

PREDICTING PROBLEM-SOLVING BEHAVIOR AMONG PRESCHOOLERS IN INDIA
A CROSS-CULTURAL COMPARISON

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(ABSTRACT)

There is evidence that the conceptualization of creativity as a process of original problem-solving is applicable to Indian preschoolers ($N=66$, mean age 54.8). The cross-cultural validity of the measuring instruments has been demonstrated. The lack of age and sex differences was consistent with results found in the U.S. (Moran, Milgram, Sawyers, & Fu, 1983) and in Israel (Milgram, Moran, Sawyers, & Fu, 1987).

Quantity and quality of ideational fluency responses were found to be strongly related; a marked order effect with popular responses occurring earlier and original responses later in the response sequence was found to exist more in high original subjects than in low. These findings duplicate those found with preschool children in the United States and in Israel.

The relationships between the variables proved to be more complex than hypothesized. In the present study with Indian preschoolers, fantasy did not act as a bridge between convergent and divergent thinking as hypothesized on the basis of results obtained in the U.S. The multidimensional model with ideational

fluency, fantasy, metaphoric comprehension, intelligence and the home as predictors accounted for 48.9% of the variance in problem-solving.

The home environment was found to be a crucial factor in the prediction of original thinking and its role in conjunction with the cognitive variables needs further examination. Considering this, it is recommended that a measure of the home environment and its profound influence on the divergent and convergent thinking of the preschool child be studied. The investigations have also revealed that the measures for stringent problem-solving are not completely satisfactory and a more appropriate criterion measure of creativity needs to be established.

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The definition and assessment of creativity has long been a subject of interest to researchers. A variety of behaviors and processes have been related to or equated with the construct of creativity which has been studied as a product, a process and a personality trait. While research on creativity has increased in the last two decades (Barron & Harrington 1981), studies focusing on developmental issues and creativity in young children are sparse (Arasteh & Arasteh, 1976; Moran, Milgram, Sawyers & Fu, 1983; Wallach, 1970). The paucity of such research may be partly attributed to the difficulties encountered in operationally defining creativity and in measuring it in an age appropriate manner.

The need to delineate the role of cultural and social factors in the development of creativity has been recognized. The extent of the influence of a culture is an intriguing question and some researchers have endeavoured to identify different aspects of individual development as culture specific. The understanding of a child's milieu in relation to its impact on the development of the child has always had implications for the understanding of cognitive abilities (Caldwell, 1967). Cultural and social environments are thought to influence both the level of creative functioning and the course of creative development within a culture.

Much of the literature on child training and personality has implied that the really crucial aspects of the socialization process in early childhood are those which have

to do with the patterns of disciplining in the early years (Straus, 1967). These affect the child's personality in terms of a sense of security, self-concept, independence of thought, self-regulation and initiative. It is true that a pattern for child-rearing that may be defined as optimal in one culture may not be so in another (Maccoby & Martin, 1983). Yet, it cannot be denied that a parent-child relationship that has the elements of firm control accompanied by high levels of parent-child interaction, democratic decision-making and mutual affection is one primarily aimed at fostering children's self-regulation.

Perhaps one of the most powerful ways in which a culture encourages or discourages creative behavior is the way by which parents and teachers encourage or discourage, reward or punish certain personality characteristics (Torrance, 1965). Emphasizing those aspects of a home that are related to creative talent, Hergenhahn (1972) identified the true essence of these factors as respecting the child as an individual, allowing the child freedom to roam and explore, providing a variety of experiences, refraining from severe punishment and encouraging the child in independent activities. It has been found that parents of children with high IQ's but low creativity scores were more authoritative in their discipline and more concerned about intellectual and social achievement than parents of children with low IQ's but

high creativity scores (Getzels & Jackson, 1961).

There is little doubt that a great part of the basic elements of the personality are laid down during the socialization process in early childhood. The decrease in the development of the creative process in children of ages 7- to 10-years, coined as the fourth grade slump, appears to be accounted for by the societal and educational pressures to conform which are intensified during these years (Torrance, 1962). In a test of this 'conformity-inhibition' theory, Straus and Straus (1968) looked at the differences in creativity scores in relation to the degree to which Indian and American societies expect normative conformity in children especially females. It was seen that children's creativity varies according to the degree to which the child's role requires conformity to conventional norms (Straus & Straus, 1968).

Thus a culture may provide a restrictive environment through the parent-child interactions and child-rearing practices that result in the setting up of rigid boundaries in the inner personal regions (Starkweather, 1971). Socialization techniques that lead to excessive repression and guilt restrict internal freedom and may interfere with the process of hypothesis formulation. If the development of a creative individual is linked to both the external and internal environments then it may be said that a culture

fosters creativity to the extent that it encourages and provides the opportunity to experience its many facets (Starkweather, 1971). In most cultures, this is different for males and females at various ages.

Cultural and societal influences have been investigated in studies of sex differences. A number of thought provoking findings concerning differences in the way boys and girls learn and think can be found in the research literature. Many of the studies on problem-solving have shown male superiority, even on "intuitive" problem-solving (Crutchfield, 1960; Hoffman & Maier, 1961; Torrance, 1965). While this may be inherent, it is more likely that it is an outcome of societal pressures that encourage sex appropriate behavior.

Support for this notion can be found in various studies indicating that sex differences found in older children do not exist in younger children. For example, no sex differences were found among American and Israeli preschoolers tested for original problem-solving (Milgram, Moran, Sawyers & Fu, 1987; Moran, Milgram, Sawyers & Fu, 1983) but have been found in Irish teenagers (Lynch, 1970) and in girls and boys over the fourth grade in the United States (Torrance, 1975) and in various studies in India.

The general superiority of boys over girls has been reported in verbal tests of creativity given to Indian

children (Raina, 1969). These results are supported by Prakash (1966) who observed few differences in creative development between boys and girls in the first and second grades but rather consistent and significant differences on both the verbal and figural tests given to third and fourth graders.

Since the Indian culture places an emphasis on male superiority and female conformity, it is not surprising that after grade two, Indian boys surpassed the girls on verbal tests of creative thinking (Prakash, 1966). Another Indian study found significant differences on verbal fluency, verbal flexibility and verbal transformation measures given to ninth graders where again, boys did better than girls (Gupta, 1982). The Indian girls scored higher on non-verbal tasks of originality, complexity and productive designing ability. This seems to support the idea that in a traditional society like India, girls are encouraged to be submissive and conforming and are more reluctant to express non-conforming ideas than are boys of the same age group.

On the other hand, no statistically significant differences were found to exist between younger boys and girls in an Indian setting who were tested on the Torrance Tests of Creative Thinking (Phatak, 1962). With the understanding that different cultures would have within it values which encourage or discourage creativity and that

there may be differences and similarities both within and between different cultures, an attempt was made to identify these values (Torrance, 1965). A checklist of characteristics important to the creative personality was given to teachers and educators in five distinct cultural groups - Germany, Greece, India, Philippines and the United States. It was found that the values of Germany and the United States correlated more closely with the ideal creative personality as judged by a panel of experts than did the other three cultures, followed first by those of the samples from Baroda, India and Greece and finally those of the sample from the Philippines.

Our understanding of the inherent quality of creativity and the specific influences of the cultural environment may be advanced by the examination of the thinking processes of young children in various cultures. Unfortunately there is a scarcity of cross-cultural research focusing on young children. Most of the evidence comes from studies involving adults, or school-age children (Khatena, Raina, Zatenyi & Gibbs, 1976; Lynch, 1970; Straus & Straus, 1968; Torrance, 1975). In a recent study, original thinking, as measured by the Wallach and Kogan Creativity Battery was examined in 41 Israeli preschoolers (Milgram et al, 1987). The findings duplicated those found with preschool children in the United States (Moran et al, 1983) and indicated that the Guilford-

Mednick conceptualization of original thinking has validity beyond a given western society.

Investigations with the above conceptualization in mind have led researchers to examine creativity as a process of original problem-solving. The lack of a valid criterion for the measurement of creativity in young children has been a problem. Recognizing the need for a criterion, some researchers have attempted to develop ecologically valid measures that are aimed at reflecting real-life situations (Milgram, 1981; Milgram & Arad, 1981). These tasks called the Stringent Problem-Solving measures (Milgram, 1981) have been used as criterion measures of original problem-solving (Milgram, 1981; Sawyers, Moran, Fu, & Horm-Wingerd, 1987). Stringent problem-solving tasks have multiple responses that fit stringent criteria for solution.

The paucity of cross-cultural research and the diverse results obtained make the task of isolating the particular environmental factors that affect creativity complicated. Yet, life in the contemporary world involves many complex problems for which creative solutions are not only welcome but essential. As a result, there has been a steadily increasing emphasis in the educational community on measuring and enhancing the creative abilities of children (Kogan, 1983). Since a child's early experiences may affect later competence levels, an exploration into problem-solving

behavior and how this may be predicted has become necessary.

The purpose of the current study was to obtain a cross-cultural comparison of original problem-solving behavior in preschoolers in India and the United States. The main aim was to investigate if the conceptualization of creativity as a process of original problem-solving had validity for the Indian society. Another aim was to investigate the predictive validity of ideational fluency, fantasy predisposition, metaphoric comprehension, intelligence and the home environment for stringent problem-solving among Indian preschoolers. The specific questions addressed included examining the differences among the subjects that could be attributed to their age level or sex and if so, what trend those differences followed. The interrelationships among all the variables in predicting stringent problem-solving behavior were also explored. Finally, the response patterns in original thinking were examined.

METHOD

Subjects

The sample from India consisted of 66 preschoolers from a pre-primary school in a town in the state of Gujarat. Baroda is the leading educational center of a progressive state and has earned a reputation for both its innovative technology and cultural traditions. Equally well known for its industries as it is for its prestigious university, the legacy of a king, the town is host to many individuals with varied linguistic backgrounds though Gujarati is the official state language.

The pre-primary school is owned and run by a large industry that employs people from all over India. The residential area for these employees is self-contained and caters to their varied needs including education for the children. The school is divided into two main units on the basis of the medium of instruction used, Gujarati or English. Each unit is composed of 12 classrooms divided into higher and lower kindergarten sections (i.e. six each). There is one teacher and a helper (maid) attached to each class with approximately 30 boys and girls in the room.

The sample for this study was selected from the English-medium unit of the school on the basis of their sex, age, socio-economic status and linguistic background. Care was

taken to see that the subjects belonged to two-parent families and lived within town limits. Some children selected through the initial screening were dropped from the final sample as one child refused to accompany the investigator, one child lived so far away so as to make the home visits impossible and one belonged to a one-parent family.

The final sample consisted of 36 boys and 30 girls from the middle socio-economic status (SES) class of the society. The ages of the sample ranged from 46- to 64-months (mean age 54.8-months). The preschoolers had either the regional language Gujarati (69.7%) or the national language Hindi (30.3%) as the language spoken at home.

Description of the Tasks and Scoring Procedures

Multidimensional Stimulus Fluency Measures. The MSFM developed by Moran, Milgram, Sawyers & Fu, (1983) consisted of three subtests (patterns, instances and uses) adapted from those of Wallach & Kogan, (1965), Starkweather (1971) and Ward (1968) for use with young children. In the patterns subtest the child was asked to provide possible interpretations for two three-dimensional styrofoam shapes. In the second subtest the child named instances of round things and red things and in the third subtest children named uses for two common objects: paper and box. Each test

response was scored as popular or original, that is given by more or less than 5% of the entire sample respectively. This form of scoring was developed by Wallach and Kogan (1965) and has been used by several investigators (Ward, 1968; Milgram & Milgram, 1976; Moran et al, 1983). Total scores were computed for each subject by adding the appropriate raw scores of the six items.

