

## Investigating the Mental Abilities of Urban Preschool Children

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### Abstract

Maximising the full potential of health and educational interventions in Indian schools requires assessment of the current level of mental abilities of the preschool children as measured by cognitive and mental tests and the identification of any barriers to improved performance. The current study examined present mental abilities of 3-5 years old preschool children. This study was conducted in purposively selected preschool laboratory run under the department of Human Development and Family Studies COHS, CCSHAU Hisar district of Haryana State, India. The sample for the study comprised of fifty children and in the age group between 3-5 years enrolled in the preschool lab was selected for the present study. McCarthy Scale was administered to all 50 preschoolers to assess their mental abilities. Significant gender differences were found in the test scores, and comparatively more girls (30%) were mentally below their chronological age than boys (26.66%). Regarding performance on different mental abilities it was observed that on perceptual abilities the performance was better than standard on block building, tapping sequence and poor on puzzle solving, draw a design, draw a child and conceptual grouping. Further for verbal abilities it is concluded that children had better performance on pictorial memory and word knowledge and lagged behind on verbal memory aspect. For quantitative abilities the selected children were better on number question and numerical memory but poor on counting and solving. This implies that there is a need to educate the parents and school teachers and administrators to provide a congenial environment to facilitate overall development. A need to educate and equip the teachers with skills in offering the pre-school programme. There is also a need to appraise the early childhood education specialists and social workers, service personnel to offer good quality and meaningful programme for young children affordable by all socio-economic groups.

**Keywords:** perceptual abilities

### 1. Introduction

The development of our children is a true indicator of our progress. Young children are now recognised as the first call on the agenda of development, not only because this is a desirable societal investment in the nation's future human resource development, but also because early childhood is both the most vulnerable and the most crucial period when the foundations are laid for cumulative life-long learning and human development.

The first five years of life are crucial for physical, social, emotional, cognitive and language development of the child because during this period the foundation for all later development is laid. The child is highly receptive to the environment and learning potentials are at its peak. In relation to the general level of intelligence reached at the age of 21, about 50 per cent of aptitudes are already fixed at the age of 4, the following 30 per cent are achieved between 4 and 8 years and the remaining 20 per cent between 8-21 years. Piaget believes that cognitive processes develop in an orderly sequence and depend on maturation of brain and interactions with their environment. Further its outcome depends on the quality of children's experiences both inside and outside of the formal classroom because young children go through a series of psychosocial and neurobiological changes. Children's ability to acquire knowledge and then use it effectively to plan, monitor and evaluate their own capabilities is better ensured during early years of life (Murlidharn and Asthana, 1991). Environment during 3-6 years of life is very significant for cognitive development. Therefore, all kinds of facilities should be provided to the child to explore, to inquire, to play and to interact with his peers for optimum development.

In the preschool period mental development is characterized by the rapid expansion of cognitive abilities. A number of cognitive capacities critical to child's overall intelligence begin to develop during this period. This includes early development of concepts, attention, relational abilities and perceptual maturation. The concepts that a child

develops are many basic concepts in children's cognitive development include those rational concepts that children use to describe what they see, hear and feel. A child's ability to understand and use these concepts is considered essential not only to school learning but also to following verbal instructions.

Early experiences of interaction with insensitive material predicted the persistence of poorer cognitive functioning (Lynne et. al.2006). Allowing preschool aged children to discover and explore freely is the foundation for developmental learning and there is an ample amount of evidence of positive impact which preschool has in the development of cognition. The sensitive period is universally recognized as the most plastic, impressionable and educationally potent period of child's life as much of child's mental development takes place during this period. Therefore, this study was conducted with a broad objective to assess the present mental abilities of 3-5 years old preschool children.

The present study was planned with the following specific objectives:

1. To assess the mental age of preschoolers.
2. To study the performance of preschool children on perceptual abilities.
3. To study the performance of preschool children on verbal abilities.
4. To study the performance of preschool children on quantitative abilities.

## 2. Methodology

### 2.1 Sample

For the present investigation a sample of 50 children in the age range of (3-5 years) was purposively drawn from preschool laboratory run under the department of HDFs, college of Home Science, CCSHAU Hisar.

