DOCUMENT RESUME

ED 116 803 PS 008 282

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TITLE Transformations and Codes in Early Pretending.
INSTITUTION Yale Univ., New Haven, Conn.
SPONS AGENCY Office of Child Development (DHEW), Washington, D.C.
PUB DATE Sep 74
NOTE 37p.; A briefer version of this paper was presented at the Annual Meeting of the American Psychological Association (82nd, New Orleans, Louisiana, Aug. 30-Sept. 3, 1974)

EDRS PRICE MF-$0.76 HC-$1.95 Plus Postage
DESCRIPTORS *Behavior Development; Behavior Patterns; *Cognitive Development; *Early Childhood Education; *Imagination; Imitation; Infancy; *Infant Behavior; Literature Reviews; Stimulus Behavior; Toys
IDENTIFIERS Piaget (Jean); *Pretend Behavior

ABSTRACT

Evidence which suggests that pretend activities become increasingly independent of the presence of realistic objects is examined in this paper. Results of research on pretend behavior in children 1 1/2 - 2 years of age are described and analyzed. Striking changes in pretend behavior are shown to occur during the second year of life. Pretend play is treated as a paradigm for understanding how children represent objects and relations. It is argued that the child can pretend that one thing is another when he can represent objects (or object activities) as prototypes and when he can use the core properties of prototypes to transform representations of immediate physical stimulation. The analysis suggests a three-phase sequence in the development of pretending based on a progression from the analogue mapping of representations to the selection and, eventually, the production of the core properties of object representations. (Author/ED)

Transformations and Codes in Early Pretending

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Abstract

Pretend behaviors show striking changes during the second year of life. Of special interest are the cognitive implications of early pretending, especially with regard to the development of representational thinking. The paper examines evidence which suggests that pretend activities become increasingly independent of the presence of realistic objects. It is argued that the child can pretend that one thing is another when he can represent objects (or object activities) as prototypes and when he can use the core properties of prototypes to transform representations of immediate physical stimulation. The analysis suggested a three-phase sequence in the development of pretending based on a progression from the analogue mapping of representations to the selection and, eventually, the production of the core properties of object representations.

Transformations and Codes in Early Pretending[1]

The second year of life marks the appearance of a remarkable phenomenon--pretend play. The early forms of pretend behaviors are striking because they seem to parody the practical activities of daily life (Valentine, 1937; Piaget, 1962; Sinclair, 1970; Inhelder, Lezine, Sinclair & Stambak, 1972). At about 12 months of age pretend activities involve familiar and well-practiced behaviors detached from their customary context--the child tilts his head back as he drinks out of an empty cup, or closes his eyes pretending to sleep without actually doing so. The sensory-motor contours of an activity are preserved, often with the inclusion of fine details such as sipping and swallowing. In these early forms, the things used in play are typically ordinary household objects and the child enacts eating or sleeping in the absence of any apparent desire for food or sleep. By 18 months of age, pretending acquires two new characteristics. First, it comes to include activities directed toward others--the child might pretend to feed his mother, a doll, or a toy animal (Inhelder et al, 1972). Second, pretend play becomes increasingly independent of the features of immediate stimulation--an inanimate object (doll or stick) might be treated as if it were animate, and a great many things (shells, sticks, boxes) might be treated as if they were cups, spoons or beds. Indeed, with age pretend activities become increasingly independent of the presence of physical objects--the child might create an imaginary person (Piaget, 1962) or an imaginary object (Overton & Jackson, 1972). It is the "as if" transformational structure of pretending--from the earliest role shifts and object substitutions to the elaborate dramatic

themes and imaginary creations of older children--which justifies its classification as a form of symbolic activity. As such, structural changes in pretending seem to mark the acquisition of representational and symbolic processes (cf. Werner & Kaplan, 1969; Furth, 1969; Paivio, 1971). For the most part, however, speculations about the cognitive and developmental aspects of pretend behavior have rested on descriptive data regarding its phenomenological features (cf. Stern, 1924; K. Bühler, 1930; Piaget, 1962). Recent studies provide more systematic evidence concerning the implications of pretend activities for an analysis of early representational processes. The present paper examines changes in the organization of pretend activities which bear upon a theory of early representational thought.

Object transformations

Early investigators were especially struck by the way a pretending child is able to use one object as if it were something else. However, whether a child will do so is related to the type of materials available to him. For example, Pulaski (1973) contrasted "highly structured" and "minimally structured" toys. Toys in the first group were detailed dolls and trucks, whereas toys in the second group were clay and blocks. Phillips (1945) used the term "realistic" to describe the difference between a set of doll house toys which were miniature replicas of household furniture and another set made up of blocks of equivalent shape and size. The results of both studies indicate that children from four to eight years of age produce a greater variety of pretend themes when the toys are less structured (or less realistic). Thus, materials which unambiguously announce what they are tend to direct and constrain pretend themes whereas more ambiguous materials make it easier for older children to improvise themes of their own. However, not all children

find less structured materials conducive to improvisation. Markey (1935) noted that the play of the younger children in a group of 22- to 50-month-olds was dominated by the physical properties and functions of the materials they were using, while it was the older children who adapted materials to the themes and purposes of play. Smilansky (1968) noted a similar difference between the play of middle class and lower class disadvantaged kindergarten children. The pretend play of the disadvantaged children was linked to detailed toy replicas of things such as dolls, beds, or trucks whereas middle class children used a variety of things such as sticks, blocks, and boxes to represent such objects.

In what sense were the objects in these studies more or less "structured," or more or less "realistic?" The question poses three separable problems having to do with what the child knows, how he knows it, and the semantics of the labels used to identify the experimental variable. An obvious, though complicated, possibility is that the objects varied in their resemblances to familiar, ordinary things. A truck which is like a truck is likely to be treated as a truck, whereas a more ambiguous object (block or box) can be treated as a variety of things, including a truck. But the very terms of this statement contain some presuppositions regarding the child's competence--for example, in some order, the child is credited with being able to represent a truck, to produce a mental alignment between that representation and an immediately present object, to understand how a truck is to be treated, and, finally, to impose that treatment on like and unlike objects (with all the intervening abilities that are implied when he does so). It is becoming increasingly useful to conceptualize representations as prototypes (Rosch, in press) which is tantamount to the radical but plausible (cf. Attneave, 1974) assertion that an object in the immediate environment "is" a truck, a

baby, or a stick to the degree that it conforms to a child's focal concept of a "truck," "baby," or "stick." If so, children's response to variations in "likeness" might be used to probe the status of children's representations, and, more importantly, to examine the processes involved when children use "un-like" materials as if they were "likenesses." Although terminology is a matter of personal preference, in the remainder of this discussion the term "highly prototypical" will be used to designate "like" objects; and the term "less prototypical" will be used to designate "less-like" or "un-like" objects.[2]

A recent study of children between the ages of 20 and 26 months (Fein & Robertson, 1974) hypothesized that in younger children the relation between materials and pretending would be the reverse of that found in older children: that highly prototypical objects--cup-like cups, truck-like trucks, doll-like dolls--would enhance pretending whereas less prototypical materials would depress it. Furthermore, children's ability to deal with less prototypical objects was expected to increase within this age range. Ideally, the curves should begin to converge, especially on measures of thematic variety.

