COGNITIVE DEVELOPMENT OF TRIBAL PRESCHOOL CHILDREN OF MYSORE DISTRICT, KARNATAKA

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Abstract

The study was carried out to determine the cognitive development among the Hakkipikki, Iruliga, Jenukuruba and Kadukuruba tribal pre-school children of 3+ to 5+ year's age group. The mean value for cognitive abilities of tribal children shows highly significant difference between the age group with regard to all the cognitive abilities.

Keywords: *Cognition, Environment, Tribal Pre-school Children, Comprehension*

Introduction

Pre-school children constitute the most vulnerable segment of the population and their nutritional status is considered as sensitive indicator of community health and nutrition. India accounts for about 16% of the total pre-school children population and from the nutritional stand point constitute a vulnerable segment and suffer the highest rate of morbidity and mortality (ICMR, 1986).

Cognitive development is the construction of thought processes including remembering, problem solving and decision making from childhood through adolescence to adulthood. All children go through a sequence of development that can be observed from large to small motor co-ordination, from simple ideas to complex thinking.

Cognition is viewed as a set of process which is concerned with the laws determining how organism knows the word around them knowing the world subsumes perception, recognition. Retention, imagination problem solving and concept formation. Naisser (1967) has used cognition as a global term to refer to all the processes by which the sensory input is transformed, reduced, elaborated, stored retrieved and utilized.

Cognitive development is intimately linked to the development of emotions, language and physical development. The sensory qualities of the environment and infant interactions with it enrich a child's ability to intellectually connect previous experiences with new information's and newly acquired skills (Smith, 2003).

The Study Population

Hakkipikki

The Hakkipikkis, a tribal population of Mysore district are known by different names in different regions; in their own dialect the Hakkipikkis call themselves as Raj Pardhi. In Kannada speaking areas of Mysore they are named as Hakkipikkis, people in Nilgiris call them Guddi Bethe. In the Hindi speaking regions this tribe is known as

Mel Shikari. They speak a dialect known as Vaghri, which is a mixture of Gujarati, Hindi, Marathi and Rajasthani languages (Mann, 1980). It is originated from Indo-Aryan languages. They are multi-occupational. It is difficult to categorise, in absolute terms, the occupation as the main and subsidiary ones. The main occupation of the Hakkipikki is flower making, doll making, those owing land as well as bullocks, switch on to agriculture in the season and then primarily may appeal to an outsider only as cultivators.

Iruliga

The Iruligas are a jungle tribe, speaking a mixture of Kannada and Tamil. They are found in the districts of Mysore and Bangalore as also on the slopes of the Mysore side of the Nilgiris. The Irulas, as their name indicates (Irul-black) is the darkest of the hill tribes of southern India. They possess the Negroid traits (short stature, flat nose, and prominent cheek bones, curly or wavy hair, and narrow foreheads). In some localities their marriage ceremonies are simple. Where they live in contact with the lower cast of the plains, they have imbibed their customs. The primary occupations are hunting, collection of honey, cultivation, basket making and agricultural labourers.

Jenu Kuruba

The Jenukuruba is one of the major tribal groups (PVTG) of Karnataka. The prefix Jenu means "honey", Kuruba indicates their caste name. The Kuruba is the name of large shepherd community of Karnataka Plateau (Aiyappan, 1948). As the name suggests Jenu Kurubas are honey gatherers. Jenu Kurubas main concentration is in Mysore and Kodagu districts. In Mysore district they are mainly concentrated in Hunsur, H. D. Kote and Periyapatna taluks. They have their own dialect known as "Jenunudi" and follow the Kannada script. They speak with outsiders in Kannada.

Kadu Kuruba

The Kadu Kuruba are inhabitating the area of Wynad, Nilgiris and Mysore district. Kadu kuruba are also called Betta kuruba. They are concentrated in the Mysore district and also in Kodagu, Dakshina Kannada and Hassan district within the Mysore district; they are settled in H. D. Kote, Hunsur, Periyapatna and Nanjangud taluks. They are dark or dark brown in colour, and a short stature with wooly hair, brownish black in complexion. They speak a dialect of their own among themselves, which is a mixture of Tamil, Malayalam and Kannada. They also speak Kannada among themselves and with outsiders. Most of them are illiterate, only a few are educated among them.

Methodology

The present study tries to explore the cognitive development of tribal children through cross-sectional survey carried out in Mysore district. In the present study, purposive sampling technique was followed by keeping clearly defined objectives, the sample for the present study comprised of four hundred tribal preschool children of 3+ to 5+ years.

Standard cognitive development assessment tool (Hema Pandey's cognitive development test tool for pre-schoolers, 1992) used to know the cognitive abilities. The details of each method of study and analysis of data under each aspect are as follows.