### 2.2 Tools

A McCarthy scale of Children's Abilities (MSCA) designed by McCarthy (1972) was used to assess the general abilities of preschool children. The MSCA contains 18 separate tests which assess child's ability in a variety of crucial areas. The test has been grouped into six scales: verbal, perceptual performance, quantitative, general cognitive, memory and motor. For each of the six scales the child's raw score is converted into scaled score, called an index according to his or her chronological age.

- a) Verbal scale (V) - constituting this scale assess the child's ability to express himself verbally and also assess the maturity of his verbal concepts. The test in verbal scale are pictorial memory, word knowledge, verbal memory, verbal fluency and opposite analogies.
- b) Perceptual performance scale (P) – This consist of game like tasks which don't require the child to speak, assesses his reasoning ability through the manipulation of materials. Tests are block building, puzzle solving, tapping sequence, right left orientation, draw a design, draw a child, conceptual grouping.
- c) Quantitative scale (Q) - This scale measures the child's facility with numbers and his understanding of quantitative words. Item content is closely related to children's interests and each item requires only a single step rather than a sequential process for solution. Item of test are- number questions, numerical memory, counting and sorting.
- d) General cognitive scale (GC) - is composed of all the tests in the V, P and Q scales. Each task is cognitive in nature and the scale as a whole provides a measure of the child's overall cognitive functioning. Only three of the eighteen tests in the McCarthy scales- Leg coordination, Arm coordination and Imitative Action- are not included on this GC scale because they involve gross motor rather than cognitive ability.
- e) Memory scale (Mem) - It assesses the child's short term memory. The Pictorial Memory and Tapping Sequence test present auditory and visual stimuli simultaneously; the Verbal and Numerical Memory tasks provide auditory stimuli only.
- f) Motor scale (Mot)- It assesses the child's coordination as he performs a variety of gross and fine motor tasks. The Leg Coordination, Arm Coordination and Imitative Action tests provide measures of gross motor ability. Draw- A- Design and Draw-A-Child assess fine motor coordination.

These contents of scale are designed to be suitable for both the sexes and culture free.

### 2.3 Scoring

Scoring of MSCA was done using the standard procedure given in the scale. Data on general information of children were also collected with the help of developed questionnaire.

### 2.4 Analyses

The raw score were converted into scale index score for analysis purpose. Mean and percentages were calculated to find out the personal profile of children. T test, chi square and correlation was also applied to judge the differences.

## 3. Results and Discussion

The data were analyzed and interpreted objective-wise as follows:

### 3.1 Personal Profile of Respondents:

Analyses revealed that 60% respondents were in the age range of 3-4 years and 40% above the age of 4years. Ratio of male and female respondents was 60:40. Majority of children (72%) were 1st born and rest were 2<sup>nd</sup> born. Data further highlighted that 68% respondents spent their 1<sup>st</sup> year in same lab nursery school followed by 2<sup>nd</sup> and more years (32%). Regarding education of parents 92% mothers and 88% fathers were graduate and above graduate followed by 8% and 12% educated up to 12<sup>th</sup> standard. Further data on parental occupation showed that 50% equal mothers which of were housewife and in service, whereas, 78% fathers were doing job and other 22% were busy in agriculture or in self business. More than fifty percent respondents (56%) belonged to nuclear family, having small sized family (58%) and remaining 44% belonged to joint and medium size of family (42%). Data in table further reveals that majority of children were having only one sibling (86%) and rest 14% were having 2 siblings.

### 3.2 Mental age of preschoolers

The mental age of the child was calculated against their score index and was compared with their chronological age. When gender wise distribution of respondents for their mental age against chronological age was analyzed, the data in table 1 highlighted that comparatively more girls (30%) were mentally below their

**Table 1.** Gender wise Frequency Distribution of children for their mental age against Chronological age

Category mental age	Male f (%)	Female f (%)	Total f (%)
Below chronological age	08 (26.66)	06(30.00)	14(28.00)
Equal to chronological age	07(23.33)	03(15.00)	10(20.00)
Above chronological age	15(50.00)	11(55.00)	26(52.00)
Total	30	20	50

Chronological age than boys (26.66%). Further higher percentage (23.33%) of boys had their mental age equal to their chronological age. Almost equal percentage of boys (50%) and girls (55%) were above chronological in their mental age. On the whole boys had superior mental age against their counterparts.

