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The Relationship of Quality of Play and Intelligence in Young Children

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LOYOLA UNIVERSITY

THE RELATIONSHIP OF QUALITY OF PLAY
AND INTELLIGENCE IN YOUNG CHILDREN

A DISSERTATION

SUBMITTED TO THE GRADUATE SCHOOL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

for the degree

DOCTOR OF PHILOSOPHY

Field of Psychology

By

Constance S. Clune

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Life

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The Relationship of Quality of Play and Intelligence
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Introduction and Statement of Purpose

Theories of play growing out of the study of biology and Darwin's concept of evolution were first expounded in the mid and late nineteenth century. Play was viewed like the other main activities of living things in that it satisfied bodily needs, preserving life and the species. The universality of play and games was stressed with the hope of showing that childrens' play reproduced the phylogenetic steps of the general history of mankind (Millar, 1968).

The empirical study of play appears to have begun in the 1920s paralleling the growth of the nursery school movement in the United States. Interest expanded so that between 1930 and 1939 alone there were 70 investigations of play in the literature. These studies covered numerous aspects of personality, attitudes, games played, physical and social aspects and individual interests. Theories developed expounding the sociology, psychology, and educational implications of play (Britt, 1941; Hurlock, 1934).

Although the relationship between play and intelligence has been discussed in research literature the question of whether IQ or MA measures reflect differences in how a child plays has not been examined closely.

Jean Piaget's research clinically demonstrates developing intelligence in the way children play. But there has been very little empirical study of the relationship of play and intelligence with the exception of the numerous cross-cultural replications of Piaget's own interviews with children (Almy, 1967; Herron & Sutton-Smith, 1971).

Piaget contends that everyone goes through a symbolic play stage of development (representational intelligence) on his way toward adult intelligence. This stage corresponds roughly to the chronological ages of three to seven. But are there measurable individual differences within this stage? Would IQ or MA measure or reflect differences in elaboration, complexity, integration and originality of play?

The purpose of this research was to examine the relationship of play as generated by the child and intellectual functioning as measured by traditional tests in young children who would be expected to be in the representative intelligence stage of development.

Operationally, the quality of children's play as

measured by Foley (1962) Quality of Play (QP) Scale was studied in relation to the subjects' scores of IQ and MA obtained through the administration of the Stanford Binet and the Wechsler Preschool and Primary Scale of Intelligence (WPPSI).

A parallel purpose in this investigation was to establish construct validity for the Quality of Play Scale or refine it as a measure of intellectual functioning. In this purpose this investigation was heuristic. In a time when intelligence testing, from its basis to its implication, is the subject of intense controversy, one is hard put to justify the development of such a measure. Yet, finding a measure of intelligence (or intellectual development in Piaget's conception) through independent play activity of the child is desirable, especially for the child who cannot be assessed in the traditional manner for lack of language, cultural advantage, or ability to relate. It was hoped that this study would be the first step in the development of a quality of play test of intellectual functioning which can be extended from the normal population used here to other cultures or emotionally disturbed populations as a tool for diagnosis and an aid in planning for educational experience.

Hypothesis

The specific research hypothesis tested in this study is that the quality of play of young children, as measured by the Foley QP Scale, is linearly related to their IQs as measured by the Stanford Binet and the Wechsler Preschool and Primary Scale of Intelligence (WPPSI).

Review of Literature

The first empirical studies of play were of a descriptive nature. They showed that play interests, at least, were affected by numerous idiosyncratic variables, such as sex, the type of play materials, economic differences, child rearing practices, and intelligence.

This descriptive stage in the history of play research gave way to a causal approach, i.e., "What happens to play if such and such independent variable is introduced?" Barker, Dembo, and Lewin's (1941) study on the effects of frustration on play is a classic example of this type of research.

By the 1940s play had been given an important and firm role in the emotional and cognitive life of an individual. Britt (1941) quoted Inge: "The soul is dyed the color of its leisure thought (p. 353)." And in the formulation of a Children's Charter, the 1930 White House Conference on Child Health and Protection proclaimed:

"With the young child, his work is his play and his play is his work (p. 206)."

With this kind of thinking, play took on a new dimension. It was seen as a positive growth principle by psychologists interested in both emotional and cognitive aspects of development. Sigmund Freud (1955) explained play (and fantasy) as the means at a child's disposal to gain control and mastery over reality. In psychoanalytic terms the ego gains strength through play, mediating in a safe way between the symbols of the id and external reality (and the superego). As Peller (1952) interpreted psychoanalytic theory a child can mitigate, deny, or temporarily solve a conflict, recapture for a time the omnipotence he once believed he possessed, repeat and gradually assimilate a traumatic experience or an insult, or overcome a specific fear.

Erik Erikson and other neo-Freudian psychoanalysts have considered play activity beyond its emotional values. In Childhood and Society (1963) Erikson insisted that the purpose of play is to "hallucinate ego mastery and yet also practice it in an intermediate reality between phantasy and actuality (p. 212)." He proposed that

Child's play is the infantile form of the human ability to deal with experience by creating model situations and

to master reality by experiment and planning. It is in certain phases of his work that the adult projects past experience into dimensions which seem manageable. In the laboratory, on the stage, and on the drawing board, he relives the past and thus relives left over affects; in reconstructing the model situation, he redeems his failures and strengthens his hopes. He anticipates the future from the point of view of a corrected and shared past.

No thinker can do more and no playing child less. As William Blake put it: "The child's toys and the old man's reasons are the fruits of two seasons (p. 222)."

As Peller (1952) pointed out, solving a problem through play seems to be the opposite of finding a solution through reasoning. Thinking respects the laws of reality while play is wishful thinking, greatly ignoring the laws of reality. Yet, they are, nevertheless, both "test-acting" according to Freud's (1955) definition of thinking. It may be noted that this concept is also the basis of Klopfer's Rorschach hypothesis that subjects who achieve a good number of M responses are intelligent, having the ability to fantasize alternatives before committing themselves to the consequences of their actions.

In thinking, we pick out elements of reality and vary them; the same is done in play. Thinking is far quicker than direct action; steps taken in play can be instantaneous. Thinking requires imagination; so does play.

Things that in reality are far apart in space or time can be brought into juxtaposition in the process of reasoning, but play also overcomes the obstacles of time and space with great facility. Play, as well as reasoning, is caused by an experience that was not concluded to our complete satisfaction (Peller, 1952, p. 81).

It is along this line of consideration that Buytendyk (1934) contended that a child plays because he is a child, because his cognitive 'dynamics' do not allow any other way of behaving. Play is the child's way of thinking.

The most elaborated explanation of this view has been given by Jean Piaget who also viewed play as the inevitable result of the child's cognitive structure. With training in philosophy and an overriding interest in epistemology, Piaget has studied the intellectual development of children in the belief that the discovery of how children think at various ages will provide a logical analysis of "knowing." Piaget's theory of play is, then, closely connected with his conception of intelligence.

To Piaget, intelligence finds its fundamental explanation in the development of intelligence. Intelligence is dynamic, not fixed, not any particular knowledge or particular skill. Rather, intelligence is adaptation to the social and physical environment and is generated by them (Piaget, 1963). It is that aspect of behavior which brings

order, lawfulness, purpose, and meaning, or in Piaget's terms, structure into behavior. An individual's development is itself a process of structure or structuring of experience and is encompassed by Piaget's concept of intelligence. The activity and the end result are partial aspects of the same process. At all levels, behavior, in Piaget's view, demonstrates aspects of structuring. He identified structuring with knowing.

The unifying principle of development, the factor which internally structures the developing intelligence, is equilibration. As Furth (1969) stated, "It provides the self regulation by which intelligence develops in adapting to external and internal changes (p. 206)."

Another of Piaget's interpreters, Sigel (1969), elaborated upon this process explaining that throughout this development there is a constant interplay between the processes of assimilation and accommodation. In the former, a person uses objects and events in terms of previous idiosyncratic habits, conventions, and preferences. In accommodation, on the other hand, he takes account of the unique aspects of a new experience and makes an effort to modify or adjust himself to fit the reality. Man assimilates knowledge and makes the necessary accommodations to this new knowledge.

This relationship of the knower and the object is knowledge and Piaget's theory holds that its acquisition comes about through different cognitive modalities at different developmental levels which correspond generally to age. The preschool child, for example:

. . . is not satisfied with speaking; he must needs "play out" what he thinks and symbolize his ideas by means of gestures or objects, and represent things by imitation, drawing, and construction. In short, from the point of view of expression itself, the child at the outset is still midway between the use of collective signs and that of the individual symbol, both still being necessary, no doubt, but the second being much more so in the child than in the adult (Piaget, 1963, p. 187).

Piaget has worked with children of various ages with similar backgrounds and has identified the sequence in which an understanding of abstract structures underlying human knowledge seems to evolve. He divided the sequence into stages which are related each in its own way to equilibration and its attendant concepts of assimilation and accommodation. Assimilation and accommodation are always fused and present in all behavior. One can predominate over the other, however. In brief, when assimilation predominates, play occurs; when accommodation predominates, imitation occurs. The gradually developing equilibrium of the two emerges at the level of operational

and rational thought. In this sense, play constitutes the extreme pole of assimilation of reality to the ego, while at the same time it has something of the creative imagination which will be the motor of all future thought and even of reason (Piaget, 1962).

Several authors have helped to clarify descriptions of these developmental stages. From birth to about eighteen months is the sensory-motor period of intelligence. Starting with uncoordinated sense impressions, which are undifferentiated from his own reflex responses to them, a child gradually achieves the sense and motor coordinations and adjustments necessary to perceive and manipulate objects in space and time and see causal connections between them (Millar, 1968). During this stage, imitation and "practice play" emerge.

