

Research Paper :

## Impact of intervention package on cognitive abilities of pre-school children

KRISHNA DUHAN, SHEELA SANGWAN AND SHANTI BALDA

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### ABSTRACT

Present study was carried out in purposively selected Hisar city of Haryana state with the aim to assess impact of intervention programme on cognitive abilities of pre-school children. A sample of 52 children in the age group of 2-6 years was drawn randomly from pre-school laboratory run under the Department of Human Development and Family Studies COHS, CCSHAU. Children were assessed for their cognitive abilities by using McCarthy scale of children's abilities (1972). Intervention programme was developed and imparted to children for two months and after one month gap and post testing was done to see the impact of intervention programme. Results revealed that at pre-testing stage, children performed below the standard scores in all the verbal aspects except story recalling and opposite analogies. At post-testing stage, children of all the age groups obtained mean scores above the standard scores, thus showed the impact of intervention on verbal abilities of children. Perceptual performance of children at pre-testing stage was below the standard scores in four aspects *i.e.* tapping sequence, draw a design, block building and conceptual grouping. At post-testing stage, children in all the three age groups were above the standard scores for all the perceptual aspects. Children of all the three age groups had not the concept of backward counting even after exposure to intervention programme. The data further revealed that motor abilities of children in all age groups at post-testing stage were above the standard score. The study concluded that there was remarkable difference in pre and post-testing mean scores for most of the activities of verbal, perceptual performance, quantitative, memory and motor aspects of cognitive abilities.

See end of the article for authors' affiliations

Correspondence to:

**KRISHNA DUHAN**  
Department of Human  
Development and Family  
Studies, I.C. College of Home  
Science, C.C.S. Haryana  
Agricultural University,  
HISAR (HARYANA)  
INDIA

**Key words :** Verbal abilities, Perceptual abilities, Quantitative abilities, Memory, Motor abilities, Cognitive abilities, Intervention programme

Pre-school period is universally recognized as the foundation period of child's life. During this period, the child attains rapid growth and development if gets congenial environment at school and at home. Research evidence indicates that much of the child's mental development takes place during the period between 3-6 years of age. Mental development includes aspects such as verbal, non-verbal, reasoning, numerical-ability, quantitative, memory and perceptual performance. Children of this age group are highly active, curious and eager to learn. They like to explore, seek new experiences for the sheer pleasure of sensing and knowing. They now operate in the 'Piaget's second major stage of cognitive development, the "pre-operational stage". This marks a major qualitative help in their thinking. At this stage they can use symbols to represent objects, places and people in their world.

Intervention package may be defined as the act of imparting knowledge and training for improving and modifying present knowledge, attitude, capacity and skills. The intervention cognitive training facilitates the intelligence and creative thinking scores of the children (Mohanty and Hejmadi, 1992). Pre-school children

receiving cognitive intervention showed significant gains in intellectual as well as other cognitive abilities compared to controlled groups of children from similar background. Therefore, keeping in mind all these factors, the present study was conducted with the aim to assess cognitive development of pre-school children and to assess the impact of intervention package on cognitive abilities of these children.

### METHODOLOGY

For the present study, Hisar city was taken purposively for easy accessibility. Department of Human Development and Family Studies, at C.C.S. Haryana Agricultural University, Hisar. Hisar runs a pre-school laboratory for the children of 2-6 years of age. It is a pre-school laboratory where children are prepared for schooling through "Developmentally appropriate practices" (DAP) approach. A sample of 52 children in the age group of 2-6 years was drawn randomly for assessing cognitive abilities. The study was conducted in three phases. During the first phase children were tested for their cognitive abilities by using McCarthy scale of children's abilities (1972). During the second phase,

intervention programme was developed and imparted to children for two months. Intervention package comprised activities on verbal, perceptual performance, quantitative and memory aspects. The details of intervention package

are as under:

During the third phase, post testing was done after a gap of one month to assess the impact of intervention package on cognitive abilities of children. At pre-testing