The results in table highlight that out of the total sample, 10 children (20%) had their mental age, equal to their chronological age indicating their development as per the norms. Further it was highlighted that 26 children (52 %) were having their mental age, above their chronological age, which indicate that these children had superior mental abilities when compared with the norms. Data further indicated that 28 percent children lagged behind in their mental abilities as their mental age was below than their chronological age. These are the children who require immediate intervention to improve their mental abilities.

### 3.3 Performance of preschool children on perceptual abilities

Age wise performance of the children has been shown in table 2 on various items, under perceptual abilities against the standards. Analysis of data for children in

**Table 2.** Age wise performance of children on perceptual abilities

Age(yrs) \ Aspects	<3		=3 to <4		=4 <5		=5>5	
	Mean		Mean		Mean		Mean	
	Calculated	Standard	Calculated	Standard	Calculated	Standard	Calculated	Standard
Block Building	6.6	5.5	8.29	7.1	9.73	9.3	10.0	9.5
Puzzle Solving	1.0	1.45	2	3.8	2.8	8.5	9.0	10.7
Tapping Sequence	2.7	1.4	2.47	2.1	5.8	3.5	5.5	4.0
Right-left rientation	-	-	-	-	-	-	4.25	6.1
Draw-A-Design	1.7	1.8	3.09	4.02	5.73	6.7	7.75	8.0
Draw-A-Child	0.4	1.1	2.05	3.05	6.4	8.0	7.5	9.1
Conceptual rrouping	2.0	2.3	3.23	5.4	6.26	7.6	6.75	7.6

all age groups revealed that children had superior performance against the standards on block building, tapping sequence, whereas, they lagged behind their age standards in puzzle solving, draw a design, draw a child and conceptual grouping.

### 3.4 Performance of preschool children on verbal abilities

Performance of children against different age group for verbal abilities has been depicted in table 3.

**Table 3.** Age wise performance of children on verbal abilities.

Age(Yrs) \ Aspects	<3		=3 to <4		=4 <5		=5>5	
	Mean		Mean		Mean		Mean	
	Calculated	Standard	Calculated	Standard	Calculated	Standard	Calculated	Standard
Pictorial Memory	2.5	1.8	4.05	2.2	5.53	3.6	5.5	3.6
Verbal Memory	1.7	6.5	3.09	12.2	3.4	22.0	11.5	22.0
Word Knowledge	9.2	8.8	12	11	15.6	16.1	14.5	16.1

Surprisingly as the age group increased the differences in their performance and standards on items they lagged behind widened. Mean comparison on different items against the standard mean on pictorial memory pointed out that children in all the age group had high mean performance against the standard mean highlighting better pictorial memory skills of selected children. Further performance of children in age groups <3 yrs and >3 to <4 years for word knowledge was higher in comparison to standard mean, whereas the children of higher age groups (= >4 to <5, =5 to >5) were below than the standard mean on word knowledge aspect. As far as the verbal memory aspect is concerned, children in all the age groups had poor performance against the standards.

### 3.5 Performance of preschool children on quantitative abilities

The quantitative abilities of children against the standards of different age groups have been presented in table 4. The results highlight that children's performance in various age groups on number questions and numerical memory was higher than the standards norms. However, a reverse trend was seen for counting and sorting aspect, where poor performance of selected children was seen when compared with standards in all age groups.