Fantasy Predisposition. Movement responses to an abbreviated form of the Holtzman Inkblot Test (Holtzman, Thorpe, Swartz & Herron, 1961), consisting of 15 inkblots served as a measure of fantasy predisposition. Movement responses have been shown to be related to creativity, imagination and fantasy (Biblow, 1973; Clark, Verldman & Thorpe, 1965; Richter & Winter, 1966; Singer & Herman, 1954). Responses were scored for movement using the standardized instructions.

Metaphoric Comprehension. This was measured through an abbreviated version of the Metaphoric Triads Task (Kogan, Connor, Gross & Fava, 1980). In this task, three pictures offering two possible pairings, one of which is metaphoric in nature were presented. Given the problems encountered by Kogan et al (1980) in presenting this task to 7-year-olds the pictures were presented in the modified format (the inverted pyramid) proposed by Kogan et al (1980). The five triads selected were those reported as least difficult for the 7-year-olds in the Kogan et al (1980) study. As a warm-up task,

each subject was provided with an explicit example of metaphoric pairing and explanation. A third trial which required another pairing and explanation from the child was added. A five-point scale was used to score metaphoric comprehension. A score of 4 was given for recognition and satisfactory explanation of the metaphoric link; 3 for recognition accompanied by a less than satisfactory explanation; 2 or 1 if the child provided a full or partial explanation on the third trial and a score of 0 when the child failed to join the critical pair or paired them on a non-metaphorical basis. A total score was obtained by summing across the five sets of triads.

Intelligence. IQ scores were obtained from the Phatak Draw-a-Man Scale which is the version of the Goodenough Draw-a-Man scale standardized for Indian children. A high correlation has been reported between the Phatak Draw-A-Man and the Goodenough scale for children 3- to 6-years of age (Sase, 1969).

Home Environment. The home environment was assessed by the Home Observation for the Measurement of the Environment (HOME) Inventory (Caldwell, 1978). The inventory is designed to sample certain aspects of the quantity and quality of social, emotional and cognitive support available to the 3- to 6-year old children in their homes. The eight subscales were scored individually and then summed to achieve a total

score. The 55 items are in the form of an observational checklist completed through direct observations in the home and school as well as through interviews with the parent or guardian, usually the mother.

Stringent Problem-solving. These tasks have been adapted from earlier work (Milgram, 1981; Milgram and Arad, 1981), by Sawyers, Moran, Fu & Horm-Wingerd, (1987) and served as the criterion measure of original problem-solving. Multiple correct solutions are possible for the two measures, the Lake Task and the Rescue Task, which offer tactile, visual and auditory stimulation through a model and picture cards respectively. In each of these tasks the child is presented a problem situation (e.g. this person has fallen into a deep hole; how does the person get out?) Responses that are feasible solutions are classified as either popular or original (given by more or less than 5% of the group respectively).

The Socio-economic Status Scale (Urban). This scale, developed by B.Kuppuswamy (1959) measures the socio-economic class of families in India. The salary, occupation and educational level of the father is used to define the family as high, middle or low SES. This instrument was used to determine the socio-economic class of the families of the subjects selected.

Procedure

The various tasks were administered individually except for the measure of intelligence. Instructions were translated into Gujarati and Hindi and each subject was tested using his/her mother tongue. The instructions for the IQ measure (a group administered test), were given in English (the medium of instruction in the school), and repeated in Gujarati and Hindi.

The tasks were presented to the subjects in four separate sessions. A room away from the classroom of the children was used for testing. In the first session, the ideational fluency tasks, the fantasy predisposition and the metaphoric comprehension measures were presented to the child. There were no time limits and the entire session took about 20- to 40-minutes with one break in the middle to ensure that the child did not get fatigued.

The stringent problem-solving measures consisting of the lake task and the rescue task were presented to each child in session two. The child was permitted to explore and manipulate the items before a description of the task was given. Only one task was presented at a time and no time limits were set. The entire session was audio-taped.

Session three involved group administration of the Phatak Draw-a-Man test in the classroom. Each child was given a sheet of drawing paper and asked to draw a human figure.

They were seated away from each other and care was taken to see that children did not get cues from their neighbors. There was no time limit set and children were discouraged from erasing their first attempt or making more than one human figure.

Home visits were made to interview the parent/s and observe parent-child interaction at home in the final session of the data collection. The interviews were informal in nature. Observations of the parent-child interactions on school premises were also considered a valid basis for scoring on the Inventory.

RESULTS

The scores obtained from the Indian sample on measures of ideational fluency, metaphor, intelligence, home environment and stringent problem-solving were subjected to two separate analysis of variance to determine if any age (median split) or sex differences existed among the preschoolers. Consistent with findings in Israel (Milgram et al, 1987) and in the U.S. (Moran et al, 1983), no significant main effects or interactions were observed. Age and sex were therefore combined for further analyses.

The cross-cultural comparison was made by using the results obtained from a parallel study (Sawyers, Moran, Fu, & Horm-Wingerd, 1987) conducted in the United States. The U.S. sample consisted of 59 preschool children (mean age 56.7-months) who were attending either an university laboratory nursery school, a community college nursery school or a local Headstart center.

The U.S. study differed from the one done in India in two major ways. One, IQ scores were extrapolated from the Information and Picture Completion subtests of the Wechsler Preschool and Primary-school Scale of Intelligence (WPPSI) and second, the home environment was not assessed.

The means, standard deviations and obtained and theoretical ranges of the five cognitive variables

(ideational fluency, fantasy predisposition, metaphoric comprehension, stringent problem-solving and IQ) obtained from the Indian and U.S. samples are reported in Table 1.

-insert Table 1 here -

A comparison of the means of the two cultural groups revealed that significant differences existed between the American and Indian preschoolers on the measures of original ideational fluency ($t=3.94, p<.001$) and fantasy predisposition ($t=4.07, p<.001$).

The obtained and theoretical ranges obtained for both groups (Table 1) indicate that the ranges obtained from the Indian children are higher on the measures of original ideational fluency and fantasy but lower on the measures of popular ideational fluency. The differences in the ranges of the other variables are very small. The means, standard deviations and ranges of the eight subscales of the HOME inventory presented to the Indian sample are given in Table 2.

-insert Table 2 here-

The comparison of the interrelationships among the variables, determined using Pearson product-moment correlations are presented in Table 3. Looking first at the cognitive variables, it was seen that in the Indian sample, there existed positive significant relationships between original and popular ideational fluency ($r=.71, p<.01$) and original ideational fluency and IQ ($r=.20, p<.05$). Stringent

problem-solving was positively correlated with popular ideational fluency ($r=.36, p<.01$) and fantasy ($r=.40, p<.01$) but not with IQ or metaphoric comprehension.

In contrast, in the American study, IQ appeared to be an important factor which related to both fantasy ($r=.38, p<.01$) and metaphoric comprehension ($r=.61, p<.01$). Metaphoric comprehension was related to popular ideational fluency ($r=.26, p<.05$) but not to original ideational fluency. There was a positive relationship between fantasy and ideational fluency ($r=.37, p<.01$) and fantasy and metaphoric comprehension ($r=.35, p<.01$).

-insert Table 3 here-

Looking at the relationships with the environmental variables in the Indian study (Table 4), it was found that the total score on the HOME and the subscale scores for physical environment, pride, affection and warmth and the variety of stimulation were not significantly related to ideational fluency, fantasy, metaphoric comprehension, IQ or stringent problem-solving.

-insert Table 4 here-

Scores on the stimulation through toys, games and reading materials subscale had a significant negative correlation with IQ. Subjects scoring high on the language stimulation subscale scored low on original ideational fluency, metaphoric comprehension and IQ. High scores on the academic stimulation

subscale had a direct relationship with low scores on original ideational fluency and high scores on stringent problem-solving measures. Physical punishment had a significant negative correlation to fantasy. Correlations among the HOME subscales ranged from .27 to .59 ($p < .001$) and were all significant (not shown in table).

The relative contributions of the variables in predicting stringent problem-solving were determined using regression analysis. In the Indian study, the prediction equation consisting of ideational fluency (original and popular), fantasy, metaphoric comprehension, intelligence and home scores yielded a multiple correlation coefficient of .70, accounting for 48.9% of the variance. The best subset for the prediction of total solutions on the stringent problem-solving tasks were the home variables accounting for 22% of the variance ($R = .47$). The addition of ideational fluency lead to an increase ($R = .58$), accounting for 33% of the variance. Without the home variables, the amount of variance explained by the four cognitive variables was 33%, which was close to the 31% explained in the U.S. study.

The order effect first postulated by Mednick (1962) and recently replicated with preschool children (Milgram et al; 1987; Moran et al, 1983), was assessed among the Indian sample by comparing the responses of children with high (above median) versus low (below median) original scores. Popular and

original scores were subjected to separate two-way analysis of variance, order of occurrence (first half versus second half of the response sequence) x level of original thinking (high versus low), with the first constituting a repeated measure. The means and standard deviations of first- and second-half original and popular scores for high and low original subjects are presented in Table 5

-insert Table 5 here -

The number of original responses increased from the first half to the second half, $F(1,64)=56.47, p<.001$ whereas the number of popular responses decreased, $F(1,64)=22.92, p<.001$. This was found to be more so for high original subjects than for low original subjects.

DISCUSSION & CONCLUSIONS

One of the most exciting findings has been that of the lack of sex and age differences. The lack of sex differences is consistent with the results of various studies done with preschoolers in India, Israel and the U.S. (Milgram et al, 1987; Moran et al, 1983; Phatak, 1962; Prakash, 1966; Sawyers et al, 1987). This seems to support the idea that in India also, the preschool girls and boys of the middle socio-economic class are not under great pressure to conform.

Results indicating no age differences are also consistent with the results of other studies (Sawyers et al, 1987; Tegano, Moran, & Godwin, 1986). Thus within the relatively narrow age range sampled, age does not appear to be a confounding variable. This may indeed be a function of the age-appropriateness of the measures used.

Examination of the means revealed that the mean of original ideational fluency obtained from the Indian sample (24.60, S.D.=18.51) was almost double than that of the U.S. sample (12.47, S.D.=9.32) but similar to that (25.69, S.D.=13.66) obtained from preschoolers in Israel (Milgram et al, 1987). Keeping in mind that the order effect postulated by Mednick (1962) of response patterns of original thinking have been supported in the Indian study, there is no readily available explanation for this significant difference in the means of original ideational fluency.

It may be noted that 26% of the Indian sample did not score at all on the measure of fantasy predisposition. Again, till further cross-cultural study is done to examine if this may be a consistent trend, no explanations are available. Considering that the measures used to assess intelligence in the two cultural groups were different, it is interesting to note that the mean for IQ of the Indian sample (117.26, S.D.=19.51) did not differ very much from that of the American children (113.05, S.D.=17.26). The means for the other cognitive variables though lower for the Indian children than for the American did not differ appreciably.

One aspect that needs to be kept in mind is that part of the U.S. sample (n=20) belonged to the local Headstart school. It was seen that the means of this subsample were consistently lower than the means obtained from the rest of the sample on the measures of IQ, fantasy predisposition, metaphoric comprehension and stringent problem-solving (Sawyers et al, 1987).

On the other hand all the Indian children belonged to urban middle-class families which indicates that there exist opportunities for exposure to stimuli (for example, readily available toys, games, books; amusement parks, zoos, and markets) which would be missing if they lived in the rural areas of India or belonged to the lower-class of the society. This difference in the samples used may account for the difference in original scores.

The interrelationships among the various cognitive variables proved to be more complex than hypothesized and differed in the

two samples. It was expected that ideational fluency, fantasy and metaphoric comprehension would be correlated with each other but independent of IQ. In the Indian sample, the strong positive relationship between original and popular ideational fluency is not surprising as these variables are part of the same measure (MSFM). What is inconsistent with previous literature and the U.S. study, and needs examination is the correlation between original ideational fluency and IQ ($r=.20, p<.05$).