Pandey's Cognitive Development Test for Pre-schoolers

Pandey's Cognitive Development test for pre-schoolers (PCDTP) developed by Hema Pandey (1992) to measure the cognitive abilities of pre-schoolers (3+ to 5+ years) by verbal and non-verbal items. It includes six sub tests.

a. Conceptual Skills

This sub-test is oriented to measure the development of various concepts by children, namely, concept of shape, color, time, classification, number, seriation weight, size, texture and coins. The sub-test calls in to operation rote memory, ability to discriminate think and utilize past experience.

b. Information

This sub test measures how much general information the subject has abstracted from his surrounding environment. The test requires ability to comprehend and capacity for associative thinking. Items included in the test are expected to assess the subject awareness of and alertness to the environment.

c. Comprehension

This test measures the subject's ability to think, recall, associate and comprehend oral directions and actions of people in the environment and reasoning with abstraction.

d. Visual Perception

Visual perception is basically included to determine the qualitative aspects of relationships which the subject has abstracted from his environment. The subject should be able to see the basic essential relationship between the objects in the environment. This requires ability to comprehend, capacity for associative thinking, discrimination, reasoning, attention, analysis and concentration.

e. Memory

This sub-test attempts to determine the level of child's ability to pay attention in a simple situation. It measures immediate auditory recall or immediate auditory (attention) span and level of mental alertness and rote memory.

f. Object Vocabulary

This sub test measures child's richness of ideas, kind and quality of language and degree of abstract thinking, vocabulary reflects also a child's level of education and environment.

Testing Procedure

The test was administered individually to child in an exclusively private room. Items wise materials provided in the kit are used and arranged in an order of presentation. After completing one test the other test was administered. During the period of test, the child was praised and encouraged to make him/her confident enough to complete the test. As the child completes the task one mark was given for correct answer. A total of 71 items were administered to the child. There is no time limit to complete all the test items. The score obtained by the child was noted down.

The collected data of cognitive development was subjected to analyze as per the instruction given in manual of respective tool. The total raw score was converted into standard score with the help of cognitive development norms for the children of different age groups. Higher the score, higher the cognitive abilities and lower the score lower cognitive abilities. The data was further computed and tabulated as per the objectives of the study.

Result and Discussion

It was observed from the table 1 that the mean value for cognitive development of Hakkipikkis children, highly significant difference between the age group was noticed with regard to all the cognitive abilities. As the age increases the mean score of conceptual skills, information and memory has also increased in all the tribal children. while the mean score of 4+ years aged children was less as compared to 3+ and 5+ years aged children in comprehension and object vocabulary in Hakkipikki, Iruliga and Jenukuruba children. Where as in Kadukuruba children the mean value increases from 3+ to 5+ years in conceptual skills, information, memory and object vocabulary, and in comprehension the mean value 4+ years children was comparatively lesser than 3+ years.

Scheffe's post Hoc test of Multiple Comparison of Tribal Children

According to Scheffe's post Hoc test of multiple comparison 5+ years aged children displayed a higher cognitive ability when compared to the children of 3+ and 4+ years in all the aspects of cognitive development namely, conceptual skills, information, comprehension, memory and object vocabulary. The result also shows a highly significant difference between the age group of Hakkipikki, Iruliga, Jenukuruba and Kadukuruba children ($P<0.0001$).

The table 2(a) shows that in Hakkipikki children, there was no significant difference in the age group of 3+ and 4+ years in their cognitive abilities with regard to conceptual skills and memory, and the Iruliga children shows no significant difference with regard to Object vocabulary, Among Jenukuruba children there is a highly significant difference was noticed with respect to 5+ years and no significant difference was observed in 3+ and 4+ years aged children with respect to memory, where as the Kadukuruba children shows highly significant difference between the children in the age group of 3+ to 5+ years in all the cognitive developments. This shows that children of 5+ years have better cognitive skills than children of 3+ and 4+ years.

Correlation for Anthropometric and Cognitive Abilities

Table 3 reveals the correlation values of anthropometric measurement with cognitive abilities. Height highly significantly correlates negatively with weight, body mass index and mid-upper arm circumference and it is highly significantly positively correlates with all other cognitive abilities except comprehension.

Weight highly significantly correlates positively with all the cognitive abilities. Body mass-index highly significantly negatively correlates with height, mid-upper arm circumference and do not correlates with skin fold thickness. It is significantly correlates with comprehension and visual perception and do not correlates with conceptual skills, information, memory and object vocabulary.

Mid-upper arm circumference highly significantly positively correlate with height and skin fold thickness and significantly correlates positively with information, visual perception and object vocabulary and do not correlates with conceptual skills, comprehension and memory.

Skin fold thickness highly significantly positively correlates with height, weight mid-upper arm circumference and do not correlates with BMI and highly significantly positive correlation with all the cognitive abilities except information.