At the end of the second year representational preconceptual intelligence evolves, lasting until about seven years of age. It is during this period that symbolic play takes place. The child on the intellectual plane does what the Freudians discuss in regard to affect, i.e., social symbols develop to mediate between individual images and reality (Piaget, 1962).

In the third stage, from about seven to about eleven or twelve years of age, representative intelligence becomes

aided by socialization and common symbols emerge. A child plays "games with rules" and intellectually handles concrete operations (classifications, seriations, term-by-term correspondences, etc.) and abstract concepts of time and space.

The fourth stage in the development of intelligence is that of formal operations. Hypothetico-deductive logic appears. This is adaptive intelligence in the form of a more permanent equilibrium of assimilation and accommodation (Decarie, 1965).

It is the second stage of Piaget's sequence with which this paper deals. He related symbolic play and representational intelligence. Such play is intelligent behavior at this stage. The child is unaware of the disequilibrium that objectively exists between his own notions and the real world that he will come to know. Furth (1969) explained that the child apparently "does not have the need for the assimilation-accommodation equilibration of mature intelligence. The child and nature take their time (p. 213)."

In play the child in this representative stage of development repeats and organizes thinking in terms of images already mastered. During this period, make-believe play becomes progressively more elaborate and organized. The

same factors which determine intellectual development would determine the development of play.

Piaget, who is a zoologist as well as an epistemologist and psychologist, has been especially interested in the normative structures of human intelligence rather than the range of variability around a given statistical norm as is found in standardized intelligence tests. It is just these individual differences in play and intelligence with which the present study is concerned and which have been neglected within play research heretofore.

The studies relating play and intelligence in the heyday of play research (1920-1940), though empirical, were not experimental. Research in general employed purely observational, questionnaire, or checklist methodology with the use of nominal scales.

In the 1920s Terman began a long-term investigation of gifted children whose IQs fell between 140 and 200 (Terman, 1926). He investigated various aspects of the children's health, family backgrounds, personalities, and day to day life including a survey of their play interests and the kinds of games they played or knew about. Terman was interested in seeing to what extent and in what respects the play life of gifted children deviated from that of the less bright children. Twelve hundred gifted chil-

dren were compared to 474 children of the same age but whose IQ scores ranged from dull to bright, the majority being of "average" intelligence. Both groups were surveyed by means of a questionnaire and checklist and asked to rate play activities with regard to their interest in them. The data were treated to yield preference indices for each activity, i.e., ratio of a total score for a given activity to the number of children in any particular group; a mean preference index was then computed for each sex for all 1,674 children and for various age groups as well as for the two groups as differentiated by IQ. A "masculinity" index and a "maturity" index were derived in this way.

A number of differences were found between Terman's selected group and the less bright children. The gifted children showed: (a) greater interest in activities requiring thinking as opposed to physical activities; (b) a slight tendency to play alone although a good deal of time was spent with other children; (c) less of a sex preference in choice of playmates but a preference for playmates slightly older than themselves (their play was like that of older children, yielding a higher maturity index); (d) less preference for competitive games; (e) imaginary playmates and "living in imaginary countries" were common especially between the ages of two and five.

In addition, Terman used a Pearson r on the mean preference indices of activities listed for boys and girls. The correlation was consistently low for opposite sex groups even in the same IQ class and consistently high within sex groups even in different IQ classes. This seemed to indicate that sex was also a factor of differential potency in play interest and was even more influential than IQ.

Lehman and Witty (1927a, 1927b, 1928, 1930) set out on an extensive study of play trying to discover:

(i) the representative play activities commonly engaged in by persons of 5 to 22 years of age residing in certain communities; (ii) the play activities best liked by these individuals; (iii) the games and other play activities consuming the greatest amount of time; (iv) the extent to which a given child participates with other children in his play activities; (v) the effect upon play behavior of such variables as age, sex, race, season, intelligence, community, etc.

A checklist of 200 activities was developed as the Lehman Play Quiz. Subjects were to indicate by check marks in four appropriate columns the activities engaged in during the previous week, those which gave the most fun, those to which the most time was devoted and how much time

that was, and whether the children played alone or with others.

This play quiz was used with various samples. With 50 children of IQ 140 and over paired with average IQ children of like age, sex, and neighborhood environment, Lehman and Witty (1927a) decided that versatility of interest did not appear intimately associated with differences in IQ. In this and other studies done by Lehman and Witty the measures of intellectual functioning determining the intellectual category for each child were from the Kansas City, Missouri public school, i.e., Terman Group Tests and the National Intelligence Test.

In a three-year study (Lehman & Witty, 1927b) where the Lehman Play Quiz data were collected on about 15,000 city and rural individuals from ages 5 to 22 the investigators divided the play interests according to age categories and activities across all ages and concluded that play behavior, rather than being periodic from a developmental standpoint, was continuous. For example, they pointed out that 25 per cent of the individuals of ages 8-1/2 to 22 participated in the same kinds of activities. There was no consideration of the 2,000 children under the age of eight, an important consideration especially in light of current developmental theories of

cognitive structure.

Again, gifted children tended to play alone more (as Terman had found) but displayed no more versatility.

"Versatility" meant actual number of activities checked on the list with no regard for differences of kind between groups.

Using the Lehman Play Quiz again, Lehman and Witty (1927b, 1928) investigated play activity and school progress and play in relation to intelligence. Comparing six groups of children divided according to sex and three levels of intelligence -- subnormal, normal, and relatively superior -- the researchers found that the more intelligent children were more active in play and extracurricular activities than their peers. Their play was more resourceful and after the age of eight was more realistically oriented, i.e., activities such as hiking, playing an instrument, or reading. Again, it was found that the more intelligent children were more solitary in their play. In addition, it was discovered that the bright children (IQ 110-160) participated in fewer activities of a motor type. The retarded (IQ 58-93) showed less originality in their play activities, preferred games without complicated rules, and games usually enjoyed by younger children.

In line with this questionnaire method of investiga-

tion is a study by Boynton and Ford (1933) who also studied the relationship between play and intelligence. Two groups of children -- "bright" and "relatively dull" -- were compared.

It was reported that: (1) the brighter child spent about 50 minutes more a day in play than the average dull child; (2) there was no apparent difference in the amount of time spent in physical play; and (3) that bright children spent more time in mental recreation than the average dull child (about one hour per day more).

Like many of the other studies reported, however, only arithmetic calculations rather than statistical tests of significance were used and, of course, group tendencies rather than individual prediction were sought.

Although some consistent differences were found, the problems of design limit the use of the results. Retrospective responses to questionnaire items are suspect and the use of a checklist, rather than an open-ended interview, can be distorting and restrictive. Lehman and Witty used both a checklist and an open-ended questionnaire in a study (1927) and found much disparity among eight-year-olds regarding favored activities. The study pointed out the contamination of results which can occur due to poor memory and/or insufficient and inapplicable response

choices.

The invention of the one-way mirror permitted the sophistication of observing spontaneous play. This was done by Cockrell (1935) who is not cited here as a researcher of the relationship between intelligence and play, but rather as a contributor to methodology in play studies. Besides doing her own observing, she began to manipulate conditions to observe their effect on play. She observed the activity with many toys, few toys, unexpected toys, with children together, and children alone. Tabulation of the play was in the form of time graphs and activity charts (what material used, with what other children, constructively or not). Among the conclusions, pertinent to the present paper's methodology (to be discussed in the next section), were that the kinds of materials evoked differences in time spent at play and constructiveness, that preschool children were willing to play alone quite naturally in a laboratory setting, and that there were individual consistencies in play behavior although not group consistencies.

Some years later Bach (1945), hoping to develop doll play into a standardized test of personality development, attempted a scientific analysis of play fantasy. In line with Cockrell's wish to provide a quantitative technique

for the study of play, he developed a notational system for scoring experimentally induced fantasies of preschool children. It was a broad scale, recording the number of actions, whether they were stereotypical or not and whether they were thematic or tangential to the experiment scenes. Thirty-five preschool children were each given four trials with a doll-play procedure under standardized conditions. Verbalness was not stimulated. An analysis was done of the degree to which intelligence, fantasy skill, and verbal and maturity factors were related to fantasy production. It was found that the quality of fantasy and IQ, MA, CA, and vocabulary were not quite statistically significant but all had positive correlations ($r = .22, .31, .24, .30$). Also, brighter children tended to show a greater interest in play activities requiring thought and imagination than did less bright children.

Neither Cockrell nor Bach attempted any graduated measurement of quality of play or fantasy, but simply an addition of the number of times that particular kinds of behavior occurred, i.e., constructiveness (Cockrell) or nonstereotypic production (Bach).

The above studies had the investigation of play behavior as their main purpose. The researchers included the relationship of play to intelligence in a rather non-

specific way. That is, in plotting the whole behavior domain, as it were, they included intelligence as a relevant factor. Terman, of course, approached the situation in the inverse way; he was interested in intelligent individuals and it could be readily seen that play was a relevant expressive variable in that domain.

The point is that there does not appear to be another empirical study of play where its relationship to intelligence was the major focus. One basic reason for this, it would seem, is that the early research was not generated by theory nor was it intended to provide feedback which might be used to revise theory. The early theories of play as mentioned above were basically physiological in orientation and they were functional descriptions rather than causal explanations. Gilmore (1966) pointed out that the classical theories "view the specific content of play behaviors as being more or less incidental to the causes of play generally (p. 346)." It was not that they are untestable; both Hurlock (1934) and Gilmore (1966) listed problems suggested by the classical theories that could be investigated. Nevertheless, essentially no research data that came out of the early play studies were relevant to these theories. The study of play was based on a common sense approach to its significance in the life of the

individual. Thus, into the 1940s, play and its relationship to anything, including intelligence, was not viewed as a testable portion of a theory of infantile dynamics or development.