In an attempt to understand this further, the data obtained from the Indian sample were re-examined to see if any outlying scores were responsible. Looking at the range of original ideational fluency, two subjects were identified with scores that differed from those of the rest of the sample by at least 28 points. The correlations of IQ with both original ideational fluency and fantasy were insignificant when the two subjects were dropped from the sample. The correlations between the other variables remained unchanged as did the multiple correlation coefficient. Thus IQ appears as a confounding factor and may be explained as an effect of the measure used to assess IQ in Indian preschoolers.

The Phatak Draw-a-Man IQ is based on the detail and depth of a child's drawing of a human figure. While children's drawings are useful tools in understanding their affective and cognitive status (Di Leo, 1983), they may more legitimately be used as a reflection of the child's developmental level. If this is so,

then original responses which seem to demand a wide breadth of responses and free-flow association of ideas may very well be found to be correlated with the developmental level. A child's developmental level implies greater exposure to the world, greater level of awareness and a greater sense of social niceties (of pleasing the experimenter, etc.). Further study is essential to understand if the differences observed across the two cultures are because of the measure used or a true reflection of cultural differences.

The correlations between stringent problem-solving and stimulation through toys, games and reading materials may be explained in the light of the established link between play and problem-solving. The notion that play provides the behavioral flexibility that makes tool use possible has been supported (Sylvia, 1977; Sylvia, Bruner, & Genova, 1976; Vandenberg, 1981). Thus children who are used to manipulating their immediate environment through toys, games, etc., or have an overall physical environment that is conducive to manipulation and change would be more likely and willing to manipulate the test materials and indulge in pretend play, using their imagination to 'rescue'.

The negative correlation between original ideational fluency and language stimulation and stimulation of academic behavior is complex in nature. One possible explanation is that there exists an identifiable trend within the items of the HOME subscales that reflects encouragement of convergent or divergent thinking in

children. An example of this is item #14 'parent teaches child some simple manners - to say, "please", "thank you", "I'm sorry".' Accordingly, the items of the inventory were examined for "directiveness" - three independent raters judged the subscales as being physically and/or mentally restrictive and involving intensive structured parental involvement. It was found that of the eight subscales those of language stimulation and stimulation of academic behavior were judged as directive.

A word of caution is that the items of the HOME inventory are not designed for investigating "directive or non-directive" parenting behavior. Still it is interesting to postulate such a relationship and find support for previous literature that suggests that a structured environment and directive parenting may be adversely related to original thinking.

With the emergence of the home environment variables as important factors in the study of problem-solving, an attempt has been made to compare the data of the HOME inventory as presented by Caldwell (1978) with the data obtained in the Indian study. As it was not possible to obtain the raw scores of the Caldwell study (Caldwell, 1978), no statistical test for the comparison of means was feasible.

A subsample of the Caldwell study consisting of 63 preschoolers was used for the comparison of the means and standard deviations obtained from the two cultural groups. "Eyeballing" the available data, it was seen that the means of

the total scale differ by 6.8 points. Individual comparisons of each of the subscales do not show many differences except for the means of variety of stimulation ($X - X' = 3.43$) and pride, affection and warmth ($X - X' = 1.15$). All the others differ by less than one point. This seems to indicate that while the overall home environment is of higher quality in the U.S. sample (Caldwell, 1978), it is not very different across each subscale.

In the American study (Sawyers et al, 1987), IQ appeared as an important factor, related both to fantasy ($r = .38, p < .005$) and metaphoric comprehension ($r = .61, p < .0001$). The relationship between fantasy and metaphor ($r = .37, p < .005$) appeared to be affected by IQ as it dropped to a non-significant level ($r = .18$) when IQ was partialled out. In contrast to the Indian study, ideational fluency was not correlated with IQ and instead was found to be related to fantasy ($r = .30, p < .005$). Based on the results obtained, fantasy was hypothesized to be bridging the gap between convergent (IQ) and divergent (ideational fluency) thinking; this was not supported by the results of the Indian sample. Again, the explanation for this may be partly the tool used to assess IQ.

The fact that stringent problem-solving was found to be correlated to popular ideational fluency and fantasy and two of the HOME subscales (academic stimulation and modeling and encouragement of social maturity) seems to indicate that there may be some convergent thinking involved in the fantasy responses

of Indian children. The relationship between fantasy and total solutions on the problem-solving task is supported in the American study and as we shall see, emphasizes the value of a multidimensional model.

The emergence of the home environment variables as strong predictors of problem-solving provides impressive support for the use of a multidimensional model. The crucial role played by the home environment in predicting problem-solving in preschoolers has implications for future research in the field.

The Indian study indicated that total solutions in the stringent problem-solving measures are best predicted by a combination of all the predictor variables (HOME subscales, original and popular ideational fluency, fantasy predisposition, IQ and metaphoric comprehension) even when the IQ measure may be reflecting the developmental level of the child. The HOME subscales and ideational fluency emerge as the best subset but still the maximum amount of variance is explained when all the variables are in the equation.

This is in contrast with the American results which indicated fantasy and IQ as the best possible subsets, accounting for 27.7% of the variance. In the U.S. study, addition of the other predictors (ideational fluency, IQ, metaphor) did not bring about an appreciable change (explained variance=29.5%). Support for the multidimensional model came from the results of the factor analysis done in the U.S. study. This along with the

results of the regression indicated that fantasy may be bridging the gap between convergent and divergent thinking and therefore a multidimensional model is necessary in predicting problem-solving.

The important role played by the home environment is further emphasized when one considers the amount of variance explained in the prediction of problem-solving when all the predictor variables are used in the Indian sample (48.9%) as compared to that obtained in the U.S. (29.5%).

Looking at the response patterns in original thinking in Indian preschoolers has lead to support of the order effect first postulated by Mednick (1962). The significant order effect with popular responses emerging early and original responses emerging late in the response sequence of all children in the Indian sample was exciting to find just as it exists among the American sample (Moran et al, 1983) and the Israeli one (Milgram et al, 1987). This order effect is justified in the light of established word associations norms concerning the probability of occurrence of popular and original responses to ideational fluency tasks. In the present study, the results indicated that order effects exist more dramatically in children who are high original subjects rather than low original. This is consistent with Mednick's formulation of different response hierarchies for high versus low original people and supports its existence for preschool children.

Again consistent with previous research, the order effect though statistically significant is not an all-or-none one. Popular and original responses occur all through the response sequence which seems to indicate that it may be necessary to allow a greater flow of all responses including popular ones in order to get high quality original responses.

As in the U.S. study, there is ample evidence for the construct validity of the conceptualization of creativity as a process of original problem-solving. This can be summed up as (1) original thinking is positively related yet empirically distinguishable from intelligence, (2) high quality original responses are associated with and related to the total production of responses and (3) a strong order effect exists in the response patterns of original thinking.

Looking at the various findings, one is increasingly drawn to support the theory that it is ideational fluency that plays an important role in defining and assessing creativity. Considering original ideational fluency as a criterion may be one way of looking at the predictive aspect of problem-solving in the future as the stringent problem-solving measures can be criticized for reflecting grown-up situations and thus being inappropriate for assessment in preschool children.

The results of this study indicate that the role of

the home environment is decisive in the prediction of problem-solving which has implications for future research. The support for the use of a multidimensional model emphasizes the complexity of the construct of creativity. The extreme caution and care needed to conduct and implement such cross-cultural investigations are emphasized. The establishment of validity for the measuring instruments has implications not only for the assessment of creativity but also provides support for the understanding of creativity as problem-solving and the implications for this particular age group.

Table 1

Comparison of the Means, Standard deviations and Ranges obtained from the Indian and U.S. (in brackets)* preschoolers.

	Mean	S.D.	Obtained Range	Theoretical Range
MSFM				
Popular	13.21 [17.42]	7.67 [8.33]	0 - 30 [3 - 38]	- -
Original	24.60 [12.47]	18.51 [9.32]	0 - 97 [0 - 42]	- -
Fantasy	13.30 [6.61]	12.79 [6.34]	0 - 38 [0 - 22]	0 - 60 [0 - 60]
Metaphor	5.68 [6.41]	5.89 [5.27]	0 - 18 [0 - 20]	0 - 20 [0 - 20]
IQ	117.26 [113.05]	19.51 [17.26]	69 - 158 [68 - 150]	61 - 184 [61 - 184]
Stringent Problem Solving	6.42 [7.51]	3.56 [3.84]	0 - 16 [0 - 16]	- -

* Note: Data as obtained by Sawyers, Moran, Fu, & Horm-Wingerd, 1987.

Table 2

The Means, Standard deviations and Ranges of the HOME Inventory

	Means	S.D.	Obtained Range	Theoretical Range
Home (total)	35.05	10.11	16 - 55	0 - 55
Toys, Games and Reading Materials,	6.62	2.67	2 - 11	0 - 11
Language stimulation	5.65	1.42	2 - 7	0 - 7
Physical environment	4.91	2.13	1 - 7	1 - 7
Pride, Affection, and Warmth	4.44	2.04	0 - 7	0 - 7
Stimulation of Academic Behavior	3.62	1.15	1 - 5	0 - 5
Modeling and Encouragement of Social Maturity	2.15	1.49	0 - 5	0 - 5
Variety of stimulation	4.52	2.08	2 - 9	0 - 9
Physical punishment	3.06	1.07	0 - 4	0 - 4

Table 3

Comparison of the Interrelationships Among the Variables

	IF Popular	IF Original	Fantasy	Metaphor	IQ	Stringent P-S
IF Original	.71** [.67**]	- -				
Fantasy	.09 [.34**]	-.02 [.34**]	- -			
Metaphor	.14 [.26*]	-.06 [.16]	.01 [.35**]	- -		
IQ	.09 [.11]	.20* [.01]	.11 [.38**]	.01 [.61]	- -	
Stringent Problem- Solving	.36** [.26**]	.14 [.23]	.40** [.47**]	.10 [.35**]	-.12 [.43**]	- -

*p<.05

**p<.01

(U.S. data [in brackets] as reported by Sawyers, Moran, Fu, & Horm-Wingerd, 1987).

Table 4

Interrelationships With the HOME Inventory Subscales

	IF Popular	IF Original	Fantasy	Metaphor	IQ	Stringent
Home total	-.04	-.03	.04	-.12	-.12	.16
Toys, games, etc.	.00	.02	.10	-.15	-.23*	.17
Language stimulation	-.06	-.22*	.01	-.31**	-.21*	.04
Physical Environment	-.04	.02	-.02	.01	.02	.17
Pride, affection,	-.15	-.06	.05	-.07	.00	-.06
Academic stimulation	-.04	-.24*	.14	.01	-.07	.27**
Modeling, etc.,	.04	.04	.03	-.05	-.01	.26**
Variety of stimulation	.00	.11	-.01	-.03	-.14	.01
Physical punishment	.00	.10	-.22*	-.18	.03	-.04

*significant at $p < .05$ **significant at $p < .01$

Table 5

Means and Standard Deviations of Original and Popular Scores
given in First and Second Half of Response Sequence for High and
Low Original Subjects

	High Original		Low Original	
	1st half	2nd half	1st half	2nd half
Original Responses	17.46	19.73*	5.85	6.18*
	(9.46)	(8.75)	(3.51)	(3.92)
Popular Responses	10.15	6.97*	5.64	3.67
	(3.57)	(3.90)	(3.63)	(3.32)

*significant at $p < .001$

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The review will focus on literature relevant to the current study, a cross-cultural comparison of preschooler's problem-solving ability and the predictive validity of the conceptualization of creativity as a process of original problem-solving.

During the last decade, there has been a steadily increasing emphasis on measuring and enhancing the creative abilities of children (Kogan, 1983). Haley (1984) talks of a particular creative response style that may be a reflection of environmental influences in a person's life. Thus membership in a particular class or setting may influence the style of creative expression.