In contructing the two toy sets, a highly prototypical object was roughly paired with a box, a cup-like cup was paired with a plastic container, a detailed toy telephone was paired with a telephone made up of a toilet paper tube and a block, a doll-like baby doll was paired with a gingerbread man, and so on for the 13 contrasting objects which made up each toy set. Adults were asked to rank the pairs (on a scale from 1-13) according to the degree of similarity between the highly prototypical standard and its less prototypical counterpart. The rankings provided a rough estimate of the degree of prototypical variation represented by each pair as judged by adults. If distance

from a prototype is an influential factor in the pretend-activities of young children, the adults' ratings and the children's play with these objects should be correlated.

Twenty-eight children (7 boys and 7 girls at each age level) were observed in their own homes on two occasions. On each visit, the children played with each toy set (balanced for presentation order over visits) for 10 minutes. Pretend activities were defined as those which (a) involved treating something inanimate as though it were animate (feeding a doll), (b) resembled a practical activity but occurred in the absence of necessary materials (drinking from an empty bottle), (c) were not carried through to their usual outcome (putting on a hat, but not going outside; closing eyes, but not sleeping), or (d) were typically performed by someone else (brushing hair, dialing a telephone).[3] In order to introduce common themes across toy sets, the adult experimenter made five play suggestions (e.g., "feed the baby," "take the baby for a ride,") at specified time intervals and in a fixed sequence.

The results indicate that at 20 months children pretended more with highly prototypical objects than less prototypical objects and that between 20 and 26 months, their ability to pretend with less prototypical materials increased. An unfortunate complication--sex differences--appeared with the highly prototypical materials. Between 20 and 26 months, the pretending of girls almost doubled, whereas the pretending ob boys declined. Although girls pretended more than boys with less prototypical materials, there was a parallel increase between 20 and 26 months (see Figure 1). Measures of frequency and variation in pretend yielded similar results and were highly correlated.

Figure 1 about here

An encouraging finding was that children's pretending was significantly correlated with adult ratings of within-pair similarity. In other words, "structure," "realisticness" or, in our terms, "prototypicalness" may have to do with the degree to which the properties of a play object resemble those of a standard representation. What is truly remarkable, is the possibility that the child's representation of a prototypical "cup," "truck," or "baby" might come to be similar to an adult's sometime during the second year of life. Although the play situation included a participating adult, age changes are consistent with the observational literature on spontaneous pretend activities.

Suggestions made during the play episodes were designed to evoke comparable activities across the two toy sets and to align the task given the adult raters with the task given the children. However, with the intrusions of an unfamiliar adult, pretend activities might reflect children's willingness to go along with an adult's suggestion rather than their capacity to treat one thing as if it were another. Suppose that there is an interplay between what a child knows about how an object can be used and an adult's suggestions about what to do with it. When the suggestions are congruent with what the child knows, the object might determine the activity far more than the adult's suggestion. In contrast, when the suggestion does not fit what the child knows about an object, pretending might be determined by the child's willingness to play the adult's game even though the child comprehends the purpose of the game but dimly, if at all.

In a follow up laboratory study (Fein & Diamond, 1974), we examined the possibility that children's unwillingness to comply with the suggestions of a stranger could account for the low level of play with less prototypical toys.

The study involved 30 children randomly assigned to two experimenter conditions (Familiar adult and Unfamiliar adult). The children played with each toy set for 12 minutes. In order to establish a baseline level, the experimenter made no suggestions during the first 4 minutes. As in the first study, five suggestions were made over the next 8 minutes.

Changes in pretend activities over successive time periods for adult and toy conditions are plotted in Figure 2. First, consider what happens when suggestions are made by a familiar adult. Under this condition, play with highly prototypical objects is enhanced, whereas play with less prototypical objects is depressed. Note also that there are apparently enough

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Figure 2 about here

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pretend possibilities in the less prototypical set so that during the 4-minute period prior to the adult's suggestions, the two toy sets do not evoke different levels of pretend play. Differences between the toy sets also appear when the children are with an unfamiliar experimenter. However, in contrast to the effect of a familiar person, suggestions from an unfamiliar person depresses children's play even with highly prototypical objects. Thus, although the distinction between willingness and competence may be relevant in the analys s of pretend play, the child's feelings about an adult does not account for the influence of toy type variations. In addition, the study found sex differences similar to those reported by Fein & Robertson (1974) for 20-month-olds. Girls pretended more than boys with less prototypical objects, and sex differences were not significant with highly prototypical objects.

In sum, the objects most likely to support pretending in young children tend to be those most similar to the objects of daily life. With age, the child's dependency on highly prototypical objects declines, and pretend schemes are extended to a wide variety of things. The child's tendency to use one thing as if it were another appears to reflect a process which shows a substantial change during the second year of life. Moreover, the pattern of sex differences, especially with respect to highly prototypical toys, suggests that the process responsible for sex-stereotyping becomes effective between 20 and 26 months (cf. Pintler, Phillips, & Sears, 1946). Although boy toys (such as trucks) and neutral objects (such as telephones) were used in the toy sets, the predominant form of pretend play during the second year of life concerns familiar household activities. Findings from a pilot study suggest that between 12 and 18 months sex differences appear only when children play with their mothers and that it is the 18-month-old girls who show the highest levels of pretending under these circumstances. Sex differences do not appear in the early forms of pretending; for example, in self-directed activities such as drinking out of an empty cup. Rather, they appear in pretend forms which involve role enactments, such as feeding a doll with an empty cup.