In the last 25 years, more infantile dynamics theories of play, as Piaget calls them, have developed and the relationship of play and intelligence is considered at length.

Gilmore (1966) noted, however, that although the psychoanalytic theory of play and Piaget's theory of play are well developed and explicit, based on close and careful observation, they also have, curiously enough, led to little or no research. The two main areas in which play has been studied are those of: (1) classifying leisure activity of children in different cultures and (2) observing the doll play of different children for components of various behaviors, especially aggression (Lewin & Wardwell, 1962).

Gilmore (1964) himself conducted an investigation of the effect of novelty and anxiety relevant toys in predisposing children to play. This, obviously, was not related to the aspect of intelligence in play. As Herron & Sutton-Smith (1971) recently pointed out, this field is still not notable for its scientific accumulations of

data -- "The theories have contributed practically nothing to science (p. 309)." Of the empirical research that has been done there is no straightforward study of the intelligence-play relationship. Gilmore (1966) explained this by noting that play is:

. . . a special behavior, one that will be difficult to explore for many initially unsuspected reasons. The very ambiguity of the term "play," the uncertainty as to just how different behavior may be to still qualify as "play" will constantly work to divide and confuse all who do not first consider and communicate their personal definitions of the term. And if research on theories of play is to be carried out, a satisfactory dependent measure of play will have to be devised (p. 354).

Needless to say, the same difficulties are inherent in the study of intelligence. Siegel & McBane (1966) made an inroad into these obstacles in studying the cognitive activity of lower-class children. They found that subjects who were unable to categorize in representational terms, were also impoverished in their play, showing a high frequency of motor activity, minimal role playing, and block play of low elaboration.

Sutton-Smith's study (1967) of winners and losers in strategy games like tick-tack-toe indicated that the two groups could be distinguished not by intelligence as measured by IQ tests but in their intellectual aspirations,

school achievement, perseverance, and rapidity of making decisions. These interrelations, game skills, personality, and cognitive mode fit into Adler's "life style" theory.

Tilton and Ottinger (1964) compared the toy-play behavior of autistic, retarded, and normal children. Observers recorded which of a number of defined toy uses occurred in each of 60 equal segments of a 20-minute individual play period. The total number of different acts in each subject's repertoire was also noted. In the proportion of overall play devoted to combinational uses of toys the groups ranked: normal, retardates, and autistic. Although the scoring procedure was rather unsophisticated this study does provide more empirical evidence for the possibility that groups of children differing in personality and/or cognitive ability can be distinguished by play and especially the organization of their play.

In 1941 in their study of frustration and aggression and regression, Barker, Dembo, and Lewin made reference to their observation that constructiveness of play was apparently related to intelligence. They found correlations of .70 between MA and constructiveness and between CA and constructiveness. When a multiple correlation test was done, CA and MA correlated .83 with their play scale of constructiveness.

Loomis, Hilgeman, and Meyer (1957) in studying differences in play behavior made several attempts at developing "verifiable methods of recording nonverbal play behavior which makes it susceptible to comparison from period to period, child to child, observer to observer (p. 691)." In addition to this utilitarian goal, they hoped to relate play behavior to ego theory (in apparently the same way Tilton and Ottinger had).

Shugart (1955) had identified two major play styles among "preschizophrenic" children which were absent in the play of normal children, i.e., the autistic style and the symbiotic style. This finding supported the theory that play impairment and distortion are concomitants of severe ego disorders in childhood.

In three attempts at recording data Loomis et al (1957) divided behaviors in terms of three categories of ego functions: reality perception, reality testing, and reality control or manipulation. Activity that fell into any one of these categories was rated for intensity of affect and involvement with things or people (self or examiner). The protocols were divided into units of analysis by time (every 3-minute interval was given a score).

One of the foci from which the play record scores

were studied was Organization:

Awareness of and use of the potentials and possibilities built into each toy; abilities in evaluating varieties of uses of toys and toy combinations; sensitivity to suggestive qualities of toys for socially meaningful construction and play utilization; judgment regarding reality nature of toys and toy situations; appropriateness in using them; grasp of purpose for which materials were intended; degree of inventiveness (Loomis, Hilgeman, and Meyer, 1967, p. 695).

This quality of organization was considered by the investigators to be a measure of reality testing discussed in ego theory. The present author considers this to be significant in the study of intelligence for its equivalency to Erikson's description of play as thinking.

The scale of Loomis et al., in its other aspects, is rather cumbersome requiring the combination of several overlapping subratings of play behavior to arrive at a single play score. In addition, its time unit of measure is too arbitrary.

Another significant attempt to conceptualize a quality of play was made by Lieberman (1965). She posed the question of whether quality of play provided a clue to divergent thinking. Having observed that children at play evidenced differences in "spontaneity, overtones of joy, and sense of humor. . . .(similar to) the factors found in

the intellectual structure of creative adults and adolescents (p. 219)," the author hypothesized that kindergarten children who rated higher in playfulness would perform better on divergent-thinking tasks than would less playful children. Playfulness was operationally defined in terms of five traits: physical, social, and cognitive spontaneity, manifest joy, and sense of humor. The Playfulness scale included a 1 to 5 point rating of each of the above traits both for frequency of occurrence and for intensity or quality. The interscorer reliability for the subjects' two kindergarten teachers who did the ratings was .70. As a note, one would have to question the possible "halo effect" contamination with these raters.

Divergent thinking was measured by three tasks:

(i) a two part, 3-minute test in which the child was asked to suggest ideas showing how a toy dog and a doll could be changed to make it more fun to play with; (ii) plot titles, a two part, 4-minute test in which two illustrated stories were read and shown and the child was asked to supply names for the stories; and (iii) the Monroe Language Classification Test, a three part, 1-1/2-minute test in which the child was asked the names of animals, things to eat, and toys.

From these tasks scores of ideational fluency, flexi-

bility, and originality were achieved which were correlated with the five playfulness traits as well as the global playfulness score. Each of the playfulness scores correlated significantly ($p \leq .001$ with ideational fluency and $p \leq .01$ or $.05$ with spontaneous fluency and flexibility). After the study began each of 93 subjects was given the Peabody Picture Vocabulary Test as a measure of convergent thinking. The Peabody MAS correlated significantly with all the traits except physical spontaneity ($r_s = .30$ to $.34$) and all three of the divergent thinking factors ($r_s = .27$ to $.30$). These correlations, although not high, indicated that playfulness in kindergarten children provides a clue to ideational fluency, spontaneous flexibility, and originality as measured. That a child's brightness is related to all these factors allows speculation within Piaget's theory. He contends that joyful spontaneity arises after competence has been achieved; at that point of mastery an activity can be enjoyed for its own sake.

Hulme and Lunzer (1966), believing that the ability to initiate fruitful interactions with the environment (an aspect of adaptive intelligence) could be measured by free group play, compared 18 severely "sub-normal" children and 18 normal children whose CAs matched the MAS of the first group. Later the subjects were administered

the Terman-Merrill (Form L) which then showed the MAs of the two groups to be fairly similar. Of course, the mean CA of the subnormals was much higher than that of the normals (by 4 years). The range of CA of the normal children was from 1-11 to 4-7, while the range for the subnormals was 3-5 to 11-5.

Intellectual functioning was related through the use of language behavior in a picture interview situation and quality of reasoning (using one of Piaget and Inhelder's problem situations as well as a coding and storage task where the subject must copy the experimenter's block model of varying complexity). The results did not support the hypotheses that the two groups would vary in the level of organization of free play or in a Piagetian task of reproducing ordered arrangements under various conditions. However, the hypothesis was upheld that the subnormal group would be inferior in loquacity and quality of language and in the task used as a measure of the capacity for storage and retention.

Some difficulties with the study are immediately apparent, however. The fact that the subnormal subjects were much older than the control subjects allows the possibility that the constructive and imaginative uses to which the material was put could be explained by their

exposure for so many more years to similar activity and observation.

Also, the test of systematization of order relations represents a task which Piaget sets in an early stage in the evolution of operational structures of intelligence. For this reason it might not have been discriminatory. There is, of course, question as to the probable overlapping of intellectual stages of operation due to the wide overall range of CAs and MAs.

There is an interesting note on this study's results regarding the language of the subnormal subjects. It was marked "by an almost complete absence of fanciful statements (p. 116)," (including playful associations and play on word sounds). Lack of control over symbolism would be suggested.

A major contribution of the Hulme and Lunzer (1966) study, besides suggesting further research, was the use of a play scale that went beyond nominal rating and was fairly compact. It was a scale of organization, tested for reliability, providing a 9-point index of elaboration in play, derived from the sums of scores on two 5-point subscales which measured adaptiveness and integration; separate scores were given for each psychological unit of behavior. The author of the scale (Lunzer, 1955) held

that the two subscales represent a unitary quality of behavior on a phenomenal level. For that reason only the combined total scale score was used in calculating results.

"Adaptiveness" for Lunzer reflects Piaget's concept of assimilation. Besides his use of material in an appropriate manner, having regard to its properties and potentialities, the child is scored higher if he "does not confine himself to the obvious treatment suggested by the material itself, but adapts it to conform with his own constructive or imaginative purpose (p. 121)." This, combined with the integration subscale which is a measure of complexity, would seem to distinguish between subjects in Piaget's symbolic play-representational intelligence scale.