In general it appears that research studies are needed across cultures to obtain insights into the factors influencing the development of creativity in such environments. Further, the cross-cultural validation of the measuring instruments is necessary to determine the validity of the construct of creative thinking. The validation of the instruments used to measure creativity is important in light of the fact that creativity research has faced the problem of inadequate measures since its conception.

Creativity

As one descends the age continuum, the meaning of genuine or real-world creativity becomes progressively less clear (Kogan, 1983). Children's creativity essentially refers to performance on

tests of the divergent thinking type (Guilford, 1967). With this in mind, creative thinking has been conceptualized as original problem-solving with ideational fluency as an essential component (Guilford, 1956, 1967; Mednick, 1962; Kogan, 1983; Wallach & Kogan, 1965).

Ideational fluency refers to the number of ideas elicited by a stimulus in a divergent thinking task (Kogan, 1983). In spite of criticism about it being an imperfect predictor of real-world creativity (Wallach, 1971), ideational fluency and other divergent thinking indices represent a mode of thought, and hence can legitimately be studied as such within a developmental and construct-validated framework (Kogan, 1983). Measures of problem-solving based on ideational fluency have been developed (Getzels & Jackson, 1962; Torrance, 1974) which have been used in many empirical studies of creativity (Barron & Harrington, 1981; Mednick, Mednick, & Jung, 1964; Milgram & Arad, 1981; Milgram, Moran, Sawyers, & Fu, 1987; Moran, Milgram, Sawyers, & Fu, 1983).

The Creativity - Intelligence Distinction

The most robust finding in the creativity domain is that of the statistical separation of convergent and divergent thinking (measured through the Wallach and Kogan, 1965 tasks), across a wide span of age groups (Kogan, 1971, 1973). Creative thinking is characterized by multiple responses (divergent) in which no one particular response is the correct answer or solution. Convergent

thinking measures involve focusing on a single response as the appropriate answer or solution.

A large number of studies have demonstrated that original thinking as measured by divergent thinking tasks is relatively independent of intelligence as a result of the thought processes involved (Milgram et al, 1987; Moran et al, 1983; Ward, 1968). In spite of this the kind of context necessary to achieve the separation has brought about some controversy (Hattie, 1977; Wallach, 1971).

Many studies have shown strikingly clear outcomes pointing to the presence of discriminant validation for convergent and divergent thinking tasks under game-like and test-like conditions (Nicholls, 1971; Milgram & Milgram, 1976; Vernon, 1971). The findings have supported the greater concurrent validity of divergent thinking indices obtained in a game-like context. Interestingly, the physical surroundings of the testing situation appear to influence the scores of creative children.

Components of Divergent-Thinking

One important issue is how divergent-thinking tasks should be scored as it is not enough to obtain a simple frequency count of the number of responses generated to a task item (ideational fluency). On measurement grounds alone, one would anticipate some relation between the indices of fluency, flexibility, uniqueness and quality (Kogan, 1983).

The link between ideational fluency and uniqueness is derived from the creativity model presented by Mednick (1962) who postulated that stronger associates or popular responses are more likely to be emitted early in the response sequence and unique or original responses later in the response sequence. Evidence for the construct validity of this order effect has been reported in the literature (Milgram & Arad, 1981; Milgram, Milgram, Rosenbloom, & Rabkin, 1978; Milgram et al, 1987; Moran et al, 1983). Because the fluent child continues to generate responses after the less fluent child has ceased, a correlation between fluency and originality is assured (Kogan, 1983). The order effect has been found to be more pronounced in high- than in low-creative subjects (Milgram, 1981; Milgram & Rabkin, 1980; Milgram et al, 1987; Moran et al, 1983).

The Quality - Quantity issue

It is important to note that uniqueness is but one component of quality and a highly unusual response may not be counted as a quality response if it is not appropriate to the stimulus item in the question. Quality, therefore reflects a blend of originality and appropriateness (Kogan, 1983) while quantity is simply a fluency count. Thus original responses are sometimes also scored for appropriateness or effectiveness (Milgram et al, 1978; Moran et al, 1983).

The creativity theory (Mednick, 1962) considers fluency of

response to represent the route through which originality and quality are assured. Support for this is provided through the high correlations found between fluency and originality (Milgram et al, 1978; Yando, Seitz & Zigler, 1979).

Long-term Stability of Divergent-Thinking Performance

The reliable use of divergent-thinking tasks for the assessment of originality in preschool children has lead researchers to examine the stability of creative thinking in an individual over the years. In spite of this, there are crucial gaps in our knowledge about long-term stability (Kogan, 1983).

The issue of the predictive validity of divergent-thinking tasks means understanding the extent to which divergent-thinking assessed at a particular time can predict creative performance at some later point of time. Do children who perform well (or poorly) relative to their peers on divergent-thinking tasks in the preschool years, continue to do so in high school and/or adulthood? The stability of original thinking has been demsonstrated for children between the age of 4- and 7- to 8-years (Moore, 1984).

Some studies done to examine consistency of divergent-thinking performance (Cropley & Clapson, 1971; Kogan & Pankove, 1972; Magnusson & Backteman, 1978) point to increases in the fluency and uniqueness components of divergent-thinking from late childhood into adolescence although not without exceptions.

Unfortunately longitudinal study of creativity has not gone beyond stability coefficients to the examination of developmental functions, that is, changes in mean level of performance across age. Also, accumulated evidence is only in support of the long-term stability of divergent-thinking performance across ages 10- to 17-years (Kogan, 1983).

It has been indicated that apparent difference in developmental growth rate may be accounted for by differential task strategies (for example, verbal and figural items). Cross-sectional comparisons (Wallach & Kogan, 1965; Wallach & Wing, 1969) done using the Wallach and Kogan tasks, suggested that growth in fluency proceeds at a more accelerated pace in the case of verbal than figural measures.

The issue of the relation between performance on divergent-thinking tests and real-world behaviors purportedly relevant to creativity has lead to the examination of varied criteria for assessing creativity. Art, drama, literature, music, creative writing, social service and science are few of the diverse domains which have been used as potentially creative achievement (Rotter, Langland, & Berger, 1971; Wallach & Wing, 1969). Such studies have had moderate success in establishing a connection between divergent-thinking indicators and talented non-attainments (Kogan, 1983).

A variety of behaviors have been related to or equated with the construct of creativity which has been studied as a product,

a process and a personality trait. Despite the disparate nature of the behaviors represented in the predictor and criterion tasks, divergent-thinking ability has a direct and substantial impact on real-life activities in young children.

Research directed towards the issue of the play-creativity linkage may well represent the most promising set of findings in children's creativity research over the past decade (Kogan, 1983). It has been seen that play can enhance problem-solving skills (Saltz & Johnson, 1974; Saltz, Dixon, & Johnson, 1977; Smith & Dutton, 1979), and seems to develop a more generalized attitude and/or schema which predisposes the individual to creating and using novelty (Vandenberg, 1980).

The lack of a valid criterion has interested researchers who have endeavoured to develop measures that reflect real-world creativity in order to obtain construct validity for creative thinking. Studies have included identification and examination of factors that are related to creativity.

Cognitive Correlates

Recently attention has been focused on the broadly conceived link between creativity and symbolic play (Kogan, 1983). Specifying objectives for creative problem-solving, Treffinger and Huber (1975) stated that the child should be able to see new relationships. This means that given perplexing situations or unfamiliar stimuli, the child should be able to identify

similarities and differences among objects or experiences and identify ideas for relating or comparing (Treffinger & Huber, 1975).

The issue of perceived similarity provides a bridge between metaphor on one hand and divergent-thinking on the other. Metaphoric similarity is typically a cross-category phenomenon in which objects and events ordinarily unrelated are brought together (paired) by virtue of some shared feature that is metaphoric in nature (Kogan, 1983). The similarity idea links creativity and metaphor because in process terms, a divergent-thinking task taps the breadth of a child's similarity class.

In its purest form, production of a metaphor carries the implication of spontaneous generation, that is, the eliciting conditions largely derive from the child rather than the materials provided by the experimenter or the environment in any specific sense (Kogan, 1983). On the other hand, in a comprehension task, the metaphor is inherent within the materials provided and the child's task is to recognize or explain it.

There is evidence for the existence of metaphoric comprehension and production in preschool children (Gentner, 1977; Winner, McCarthy & Gardner, 1980). Metaphoric comprehension is also found to function as a stable individual differences variable. Further, in regard to comprehension, a metaphoric response often connotes a performance of higher quality than is reflected by other cognitive functions (Kogan, 1983). Thus it

does not share with divergent-thinking the property of independence from assessments of intelligence or convergent-thinking (Kogan, 1980; Kogan, Connor, Gross, & Fava, 1980; Malgady, 1977). It is seen that it is quality rather than fluency of ideas generated in tasks of divergent-thinking that bears some relation to metaphoric processing as measured through the Metaphoric Triads Task (Kogan et al, 1980).

Another new direction in research on assessment of creativity is one that is based on the increased recognition of the role of imagery, imagination and creativity. Creativity is a complex phenomenon and there is a need for extensive evidence concerning the development of creative abilities (Treffinger, 1980). Examination of the relationship between divergent-thinking and fantasy predisposition has revealed that superior performers in original thinking tend to produce novel stories and concepts in response to the Thematic Apperception Test (Maddi, 1965). This indicates that fantasy predisposition contributes to the ability to generate solutions on problem-solving tasks.

Environmental Influences

The complex cognitive and affective components of creativity, and the social, motivational and environmental influences upon creative expression have been studied by many (Gowan, 1977, 1980; Gowan & Olson, 1979; Torrance, 1979; Treffinger, 1980). On the basis of research and theory, one can

delineate several issues regarding the assessment of creative thinking.

One of these is that creative thinking represents a complex synthesis of cognitive and affective processes and its expression is influenced by environmental or situational factors (Treffinger, 1980). Ideationally fluent children have been found to be much more likely than their less fluent peers to seek out cues in the external environments as an aid to responding on divergent thinking tasks (Ward, 1969). Creative response styles during early childhood may therefore reflect the level of cognitive development and life experiences (Haley, 1984).

One of the most powerful ways by which creative behavior is encouraged or discouraged is the way parents and teachers interact and influence certain personality characteristics in children (Torrance, 1970). The manner in which creative abilities develop and function appear to be strongly influenced by the way the environment supports a person's creative needs. This demonstrates the need to delineate the crucial role that the cultural and social environment plays in the development of the young child.

An important finding that points to social determinants of creativity is the decrease in the development of the creative process in children of ages 7- to 10-years; coined as the 'fourth grade slump' (Torrance, 1970), this decrease appears to be accounted for by the societal and educational pressures to

conform which are intensified during these years. The evidence presented indicated that there are discontinuities of some kind in almost all cultures and that cultural and social factors influence both the level of creative functioning and the course of creative development within the culture.

The need to delineate the role of cultural and social factors in the development of creativity has been recognized. It is also true that the understanding of a child's milieu in relation to its impact on the development of the child has always had implications for the understanding of cognitive abilities (Caldwell, 1967). There is little doubt that a great part of the basic elements of personality are laid down during the socialization process in early childhood.

Emphasizing those aspects of a home that are related to creative talent. Hergenhahn (1972) identified the true essence of these factors as respecting the child as an individual, allowing the child freedom to roam and explore, providing a variety of experiences, refraining from severe punishment and encouraging the child in independent activities. It has been found that parents of children with high IQ but low creativity scores were more authoritative in their discipline and more concerned about intellectual and social achievement than parents of children with low IQ but high creativity scores (Getzels & Jackson, 1961).