Aspects	Activities	Items
Verbal aspect	Pictorial memory	Pictures of woman, cat, spoon, ball, fish and chair.
	Picture vocabulary	Picture of tomato, peacock, banana, horse and a girl. Picture of bus, crayon, bag and flower
	Oral vocabulary	Define the words: Mango, cat and scooter, potato, T-Shirt, shoes, fridge and shop.
	Word and sentences	– Repetition of words: – Orange, banana, guava – Red, blue, green – Tomato, potato, brinjal, cabbage – Bus, truck, tractor, jeep, motor cycle. – Lion, crocodile, leopard, elephant, giraffe – Story of lion and rat
	Verbal fluency	Name: – Things to eat – Animals – Things to wear – Play material (toys) – Colours – Things to ride
	Opposite analogies	Tell the opposite words: – Inside-outside – Small-big – Top-bottom – Fat-thin – Fast-slow
Perceptual performance	Block building	– Square blocks to build- house, train and school
	Puzzle solving	– Cut-outs of different pictures <i>i.e.</i> apple, radish
	Tapping sequence	– 4 Bowels, 1 spoon.
	To draw-a-design	– Different geometrical shapes- 9 in number
	To draw a-face	– Happy and angry face
Quantitative aspects	Conceptual grouping	– Squares and circles of three different colours and different sizes (big and small)
	Number questions	6 simple questions of addition and subtraction
	Forward series	Repeat the numbers in sequence – 3-5-7 – 2-4-8-12 – 2-7-9-11 – 5-2-4-8-8 – 7-5-3-9-6
	Backward series	Repeat the number backward – 5-7 – 8-6 – 1-6-4 – 4-2-3-9
	Counting and sorting	Pencils, beads, balls etc. or anything available at home. Make groups of 2-2, 4-4 objects available and also make the position of the objects <i>i.e.</i> 2 <sup>nd</sup> , 5 <sup>th</sup> from left or right.

as well as post-testing stage mean scores and standard deviations were calculated for each aspect and were compared with standard mean scores and standard deviations. On the basis of standard mean scores, the results were interpreted.

**FINDINGS AND DISCUSSION**

The perusal of data presented in Table 1 reveals that at pre-testing stage children of all the three age groups achieved mean scores above the standard scores only in two aspects *i.e.* story recalling and opposite analogies. They achieved mean scores below the standard scores for word and sentences and word knowledge. In pictorial memory, children at the age of 3 years performed below the standard scores while children of 2.6 years and 3.6 years performed above the standard scores. With regard to verbal fluency aspect, children at the age of 2.6 years had mean scores below the standard scores while children of other age groups performed above the standard scores. The results further revealed that at the post-testing stage

*i.e.* after exposure to intervention programme, mean scores for all the aspects of verbal abilities (pictorial memory, word knowledge, word and sentences, story verbal fluency and opposite analogies) were above the standard mean scores in all the age groups except children of 3.6 years, who performed below the standard mean score for word and sentences.

The above results may be concluded that at pre-testing stage, children performed below the standard scores in all the verbal aspects except two aspects *i.e.* story recalling and opposite analogies. At post-testing stage, children of all the age groups obtained mean scores above the standard scores, thus showed the impact of intervention on verbal abilities of children. The above results are in tune with the findings of Saini (2004).

Table 2 shows the impact of intervention on perceptual performance of children. The data of Table 2 portray that pre-testing mean scores in all the three age groups were below the standard mean scores in four aspects *i.e.* tapping sequence, draw a design, block building

**Table 1: Impact of intervention on verbal abilities**

Aspects	2 years and 6 months						3 years						3 years and 6 months					
	Pre testing		Post testing		Std. score		Pre testing		Post testing		Std. score		Pre testing		Post testing		Std. score	
	Mean	S.D.	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pictorial memory	1.1	0.7	2.0	1.06	0.9	1.0	1.2	0.8	3.0	0.7	1.8	1.4	2.5	0.67	3.6	0.54	2.2	1.5
Word knowledge	5.0	0.72	7.75	0.88	7.6	3.0	7.2	0.84	10.2	0.7	10.0	2.8	7.5	0.45	11.02	0.44	11.0	3.3
Word and sentences	3.4	1.0	4.31	1.35	4.3	3.9	6.2	3.1	9.6	3.28	8.7	5.5	8.0	1.0	10.6	1.67	12.2	7.3
Story	0.6	0.84	1.0	.92	0.2	0.7	1.0	0.5	2.4	0.54	1.0	1.9	1.8	0.75	3.4	0.89	1.8	2.6
Verbal fluency	2.0	0.95	4.25	1.03	2.5	2.7	5.8	1.25	8.0	1.58	4.7	3.6	7.5	0.56	11.8	1.09	6.2	3.8
Opposite analogies	1.5	0.85	2.62	0.74	0.4	0.9	2.4	1.0	3.4	0.4	1.5	1.5	5.2	1.0	7.8	0.44	2.2	1.7