The question pursued in the present research is how well these differences in adaptiveness in a play situation are correlated with intellectual functioning as measured by traditional tests. As elaborated on above the specific research hypothesis tested is that quality of play of young children, as measured by the Foley QP Scale, is linearly related to their IQs as measured by the Stanford Binet and the Wechsler Preschool and Primary Scale of Intelligence (WPPSI).

This study in following the research reviewed above contributes to an empirical foundation for play and intelligence theory.

Method

Subjects

One hundred subjects, 2 boys and 2 girls in each of 25 monthly age slots from 4 years, 5 months to 6 years, 5 months were recruited from the regular kindergarten and first grade enrollments and pre-enrollments at three different Catholic grammar schools. It is this age group which falls in the middle of Piaget's symbolic play stage previously discussed. The racial and socio-economic status of the subjects is white middle-class. Prescreening was done to eliminate as subjects children with central nervous system disabilities and those from families where English is not the predominant language.

Materials and Measures

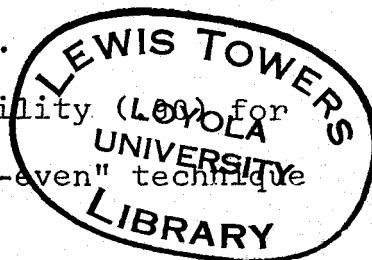
Each child was administered the Stanford Binet Form L-M (S-B) and the Wechsler Preschool and Primary Scale of Intelligence (WPPSI). He was also engaged in a 20 minute individual play session. Quality of play ratings were obtained according to the scale developed by Foley (1962) and found in her unpublished dissertation. (See Appendix A for the scoring manual.) It is a scale of organization and complexity which provides a 7-point index of elaboration, integration, and originality for play behavior. These are the qualities considered above in the

theoretical discussion of intelligence and play. Separate scores were given for each unit of behavior. An activity is scored as a separate unit when the subject's behavior suggests a change in goal or focus of attention. The score for each unit was multiplied by the time (in seconds) of that unit. The subject's final Quality of Play - Time score (QP_T) was the sum of the unit quality of play scores divided by 1,200 -- the time in seconds of the total play session.

Another score, Quality of Play - Actual (QP_A), reflected the sum of the unit quality of play scores divided by the number of seconds out of the 1,200 that the subject actually spent in measurable or scorable activity, this study's operational definition of play.

This play scale constructed by Foley (1962) has excellent interscorer reliability. In regard to discerning psychological units of play Foley and another psychologist had 93.4 per cent agreement when 183 units within three play protocols were considered. Of the 171 units common to both scorers there was agreement (in terms of the subjects' activity and emotional tone) on 170 units or 99.4 per cent of the units.

A split-half coefficient of reliability (0.99) for the QP scale was achieved using an "odd-even" technique



on 50 protocols each of 40 minutes duration. The inter-scorer reliability of the QP scores obtained by Foley and another psychologist, who independently rated five play records, was .99 for QP/1200, (QP_T).

Paollela (1973) in unpublished dissertation research attained reliability coefficients of .99 for QP when he and an assistant independently rated 40 play records each 20 minutes in length.

The play materials provided for the children included three plush brown bears of graduated sizes as well as a large sized "family" of dolls (father, mother, boy, girl, baby), a small wagon filled with building blocks, a mallet, crayons, paper, clay, and a toy telephone. These materials were considered "raw material" toys which would stimulate S's "putting himself" into their use.

Other materials used by the examiner were a stopwatch and a tape recorder to monitor the length of the session and the amount of time the subject spent in each unit of play and get a verbatim record of all verbalization.

Procedure

Administration of the two intelligence tests and the play session required two visits to the Loyola University Guidance Center where this research was conducted. The IQ tests were administered in counterbalanced fashion by

four examiners -- all male. The play sessions were conducted by the author, a female.

Instructions to the subjects before they entered the play room were as follows:

I have several different toys for you to play with. I would like you to play with any of them you want to in any way you want to for about 20 minutes. The only things you may not do are purposely hurt yourself, or me, or break the toys. While you're playing I'm going to sit over to the side and do some writing. I'll tell you when time is up.

Nothing was said about verbalness. The subject's interaction with the experimenter was not encouraged and when such interaction was started by the subject and was extraneous to playing with the materials provided, it was actively discouraged with attempts to reinterest the child in the play materials, partially repeating the instructions.

If the subject was slow to enter into the play session, was frightened and/or uncooperative, the experimenter actively encouraged the subject's participation in much the same way one would in a traditional testing situation. There was no limit on the number of verbal encouragements that could be given to a subject with the materials. No encouragements were made, of course, that would have usurped the child's spontaneous movement from one level of

play to another as measured by the Foley Quality of Play Scale discussed above.

While the subject was playing the experimenter took observational notes of what he was doing and which material was being used and how, marking the times in the session as measured by a stopwatch at which the child changed activities and/or materials. The tape recorder was turned on simultaneously with the stopwatch in order to get an accurate verbal transcription.

A "blind" scoring technique was used by the examiner in that as play observer she did not know the scores the subjects had achieved on the previously given IQ tests.

Results

Tables 1 and 2 report the means and standard deviations of the chronological age, intelligence, and play scores considered in this study for boys and then for girls, respectively. There are four levels of chronological age: Group 1, CA = 53-59 months; Group 2, CA = 60-65 months; Group 3, CA = 66-71 months; Group 4, CA = 72-77 months. Table 3 reports the means, standard deviations, and ranges of these measures for the total sample of children. The variables under consideration are CA, MA, WPPSI Verbal, Performance, and Full Scale IQ, Stanford Binet IQ, Units of Play Action, Time in seconds actually spent in play, and Quality of Play (for total session time - QP_T as well as actual time spent in scorable play - QP_A).

In order to test the hypothesis that Quality of Play is linearly related to intelligence Pearson product-moment correlations (r_s) were done between the QP scores (for both total time and actual time spent in scorable play) and CA, MA, WPPSI Verbal IQ, WPPSI Performance IQ, WPPSI Full Scale IQ, Stanford-Binet IQ and number of units for both boys and girls as well as total N. The results are seen in Table 4.

Table 1

Means and Standard Deviations of Chronological Age, Intelligence, and Play
Scores for Four Age Groups and Total Sample of Boys

Age Groups	CA	MA	VIQ	PIQ	FIQ	SB	Units	Time	QP _T	QP _A	
1	<u>M</u>	56.00	61.60	101.80	104.70	103.60	109.50	24.20	1063.43	3.69	3.93
	<u>SD</u>	2.00	9.90	19.30	17.00	18.10	17.50	11.00	317.06	1.38	1.16
2	<u>M</u>	62.50	70.40	106.50	111.40	109.70	114.90	22.20	1099.10	4.31	4.67
	<u>SD</u>	1.71	8.20	16.30	13.30	16.60	15.60	14.80	177.69	1.13	.88
3	<u>M</u>	68.50	78.00	108.80	108.20	109.40	116.60	22.30	1130.21	4.10	4.31
	<u>SD</u>	1.71	8.20	10.80	15.90	13.30	13.80	4.00	84.37	1.01	.88
4	<u>M</u>	74.50	79.20	100.80	108.60	104.90	106.60	14.90	1169.42	4.61	4.74
	<u>SD</u>	1.71	9.50	10.30	10.50	8.70	12.30	8.40	42.53	.67	.70
Total	<u>M</u>	65.00	72.20	104.40	108.00	106.70	111.90	20.70	1140.70	4.20	4.40
	<u>SD</u>	7.30	11.40	14.60	14.50	14.40	15.10	10.70	190.70	1.10	.90

Table 2

Means and Standard Deviations of Chronological Age, Intelligence, and Play

Scores for Four Age Groups and Total Sample of Girls

Age Groups	CA	MA	VIQ	PIQ	FIQ	SB	Units	Time	QP _T	QP _A	
1	<u>M</u>	56.00	65.60	106.40	103.20	106.20	117.50	26.60	1168.29	3.94	4.04
	<u>SD</u>	2.00	10.70	13.10	11.50	12.30	17.50	7.90	32.47	.71	.69
2	<u>M</u>	62.50	78.10	108.00	105.10	107.30	117.50	27.50	1011.30	3.40	3.88
	<u>SD</u>	1.71	21.90	18.00	16.50	17.10	18.30	10.40	323.63	1.26	.71
3	<u>M</u>	68.50	73.60	97.80	104.90	101.30	109.70	20.60	1059.36	3.76	4.26
	<u>SD</u>	1.71	11.80	15.10	18.50	17.40	17.90	9.20	184.19	1.05	.84
4	<u>M</u>	74.50	79.80	103.70	106.90	106.00	108.00	20.20	1084.58	4.46	4.80
	<u>SD</u>	1.71	6.60	10.90	13.20	10.40	11.20	4.70	218.21	1.23	.92
Total	<u>M</u>	65.00	72.60	103.10	104.50	104.00	113.00	23.50	1086.30	3.90	4.30
	<u>SD</u>	7.30	11.20	18.10	14.70	14.30	16.60	8.70	206.11	1.10	.80

Table 3

Means, Standard Deviations, and Ranges of Chronological Age,
Intelligence, and Play Scores for Total N

Variable	<u>M</u>	<u>SD</u>	Range
CA (months)	65.00	7.30	53-77
MA	72.40	11.30	45-98
VIQ	103.10	17.00	65-137
PIQ	106.50	14.60	58-143
FIQ	105.90	14.30	60-134
SB	112.50	15.80	69-167
Units	22.10	9.80	3-57
QP _T	4.03	1.10	0-5.61
QP _A	4.31	.90	1-5.69