It is true that a pattern for child-rearing that may be defined as optimal in one culture may not be so in another

(Maccoby & Martin, 1983). Yet, it cannot be denied that a parent-child relationship that has the elements of firm control accompanied by high levels of parent-child interaction, democratic decision-making and mutual affection is one primarily aimed at fostering children's self-regulation. Much of the literature on child training and personality has implied that the really crucial aspects of the socialization process in early childhood are those which have to do with the patterns of disciplining in the early years (Straus, 1967). These affect the child's personality in terms of a sense of security, self-concept, independence of thought, self-regulation and initiative.

Thus a culture may provide a restrictive environment through the parent-child interactions and child-rearing practices that result in the setting up of rigid boundaries in the inner personal regions (Starkweather, 1971). Socialization techniques that lead to excessive repression and guilt restrict internal freedom and may interfere with the process of hypothesis formulation. If the development of a creative individual is linked to both the external and internal environments then it may be said that a culture fosters creativity to the extent that it encourages and provides the opportunity to experience its various facets (Starkweather, 1971).

A culture that limits the freedom of a person in an area, or a variety of areas, keeps the person from learning the necessary modes of communicating feelings and needs. The role of conformity

in the expression of creativity must be emphasized. Straus and Straus (1968) found that children's creativity varies according to the degree to which the child's role in the family requires conformity to conventional norms. A test of this 'conformity-inhibition' theory was made possible through the known differences in the degree to which Indian and American societies expect normative conformity of children, and seeing that in both societies greater conformity is expected from the females. This is true of most patriarchal societies.

It is natural therefore that a number of thought provoking findings concerning differences in the way boys and girls learn and think can be found in the research literature. Many of the studies on problem-solving have shown male superiority, even on "intuitive" problem-solving (Crutchfield, 1960; Hoffman & Maier, 1961; Torrance, 1965).

While this may be inherent, it is more likely that it is an outcome of societal pressures that encourage sex appropriate behavior. Support for this notion can be found in various studies indicating that sex differences found in older children do not exist in younger ones. For example, no sex differences were found among American and Israeli preschoolers tested for original problem-solving (Milgram et al, 1987; Moran et al, 1983) but have been observed in Irish teenagers (Lynch, 1970) and in boys and girls over the fourth grade in the United States (Torrance, 1975). This trend has also been seen in various studies in India.

The general superiority of boys over girls has been reported in verbal tests of creativity given to Indian children (Raina, 1969). These results are supported by Prakash (1966) who observed few differences in creative development between boys and girls in the first and second grades but rather consistent and significant differences on both the verbal and figural tests given to third and fourth graders.

Since the Indian culture places emphasis on male superiority and female conformity, it is not surprising that after grade two, Indian boys surpassed the girls on verbal tests of creative thinking (Prakash, 1966). Another Indian study found significant differences in verbal fluency, verbal flexibility and verbal transformation measures given to ninth graders where again, boys did better than girls (Gupta, 1982). On the other hand, no statistically significant differences were found to exist between younger boys and girls in India, who were tested on the Torrance Tests of Creative Thinking (Phatak, 1962).

In comparing the United States, Hungary and India, it was found that Indian adults scored highest on individuality and artistry; second on initiative and third on environmental sensitivity and self-strength (Khatena, Raina, Zatenyi, & Gibbs, 1976). This seems to reinforce the fact that while traditional Indian society may foster development of artistic talents especially music and dance, conformity and obedience is expected and independence in decision-making is neither admired nor

encouraged.

The extent of influences of a culture is an intriguing question and researchers have endeavoured to identify different aspects of individual development as culture specific. Undoubtedly a society and its norms play an important if not crucial role in the formation of the personalities of its people.

Yet whether creativity is an inherent quality or a result of socialization patterns may be seen only by the examination of the thinking processes of young children across cultures. Whether the influence of socializing factors exhibits itself in the creative thought and behaviors of children as young as four years and whether this influence holds true only in certain nurturant environments remains to be seen.

Unfortunately cross-cultural studies are few. A reality of the research process, especially cross-cultural research, is that it often requires a compromise between the theoretically desirable and the operationally possible. Cross-cultural similarities and differences on some particular variable are not only a core theoretical concern of the researcher but also the factors which intrude upon the methods used to study them (Trimble, Lonner & Boucher, 1983).

Considering both question and data, the researcher needs to pay particular attention to such methodological issues such as the appropriateness of the task to the question in the cultures being studied, the sensitivity of the measurement technique to

cultural subtleties and the relevance of the research instrument to the persons in the culture. These issues have been neglected for the most part by psychologists in India (Sinha, 1983). It is emphasized that understanding and insight into the characteristics of the particular culture and their interaction with the tester and the nature of testing become essential if reliable data is to be obtained.

An intriguing slant is one taken by Carroll (1983) who advocates that one needs to focus on the similarities between cultures rather than the differences as it is this that can provide a theoretical overview and evidence for construct validity. Accordingly, insofar as all human cultures have language systems that follow some overall pattern, ways of counting and qualifying that rely on universal characteristics of nature, modes of representation that have obviously common features, and procedures of logical reasoning that must depend on fundamental aspects of reality, it is expected that a high degree of similarity in results would exist over these cultures.

Thus though the researcher may have to use tests with instructions in different languages or take into consideration the practices and values of that particular culture which is being studied, the essential over-riding goal must remain the identification and measurement of those characteristics of human behavior and ability that are universal in nature. Keeping this in mind, the identification of those cultural factors that do

influence human ability in an obvious way is crucial to an understanding of both the ability and the nuances of the culture.

There is a growing consensus among researchers that measures of specific environmental processes are often more accurate indices of environmental quality than either socio-economic status (SES) measures or family structure measures (Bloom, 1964; Caldwell, 1968). Comparison between an environmental measure and SES in terms of their relationship with intelligence (measured through the Stanford-Binet IQ) at three-years-of-age showed that the environmental measure actually predicts IQ as well as a combination of process and status measures (Bradley, Caldwell, & Elardo, 1977). Thus the home environment appears to be sensitive and accurate in helping predict cognitive processes.

Considerable evidence that social-psychological factors have a significant impact on the productivity and creativity of individuals (Amabile, 1983). A truism in the field of child development is that the milieu in which development occurs affects that development (Caldwell, 1967). Indeed certain cultures seem to reflect rigidity in some areas that may differ from those in another. Rigidity in thought which inhibits expression of innovative ideas leads to repression of free or "associative" thinking that is the path of originality.

Summary

One of the most significant changes in the field of creativity research that has occurred over time is the

contemporary emphasis on the multidimensional nature of creative thinking. The complexity involved in the construct and assessment of creativity has led researchers to examine the various cognitive correlates and social, cultural factors that influence creativity. Ample evidence is now available to suggest that the creativity, metaphor and cognitive-style domains are not independent of each other.

The implications of the results reported are indeed far-reaching and have relevance for schools, families and societies. Life in the contemporary world involves many complex problems for which creative solutions are not only welcomed but essential. It has been seen that creative-learning helps children develop self-reliance and independence (Treffinger, 1980), it assists children in dealing with future problems that cannot be anticipated.

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GENERAL INSTRUCTIONS FOR THE EXAMINER

Please bear in mind the following general guidelines:

1. The establishment of the proper atmosphere for testing and rapport between examiners and subjects is a critical factor in this study. Examiner behavior can significantly affect the research results. Examiners must behave in a friendly manner, create a pleasant atmosphere, and refrain from any behavior which creates the impression of school-type testing and evaluation. The very words and actions of the examiner at all times are critical.
2. It is imperative not to express anger or impatience at any time. It is important to maintain a pleasant tone in your speech at all times.
3. Since testing procedures are untimed, each subject will finish at a different time. Allow children enough time to do each task. Do not overschedule.
- 4a. The examiner must bear in mind the importance of establishing trust, a pleasant atmosphere, and the desire to participate. The examiner should maintain as natural a manner as possible while at the same time stimulating the child's interest in the games, and encouraging the child to think and to make the maximum effort to give as many responses as possible.
- 4b. The examiner should exchange names with the subject, record the name, and continue to call the subject by the first name so that the examiner can use it in establishing a more relaxed and friendly atmosphere.
- 4c. The examiner says:

Today we are going to play some games. They are a new kind of game which you have probably not played before. We will play several different games. These are thinking and imagination games. You don't have to hurry. We can play for as long as you want.
- 4d. Refer to specific task instructions for detailed instructions on tasks and answer sheets. Examiner records child's answers directly on the form provided. If you do not have enough room use the other side of the answer sheet.

- 4e. At the end of test session the examiner should say to the subject: "That was the last game for today. Thank you for your cooperation, you were a big help. You did very well. I'll see you again and play some more games like these".

The Metaphoric Triads Task

Instructions

The examiner says:

We are interested in what you think about pictures. I am going to show you some pictures and ask you some questions about them. Let's try this one.

Begin with the example; if the child has not identified the metaphor add: "Here is another way these are alike, the woman has long wavy hair which hangs down and the plant has long stems which hang down. Her hair looks like the plant".

Present each triad like this:

1. Here is a _____ and this is a _____. (name and point to the pictures at top)
Which of these pictures goes together with this _____, which are alike? (name and point to bottom picture)
Why are they alike?
2. Can the _____ go together with this one, are these alike? (point to picture not chosen)
Why are these alike?
3. If the child has not correctly identified the metaphoric reason point to the metaphoric pair and ask: "Is there any other way these two pictures are alike?"

If you need to probe for clarification say: "Tell me more about it".

Answer Sheet

- a. Record child's response to question 1: L=left picture; R=right picture (child's left or right); No=No, they don't go together; DK= don't know; NR=no response.
- b. Record child's response to question 2. Write out reason.
- c. If needed record child's response to question 3.

Note: Questions 1 and 2 are always asked, question 3 is asked only if child does not identify metaphor in 1 or 2.

Multidimensional Stimulus Fluency Measures

VPI & SU: Creativity Research Group

Instructions

Pattern meaning

"In this game I'm going to show you some pieces. After looking at each one I want you to tell me all of the things you think each piece could be. Here is an example - you can turn it any way you'd like to." (All pieces are made of painted styrofoam. Give the child the example block). "What could this be?" (Let the child respond). "Yes, those are fine. Some other things I was thinking of were a bridge, a bed, a building block, a chair and there are probably a lot of other things too." (The experimenter could vary suggestions so as to give different ones than the child but to include all of the above). If the child indicates understanding of the game then proceed with the tasks, presenting each piece in sequence.

"Now remember I will give you a piece and you are supposed to name all the things it could be. Take as long as you want."

example:

Item 1:



Item 2:



When a child stops responding, ask "What else can you think of" until the child indicates that he or she has no more responses to make.

If a child begins to play with the test materials in a manner

which might damage them say "Please play carefully with the pieces, they were made specially for these games and we don't want them to break."

Instances

"We're going to play a game called 'All the things you can think of'. I might say 'things that make a noise' and it is your job to tell me the names of all the things you can think of that make a noise!" (Let the child try to generate responses). Then reply with, "Yes, those are fine. Some other things might be a horn, an airplane, a whistle or people shouting." (The experimenter should vary these suggestions so as to name those not told by child). Then say, "We can see that there are all kinds of different answers in this game. Do you see how we play?" (If child indicates understanding of the game proceed with the other queries; if child does not understand, present another example). The experimenter then initiates the testing by saying, "Now remember, I will name something and you are supposed to name as many things as you can think of that are like what I've said. OK, let's go."