What about the process underlying the relation between materials and pretending? One possibility is that, in early pretending, children's notion of activities such as drinking or sleeping is applied only to objects which exhibit a set of particular features (e.g., a handle, concavity, solidity, and roundness, for cup). With age, criterial requirements are relaxed so that the child demands less of a given stimulus array, and an activity can be performed

on objects which exhibit fewer or modified features. Although the change might be considered a case of "stimulus generalization," to do so involves attributing the ability to identify objects according to well-specified, intersecting dimensions to children during the earliest stages of pretend play. Then, to account for generalization, it would be necessary to choose between the child's selection or deletion of dimensions and his response to variation within a dimension. Furthermore, with age, children become increasingly able to create imaginary objects in the absence of an eliciting stimulus object--a body part might be shaped to simulate a cup, or a cup might be created by the gesture of holding one. In view of the developmental course of pretend activities, stimulus generalization implies that as children grow older they become less able to differentiate objects in their environment, more confused regarding the actual presence or absence of things, or less informed about whether particular objects are really capable of eating, sleeping, holding liquid, or traveling on a highway. Since, in the past, the concept of stimulus generalization has required the introduction of complex cognitive processes in order to account for relatively simple phenomena, (cf. Reese, 1968, for a review and analysis of transposition studies), its parsimony as an explanatory (rather than descriptive) concept is debatable.

Let us assume, for the moment, that by two years of age, the child who feeds a horse-like toy horse with a cup-like cup knows that real animals eat and that a cup is to drink from. A proposed scheme for a child pretending to feed a toy horse with an empty cup is illustrated in Figure 3 (Fein, in press). Pretend schemes are functional in so far as the child is able to behave as if he were attributing living functions to an inanimate object, adding liquid to an empty cup and, importantly, establishing the relation

between horse and cup. In a sense neither the horse (a toy) nor the cup (empty) are "real" but the child can "feed the horse" with little difficulty.

Figure 3 about here

Now suppose these highly prototypical objects are replaced by less prototypical counterparts.[4] In order to deal with materials which are neither horse-like nor cup-like the child must be able to initiate a pretend scheme while ignoring some (or all) properties of the immediate objects. In the present paper, the term transformation is used to designate the process which mediates such behavior and permits one object (a less prototypical object) to be used as if it were another (a highly prototypical object). Note that three categories of transformations are presented in Figure 3: the shift from self to other (the child who is usually fed by another becomes the one who feeds), the transformation of an inanimate object into an animate one (horse shape into horse) and the transformation of one inanimate object into another (a shell into a cup). In the above example, the relation "feeding/eating" would require two transformations by the child if both the "horse" and the "cup" were neither horse-like nor cup-like. Suppose pretending in young children depends on the number of transformations necessary to produce a relation (such as "horse eats from cup"). The hypothesis is that within a given relation ("x eats from y"), pretending in young children will vary as a function of the number of substitutions (x' for x, y' for y) presented to them. Two of the categories diagramed in Figure 3 are open to experimental manipulation: a less prototypical cup (or horse) can be substituted for a highly prototypical one. Substitutions can occur singly or jointly.

In a recent laboratory study (Fein, in press), two-year-olds were given the problem of "feeding the horse" under either single or double substitution conditions. Baseline trials with highly prototypical objects were followed by substitution trials with less prototypical materials. The proportion of children who responded correctly (i.e., fed the horse) on baseline trials and in each substitution condition is shown in Table 1. The prediction that a double substitution would be more difficult than single substitutions and, therefore, would show the lowest level of performance was supported.

Table 1 about here

Apparently children manage single substitutions when one or another part of the relation is anchored by a likeness. The results suggest that for two-year-olds, the relations x : y as x′ : y; or, x : y as x : y′ are easier to complete than x : y as x′ : y′.

When two categories of objects (x and y) appear in relation to one another (in this case, the relation is the act of eating) a highly prototypical x (horse) or y (cup) may facilitate the classification of y′ as y or x′ as x. If so, the paradigm might illustrate how the domain of a prototype (of horse or cup) becomes extended, or in other terms, how the category represented by a focal concept becomes enlarged. Three principles may be that (1) by two years of age, the child has acquired schematic representations of familiar objects, (2) things are typically represented in relation to other things (horse in relation to cup) and not as discrete, isolated events, and (3) the domain of a category becomes enlarged when its entry into an anchored relation requires some modification. When the child establishes the relation "horse eats from cup," he has attained

a prototypical frame into which can be fitted either a less-like horse or a less-like cup, provided that one part of the relation is sufficiently anchored. The scheme also suggests that the child's capacity to transform object prototypes as "pretend" might be an extreme expression of a category formation process which plays at the fuzzy boundaries where an object can be "a sort of" in some respects, but not others; symbolically, but not "really."

Forms of play and pretending

A recent observational study by Inhelder, Lezine, Sinclair & Stambak (1972) posited that during the second year of life other play activities should show changes which parallel children's increasing tendency to pretend. Suppose non-pretend activities are classified according to their structural characteristics. In a Piagetian taxonomy, one-object activities would be the most primitive. The child simply applies sensory-motor schemas such as pushing, pulling, throwing, waving to a single object. At a somewhat more advanced level, children examine the parts of objects (wheels, knobs) and place two objects in relation to one another (i.e., on top of, into, next to) often governed by functional appropriateness (cup on top of table, spoon into cup). Presumably, these activities reflect the child's organization of topological spatial relations--both the relation of a distinctive part to the whole and the relation of one object to another. Finally, the child comes to acknowledge other characteristics of objects (e.g., roundness) and to use these characteristics in his organization of them. It is at this level that he is able to solve form board problems or put rings on a stacking pole. It is also at this time that the child begins to build towers and rows in which similar objects are systematically ordered with respect to common features.

As Denney (1972) noted, two-year-olds in a free classification task put similar things together by building a tower rather than by forming a proximity grouping. It should be noted that age norms for items on infant developmental tests (cf. Bayley, 1969) seem to follow such a taxonomy. From a developmental perspective, the striking phenomenon is that prior to a certain time, the task of putting a round form into a round hole simply doesn't make sense to the child. The observations of Inhelder et al. suggest a developmental progression in which representational schemes interact with operational schemes (Piaget & Inhelder, 1971). The child initially performs distinctive action routines on an object treated as if it were a distinctive, undifferentiated pattern, unrelated at any given time to other objects in the array. As individual object patterns become decomposed and dimensionalized, new patterns of "objects-in-relation" can be constructed by way of special combining activities which can be applied iteratively. A new way of representing objects is thus associated with a new way of organizing relations between objects.

The leap in pretending which appears during the second year may be associated with the child's ability to deal with the dimensions of objects in either a functional context (the rings of a stack toy can be eaten like a doughnut) or in a "putting into relation" context (round rings go on a round pole). At least observers have repeatedly noted (Stern, 1924; Furth, 1969) that the pretend transformations of young children seem linked to the properties of an immediate object (e.g., roundness, concavity, handle) which enhance the likelihood that it will be treated as a particular something else (e.g., a cup). If, as Piagetians claim, activity-object representations are initially acquired through imitation (i.e., the figurative aspects of intelligence), the develop-

ment of pretend substitutions would seem to depend upon the functioning of a second, more sophisticated process (i.e., the operative aspects of intelligence) which can break down, code and combine the central elements of activity-object representations.