Table 4

Correlation Coefficients Between Quality of Play Scores (Total and Actual),
Units of Play, and Intelligence Scores for Boys, Girls, and Total N

Quality of Play Scores and Units

Intelligence Indicators	Boys (<u>N</u> =50)			Girls (<u>N</u> =50)			Total (<u>N</u> =100)		
	QP _T	QP _A	Units	QP _T	QP _A	Units	QP _T	QP _A	Units
CA	.26	.24	-.27	.13	.28a	-.22	.19	.26a	-.25a
MA	.40b	.38b	-.20	.36a	.25	.00	.38c	.32b	-.11
VIQ	.36a	.32a	-.01	.15	.04	.11	.25a	.17	.04
PIQ	.50c	.50c	-.20	.30a	.17	-.10	.41c	.34c	-.16
FIQ	.48c	.45b	-.11	.31a	.12	-.02	.40c	.30b	-.08
SB	.29a	.27	.00	.29a	.07	.19	.28b	.17	.09
Units	-.39b	-.48c	1.00	-.39b	-.54c	1.00	-.40c	-.51c	1.00

a $p \leq .05$ b $p \leq .01$ c $p \leq .001$

Table 4 shows that the Quality of Play scores taken over the entire 1,200-second (twenty-minute) play session correlated significantly with both the Stanford-Binet IQs and the WPPSI Full Scale IQ for boys, girls, and total N. This gives some support to the research hypothesis that quality of play, as measured by the Foley play scale designed to tap elaboration, complexity, originality and integration of play behavior, is related to intelligence as measured by traditional tests.

It is seen that QP_T was more highly related to the WPPSI IQ than the Binet. This is a reflection of the higher correlation between QP_T and the Performance IQ of the WPPSI as compared to the Verbal IQ of the WPPSI. Table 5 shows the correlation coefficients between the Stanford Binet IQs and the WPPSI Verbal, Performance, and Full Scale IQs for Boys, Girls, and Total N. It is seen that for all three groups the Verbal IQ of the WPPSI was better correlated than the WPPSI Performance IQ with the Stanford Binet IQ, a predominantly verbal test.

A comparison of QP_T and QP_A correlations in Table 4 shows a stronger relationship between the intelligence indicators and Quality of Play scores considered over the total 20-minute play session (QP_T) as opposed to the Quality of Play scores achieved when only actual measurable

Table 5
Correlation Coefficients Between the Stanford Binet
IQs and the WPPSI Verbal, Performance, and
Full Scale IQs for Boys, Girls and Total N
Stanford Binet IQs

WPPSI IQs	Boys (<u>N</u> =50)	Girls (<u>N</u> =50)	Total (<u>N</u> =100)
VIQ	.87	.56	.68
PIQ	.68	.55	.60
FIQ	.87	.79	.82

play within the session was considered (QP_A). This was especially true for the girls.

Table 4 suggests that the intelligence quotients vary more with persistence in play (of even perhaps a relatively lower quality) as reflected in the QP_T scores than with intermittent higher quality play (QP_A). A subject's QP_A score can only be equal or greater than his QP_T score as is obvious from the way it is calculated (see Method Section). Thus, a child who played at a very high level for half of the session and did nothing the rest of the time could have a higher QP_A score than another child who played for the entire session but at a mediocre level. Apparently it is not this short-run showing of what one is able to do which reflects IQ.

To further investigate the role of persistence in play the amounts of time the boys and the girls spent in play were compared. It was found (See Tables 1 and 2) that the girls averaged about 28 seconds less play per protocol than the boys. An examination of the raw data indicated that this difference between means of time spent in play was not just the result of extreme scores. In fact the difference between means was increased when either the eight lowest and/or eight highest time scores were omitted. Pearson rs were used to pursue the question of

Table 6
 Correlation Coefficients Between IQs and
 Time Spent in Scoreable Play for
 Boys, Girls, and Total N

IQ	Time		
	Boys	Girls	Total
WPPSI	.46b	.31a	.39c
SB	.31a	.39b	.35c

a $p \leq .05$

b $p \leq .01$

c $p \leq .001$

the relationship between IQ and time spent in play. Table 6 reports the results. A comparison with the correlation coefficients in Table 4 shows that time spent in play was more strongly associated with the Stanford Binet IQ than was Quality of Play (either QP_T or QP_A). The difference is most dramatic with the girls who had a correlation of only .07 between Stanford Binet and QP_A but a correlation of .39 between Stanford Binet and time spent in play.

Correlations were also run between the number of play units used within the 20-minute play session and the intelligence scores and chronological age. Table 4 shows that for the total population the number of units was significantly ($p \leq .05$) correlated with chronological age. It did not vary significantly, however, with any of the intelligence test measures. Units did vary inversely and significantly with Quality of Play (QP_T and QP_A). This would be expected since a child who was frequently changing activities would have a hard time "really getting into" anything very well to exhibit or plan elaborate, organized themes, original or not.

The Quality of Play Scores (Actual and Total) were subjected to analysis of variance tests for boys and girls according to four levels of chronological age described above. There were no advance hypotheses about the rela-

tionship between sex, CA, and QP but the analyses of variance were done to gain developmental information. The results of these analyses done on the two Quality of Play scores for sex and age are presented in Table 7.

It can be seen that QP_A scores are significantly different among the age groups used for comparison. The differences between age groups for QP_T scores, however, do not quite reach the .05 level of significance. Tables 1 and 2 report the mean QP_A scores for boys and girls for these age groups. From the youngest group to the oldest group the mean QP_{As} are 3.93, 4.67, 4.31, and 4.74 for the boys and 4.04, 3.88, 4.26, and 4.80 for the girls.

It appears from the mean QP_A scores that the difference indicated by the F ratio can be accounted for by the extreme age groups for the boys and the very oldest and two youngest groups for the girls. It must be remembered that QP_A scores appear to reflect possibly shorter spans of high quality play. Thus, there was persistence of some level of play across the age groups which varied with IQ measures for both sexes. (See Table 4 for QP_T coefficients of correlation.) But the Quality of Play within the time that the children actually played did apparently distinguish at least the extreme age groups for both sexes (as well as vary to some degree with the IQ

Table 7
 Analyses of Variance for Quality of
 Play Scores (Total and Actual)

	QP _T			QP _A		
	<u>df</u>	<u>MS</u>	<u>F</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Sex	1	1.50	1.29	1	.38	.51
Age	3	2.77	2.40	3	2.69	3.58*
Sex and Age	3	1.37	1.18	3	.96	1.28
Within Cells	92	1.16		92	.75	

* $p \leq .02$

scores of the boys). It should be recalled in regard to this that, in fact, the boys were more actively persistent than the girls, thus making their QP_T and QP_A scores more similar than were the girls.

Partial correlation coefficients were computed in order to clarify the relationship between Quality of Play and IQ holding age constant. The results are reported in Table 8. Although all of the correlation coefficients were increased when age was held constant (compare to Table 4) the level of significance was affected on only the correlation between the Stanford Binet IQ and QP_A . The increase of this correlation from .27 to .29 was sufficient to yield significance ($p \leq .05$).

Table 8
 Partial Correlation Coefficients Between
 Quality of Play (Total and Actual)
 and IQ Scores with Age Held Constant
 for Boys, Girls, and Total N
 Quality of Play

IQ	Boys		Girls		Total	
	QP _T	QP _A	QP _T	QP _A	QP _T	QP _A
WPPSI FIQ	.49c	.46b	.32a	.14	.42c	.32b
SB	.31a	.29a	.33a	.13	.32b	.21

a $p \leq .05$

b $p \leq .01$

c $p \leq .001$

Discussion

Summarizing the last section, the results of this investigation indicated that: (1) Quality of Play (its organization, complexity, elaboration, and originality) varied positively with traditional intelligence test measures in young children; (2) the Quality of Play measure calculated to reflect persistence in play over time (QP_T) correlated positively with traditional intelligence scores more than did the measure calculated to reflect quality alone (QP_A) regardless of how short a time it was exhibited; (3) Quality of Play measure (QP_A) calculated without regard to persistence distinguished the youngest and oldest age groups within the population tested; (4) units of play activity did not correlate significantly with intelligence test measures but they did correlate inversely and significantly with chronological age and with quality of play; (5) the Quality of Play Scores were correlated most highly with Performance IQs on the WPPSI, especially for boys, as opposed to the WPPSI verbal IQs or Stanford Binet IQs.

These results provided some support for Piaget's developing stages of intelligence. For children presumed to be in Piaget's developmental stage of representational intelligence and symbolic play, quality of play increases

as they get older and have more experience dealing with their environment. They become better structurers, better thinkers, better knowers in Piaget's terms.

The correlations attained between the Quality of Play scores and IQ, while statistically significant, were not high. This might well be explained by the fact that the QP scale concentrated on the "how" of learning rather than the content of knowledge. The test constructions of Binet and Terman, designed to measure convergent thinking and general information (especially for younger children), was a feat of pragmatism. The tests were developed to help in school placement and that is what they did. They were not based in a theory of intelligence. Soon this led to the situation which generally exists today -- that "intelligence is defined as that which inheres in the intelligence tests" (Zach, 1966), i.e., intelligence is what the test measures. The idea of fixed intelligence was not what either Binet or Terman had in mind. The fact that teaching and environment has been seen to result in significant increases in IQ scores suggests that intelligence must be viewed in a different way. It is not a static, inherent quality. Chien (1945) held that it is an attribute of behavior and not an attribute of a person. We can only measure or observe manifestations of it. In this case attempts should be made

to observe samplings of intellectual behavior adaptive to one's environment. The key words are adaptive behavior. The sampling of cognitive functions achieved by traditional IQ tests maximize the content aspect of learning at the relative expense of the process aspect. Zach (1966) pointed out that intelligence tests have "focused on estimating the effectiveness of the individual at the time of testing instead of estimating the plasticity of central processes (p. 121)."