1. Name all the things you can think of that are red.
2. Name all the things you can think of that are round.

Alternate Uses

"Now we have a game called 'What can you use it for?' The first thing we're going to play with will be a pencil". (Experimenter hands pencil to child). "I want you to tell me all the things you can think of that you can do with a pencil or play with it, or make with it. What can you use a pencil for?" (Let child generate responses). Then reply with a "Yes, that's fine. Some other things you could use a pencil for are as a flagpole, to dig in the dirt, or you could use a pencil as a mast in a toy boat. Probably there are a lot of other things too". (The examiner should vary answers so as to give all of these which the child did not give). Then proceed by saying, "You see that there are all kinds of different answers in this game. There is no one right or wrong answer. Do you know how to play?" If the child indicates understanding of the game then

proceed with test items. If the child does not understand, repeat procedure from the beginning. If child still does not understand, terminate. To initiate testing, the examiner should say: "Now remember I will name something and you are supposed to tell me as many uses for it that you can think of. Take as long as you want. Let's try this one". (No help should be given to the child on test items).

What can you use a BOX for?

What can you use PAPER for?

Problems may arise when children ask additional questions. For example, if the child asks, "What size box?" the experimenter should reply with a very neutral answer such as "Whatever size you think of". All clarifications of the test questions should be of non-committal type.

When the child stops responding ask, "What else can you think of" until the child indicates that he or she does not wish to continue or can think of no more.

Stringent Problem-Solving Measures

(VPI & SU Creativity Research Group)

Instructions

The lake task

Materials: model of a lake
water
lego blocks including a person and
two sets of wheels

Place the lake model on a low table with the lego pieces next to it. Fill the lake with water and allow child to manipulate the blocks till the child is comfortable. Then begin testing by saying, "Here is a person in a car who is driving along. This person comes to a lake and wants to cross the lake. How can this person do it? Can you help? You may use any of these materials to help this person cross."

When the child stops responding, ask "What else can you think of" until the child indicates that he or she has no more responses to make.

The rescue task

Materials: three laminated cards with line drawings on them

Place the cards to one side of the table, face down. Once child is comfortable begin testing by saying, "Now we shall play another game of helping. Here is a person who is going for a walk (Show card 1). This person (hiker) is carrying a lot of equipment." (Allow child to identify the various tools the hiker is carrying). "Suddenly this person falls into a deep hole (Show card 2). The person is not hurt at all but now does not know how to get out of the hole (Show card 3). How can this person come out? Can you suggest something so that this person can come out of the deep hole."

Endeavour to get as many responses as possible till child indicates he or she has no more responses to make. Terminate by appreciating child's help and cooperation.

Holtzman Inkblot Test

Instructions and Scoring

Seat child comfortably and explain task by saying, "Now we are going to play a game in which I will show you some cards and you must tell me what you see on those cards. There are no right or wrong answers. You can tell me whatever comes to your mind."

Present each of the 15 cards to child, repeating the instructions at each presentation if necessary. Endeavour to get a response from child for each card but do not give cues. Direct inquiry to elicit movement should never be made by examiner. Terminate by appreciating child's help and cooperation.

The scoring of Movement is linked closely to content in most traditional systems for the Rorschach. The essential characteristic of the movement response is the energy level or dynamic quality of it, rather than the particular content.

The 5-point scale used for scoring is -

- 0-no movement or static potential for movement
- 1-static potential for movement as indicated by such participles as sitting, looking, resting, lying
- 2-casual movement, such as walking, talking, climbing, reaching
- 3-dynamic movement, such as lifting, dancing, running, weeping
- 4-violent movement, such as whirling, exploding

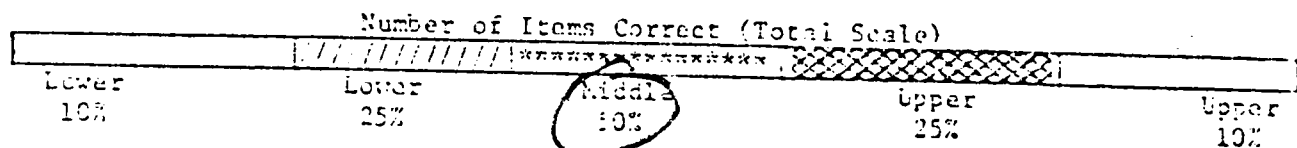
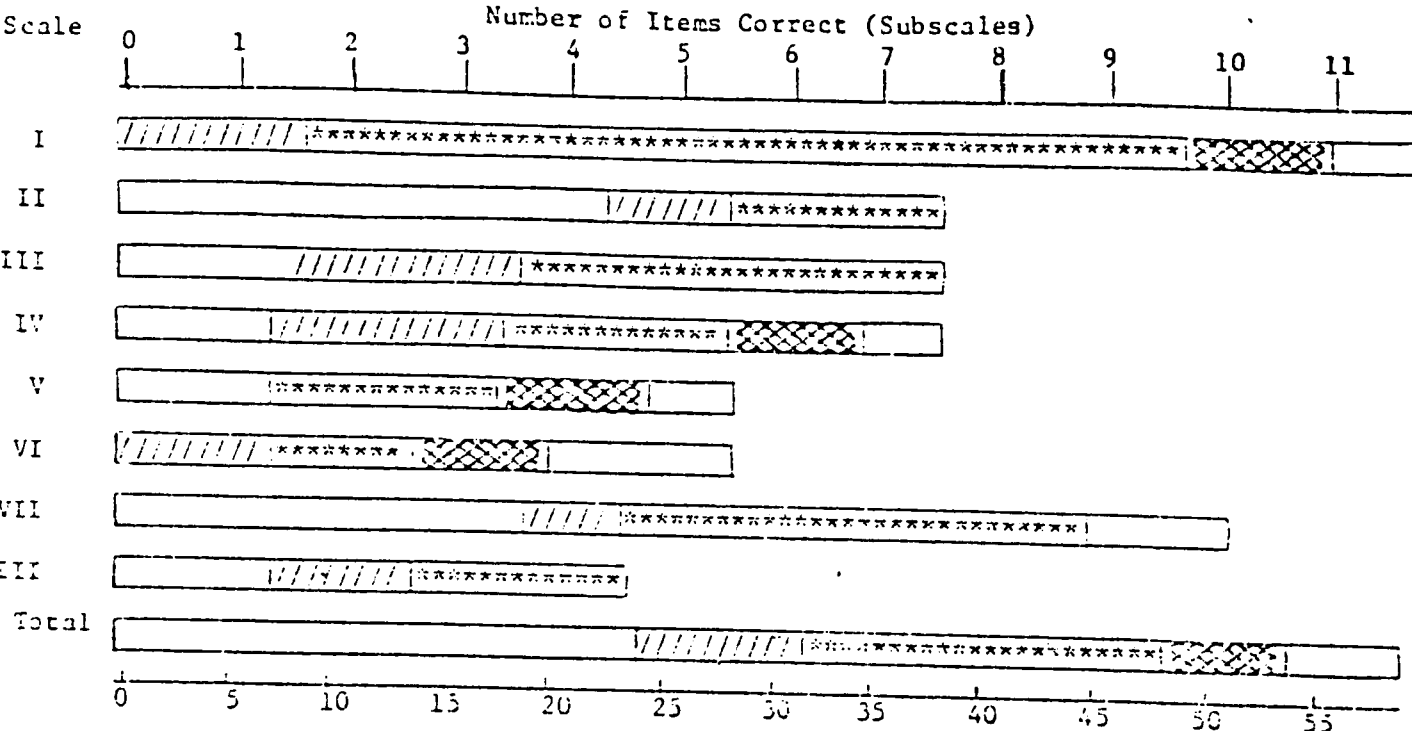
Credit for movement is given only when the subject voluntarily ascribes movement or potential for movement to the percept.

HOME INVENTORY (Preschool)

Child's Name _____ Date of Interview _____

Child's Birthdate _____ Interviewer _____

Relationship of person interviewed to child _____ Place of interview _____



Subscale	Raw Score	Percentile Band
I Stimulation Through Toys, Games and Reading Materials		
II Language Stimulation		
III Physical Environment: Safe, Clean, and Conducive to Development		
IV Pride, Affection, and Warmth		
V Stimulation of Academic Behavior		
VI Modeling and Encouragement of Social Maturity		
VII Variety of Stimulation		
VIII Physical Punishment		
Total		

HOME OBSERVATION FOR MEASUREMENT OF THE ENVIRONMENT

INVENTORY (Preschool)

I. STIMULATION THROUGH TOYS, GAMES, AND READING MATERIALS	YES	NO
1. Toys to learn colors and sizes and shapes--pressouts, play school, pegboards, etc.		
2. Three or more puzzles.		
3. Record player and at least five children's records.		
4. Toys or game permitting free expression (finger paints, play dough, crayons or paint and paper, etc.)		
5. Toys or game necessitating refined movements (paint by number, dot book, paper dolls, crayons and coloring books).		
6. Toys or game facilitating learning numbers (blocks with numbers, books about numbers, games with numbers, etc.)		
7. Ten children's books.		
8. At least ten books are present and visible in the apartment.		
9. Family buys a newspaper daily and reads it.		
10. Family subscribes to at least one magazine.		
11. Child is encouraged to learn shapes.		
II. POSITIVE SOCIAL RESPONSIVENESS	YES	NO
12. Toys to learn animals--books about animals, circus, games, animal puzzles, etc.		
13. Child is encouraged to learn the alphabet.		
14. Parent teaches child some simple manners--to say, "Please," "Thank you," "I'm sorry."		
15. Mother uses correct grammar and pronunciation.		

	YES	NO
16. Parent encourages child to relate experiences or takes time to listen to him relate experiences.		
17. When speaking of or to child, mother's voice conveys positive feeling.		
18. Child is permitted some choice in lunch or breakfast menu.		
SUBSCORE		

III. PHYSICAL ENVIRONMENT: SAFE, CLEAN AND CONDUCIVE TO DEVELOPMENT		YES	NO
19. Building has no potentially dangerous structural or health defect (e.g., plaster coming down from ceiling, stairway with boards missing, rodents, etc.)			
20. Child's outside play environment appears safe and free of hazards. (No outside play area requires an automatic "no".)			
21. The interior of the apartment is not dark or perceptibly monotonous.			
22. Neighborhood has trees, grass, birds--is esthetically pleasing.			
23. There is at least 100 square feet of living space per person in the house.			
24. In terms of available floor space, the rooms are not overcrowded with furniture.			
25. All visible rooms of the house are reasonably clean and minimally cluttered.			
SUBSCORE			

IV. PRIDE, AFFECTION, AND WARMTH		YES	NO
26. Parent holds child close ten to fifteen minutes per day, e.g., during TV, story time, visiting.			
27. Mother converses with child at least twice during visit (scolding and suspicious comments not counted.)			

28. Mother answers child's questions or requests verbally.		
29. Mother usually responds verbally to child's talking.		
30. Mother spontaneously praises child's qualities or behavior twice during visit.		
31. Mother caresses, kisses or cuddles child at least once during visit.		
32. Mother sets up situation that allows child to show off during visit.		
SUBSCORE		

V. STIMULATION OF ACADEMIC BEHAVIOR		
33. Child is encouraged to learn colors.		
34. Child is encouraged to learn patterned speech (nursery rhymes, prayers, songs, TV commercials, etc.)		
35. Child is encouraged to learn spatial relationships (up, down, under, big, little, etc.)		
36. Child is encouraged to learn numbers.		
37. Child is encouraged to learn to read a few words.		
SUBSCORE		

VI. MODELING AND ENCOURAGEMENT OF SOCIAL MATURITY		
38. Some delay of food gratification is demanded of the child, e.g., not to whine or demand food unless within 1/2 hour of meal time.		
39. Family has TV, and it is used judiciously, not left on continuously. (No TV requires an automatic "No"--any scheduling scores "Yes".		
40. Mother introduces interviewer to child.		
41. Child can express negative feelings without harsh reprisal.		
42. Child is permitted to hit parent without harsh reprisal		
SUBSCORE		

VII. VARIETY OF STIMULATION

	YES	NO
43. Real or toy musical instrument (piano, drum, toy xylophone or guitar, etc.)		
44. Family members have taken child on one outing (picnic, shopping excursion) at least every other week.		
45. Child has been taken by family member on a trip more than 50 miles from his home during the past year (50 mile radial distance not total distance).		
46. Child has been taken by a family member to a scientific, historical, or art museum within the past year.		
47. Tries to get child to pick up and put away toys after play session--without help.		
48. Mother uses complex sentence structure and some long words in conversing.		
49. Child's art work is displayed some place in house (anything that child makes.)		
50. Child eats at least one meal per day, on most days, with mother (or mother figure) and father (or father figure). (One parent families get an automatic "no".)		
51. Parent lets child choose certain favorite food products or brands at grocery store.		
SUBSCORE		

VIII. PHYSICAL PUNISHMENT

	YES	NO
52. Mother does not scold (yell?) or derogate child more than once during visit.		
53. Mother does not use physical restraint, shake, grab, or pinch child during visit.		
54. Mother neither slaps or spansks child during visit.		
55. No more than one instance of physical punishment occurred during the past week. (accept parental report).		
SUBSCORE		

B. KUPPUSWAMY
SOCIO-ECONOMIC STATUS SCALE (URBAN)
SCORE CARD

SESS Class

Code No Name

Age Address

Check below by putting a cross in the appropriate item box on the basis of information Blank. Put the weights (Scores) in last column.