The linkages between general cognitive structures and pretend enactments are of considerable interest to an interpretation of the changing form of pretend play as an index of cognitive sophistication rather than cognitive deficiency. The young child may not always be certain that a given object or an imaginary object is not the "real" thing, and it may also be that, paradoxically, pretend activities serve to clarify the boundaries between "real" and "not real." However, the Inhelder et al. observations suggest that by 18 months the child has acquired an impressive amount of information about how objects in the world go with some activities and not with others. The relation between pretend activities and other indices of cognitive development, and especially the connections suggested by Inhelder et al. is an important issue in the formulation of theoretical statements about the processes which permit young children to develop the complex structures of pretend games.

Transformations and codes.

What are the implications of the existing evidence for a theory of pretending? Several possibilities which have a contemporary ring can be found in the speculations of early investigators. Among others, Stern (1924) suggested that in pretend transformations the child selects features which are shared by the physically present object and the imagined one while overlooking the differences. "Thinking by analogy" was the process proposed by

Griffiths (1935) and other theorists (C. Bühler, 1935; K. Bühler, 1930) to account for the way relations are preserved over a wide range of objects. The selection of particular properties becomes possible when the child has constructed stable internal representations of familiar objects and activities. Presumably, these representations are multi-modal patterns which store the salient aspects of kinesthetic, visual, tactile and auditory events. It has also been suggested that pretending reflects the child's ability to represent a class of objects in addition to particular objects; that the child's representations become somewhat idealized prototypes or templates (C. Bühler, 1935) or familiar experiences. For example, exposure to many instances of "something to drink from" would set up a conceptual type, a central organized core of properties or features which represent "cupness." A similar structure has been proposed by Piaget (1966) and elaborated by Furth (1969) although to these authors the central core of a representation is derived from imitation and is primarily motoric and kinesthetic. The routinized actions of drinking constitute the core of the image around which "things to drink from" and "drinkers" become embedded; prototypical actions incorporate objects, so that representations are essentially schematized "objects in action." The ikonic mode of representation discussed by Bruner, Oliver, & Greenfield (1966) also assumes a schematic core, although the core is derived from perception rather than action.

In what way might drinking from a cup-like cup differ from drinking from a shell? The early forms of pretending would involve a global likening of objects in the environment to a mental representation rather than a detailed feature by feature analysis (Griffiths, 1935). A pretend behavior can occur when sufficient pattern equivalence is established. When the child pretends

to drink from a cup-like cup, the likeness between the child's mental representation of "cup" (whether of object or of object-in-action) and the immediate object (or the child's representation of the immediate object) is supported by several properties of the immediate stimulus field and the pretend enactment requires few selections or analogic extensions. Relatively little transformational activity is necessary. In a sense, the child is merely expressing what he knows about how an object can be used (Preyer, 1888; Piaget, 1962) detached from the practical context in which he typically uses it. The behavior expresses a functional concept which no longer requires a functional context (hunger or food) to be activated. Although the notion of analogy was used loosely and descriptively by early investigators, analogue processes have recently received serious attention from cognitive theorists (cf. Attneave, 1974[5]). The virtue of an analogue model is that it assumes that objects are coded in one way and relations in another. In such a model, the sensory events, "baby drinking from cup," would be projected onto a representational map which preserves the structure of objects and relations. The relations might be felt activities or perceived activities (i.e., spatial and temporal changes in the relative locations of objects For the most part, an analogue model is consistent with Piaget's notions regarding the figurative aspects of thinking in which the formation of representations is derived from imitation, and the interpretation of representations is based on sensory-motor schemes. The 12-month-old knows what a cup looks like and he knows how it is used. The first phase of pretending, then, might rest upon analogue processes in which events (e) are mapped onto stimulus representations (sr), mapped onto prototype representations (pr),

Phase 1: $X_e : Y_e$ as $X_{sr} : Y_{sr}$ as $X_{pr} : Y_{pr}$

What, then, might be the process underlying pretend enactments in which one thing is used as if it were another? Suppose the child feeds a shape with a shell. The implication of early theorizing is that the analogy has become extended by a process which can decompose representations into their core properties. In terms of current formulations, a digital descriptive process intervenes to select, and, in a sense, to transform the information represented represented on the immediate map of stick and shell by way of the core properties of a prototype representation of "baby" in relation to "cup." At a transitional point, highly prototypical objects might function as an anchoring frame which supports the selection of relevant properties. Although at two years of age the selection process is dependent on anchor supports, the need for an anchor should lessen with age as selective processes become established. Phase 2 in the development of pretend activities thus seems to reflect the addition of a process which decomposes and codes the core properties of prototype representations and applies the coding scheme to representations of objects in an immediate stimulus array.

Phase 2: $X_{pr} : Y_{pr} \xrightarrow{\text{selection}} X'_{pr} : Y'_{pr}$ as $X'_{sr} : Y'_{sr}$ as $Y'_{e} : Y'_{e}$

At its most advanced level, pretending seems to involve a third process. One of the remarkable characteristics of the behavior of older children is that they are able to "produce" an imaginary object using a body part or gesture. The child might shape his hand to form a cup or curve his fingers to hold one (Overton & Jackson, 1973). In these later behaviors, an immediate object need not be present and pretending becomes increasingly a matter of the production of features evoked and governed by a mental scheme. Thus, in Phase 3 the child seems able to decompose representational prototypes, to select and, finally, to generate the salient characteristics of imagined objects in the

absence of external stimulation.

Phase 3: X_{pr}: $Y_{pr} \xrightarrow{\text{selection}} X'_{pr}$: $Y'_{pr} \xrightarrow{\text{productions}} X_e$: Y_e as X_{sr}: Y_{sr}

In a sense, analogue and digital processes become reciprocal: map-like representations can be decomposed and coded into properties and the code for properties can be used to generate map-like representations. The notion of reciprocity is compatible with suggestions (Piaget & Inhelder, 1971; Youniss & Dennison, 1971) that, with age, the figurative and operative aspects of thinking function together in a complementary fashion.

The preceding analysis neglects many problems (memory, images, parallel processing, and especially the details of the decomposition of X and Y), but it suggests a three-phase sequence which conforms well to observational and experimental data. Admittedly, the supporting evidence is fragmentary. However, a preliminary effort to interpret the existing evidence may serve to identify problems for future research and to suggest how the data base might be strengthened.