Piaget has made the most systematic attempt to define intelligence in terms of content and process within development. Intelligence is the central structuring developed in the course of child-environment interaction. It makes sense then to evaluate intelligence by sampling behavior for evidence of the presence of organizational structures which underlie divergent as well as convergent thinking and to generate intelligence by demonstrating the "how" instead of the "what" of thinking.

An interesting project was started in New York City schools in 1964 (Loretan, 1965; Stoddard, 1966) to restore to the domain of the classroom teacher the process of estimating and fostering the intellectual development of children according to Piaget's theory of operative intelligence. Traditional IQ tests were dropped. Where tests ask

questions and students are expected to respond drawing from their own experiences, a curriculum guide was developed which did not make the assumption that all the children had had the same experiences. Teachers observed intellectual functioning as it was put to work by the child on problems that were meaningful to him. A teacher could see where a child was in his process of development and further this process. Instead of measuring intelligence by tests, teaching and learning tasks were substituted to develop intelligence. Perhaps, then, it is not surprising that the Foley Play Scale did not correlate very highly with the WPPSI and Binet. It measured something more than convergent thinking within similar experiential backgrounds.

Future research could profitably concentrate on empirically establishing the suggested relationship between play and Piagetian concepts of intelligence as process. It was seen in the present study that Quality of Play and MA were related. Furthermore, Quality of Play was higher among the older children, those who were approaching the end of Piaget's representational stage. Play is apparently universal across cultures (Millar, 1968). In fact it is interesting to note that quantity and elaboration of play increases in species of animals as they place higher on

the phylogenetic scale, as there is more requirement for adaption rather than reliance on instinct (Beach, 1945). In humans, symbolic play has been observed across socio-economic groups. Eifermann (in Herron & Sutton-Smith, 1971) found that both culturally advantaged and disadvantaged Israeli and Arab children engaged in symbolic play. The development of this stage was delayed, but nevertheless eventually developed in the lower socio-economic groups. Anastasi (1961), Rosenberg (1967), and Stoddard (1966) are three writers concerned with mental measurement and the relationship of intelligence and culture. Comparing the development of play process over age with children's working out Piaget's classical cognitive problems might indeed provide a culture-free alternative index to cognitive development.

Summary

Piaget has clinically demonstrated developing intelligence in the way children play. He contends that everyone goes through a symbolic play stage of development (representational intelligence) on his way toward adult intelligence. Play is viewed as an inevitable result and contributor to the child's cognitive structure. The present investigator examined the relationship of play as generated by the child and intellectual functioning as measured by traditional tests in young children who could be expected to be in the representative intelligence stage of development. The quality of children's play, elaboration, complexity, integration, and originality as measured by the Foley Quality of Play Scale (QP) was studied in relation to the subjects' scores of IQ and MA achieved on the Stanford Binet and the Wechsler Preschool and Primary Scale of Intelligence (WPPSI). A parallel heuristic purpose of this investigation was to establish construct validity for the QP scale or refine it as a measure of intellectual functioning. The specific research hypothesis tested was that the quality of play in young children, as measured by the QP scale, is linearly related to their IQs as measured by the Stanford Binet and WPPSI.

One hundred subjects, 2 boys and 2 girls in each of 25 monthly age slots from 4 years, 5 months to 6 years, 5 months were recruited from enrollments and pre-enrollments at three different Catholic grammar schools. The subjects were volunteered by their parents. They were white and middle-class with no central nervous system disability and from families where English was the predominant language.

The results of this investigation supported the research hypotheses that quality of play correlated positively with traditional intelligence test measures. The correlations attained, while statistically significant were not high. This was explained by the fact that the QP scale and the Stanford Binet and WPPSI reflect two different aspects of intelligence. The QP scale concentrated on the "how" of learning, the structuring process of knowledge while the traditional IQ tests operationally focus on the content of knowledge.

Quality of play was measured in two ways: (1) to measure the upper limits of performance without regard to amount of time actually spent in play (QP_A) and (2) to measure persistence in play over 20 minutes masking the effects of short periods of very high or very low quality (QP_T). It was found that QP_T varied with traditional intelligence scores more than did QP_A . However, a factor

analysis indicated that QP_A scores distinguished the youngest and oldest children more so than did QP_T . Thus, children were more evenly persistent in play across the ages but the quality of play increased in the older children. Other results discussed were that the number units of play did not vary significantly with intelligence test measures but they did vary inversely and significantly with CA and QP. Finally, the QP scale as a measure of intelligence is best correlated with Performance IQs on the WPPSI, especially for boys, as opposed to the WPPSI Verbal IQs or Stanford Binet IQs. These results were interpreted to provide some support for Piaget's developing stages of intelligence and for the refinement of the QP scale as a culture-free alternative index to cognitive development.

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Appendix A

Scoring Manual for Quality of Play Scale

I. Scoring Manual for Units of Action

The Units of Action (UA) score for Play 1 or Play 2 consists of the total number of units occurring during the first 20 min. of each period. In general, an activity is scored as a separate unit when S's behavior suggests a change in goal or focus of attention.

The time spent in the action assigned a UA rating is noted for each unit. When a unit is not complete because of the 20 min. limit, the elapsed time for the activity occurring prior to this limit is assigned to the unit. Activity involved in the transition from one activity to another is not scored as a separate unit when S's intention is obvious and no loitering occurs. In this case, the time interval between the activities is counted with the new activity. However, when the transition involves a delay, distraction, or unnecessary wandering, it is scored as a separate unit.

Criteria for Scoring of Action

1. Different activities with different objects.

A single complete activity preceded and followed by different activities in terms of objects or playthings used, focus of attention, or mode of expression is scored as 1 unit. However, an activity involving several different objects which may be meaningfully grouped together in terms of class, location, or S's undifferentiated treatment of them is scored as 1 unit. In addition, a period of rather generalized attention to a number of objects such as might occur during episodes of wandering about the room is scored as a single unit. In general, 1-unit ratings of activities involving different objects are made when the assignment of

separate ratings would be difficult or impossible and the activity may be more meaningfully subsumed under a single unit such as "wandering."

Scorable as 1 unit: Building a block tower (preceded by doll play and followed by drawing)--talking to E (preceded by looking out of the window and followed by play with bears)--placing a variety of toys in the wagon without paying particular attention to any one--walking around the room and looking at different objects without becoming involved with any one object for more than a few seconds--activity around the window involving looking out, tapping fingers on sill, and poking at glass (see also UA, Sect. 4).

2. Series of different activities with the same objects.

Activities with the same objects or playthings are scored as separate units when each represents a discrete activity which would be scored as 1 unit if it occurred separately. In addition, play with the same toy or group of toys is divided into separate units when the ongoing activity would be assigned different quality of play rating (e.g., inspection versus fantasy play).

Scorable as 2 or more units: A series of drawings, each on a separate piece of paper (1 unit per drawing)--two or more drawings on a single sheet where the content or S's comments suggest they are unrelated such as a house and writing (1 unit for each separate part)--building a block structure and later using the blocks for a new structure or piling them in the wagon (2 units)--inspection or simple manipulation of a toy to see how it works followed by fantasy activity involving the toy (2 units)--pushing the blocks around aimlessly and then integrating them into a structure (2 units)--building a block structure followed by rather prolonged destruction of it and finally loading the blocks in the wagon (3 units)--making different objects from Play Doh such as a dish, snake, and person (1 unit per object)--differentiated activity and prolonged attention to toys of the same class as dressing and/or undressing members of the doll family or giving big bear and little bear separate rides in the wagon (1 unit for the activity with each member of the toy group).

Scorable as 1 unit: Repetitions of the same activity or repeated attempts to attain some goal (as rebuilding a block tower which falls)--slight variations on a single theme (as making pancakes with Play Doh)--making several different objects from Play Doh which combine

into a single unit (as nest and eggs or dish with food)--rapidly executed activities with toys of the same type when S does not treat them in a differentiated manner (as removing the shoes from all the dolls in quick succession or piling all the dolls in the wagon for a ride).

3. Interruptions or breaks in ongoing activity.

a. By activity with different objects or the same objects with different intent.

The scoring of interruptions arising from activity with different objects is a special case of different activities with different objects (Sect. 1) and, consequently, the interruption is scored as 1 unit. However, in the case of interruptions, the interpolated activity is often shorter and/or incomplete and, as such, may escape attention. This is especially true when the interruption involves activity with the same objects but the intent of the activity or quality of play level is different. In both instances, the interrupted activity, the interruption, and the subsequent activity (a different activity or the resumption of the original activity) are each scored as 1 unit.

Scorable as 3 units: Building with blocks interrupted by period of pounding a block on floor before building activity resumed--drawing interrupted to look at block and drawing resumed--fondle and talk to bear, hold carelessly while looking out of window, and return to play with Doh to show E or sitting back so S is no longer engaged in activity) before resuming activity.

(Note: If S's attention remains focused on what he is doing suggested by continued work on production and/or talk of what he is doing, the showing is considered an overlapping activity and is not scored as a separate unit.)

b. By inactivity, contemplation, loss of attention, etc.