ITEMS	Weight	Score	ITEMS	Weight	Score																		
A. Education			C. Income (Revised 1981)*																				
1. Professional degree or Hons. M.A. & above	7	<input type="checkbox"/>	1. Above Rs. 2,000.00 per month	12	<input type="checkbox"/>																		
2. B.A. or B. Sc. Degree	6	<input type="checkbox"/>	2. Between Rs. 1,000.00 and Rs. 1,999.00	10	<input type="checkbox"/>																		
3. Intermediate or Post-High School Diplomas	5	<input type="checkbox"/>	3. Between Rs. 750.00 and Rs. 999.00	6	<input type="checkbox"/>																		
4. High School Certificate	4	<input type="checkbox"/>	4. Between Rs. 500.00 and Rs. 749.00	4	<input type="checkbox"/>																		
5. Middle school completion	3	<input type="checkbox"/>	5. Between Rs. 300.00 and Rs. 499.00	3	<input type="checkbox"/>																		
6. Primary School or literate	2	<input type="checkbox"/>	6. Between Rs. 101.00 and Rs. 299.00	2	<input type="checkbox"/>																		
7. Illiterate	1	<input type="checkbox"/>	7. Below Rs. 100.00	1	<input type="checkbox"/>																		
A.....			C.....																				
B. Occupation			Total Score																				
1. Profession	10	<input type="checkbox"/>	(Add. A. B. C.)																				
2. Semi-Profession	6	<input type="checkbox"/>	<div style="border: 1px solid black; width: 100px; height: 100px; margin: 10px auto;"></div> <table style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="width: 10%;">S</th> <th style="width: 20%;">Total Score</th> <th style="width: 10%;">SESS Class</th> </tr> </thead> <tbody> <tr> <td>S</td> <td>26-29 ...</td> <td>I</td> </tr> <tr> <td>C</td> <td>16-25 ...</td> <td>II</td> </tr> <tr> <td>A</td> <td>11-15 ...</td> <td>III</td> </tr> <tr> <td>L</td> <td>5-10 ...</td> <td>IV</td> </tr> <tr> <td>E</td> <td>Below 5 ...</td> <td>V</td> </tr> </tbody> </table>			S	Total Score	SESS Class	S	26-29 ...	I	C	16-25 ...	II	A	11-15 ...	III	L	5-10 ...	IV	E	Below 5 ...	V
S	Total Score	SESS Class																					
S	26-29 ...	I																					
C	16-25 ...	II																					
A	11-15 ...	III																					
L	5-10 ...	IV																					
E	Below 5 ...	V																					
3. Clerical, Shop owners, Farm-owners etc.	5	<input type="checkbox"/>																					
4. Skilled worker	4	<input type="checkbox"/>																					
5. Semi-Skilled worker	3	<input type="checkbox"/>																					
6. Unskilled worker	2	<input type="checkbox"/>																					
7. Unemployed	1	<input type="checkbox"/>	B.....																				

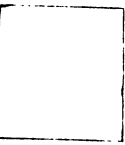
INFORMATION BLANK

Socio-Economic Status Scale (Urban)

B. KUPPUSWAMY

S E S S

C l a s s



FORM B

Please answer the following questions as carefully regarding your father. If your father is not alive then give the particulars regarding your guardian.

नीचे के प्रश्न आपके पिता के बारे में हैं, यदि पिता न हों तो अपने संरक्षक के बारे में सूचना दीजिये।

1. Name.....2. Age.....
नाम वय

3. Address (Institutional).....
पता (संस्था का)

4. Address (Home).....
पता (घर का)

A. Education of Father / Guardian

आपके पिता / संरक्षक की शिक्षा

1. School or College Examinations passed उत्तीर्ण परीक्षाएँ, स्कूल अथवा कालेज	Year if known किस वर्ष	2. Technical or Professional Examinations passed उत्तीर्ण टेक्नीकल या व्यावसायिक परीक्षाएँ	Year if known किस वर्ष
.....
.....
.....
.....

B. Occupation of Father / Guardian

आपके पिता / संरक्षक का व्यवसाय

- (a) In which organisation he does his work ?.....
वे किस संस्था में काम करते हैं ?
- (b) Who controls the organisation ?.....
संस्था का उच्चतम अधिकारी ?
- (a) What is the exact designation ?.....
संस्था में उनका पद ?
- (b) What is the nature of work ?.....
काम का रूप ?
-
-

C. Income of your Father/Guardian

आपके पिता/संरक्षक की आय

1. What is the monthly salary or weekly wages of your father or guardian ?.....
उनका मासिक या साप्ताहिक वेतन ?
-
2. What are the allowances or bonus he gets.....
नियमित आय के अलावा लाभांश, बोनस आदि जो उन्हें मिलते हों
-
3. Any other sources of income ?
आय के अन्य स्रोत
- | | Monthly Income
मासिक आय |
|----------|----------------------------|
| (a)..... | |
| (b)..... | |
| (c)..... | |
| (d)..... | |

PHATAK DRAW-A-MAN TEST OF INTELLIGENCE

SCORING

The scoring of the human figure is simple for any one who is capable of following the instructions faithfully. However, it requires careful study and patience. There is often the danger of the scorer becoming oblivious about the details of the scoring points, even after having them studied once. There are also some items where subjective judgment could not be avoided. The individual scorer will develop his own standard if he carefully scores a few drawings for his training before scoring the drawings for children's evaluation. The scoring scale with illustrative drawings where possible, is given below.

SCORING SCALE

Description of the point	Weighted score	Illustrations
1. HEAD		
Figure without head	0	
Head present	1	
Round head	2	
Oval head (face) or profile	3	
2. EYES		
Eyes present	1	
Eye-lids and pupils or eye-brows or eye-lashes shown	2	
Eye-lids, eye-brows and pupils present	3	

Description of the point

Weighted score

Illustrations

3. NOSE

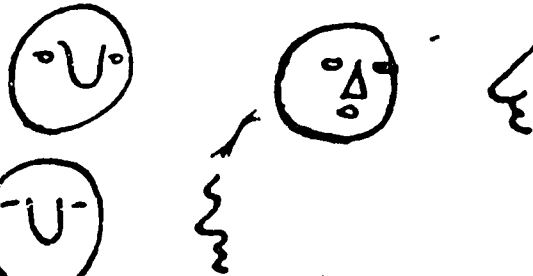
Nose present

1



Nose in two dimensions

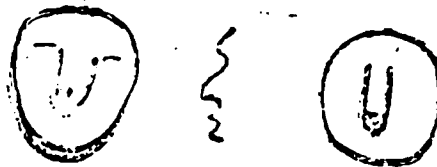
2

Two dimensional nose
in the middle of the face
OR
Nostrils indicated

3

Two dimensional nose
in the middle of the face
and nostrils indicated

4



4. EARS

Ears present

1



Ears symmetrical

2

Length of the ears more
than breadth or ear-hole
indicated

3



Shape of the ear shown-lobe

4



5. HAIR OR HAT


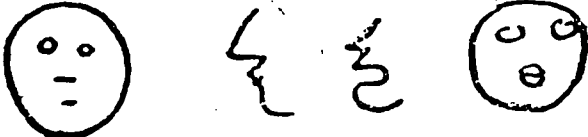

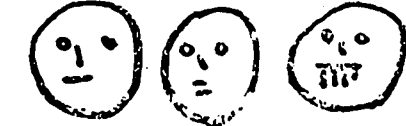


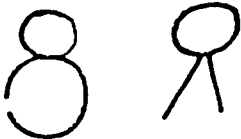
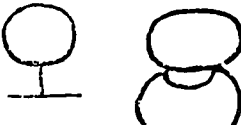
Hair Or Hat present

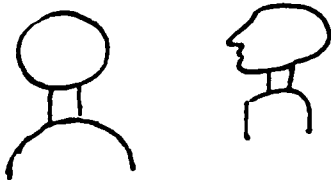

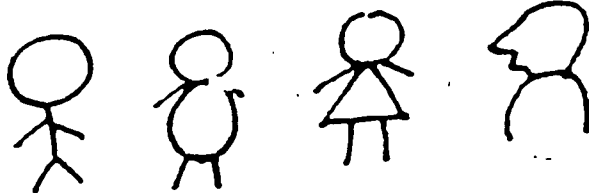





1

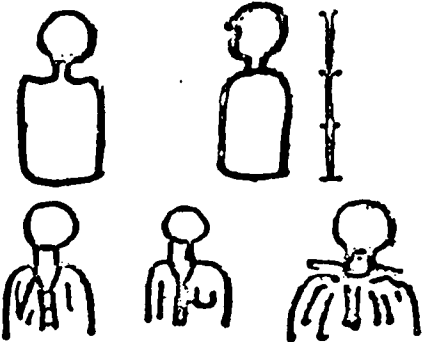
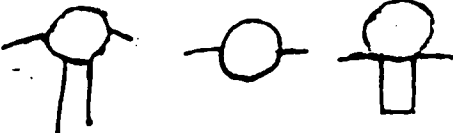

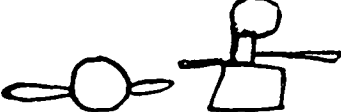
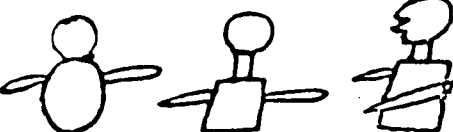




Hair presentation better
than a scribble or vertical lines
OR
Hat non-transparent

2



Description of the point	Weighted score	Illustrations
6. FOREHEAD		
Forehead indicated by sufficient space between the headline and eyes, eyebrows, nose or any mark of decoration	1	
7. CHIN		
Chin indicated by space	1	
Well formed shape of the chin	2	
8. MOUTH		
Mouth present	1	
Mouth in two dimensions-transparent or showing teeth	2	
Mouth in two dimensions-lip-line indicated	3	
9. NECK		
Neck not shown	0	
Neck shown	1	

Description of the point	Weighted score	Illustrations
NECK (Contd.)		
Neck in two dimensions	2	
Neckline in continuation of trunkline or headline, or neckline of the dress drawn	3	
10. TRUNK		
Trunk present	1	
Squarish trunk	2	
Length of the trunk more than breadth	
OR Some indication of the dress - buttons, design, pockets or shape	
OR Shoulders indicated	3	
Length more than breadth and shoulders indicated	4	

Description of the point	Weighted score	Illustrations
10. TRUNK (Contd.)		
Length more than breadth and shoulders indicated and length of the trunk more than length of the head—approximately twice OR In dressed drawings folds or curves of the dress indicated along with button-strip, neckline, or collar (any two)	
	5	
11. ARMS		
Arms present	1	
Arms attached to the trunk	
OR		
Two dimensional arms	2	
Two dimensional arms attached to the trunk	
OR		
Arms (single line) attached to the trunk at the right place	3	
Two dimensional arms attached to the trunk at the right place	
OR		
Two dimensional arms with one of the joints indicated—elbow, wrist or shoulder	
Single line arms attached to the trunk at the right place and one of the joints indicated	4	

Description of the point

Weighted score

Illustrations

11. ARMS (Contd)

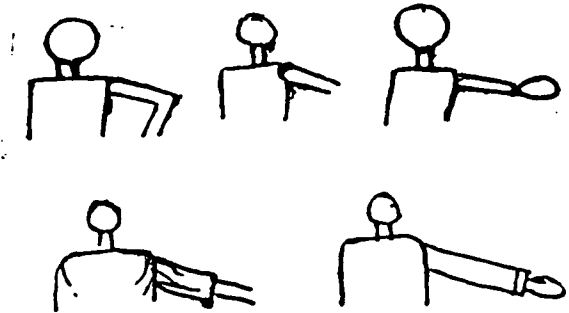
Two dimensional arms
attached to the trunk at
the right place and one of
the joints indicated

.. .. .