For example, it would be helpful to know more about how children classify objects during the second year of life. As several investigators have noted (Ricciuti, 1965; Gelman, 1972; Nelson, 1973), the analysis of young children's classifying schemes has been hampered by the problem of identifying relevant classifying behaviors, designing appropriate tasks, and presenting the stimulus dimensions that young children tend to use when grouping objects. Apparently, children between 12 and 24 months do group objects, although their classification behaviors tend to be sequential rather than spatial (Ricciuti, 1965). When young children are given sets of familiar objects (cars; eating utensils, animals), the sequencing of their activities tends to fall within category boundaries (e.g., from car to car, rather than from car to animal). When the

ability of young children to classify objects is judged by the formation of spatial groupings of complex stimulus arrays which vary according to dimensions such as color, size, or shape, the results are quite different (Inhelder & Piaget, 1964; Vygotsky, 1962; Denney, 1972). Typically, under these circumstances, young children do not form consistent spatial groupings, and when they do so, the groupings are likely to be embedded in a play activity such as building (Denney, 1972). With respect to pretend activities, it would clarify matters if we could specify the perceptual characteristics which make some objects "cup-like" and other objects "truck-like." There is some evidence that the contrast between topological and euclidian properties may be an important one in the analysis of the boundaries for words such as "cups" (cf. Labov, 1973) and in young children's spatial discriminations (Piaget & Inhelder, 1956). It may be that the three-dimensional topological properties of objects (open container-closed container) are more salient than three-dimensional euclidian properties (round container-square container) and that young children use topological properties in their early object concepts.

Thus, although limited, there is some evidence that young children apply grouping rules to objects in an immediate stimulus array. But do they retain the particular characteristics of an object when it is no longer in view and do they expect these characteristics to remain stable? Recent studies of object permanence indicate that by 18 months children will search actively for a hidden object when another has been substituted in its place (LeCompte & Gratch, 1972), a finding which suggests that children do not expect the characteristics of an object to change when it merely disappears under a screen. Even more suggestive is the possibility that children as young as three years of age conserve number (Gelman, 1972), which suggests that even younger children may have acquired some rudimentary abstract ways of organizing the

invariant aspects of reality. Although it would be mistaken to attribute adult capacities to young children, it would be equally mistaken to underestimate the extent to which young children have assembled stable and even abstract representational schemes. Evidence that young children have acquired functional categories, that under some circumstances they expect objects to stay the same, and that by the third year they may appreciate the ground rules of number, would tend to support the credibility of a three phase sequence. Whether, in addition, children's early representations of activity-object relations are similar to the prototypes described by Rosch (in press) is an empirical question of considerable importance to the phase 1 analogue process we have proposed.

Some theorists conceive of pretend activities as imitations (cf. El'Konin, 1966; 1969). However, to do so without examining the structure of the behavior may be to use a descriptive label which obscures the significance of the child's achievement. Suppose the child who feeds his mother with an empty cup is imitating what his mother has just done to him. Structurally, one might say either that "the child acts as mother" or, that "the child acts in relation to mother as mother acts in relation to child." In the former statement, the child is simply repeating the mother's activity with respect to any suitable object (cup) or any available person (mother). In the latter statement, the child is assumed to have reversed the role relations of a familiar situation (Sutton-Smith, 1966). Suppose, though, that the child's behavior might have been provoked by the presence of a cup and the mother, but nonetheless the child apparently recovers a previously observed action (from many other possibilities) and produces it as his own. Suppose, also, that the child feeds a doll (or stick) with an empty cup (or shell) or has a "mother" horse

feed a "baby" horse. The action originally borrowed from the mother has become embedded in a system of extensions considerably removed from the originally observed event. At the very least, one would have to posit some intervening representational process which permits the child to establish an equivalence between someone else's behavior and his own and which is then applied to new situations. The child's notion of a mothering role might be bounded by what he knows about the activities of real mothers (mother is what mother does). If, as Piaget suggests, the core of focal concepts comes from activity based relationships, one would expect the functional aspects of role representations to be circumscribed by the child's experiences as observer and participant. By three years of age children coordinate activity sequences of "cooking" (stirring, pouring, scooping from empty pots and pans), feeding, grooming and toileting a doll or toy animal, talking on a toy phone and so forth. With sufficient longitudinal data, it should be possible to trace back in time the history of individual activity elements which at older ages are part of complex pretend scenes. One would expect to find that role elaboration as if appears in play involves the integration of familiar activities rather than the invention of new ones.

It is noteworthy that current theorists generally prefer the term modeling to imitation, and that the shift in terminology has been accompanied by the positing of a symbolic function of some sort to account for many modeling phenomena (cf. Bandura, 1974). Although the distance between cognitive theorists (such as Piaget) and social learning theorists is thereby considerably reduced, the positions can still be contrasted. For example, according to a cognitive position, modeling should not facilitate the tendency for young children to treat one thing as if it were another. For example, if a modeling condition were added to the studies reported by Fein & Diamond (1974)

or Fein (in press), one would expect the facilitative influence of a model using less prototypical materials to increase substantially between two and four years of age and to be linked to the tendency to substitute objects in the absence of a model.

In the present paper, pretend play is treated as a paradigm for understanding how children represent objects and relations. The paradigm contrasts two processes--one which maps representations and another which codes and transforms them. The linkages between children's cognitive abilities and the structure of pretending are presented in a three phase developmental sequence. Pivotal questions hinge on whether early pretend behavior merely reflects the young child's tendency to copy coupled with his confusion over the nature of physical events. Karl Buhler once asked: would the child be surprised if the stick he were feeding began to cry? If the child were hungry, would he be satisfied to drink from an empty cup? To the extent that early pretend games stress the familiar, routinized activities of daily life and the objects typically associated with these activities, it is tempting to credit the child with some clear notions about what things are and how they are supposed to be used. But how and when children distinguish "real" from "pretend" is an empirical question, of interest because it asks whether the child represents both the stick as a stick and the stick as a baby, whether "real" representations and "as if" representations co-occur.

There is, of course, a difference between the use of pretend play as a paradigm for studying early cognitive development and a theory of pretending. However, an understanding of the cognitive substrate may be necessary to illuminate why children play pretend games, how pretend games come to reflect social conflicts and values, or how children benefit from such games.

References

Attneave, F. How do you know? American Psychologist. 1974, 29, 493-499.

Bandura, A. Behavior theory and the models of man. American Psychologist, 1974, 29, 859-869.