**Table 4.** Age wise performance of children on quantitative scale of general ability

Aspects	<3		=3 to <4		=4 <5		=5>5	
	Mean		Mean		Mean		Mean	
	Calculated	Standard	Calculated	Standard	Calculated	Standard	Calculated	Standard
Number Question	3.6	2.4	5.8	3.1	8.13	4.4	10.5	4.5
Counting & Sorting	1.0	1.3	3	4.1	4	6.3	4.75	6.3
Numerical Memory (forwarded & backward series)	2.6	2.2	6.85	4.6	9.33	5.9	13	7.5

From the tables of comparison of selected children performance with standard, it is concluded that under perceptual abilities the performance was better than standard on block building, tapping sequence and poor on puzzle solving, draw a design, draw a child and conceptual grouping. Further for verbal abilities it is concluded that children had better performance on pictorial memory and word knowledge and lagged behind on verbal memory aspect. For quantitative abilities the selected children were better on number question and numerical memory but poor on counting and solving. Kumari and Chikkara (1995) carried out a study on levels of cognitive abilities among pre-schoolers. Results revealed that, the concepts of matching, object assembling, textures, discrimination, verbal identification and conceptual development of size, speed, shape, colour were performed by majority of the pre-schoolers. Further, results indicated that children performed better on lower order concepts as compared to higher order concepts. The sample consisted of 80 pre-schoolers of 3-6 years from eight randomly selected Anganwadis of Haryana.

So it is suggested that the curriculum of Lab. nursery needs to lay emphasis while planning activity plan on the areas where majority of children performed poor against the norms.

In contrast Sharma and Gulati (2013) found that female had better verbal ability as compared to males and thus significant differences were observed in verbal ability.

Further analyses showed that majority of male and female had below average perceptual skills (70% and 75% respectively), quantitative ability (90% both male and female) and memory skills (57% and 70% respectively). Whereas, in motor skills, 60% males and 70% females had performed on average level. Gender differences in distribution of sample as per level of cognitive abilities were not found significant in all the aspects.

In contrary Wallentin (2009) and Sharma and Gulati (2013) concluded that women tend to be better than men in reading, identifying matching items, perceptual speed and verbal fluency and significant differences between male and female were observed in all the aspects.

The outcome and inferences of this study is interesting and worth noting in the sense that no significant gender differences were found in all the aspects of general abilities of preschool children. The possible reason may be given that children who were enrolled in preschool lab receiving similar exposure or both male and female children are coming from similar background families. All the children had spent more than one year time in preschool. The performance of children on all the aspects of general abilities was observed average and below average.

In the light of above results it can be suggested that intervention should be given to children to enhance their general ability skills. Parents should also be given intervention so that they can easily identify their children's ability that in which aspect child is poor so that they can also improve their skills in time.

#### 4. Conclusion

It is quite obvious that the situation as indicated by the study is alarming and the data given here clearly indicates variations in different mental abilities of preschool children. Regarding performance on different mental abilities it was observed that on perceptual abilities the performance was better than standard on block building, tapping sequence and poor on puzzle solving, draw a design, draw a child and conceptual grouping. Further for verbal abilities it is concluded that children had better performance on pictorial memory and word knowledge and lagged behind on verbal memory aspect. For quantitative abilities the selected children were better on number question and numerical memory but poor on counting and solving.

#### 5. Recommendations for improving mental abilities of preschoolers

- The importance of nutritional balance with foods that provide a high yield of vitamins and minerals cannot be overstated when it comes to enhancing your child's mental capabilities. Better-nourished children simply

- function more effectively on a cognitive level.
- Physical activity, including to your children helps nurture a love of language and promotes bonding both of which optimize a child's intellectual potential.
  - Engaging your children in conversation playing sports, boosts blood flow to all parts of the body, including the brain. When the brain is supplied with freshly oxygenated blood, concentration, thinking speed and complex reasoning are all enhanced.
  - Create a Stimulating Environment.
  - It's no big news flash that reading helps develop their language and vocabulary skills.
  - Playing games that stimulate the mind, particularly those that make use of strategy, will build verbal skills, plus improve powers of concentration, perception and reasoning.
  - One of the most efficient and effective methods for stimulating a child's mental processes and performance is controlled breathing. Controlled breathing increases oxygen flow to the brain, which in turn boosts memory, concentration and problem-solving abilities.
  - Create an Empowering Internal Dialogue. A positive internal dialogue can dramatically enhance intellectual performance.

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