Conclusion

All the cognitive abilities highly significantly positively correlate with each other, 5+ years aged children displayed a higher cognitive ability when compared to the children of 3+ and 4+ years in all the aspects of cognitive development namely, conceptual skills, information, comprehension, memory and object vocabulary. The result also shows a highly significant difference between the age group of Hakkipikki, Iruliga, Jenukuruba and Kadukuruba children ($P<0.0001$).

Table 1: Mean and Standard Deviation Values for Conceptual skills, Information, Comprehension, Memory and Object Vocabulary

Population	Age (Years)	N	Conceptual skills		Information		Comprehension		Memory		Object vocabulary	
			Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Hakkipikki	3	18	4.11	0.47	2.00	0.00	2.00	0.00	0.56	0.51	2.00	0.00
	4	25	6.52	0.71	4.00	0.00	1.00	0.00	1.00	0.00	1.88	0.33
	5	57	16.93	3.43	5.47	0.60	3.56	0.50	4.56	1.62	3.68	0.68
Iruliga	3	27	3.07	0.38	2.00	0.00	2.00	0.00	0.00	0.00	2.00	0.00
	4	29	6.34	0.85	3.90	0.31	1.03	0.18	0.93	0.25	1.90	0.31
	5	44	18.84	2.66	5.75	0.48	3.82	0.44	5.14	1.39	3.91	0.42
Jenukuruba	3	29	4.07	3.10	2.14	0.74	2.07	0.37	0.21	1.11	2.07	0.37
	4	30	6.43	0.72	4.00	0.00	1.03	0.18	0.97	0.32	1.93	0.25
	5	41	17.66	4.68	5.51	1.09	3.68	0.61	4.85	1.75	3.80	0.74
Kadukuruba	3	40	5.45	1.23	1.72	0.45	2.00	0.00	0.42	0.63	0.98	0.73
	4	29	6.48	0.98	4.00	0.00	1.10	0.31	1.03	0.18	1.48	0.50
	5	31	14.48	3.01	5.13	0.49	3.13	0.49	3.61	1.11	3.26	0.44

Table 2 (a): Scheffe's Post Hoc Test for Multiple Comparisons with Age (Hakkipikki); Pair-wise Comparisons

Dependent Variable	Age	Age	Mean Difference	Std. Error	Sig.[a]
Conceptual skills	3	4	-2.409*	0.816	0.012
		5	-12.819*	0.714	0.000
	4	3	2.409*	0.816	0.012
		5	-10.410*	0.633	0.000
	5	3	12.819*	0.714	0.000
		4	10.410*	0.633	0.000
Information	3	4	-2.000*	0.141	0.000
		5	-3.474*	0.123	0.000
	4	3	2.000*	0.141	0.000
		5	-1.474*	0.109	0.000
	5	3	3.474*	0.123	0.000
		4	1.474*	0.109	0.000
Comprehension	3	4	1.000*	0.118	0.000
		5	-1.561*	0.103	0.000
	4	3	-1.000*	0.118	0.000
		5	-2.561*	0.091	0.000
	5	3	1.561*	0.103	0.000
		4	2.561*	0.091	0.000
Memory	3	4	-0.444	0.388	0.763
		5	-4.006*	0.339	0.000
	4	3	0.444	0.388	0.763
		5	-3.561*	0.301	0.000
	5	3	4.006*	0.339	0.000
		4	3.561*	0.301	0.000
Object vocabulary	3	4	0.12	0.169	0.001
		5	-1.684*	0.148	0.000
	4	3	-0.12	0.169	0.001
		5	-1.804*	0.131	0.000
	5	3	1.684*	0.148	0.000
		4	1.804*	0.131	0.000

Table 2 (b): Scheffe's Post Hoc Test for Multiple Comparisons with Age (Iruliga); Pair-wise Comparisons

Dependent Variable	Age	Age	Mean Difference	Std. Error	Sig.[a]
Conceptual skills	3	4	-3.271*	0.493	0.000
		5	-15.767*	0.451	0.000
	4	3	3.271*	0.493	0.000
		5	-12.496*	0.441	0.000
	5	3	15.767*	0.451	0.000
		4	12.496*	0.441	0.000
Information	3	4	-1.897*	0.098	0.000
		5	-3.750*	0.089	0.000
	4	3	1.897*	0.098	0.000
		5	-1.853*	0.087	0.000
	5	3	3.750*	0.089	0.000
		4	1.853*	0.087	0.000
Comprehension	3	4	0.966*	0.084	0.000
		5	-1.818*	0.077	0.000
	4	3	-0.966*	0.084	0.000
		5	-2.784*	0.075	0.000
	5	3	1.818*	0.077	0.000
		4	2.784*	0.075	0.000
Memory	3	4	-0.931*	0.250	0.001
		5	-5.136*	0.229	0.000
	4	3	0.931*	0.250	0.001
		5	-4.205*	0.224	0.000
	5	3	5.136*	0.229	0.000
		4	4.205*	0.224	0.000
Object vocabulary	3	4	0.103	0.087	0.716
		5	-1.909*	0.080	0.000
	4	3	-0.103	0.087	0.716
		5	-2.013*	0.078	0.000
	5	3	1.909*	0.080	0.000
		4	2.013*	0.078	0.000