Bruner, J. S.; Oliver, R. R.; & Greenfield, P. M. Studies in cognitive growth. New York: Wiley, 1966.

Buhler, C. From birth to maturity. London: Routledge & Kegan Paul, 1935.

Buhler, K. The imagination of the child at play. In The mental development of the child. New York: Harcourt, Brace & Co., 1930.

Cassirer, E. The philosophy of symbolic forms. New Haven: Yale University Press, 1957.

Denney, N. W. A developmental study of free classification in children. Child Development, 1972, 43, 221-232.

El'Konin, D. B. Some results of the study of the psychological development of preschool-age children. In M. Cole & I. Maltzman (Eds.), A handbook of contemporary Soviet psychology. New York: Basic Books, 1969, 163-208.

Fein, G. A transformational analysis of pretending. Developmental Psychology, in press.

Fein, G., & Diamond, E. The influence of toy type and adult familiarity on the pretend play of 22-month-olds. Yale University, 1974.

Fein G., & Robertson, A. Cognitive and social dimensions of pretending in two-year-olds. Yale University, 1974.

Furth, H. G. Piaget and knowledge. Englewood Cliffs: Prentice-Hall, 1969.

Gelman, R. Logical capacity of very young children: Number invariance rules. Child Development, 1972, 43, 75-90.

Griffiths, R. A study of imagination in early childhood. London: Kegan Paul, 1935.

Inhelder, B.; Lezine, I.; Sinclair, H.; & Stambak, M. Les debut de la function symbolique. Archives de Psychologie, 1972, 41, 187-243.

Inhelder, B., & Piaget, J. The early growth of logic in the child. London: Routledge & Kegan Paul, 1964.

Labov, W. Boundaries of words and their meanings. In R. Shuy and C. J. Bailey (Eds.), New ways of analyzing variations in English. Washington, D. C.: Georgetown University Press, 1973.

LeCompte, G. K., & Gratch, G. Violation of a rule as a method of diagnosing infants' levels of object concept. Child Development, 1972, 43, 385-396.

Markey, F. V. Imaginative behavior of preschool children. Child Development Monographs, 1935, No. 18.

Masters, J. C., & Wellman, H. W. The study of human infant attachment: A procedural critique. Psychological Bulletin, 1974, 81, 218-237.

Messer, S. B., & Lewis, M. Social class and sex differences in the attachment and play behavior of the year-old infant. Merrill-Palmer Quarterly, 1972, 18, 295-306.

Nelson, K. Some evidence for the cognitive primacy of categorization and its functional basis. Merrill-Palmer Quarterly, 1973, 19, 21-40.

Nelson, K. Structure and strategy in learning to talk. Monographs of the Society for Research in Child Development, 1973, 38 (Serial No. 149).

Overton, W. F., & Jackson, J. P. The representation of imagined objects in action sequences: A developmental study. Child Development, 1973, 44, 309-314.

Paivio, A. Imagery and verbal processes. New York: Holt, Rinehart & Winston, 1971.

Phillips, R. Doll play as a function of the realism of the materials and the length of the experimental session. Child Development, 1945, 16, 123-143.

Piaget, J. Play, dreams and imitation in childhood. New York: Norton, 1962.

Piaget, J. "Response to Brian Sutton-Smith." Psychological Review, 1966, 73, 111-112.

Piaget, J., & Inhelder, B. The child's conception of space. London: Routledge & Kegan Paul, 1956.

Piaget, J., & Inhelder, B. Mental imagery in the child. New York: Basic Books, 1971.

Pintler, M. H.; Phillips, R.; & Sears, R. Sex differences in the projective doll play of preschool children. Journal of Psychology, 1946, 21, 73-80.

Preyer, W. The mind of the child. International Education Service, 1888 (German edition, 1895).

Pulaski, M. A. Toys and imaginative play. In J. L. Singer (Ed.), The child's world of make-believe. New York: Academic Press, 1973.

Reese, H. W. The perception of stimulus-relations: Discrimination learning and transposition. New York: Academic Press, 1968.

Ricciuti, H. Object grouping and selective ordering behavior in infants 12-24 months old. Merrill-Palmer Quarterly, 1965, 11, 129-148.

Rosch, E. Universals and cultural specifics in human categorization. In R. Breslin, S. Bochner, & W. Lonner (Eds.), Cross-cultural perspectives in learning. Sage Press, in press.

Sinclair, H. The transition from senso-y motor behavior to symbolic activity. Interchange, 1970, 1, 119-129.

Smilansky, S. The effects of sociodramatic play on disadvantaged preschool children. New York: Wiley, 1968.

Stern, W. Psychology of early childhood. New York: Henry Holt and Co., 1924.

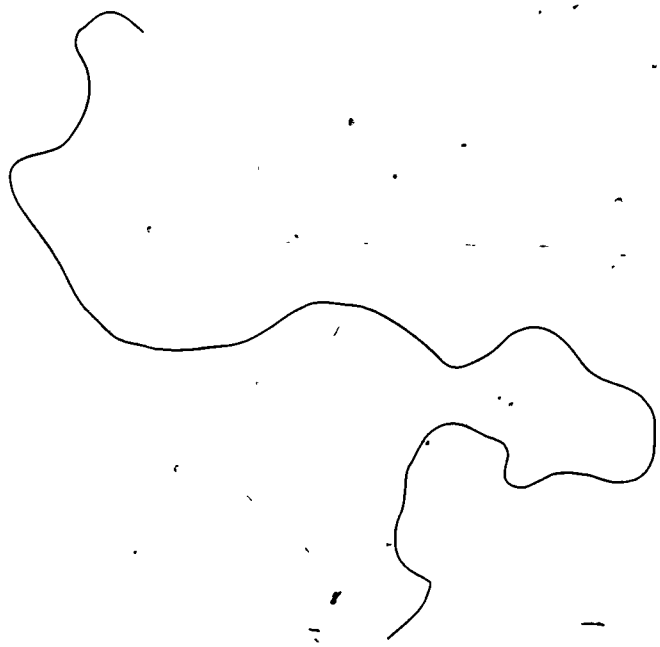
Sutton-Smith, B. Role replication and reversal in play. Merrill-Palmer Quarterly, 1966, 12, 285-298.

Valentine, C. W. A study of the beginnings and significance of play in infancy. British Journal of Educational Psychology, 1937, 7, 285-306.

Vygotsky, L. S. Thought and language. Cambridge, Mass.: MIT Press, 1962.

Werner, H., & Kaplan, B., Symbol formation. New York: Wiley, 1964.

Youniss, J., & Dennison, A. Figurative and operative aspects of children's ingerence. Child Development, 1971, 42, 1837-1847.