**Table 2 : Impact of intervention on perceptual performance**

Aspects	2 years and 6 months						3 years						3 years and 6 months					
	Pre testing		Post testing		Std. score		Pre testing		Post testing		Std. score		Pre testing		Post testing		Std. score	
	Mean	S.D.	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Block building	3.0	1.78	5.0	1.69	4.4	1.9	5.0	1.64	7.4	0.54	6.0	2.5	6.0	1.0	8.2	1.3	7.1	2.2
Puzzle solving	1.0	0.74	1.87	0.64	0.9	1.0	2.0	1.87	3.4	0.89	2.0	2.6	3.0	2.9	4.2	0.83	3.8	4.3
Tapping sequence	0.5	0.72	1.0	1.06	0.8	0.8	1.1	0.85	2.6	0.89	1.3	1.1	1.5	1.25	3.2	0.44	1.6	1.0
Draw a design	1.3	0.84	2.78	0.7	1.4	1.2	2.1	0.69	4.2	0.83	2.2	1.3	2.7	1.0	5.8	1.09	2.8	1.4
Draw a child	1.2	0.89	2.0	1.18	0.2	1.0	2.4	1.25	3.8	0.83	1.0	2.2	5.2	0.97	6.8	0.83	2.3	2.9
Conceptual grouping	1.0	0.95	1.75	0.7	1.4	1.7	2.0	0.87	3.2	1.09	3.1	2.6	4.0	1.25	6.8	0.44	4.1	2.7

**Table 3 : Impact of intervention on quantitative abilities**

Aspects	2 years and 6 months						3 years						3 years and 6 months					
	Pre testing		Post testing		Std. score		Pre testing		Post testing		Std. score		Pre testing		Post testing		Std. score	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Numberquestion	1.4	0.85	2.37	0.91	0.8	1.11	2.5	0.74	4.0	0.7	2.0	1.4	4.0	1.25	7.4	1.67	2.3	1.4
Forward series	1.5	1.6	2.62	1.18	1.8	1.8	2.5	1.23	4.6	0.89	2.6	1.8	5.2	1.45	6.6	1.94	3.8	1.9
Counting and sorting	0.8	1.3	1.12	0.83	.7	1.0	3.1	1.56	4.2	.83	1.9	1.8	3.8	2.5	5.0	1.41	2.6	2.2

and conceptual grouping. The data further revealed that older children (3.6 years) had poor performance in puzzle solving aspect while children of 2.6 years and 3.0 years performed above the standard scores. At post-testing stage *i.e.* after exposure to intervention programme, children in all the three age groups were above the standard mean scores for all the perceptual aspects. The results are in consistent with the findings of Saini (2004).

Data presented in Table 3 portray the impact of intervention on quantitative performance of children. The perusal of results show that at pre-testing stage children in the age group of 2.6 years and 3.0 years obtained mean scores below the standard scores while children in the age of 3.6 years performed above the standard scores in two aspects *i.e.* forward series and in backward series. Data further showed that children of all the three age groups had not the concept of backward counting even after exposure to intervention programme. Where as, in other aspects, they performed above the standard mean scores. The results are supported by the study of Sangeeta (1999) who found that after intervention, the experimental group performed better in all the activities of quantitative aspect. Results also revealed that after exposure to intervention programme, children of all age groups scored above the standard scores in number question, forward

series, backward series and counting and sorting aspects of quantitative mental abilities. Jaswal and Saini (2000) quoted that intervention is essential keeping in view the present status of quantitative abilities of pre-school children since it has been proved to be effective in enhancing their abilities.

Table 4 shows the impact of intervention on memory abilities of children. The results revealed that before exposure to intervention programme the children of all the three age groups attained mean scores below the standard scores in tapping sequence and word and sentence formation. Regarding forward series counting, children in 2.6 age group also performed below the standard mean scores. Data further showed that no child had concept of backward series counting even after exposure to intervention programme. This may be due to the fact that children of 2.6 years had not backward series concept in their curriculum moreover, it also created confusion while reciting number in backward series.

The post intervention results revealed the remarkable improvement in all the aspects of memory as children performed above the standard scores at post-testing stage. The results are supported by the findings of Sangeeta (1999) and Kaliramna (1999).