Changes from activity to relative inactivity (sitting, standing, looking) are scored as 1 or 2 units. When the interval of inactivity suggests a period of contemplation, planning, or uncertainty about the next step in the ongoing activity and attention is focused mainly on the objects of the prior activity, the period of activity and inactivity

are scored as 1 unit. If the original activity is resumed, the entire sequence is scored as 1 unit. If a different activity is initiated after the interval the sequence is scored as 2 units.

When the original activity is interrupted by a period of inactivity suggesting loss of attention and a search for a new activity as reflected by generalized looking around, verbalizations, or movement away from the original activity, the activity and the interval are scored as 2 units. Thus, as with interruptions in general, the entire sequence including the subsequent activity is scored as 3 units regardless of whether the original activity is resumed or a different activity initiated. Even when S continued to hold an object used in the original activity, if the object appears to be temporarily forgotten and is not used, the intervening activity is scored as a separate unit.

An exception to the scoring of an interruption as a separate unit arises when the interruption is very brief (i.e., less than 10 sec.). Thus quick glances at E or other objects are not scored as separate units. For further discussion of this point see Section 4.

Scorable as 1 unit: Drawing, sits back to study handiwork and occasionally glances at E, and resumption of drawing--building with blocks, crawls around structure to look at other side, and resumes building activity.

Scorable as 2 units: Building with blocks, sits back and taps floor with block and wonders how to fit block in while looking at structure, shakes head as if unable to decide and starts conversation with E--tries to make dolls sit up in wagon, dolls fall over and S stares moodily at them, sighs and turns to play with blocks.

Scorable as 3 units: Drawing, S leans back and gazes around room and at other toys, resumes drawing activity--pulls wagon around room, pauses to look out of window while still holding wagon cord, continues to pull wagon around room.

4. Simultaneous or rapidly alternating activities.

Two activities occurring simultaneously, or in rapid alternation, where the assignment of times would be difficult are scored as 1 unit. This classification is differentiated from interruptions because the ongoing activity is

either continuous or subject to only very brief (less than 10 sec.) disruptions. Glancing quickly at E or talking while engaged in play and requesting E to look at progress in ongoing activity are the most frequent sources of simultaneous activity scored as 1 unit.

Scorable as 1 unit: Repeatedly calling attention to progress in making block structure without interrupting activity ("Look! Now I'm putting the door in . . . Look! This is going to be the window" as S places blocks)--looking quickly at E or around the room while drawing--talking to self about ongoing activity--rapid alternation of fantasy play and explanations to E (as a telephone conversation in which S talks to imaginary friend and reports what friend has said to E and what he will say to friend and then does so).

II. Scoring Manual for Quality of Play

Each unit of action involving a play activity is assigned a Quality of Play (Q-Play) rating on the basis of the 1-7 pt. scale described in the following section. Play is, by definition, any activity involving the toys provided in the experimental situation regardless of how little the activity resembles play. In turn, play activities which do not involve the standardized toys are not rated for Q-Play.

The Quality of Play/Time (Q-Play/T) score for Play 1 or Play 2 is obtained by multiplying the 1-7 pt. rating for each play activity by the time spent in that activity, summing the products, and dividing by the total time S spent in the rated play activities during the first 20 min. of Play 1 or Play 2.

The Q-Play/20 score for Play 1 or Play 2 is also obtained by multiplying the 1-7 pt. rating for each play activity by the time spent in that activity and summing the products, but the total is divided by 20 (i.e., the total time rated for quality of play in Play 1 or Play 2).

The Play 1-Play 2 Difference score is obtained for both Q-Play scores by subtracting Ss' Play 1 from his Play 2 score.

Special Considerations in Assigning Ratings

Play activities interrupted by a different activity. When play with a particular toy or group of toys is interrupted by other activities the Q-Play rating is, in general,

assigned on the basis of the entire sequence of units comprising a particular play activity rather than its separate parts. For example, if S leaves his drawing to look out of the window and then returns to drawing, the Q-Play rating is based on the completed drawing (or its final state if left unfinished). The time assigned to the activity includes only the time spent in the activity--not the time involved in the interruption.

Different levels of play within the same activity. When play with a particular group of toys was pursued on more than one level, each level is rated separately for Q-Play. For example, S's fantasy play with the dolls (6 pts.) was interspersed with period of inspecting the dolls' clothes (3 pts.).

Overlapping play activities. When play activities which would receive different Q-Play ratings occur simultaneously, only the activity involving the higher rating is scored. This situation is most frequent when S continues to hold a toy without using it while pursuing another play activity.

Play activities not involving contact with the toys. In general, S's activity must involve contact with the play materials to receive a Q-Play rating. That is, merely looking at or talking about a toy is not rated. However, Q-Play is scored when the lack of contact occurs during ongoing play and S's attention remained focused on the toys as evidenced

by fantasy about what is occurring, crawling around to size up the situation and making plans, or talk with E about progress (such as what S has done or plans to do). Those intervals receive the same Q-Play rating as the activity itself.

Criteria for Rating Quality of Play

A general description of the types of play behavior characterizing each level on the 1-7 pt. scoring scale for Q-Play is presented below. Specific examples of the play behavior assigned 1-7 pt. ratings for each toy or group of toys are provided in the following section.

1 Point. Touching or holding with minimal manipulation or examination.

Toy must be held in hand or touched--not merely looked at. Attention to toy is superficial and casual and frequently appears idle as if S is preoccupied with something else. True manipulation is absent--S simply handles the toy without attempting to make it do anything. Examination is limited and S does not appear concerned with how the toy is made or how it works.

2 Points. Primitive, inadequate, or undeveloped use.

Active manipulation or handling of the toy without apparent purpose. Thus S frequently appears to be doing something for the fun of it (even though it may be rather stupid), because he is bored and has nothing better to do, or while his mind is really on something else. No fantasy activity is discernable although S may state what he is doing in a factual way. Activities at this level tend to be short, but may be long when the same action is repeated again and again.

3 Points. Investigation and purposeful activity of a non-play nature.

Examination and careful investigation of how something works or is put together. Investigation is inferred from the way S manipulates the toy and/or questions about how it works. Simple problem solving may occur as, for example, seeing whether something will come off, finding out how it

fits together, or why it makes a noise. The problem need not be solved.

All activities involving organizing, cleaning up, arranging, and putting away of playthings.

Showing and explaining play creations to E when the action involves a break in the ongoing play activity. When showing and/or explaining activities overlap with the play activity, the action is rated at the level assigned to the play activity or for the activity receiving the higher rating. Seeking assistance from E.

4 Points. Appropriate activity at undeveloped level.

Play at this level creates the impression that S is really making or doing something with the play materials, but the product of the activity does not clearly reveal S's intent and S does not provide clues through conversation or fantasy. In general, the play is relatively unelaborated and involves expected and obvious uses and groupings of the toys (e.g., pounding with the hammer, playing with crayons and paper or blocks and the wagon). Play is characterized by doing something to the toy rather than having it play some role as it might in fantasy (e.g., S hits the dolls rather than having them hit each other). Directness of purpose and fantasy may exist, but neither is clear from S's actions alone. Thus many behaviors rated at this level would receive a higher rating if S verbalized the purpose of the activity or accompanied the action with spoken fantasy. Play is frequently short but may be long through repetition.

5 Points. Appropriate activity at developed level--imaginative and/or purposeful use.

Play is frequently directed toward some recognizable goal as in drawing a picture or making a block structure. The activity tends to be well sustained and is frequently completed although neither its completion nor the quality of the finished product is important for the 5-pt. rating if the purpose is clear. Fantasy play is common, especially with the dolls and bears who are no longer inanimate objects, but the actors in S's fantasy. The fantasy episodes are generally short (a single, unelaborated incident) and S's fantasy need not be verbalized if the import of the action is apparent (as the father doll spanking the child doll).

In general, play at this level differs from 4-pt. activities in being more sustained, developed, and purposeful or imaginative although S's use and grouping of the toys is still

expected and obvious. Level 5 is differentiated from level 6 in terms of the greater elaboration of the play activities, the more creative use of the toys, and the larger scope of the activity which characterizes the higher level (e.g., a small block building versus an elaborate castle or a snake versus a nest with chicken made from clay.)

6 Points. Highly elaborated or creative (but relatively short) activities.

Activities which are well developed and elaborated although the use of the toys need not be particularly original. The activity is sustained and purposeful and whatever is undertaken is usually completed. Play usually involves only one type of toy (such as blocks) or expected combinations of playthings (as blocks and wagon or crayons and paper), but S fully realizes their potential. Fantasy is frequent.

Very imaginative use of the toys involving an unusual (but appropriate) combination of playthings or clever solution to a problem. The activity is frequently fairly short although occasionally S spends considerable time in executing a single original idea.

7 Points. Highly elaborated creative activities.

Play at this level combines both aspects of Level 6 in that it involves creative and imaginative use of the toys where the creativeness tends to be sustained, elaborated and developed over a period of time. Several toys or groups of toys and non-toy objects are integrated in a meaningful and appropriate, although frequently unexpected way. Unlike Level 6 where a single idea may be developed at length, the 7 pt. play activity seems to develop as S pursues it--new elements and ideas are integrated in the course of action. Fantasy is frequent and long fantasies suggesting the same sort of elaboration of ideas as described for the toys are rated at this level even though the activity with the toys is more usual and includes less integration of toys of different types.

Examples of 1-7 Pt. Q-Play Ratings for Each ToyBears and DollsBlocks and Mallet1 Point

Touch casually--pick up and hold (not like a baby)--sit or lie on in absent way.

Touch--hold as if forgotten--jiggle in hand--run hands over--push a little in aimless way--stand on.