Footnotes

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[1]This work was supported by the Office of Child Development, Project No. OCD-CB-98. A briefer version of this paper was presented at the American Psychological Association meetings, New Orleans, September, 1974. The author is grateful to William Kessen for his critical reading of the manuscript.

[2]These terms imply a dimension which necessarily creates problems having to do with intra-dimensional categories (e.g., structured-unstructured, real-unreal, prototypical-unprototypical), category metrics, and category boundaries (Cassirer, 1957; Labov, 1973).

[3]The criteria for pretend activities were similar in all studies reported in the present paper. Observer agreement for studies which took place in the home were determined from four 20-minute filmed play sequences. For studies which took place in the laboratory, reliability estimates were based on the scores of two observers located behind a one-way viewing window. Observer agreement (calculated as the proportion of the number of agreements to the total number of agreements plus disagreements for each unit of coded behavior) ranged from 87% to 95%.

[4]In order to simplify the analysis, "prototypicalness" was unitized according to adult ratings of prototype distance. In this way, substitutions across categories were roughly equivalent.

[5]Attneave (1974) examines evidence from adults which suggests that one phase in the processing of events involves an analogue transformation of sensory stimulation into map-like structures which represent objects and relations. A second phase involves digital processes which describe the objects and relations coded on the map. We have used Attneave's formulation because it expresses distinctions similar to observed changes in pretend play.

TABLE 1

Proportion of Children Who Respond Correctly

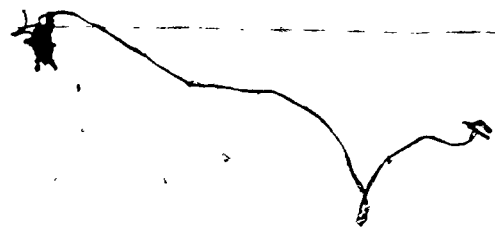
on Baseline and Substitution Trials

	Substitution Condition		
	Single (IA) (cup)	Single (IB) (horse)	Double (II) (cup & horse)
Baseline Trials[a]	.93	.92	.94
Substitution Trials	.79	.61	.33
N[b]	14	13	18

[a]On baseline trials, children were asked to feed the horse with highly prototypical objects.

[b]3 children (2 in Condition IB and one in Condition II) never feed the horse although they pretended to feed themselves. These children were excluded from this analysis.

Figure 1 Mean scores for Pretend Frequency as a function of age, sex, and toy type.



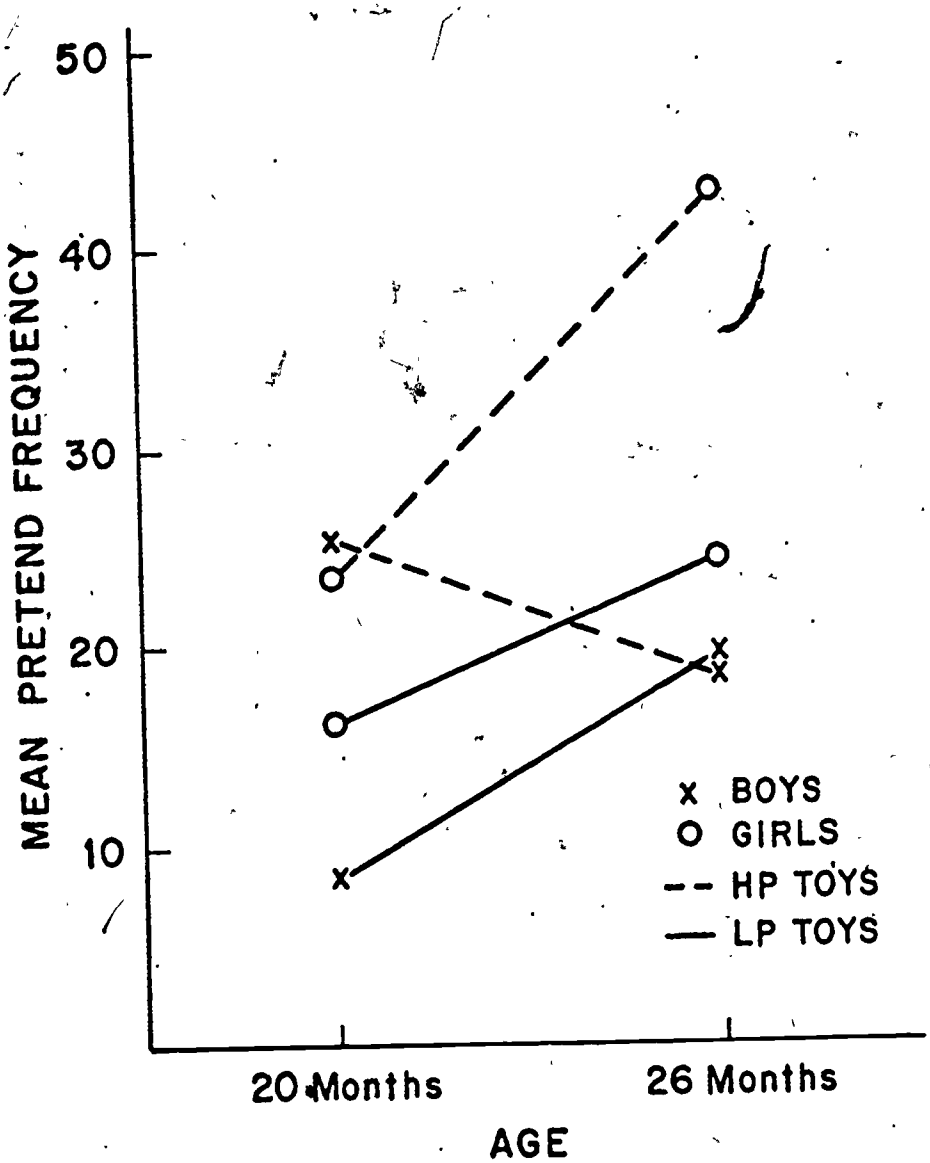

MEAN PRETEND FREQUENCY
50
40
30
20
10
20 Months
26 Months
AGE
x BOYS
O GIRLS
-- HP TOYS
— LP TOYS

Figure 2. Mean scores for Pretend Variation per 10-second interval as a function of sex and toy type.