Results of Table 5 reveal that in three motor aspects

**Table 4 : Impact of intervention on memory abilities**

Aspects	2 years and 6 months						3 years						3 years and 6 months					
	Pre testing		Post testing		Std. score		Pre testing		Post testing		Std. score		Pre testing		Post testing		Std. score	
	Mean	S.D.	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pictorial memory	1.1	0.7	2.0	1.06	0.9	1.0	2.2	0.8	3.0	0.7	1.8	1.4	2.5	0.67	3.6	0.54	2.2	1.5
Tapping sequence	0.5	0.72	1.0	1.06	0.8	0.8	1.1	0.85	2.6	0.89	1.3	1.1	1.5	1.25	3.2	0.44	1.6	1.0
Word and sentences	3.4	1.0	4.12	1.35	4.3	3.9	6.2	3.1	9.6	3.28	8.7	5.5	8.0	1.0	10.6	1.67	12.2	7.3
Story	0.6	0.84	1.0	.92	0.2	0.7	1.0	0.5	2.4	0.54	1.0	1.9	1.8	0.75	3.4	0.89	1.8	2.6
Forward series	1.5	1.6	2.62	1.18	1.8	1.8	2.5	1.23	4.6	0.89	2.6	1.8	5.2	1.45	6.6	1.94	3.8	1.9
Backward series	0	0	0.12	0	0	0	0	0	0	0	0.1	0.2	0	0	0	0	0.1	0.4

**Table 5 : Impact of intervention on motor abilities**

Aspects	2 years and 6 months						3 years						3 years and 6 months					
	Pre testing		Post testing		Std. score		Pre testing		Post testing		Std. score		Pre testing		Post testing		Std. score	
	Mean	S.D.	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Leg coordination	3.0	2.1	4.12	2.64	3.5	2.9	4.5	1.0	6.8	1.09	5.9	2.8	5.9	0.84	8.6	0.89	7.3	2.8
Arm coordination	1.5	1.0	3.37	1.4	1.6	1.9	2.4	0.8	3.4	.54	2.5	2.7	3.2	.5	5.6	.54	4.4	3.7
Imitative action	0.5	0.64	1.37	.74	2.1	1.1	1.1	0.45	2.0	0.0	2.8	0.9	2.0	.54	2.2	.44	3.2	.7
Draw a design	1.5	0.84	2.78	0.7	1.4	1.2	2.2	0.69	4.2	0.83	2.2	1.3	3.0	1.0	5.8	1.09	2.8	1.4
Draw a child	1.2	0.89	2.0	1.18	0.2	1.0	2.4	1.25	3.8	0.93	1.0	2.2	5.2	0.97	6.8	0.83	2.3	2.9

*i.e.* Leg coordination, Arm coordination and imitative action, the children in all age groups obtained mean scores below the standard scores. While in other two aspects *i.e.* draw a design and draw a child, children were found near to the standard scores at pre-testing stage. The data further revealed that at post-testing stage children in all age groups obtained mean scores above the standard scores except in one aspect *i.e.* imitative action where children did not improve even after exposure to intervention programme.

From the study, it can be concluded that there was remarkable difference in pre and post testing mean scores for most of the activities of verbal, perceptual performance, quantitative, memory and motor aspects of cognitive abilities. Improvement in the performance was due to the intervention package given to the children. The results are in line with the findings of Schaefer and Aronson (1972) who found significant improvement in linguistic and perceptual tasks through intervention in early years. The results of the study are also supported by the findings of Mohanty and Mishra (1991) who gave short term intervention and found significant improvement in cognitive skills of children. Therefore, on the basis of results, it may be inferred that interventions should be imparted to improve cognitive abilities as well as other skills especially during early childhood period. As pre-school period is the foundation stage of all the developments and if the child is provided congenial environment at home and at school, the optimum development may take place. So, if child is exposed to various conceptual activities such as puzzle fixing, block building, drawing, conceptual grouping, motor activities, number concepts etc. ,no doubt it will help to scaffold the cognitive abilities of children. The counseling and training programmes should be organized for parents and teachers

to update their knowledge and skills to further help their children during this critical period.

Authors' affiliations:

**SHEELA SANGWAN AND SHANTI BALDA**,  
Department of Human Development and Family Studies,  
I.C. College of Home Science, C.C.S. Haryana  
Agricultural University, HISAR (HARYANA) INDIA.

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