OR

In dressed drawings, curves
or folds on the sleeves or
wrist-cuff indicated

5



12. FINGERS

Fingers or palm present

1



Fingers and palm

.. .. .



OR

Correct number of fingers

.. .. .



OR

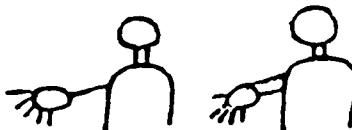
Fingers in two dimensions

2



Palm with correct number
of fingers

.. .. .



OR

Palm with two dimensional
fingers

3



Palm with two dimensional
correct number of fingers

4







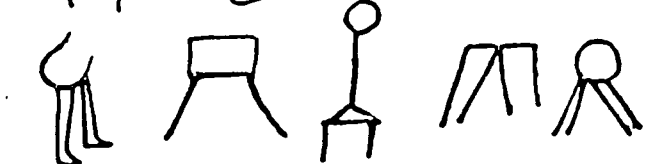


ADDITIONAL

Indication of thumb
(Opposition)

1



Description of the point	Weighted score	Illustrations
13. LEGS		
Legs present	1	
Legs attached to the trunk	
OR Legs in two dimensions	2	
Two dimensional legs attached to the trunk	3	
Knee-joint indicated in undressed drawings	
OR In dressed drawings, folds on the sleeves or shape indicated—may be transparent	4	
ADDITIONAL		
Hip-joint indicated by legs being not parallel	1	

14. TOES OR FEET

Undressed Drawings :
Toes or Feet or Chappal
present

1



Dressed Drawings :
Shoes indicated by lace
or buttons

1



Description of the point

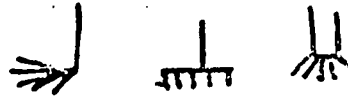
Weighted score

Illustrations

14. TOES OR FEET (Contd.)

Undressed Drawings :

Correct number of toes



OR

Toes in two dimensions 2



Dressed Drawings :

Heels or ankle lining drawn 2



Undressed Drawings :

Toes and feet shown 3

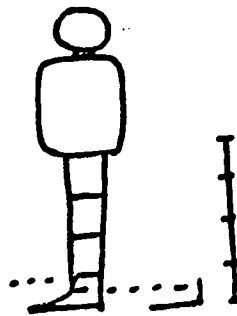


Dressed Drawings :

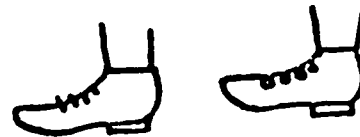
Heels and ankle lining drawn 3



Undressed Drawings :

Toes in two dimensions
and feet in proportion-
length more than height
and length less than $\frac{1}{2}$
of the leg 4

Dressed Drawings :

Shape of the shoe properly
shown with lace or buttons,
heels and ankle lining 4

15. MOTOR CO-ORDINATION

Absence of muscle control
in lines of the drawing 0

Description of the point

Weighted score

Illustrations

15. MOTOR CO-ORDINATIONS (Contd.)

Control of muscles shown
in drawing the major parts
of the figure such as trunk,
head, legs and arms, etc.

1



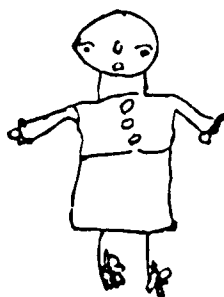
Control of muscles shown
in drawing minor parts of
the figure such as eyes,
fingers, toes, etc.

2



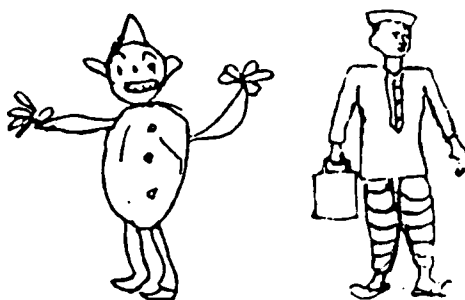
Control of muscles shown
at the points of attach-
ments of various parts in
the figure.

3



Whole drawing indicating
control of hand and free
movements, or Drawing-
style line.

4



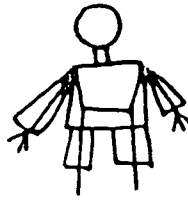
Description of the point

Weighted Score

Illustrations

16. DRESS

Two complete pieces of clothing—transparent



OR

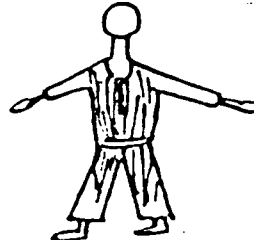
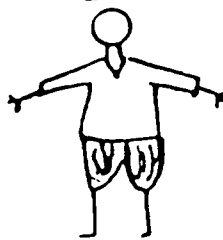
Onepiece non-transparent

1



Two pieces of clothing non-transparent

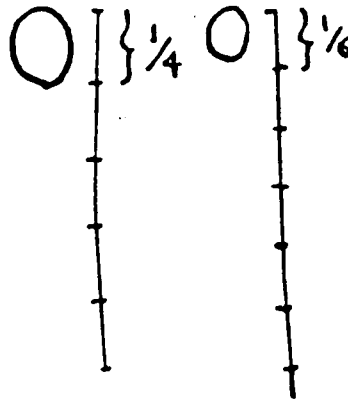
2



17. PROPORTION-HEAD

Head less than $\frac{1}{4}$ of the remaining figure and more than $\frac{1}{6}$ of it

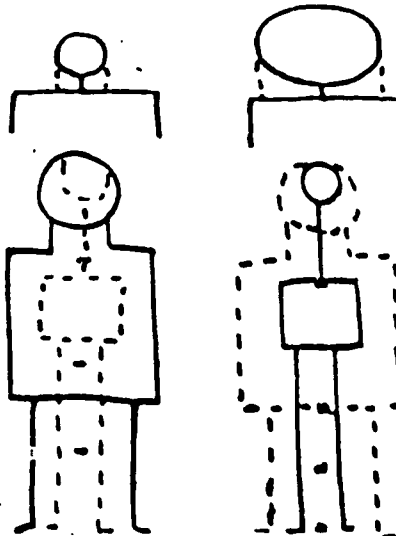
.



OR

Breadth of the head less than the trunk—not less than $\frac{1}{3}$

1



Both the above mentioned proportions present

2

Description of the point

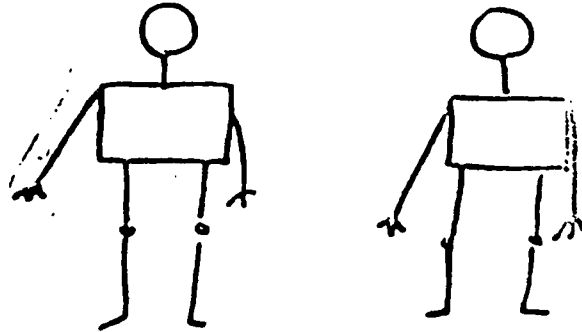
Weighted score

Illustrations

18. PROPORTION - ARMS

Arms slightly longer than
the trunk not reaching knee

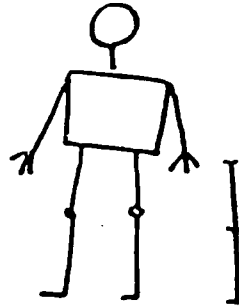
1



19. PROPORTION - LEGS

Legs longer than arms
and trunk - not more than
twice the trunk

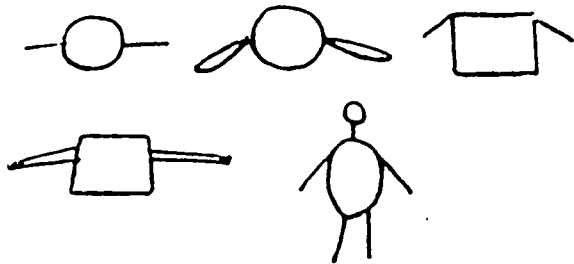
1



20. SYMMETRY

Arms symmetrical on two
sides and equal in length
approximately

1



21. GENERAL

Indication of environment,
action or situation

1

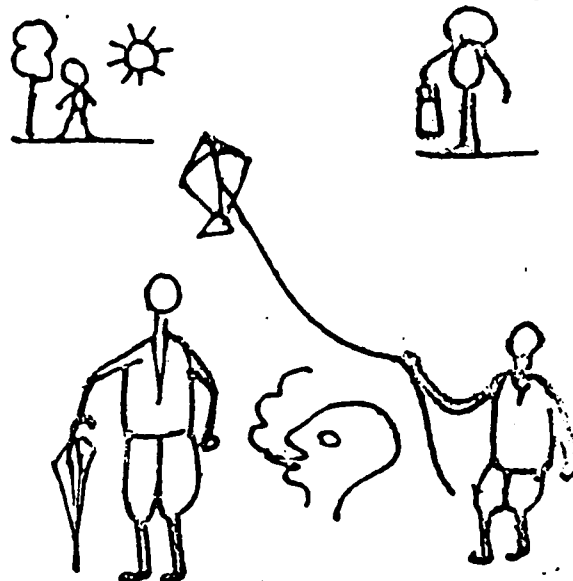


Table 6

Comparison of the Means and Standard Deviations for the HOME Inventory obtained in Baroda, Gujarat, India and Little Rock, Arkansas, USA

HOME Subscales	American sample . Indian sample			
	mean	S.D.	mean	S.D.
1 Toys, Games & Reading materials	6.02	3.60	6.62	2.67
2 Language stimulation	6.08	1.02	5.65	1.42
3 Physical Environment	5.64	1.44	4.91	2.13
4 Pride, affection etc.	5.59	1.58	4.44	2.04
5 Stimulation of academic beh.	3.90	1.19	3.62	1.15
6 Modeling, etc.	2.67	1.37	2.15	1.49
7 Variety of stimulation	7.95	2.28	4.52	2.07
8 Physical punishment	3.39	1.06	3.06	1.07
Total sample	41.85	9.95	35.05	10.11

Table 7

Intercorrelations Among The HOME Inventory Subscales

	. 1	. 2	. 3	. 4	. 5	. 6	. 7	. 8	.
1.Toys, etc.	-	.59	.42	.42	.54	.55	.56	.44	
2.Language sti.		-	.41	.27	.57	.32	.38	.31	
3.Phy.Envnt.			-	.35	.50	.32	.48	.41	
4.Pride, etc.				-	.37	.40	.50	.33	
5.Academic sti.					-	.36	.42	.27	
6.Modeling, etc.						-	.52	.28	
7.Variety of sti.							-	.46	
8.Phy. Punishment								-	

* all significant at $p < .001$

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