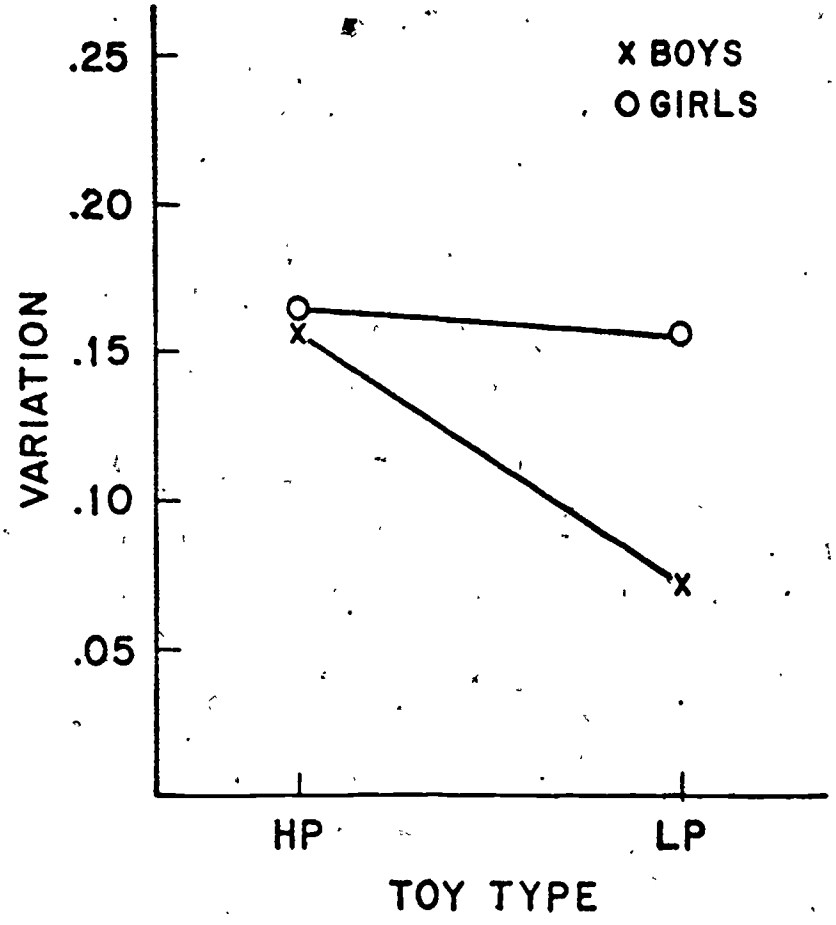
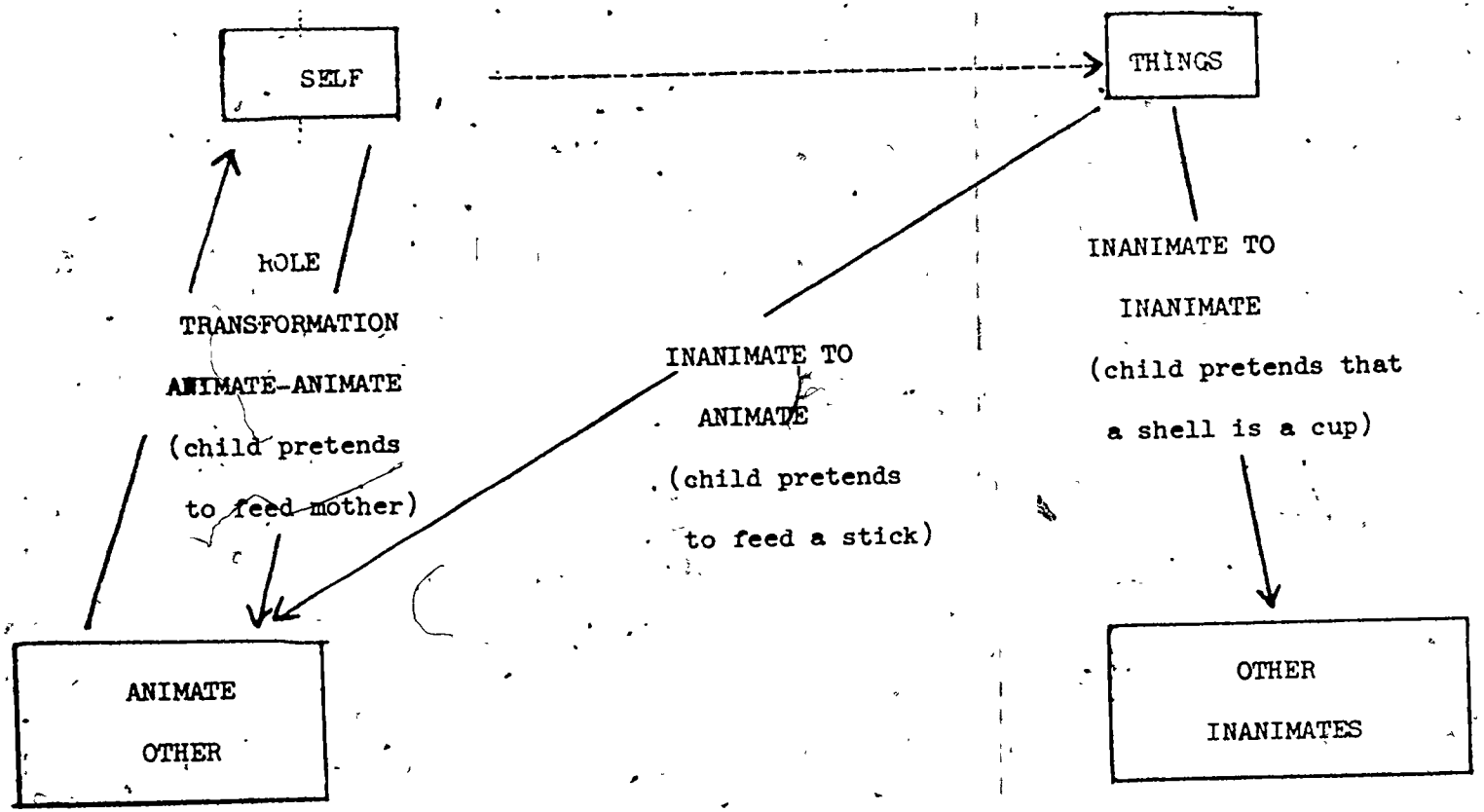

.25
.20
.15
.10
.05
VARIATION
X BOYS
O GIRLS
HP
LP
TOY TYPE

Figure 3 Transformation categories in role related pretends


SELF
THINGS
ROLE
TRANSFORMATION
ANIMATE-ANIMATE
(child pretends
to feed mother)
INANIMATE TO
ANIMATE
(child pretends
to feed a stick)
INANIMATE TO
INANIMATE
(child pretends that
a shell is a cup)
ANIMATE
OTHER
OTHER
INANIMATES