2 Points

Bounce and jiggle up and down--move arms or legs in aimless way--hit or poke without punishment fantasy--move to different location or wagon (not idea of pick up or ride)--sit on and push self around floor--rough tossing around--throwing--push in heap and roll on.

Push several together without building--isolated episodes of tapping or hitting together or on other objects (as if enjoys pounding)--toss around actively but aimlessly--put few in wagon without idea of picking up or load--shove around actively--destruction of a building (casual or prolonged)--stick two together with clay in idle way--scratching desk or other surface with corner.

3 Points

General inspection--finding out how to remove clothes--remove and replace shoe, etc. as simple problem (need not succeed)--more complete undressing if apparent purpose is to investigate (no fantasy)--hitting bear to learn about squeak--getting E to help with clothes or bow--put away to clean up--arrange or line up as they were at start of session.

Inspect blocks noting size, color, etc.--observe two blocks make something as two arches form circle--look at mallet, inquire about use and tap a little to try out--show E completed structure or ask advice--cleaning or clearing up by putting blocks in wagon or toy box.

Examples of 1-7 Pt. Q-Play Ratings for Each Toys cont.Bears and DollsBlocks and Mallet4 Points

Make stand, sit, or walk--push or hit together suggesting a fight--roughness that might be punishment--hold like a baby--fondling and cuddling (no fantasy)--undress dolls as activity rather than inspection (no reason specific but may involve fantasy).

Put a few blocks together as if building something or noting it will be something without further development of idea--tap on block with mallet as if for purpose--knocking apart and replacing suggesting some purpose--place a number of blocks in wagon with more enthusiasm than order (interest suggests play rather than cleaning up and purpose unspecified).

5 Points

Actors in S's fantasy who do simple things like kiss, spank, or fight, take a quick ride in wagon and other single episode activities--undress one doll for bath or to fix hair (may or may not redress)--partially undress more dolls for some purpose but fantasy not elaborated--holding like baby or child and have simple conversation with or talk to.

Pile blocks in wagon for a load to take somewhere (see wagon)--simple structures (about 20 or fewer blocks) in building that shows purpose or that S says is something, e.g., towers, houses, trees--smaller structures with original idea as a slide--mallet used as hammer for tapping in blocks--blocks stuck together with clay but not used as structural aid (see 6 pts.)--destructive actions involving fantasy associated with 5 pt. building as a tree of blocks being chopped down with a block hatchet.

Examples of 1-7 Pt. Q-Play Ratings for Each Toys cont.Bears and DollsBlocks and Mallet6 Points

Similar to 5 pts. but involves more episodes and/or characters--family goes for ride--mother sends children to store--family is undressed to go to bed--family goes to church with wagon as car--longer fights and arguments with integrated fantasy.

Elaborate structures using all or most of blocks, e.g., castles, large houses, factories--fewer blocks in original building as gas station with pumps and signs--solving structural problem in building a high tower by sticking blocks together with clay--building a house with wagon used to haul wood (blocks)--careful placing of all blocks in wagon so fit flat (as when manufacturer sold them).

7 Points

Long fantasy involving the doll family in which each member tries to obtain a gift from the fish pond and, upon failing, calls upon another member and finally the bears. Different roles played realistically by S--blocks used to make stove on which clay pancakes are cooked for bears. Subject draws a picture while waiting for pancakes to cook and then feeds bears.

A substantial number of blocks used to build a house which then became the home of the three little pigs with the bears, as wolves, trying to get in and subsequently being trapped. Elaborate fantasy which frequently involved little contact with toys.

Examples of 1-7 Pt. Q-Play Ratings for Each Toy cont.Crayons and PaperClay1 Point

Touch or hold in hand--stand or kneel on.

Touch or hold in hand as if forgotten, often while doing something else.

2 Points

Draw a line or two or scribble in idle way (no other drawing) --long series of drawings mostly in one color (fast and just a couple lines on each page)--drop crayons on paper or on floor--mark up shoes or room in destructive way--shuffle papers or toss around (not lining up)--fold roughly, crumple, or sit on a pushing self around--move from one spot to another or to wagon without apparent purpose--break crayons or tear paper off.

Squeeze, knead, pat, stick fingers into, step on, hit with mallet, break pieces off, etc. as simple activity without apparent purpose of making anything--pat on paper without making anything--stick pieces on window or other inappropriate places--removing from can and/or replacing when not part of other play--squash object with prolonged squeezing (idea of destruction rather than preparing to make new object).

3 Points

Look at carefully and comment on colors, etc.--show E drawing as separate activity (not part of running comment during drawing)--line up paper or crayons as preparation for drawing or as clean up at end --put away in box or wagon.

Inspect label on can--look at clay and comment on color or texture--take clay out to get ready to make something or put it back in can at end (each as fairly long effort--quick removal, etc. rated with play activity itself)--showing E what has been made as separate activity (see crayons and paper)--asking for help in kneading clay or removing from can.

Examples of 1-7 Pt. Q-Play Ratings for Each Toy cont.Crayons and PaperClay4 Points

Drawing that might be something even if it looks like a scribble since S spends some time and effort--elaborate scribbles in several colors--complexes of lines (unnamed), scribbles called designs or writing when they bear no resemblance--simple scribbles called something (2 pts. if not).

Rolling balls, cylinders like snakes, patting flat like pancake or anything which suggests some purpose, but object is not named and is frequently remolded into something else--calling objects something when it looks like nothing, e.g., a lump of clay called a shoe--rolling a piece with a block but not making anything recognizable.

5 Points

Simple drawings of a single unit such as a house, tree, head or flower which are recognizable--repetitious and quickly executed designs even if large--printing name (or poor but recognizable attempt)--attempts to write or print a few letters or numbers which are passable or good--drawings involving more elements with each very simple (a few lines) as tree, person, and flowers.

Simple objects, often designated or clearly recognizable, such as bells, snakes, apples, eggs, and pancakes--two-ball type shapes like snowmen or bears (relatively unelaborated)--simple nest with eggs--single round piece cut with can cover without fantasy of cooky--play with something that has been made (as a ball).

6 Points

Integrated drawings and time consuming, well-executed designs--drawings resembling a picture with several elements as room with furnishings and person, house, sun, trees, etc.--one thing like a house or person elaborated--original idea as copy of toy telephone or wagon--copying a block design made previously even though execution is poor--long lettering or numbering sequences.

Cookies cut with cover of can (designated or fantasy)--other confections such as plates and food--people--animals--bird and nest--pumpkin with light and cover--in general, groups of simple objects which take time or complex single objects.

Examples of 1-7 Pt. Q-Play Ratings for Each Toy cont.Crayons and PaperClay7 Points

Clever integration of clay figure and drawing as picture of a girl with well executed clay dog on leash-bas-relief clown carefully shaped with mallet handle and colored with crayons on paper with circus tent and other decorations.

A chicken with nest as part of farm fantasy in which farmer steals chicken in wagon, chicken is attacked by clay snake, and finally saved by S.

Examples of 1-7 Pt. Q-Play Ratings for Each Toy cont.TelephoneWagon1 Point

Touch--hold--pick up and put down.

Touch--hold cord as if forgotten--sit in or rest foot in (no pushing activity)--move back and forth a little in bored way.

2 Points

Jiggle or toss around--dial once or twice for fun or in idle way (no suggestion of phone call--long and repetitious dialing apparently and fun of activity or noise--twirling receiver on cord--moving from one place to another without apparent purpose.

Roll or kick back and forth--twist, swing, or idly knot cord--turn over and shove around roughly--hit without idea of repair--pull a foot or two when empty without idea of trip or taking some place--toss in a few blocks or other toys without evidence of intent to clean up or get a load to haul.

3 Points

Examine by turning over--wondering about bank in bottom--dialing to find out how it works and perhaps commenting on bell--untangling cord--load in wagon or toy box as part of clean up.

Examine as words on side or wheels--use to load toys in for clean up (neat or messy)--put away in box.

4 Points

Dial and hold receiver in hand and/or listen as if a real call but no conversation or fantasy--mentions intent to call some number and dials but no listening or other follow through.

Pull around empty as if taking a trip--tap wheels with mallet as if S is mechanic but no fantasy to clarify--place a few toys in wagon and pull a short distance with possible idea of load--place a number of blocks or other toys in wagon, reason unspecified and no trip (gives idea this is fun to do).

Examples of 1-7 Pt. Q-Play Ratings for Each Toy cont.TelephoneWagon5 Points

Making a call including dialing, listening, and saying "Hello" and/or a few words--dial, listen, and report phone is busy, no answer, or other outcome of call (not elaborated--see level 6).

Taking dolls or bears on short trips--S gives self a ride in wagon--Building simple structures with blocks using wagon as floor--make a sidewalk with blocks--pile most of blocks in wagon in neat way (but not so all fit flat as originally packed by manufacturer)--

Rating of play with wagon usually involved other toys and level of play determined by nature of activity (see bears, dolls, etc.).

6 Points

Telephone calls involving dialing, listening and a conversation in which there are several exchanges with a fantasy person (may be mumbled, whispered or relatively short exchanges--extended fantasy about telephone being busy, wrong number, no answer so try another number in context of realistic use of phone.

No 6 pt. rating unless used in conjunction with other toys.

7 Points

Play with father doll including having him make a telephone call and talk as well as helping him hold crayons for writing.

No 7 pt. rating unless used in conjunction with other toys.

APPROVAL SHEET

The thesis submitted by Constance S. Clune has been read and approved by the director of the thesis. Furthermore, the final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated, and that the thesis is now given final approval with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

5 January 73
Date

Patricia M. Berger, Ph.D.
Signature of Adviser