Table 2 (c): Scheffe's Post Hoc Test for Multiple Comparisons with Age (Jenukuruba); Pair wise Comparisons

Dependent Variable	Age	Age	Mean Difference	Std. Error	Sig.[a]
Conceptual skills	3	4	-2.364*	0.902	0.030
		5	-13.590*	0.840	0.000
	4	3	2.364*	0.902	0.030
		5	-11.225*	0.832	0.000
	5	3	13.590*	0.840	0.000
		4	11.225*	0.832	0.000
Information	3	4	-1.862*	0.211	0.000
		5	-3.374*	0.197	0.000
	4	3	1.862*	0.211	0.000
		5	-1.512*	0.195	0.000
	5	3	3.374*	0.197	0.000
		4	1.512*	0.195	0.000
Comprehension	3	4	1.036*	0.117	0.000
		5	-1.614*	0.109	0.000
	4	3	-1.036*	0.117	0.000
		5	-2.650*	0.108	0.000
	5	3	1.614*	0.109	0.000
		4	2.650*	0.108	0.000
Memory	3	4	-0.760	0.335	0.070
		5	-4.647*	0.312	0.000
	4	3	0.760	0.335	0.070
		5	-3.887*	0.309	0.000
	5	3	4.647*	0.312	0.000
		4	3.887*	0.309	0.000
Object vocabulary	3	4	0.136	0.140	0.010
		5	-1.736*	0.131	0.000
	4	3	-0.136	0.140	0.010
		5	-1.872*	0.129	0.000
	5	3	1.736*	0.131	0.000
		4	1.872*	0.129	0.000

Table 2 (d): Scheffe's Post Hoc test for Multiple Comparisons with Age (Kadukuruba); Pair-wise Comparisons

Dependent Variable	Age	Age	Mean Difference	Std. Error	Sig.[a]
Conceptual skills	3	4	-1.033	0.469	0.009
		5	-9.034*	0.460	0.000
	4	3	1.033	0.469	0.009
		5	-8.001*	0.497	0.000
	5	3	9.034*	0.460	0.000
		4	8.001*	0.497	0.000
Information	3	4	-2.275*	0.097	0.000
		5	-3.404*	0.096	0.000
	4	3	2.275*	0.097	0.000
		5	-1.129*	0.103	0.000
	5	3	3.404*	0.096	0.000
		4	1.129*	0.103	0.000
Comprehension	3	4	.897*	0.079	0.000
		5	-1.129*	0.077	0.000
	4	3	-.897*	0.079	0.000
		5	-2.026*	0.084	0.000
	5	3	1.129*	0.077	0.000
		4	2.026*	0.084	0.000
Memory	3	4	-.609*	0.182	0.003
		5	-3.188*	0.179	0.000
	4	3	.609*	0.182	0.003
		5	-2.578*	0.193	0.000
	5	3	3.188*	0.179	0.000
		4	2.578*	0.193	0.000
Object vocabulary	3	4	-.508*	0.145	0.002
		5	-2.283*	0.142	0.000
	4	3	.508*	0.145	0.002
		5	-1.775*	0.153	0.000
	5	3	2.283*	0.142	0.000
		4	1.775*	0.153	0.000

Based on estimated marginal means, *. The mean difference is significant at the 0.05 level; a. Adjustment for multiple comparisons

Table 3: Correlation for Anthropometric and Cognitive Abilities

Anthropometric* Cognitive abilities		Height	Weight	BMI	MUAC	Skin fold thickness	Conceptual skills	Information	Comprehension	Visual perception	Memory	Object vocabulary
Height	Pearson Correlation	1										
	Sig. (2-tailed)											
	N	800										
Weight	Pearson Correlation	.776**	1									
	Sig. (2-tailed)	0										
	N	800	800									
BMI	Pearson Correlation	-.390**	.245**	1								
	Sig. (2-tailed)	0	0									
	N	800	800	800								
MUAC	Pearson Correlation	.742**	.672**	-.154**	1							
	Sig. (2-tailed)	0	0	0								
	N	800	800	800	800							
Skin fold thickness	Pearson Correlation	.246**	.259**	-0.004	.292**	1						
	Sig. (2-tailed)	0	0	0.907	0							
	N	800	800	800	800	800						
Conceptual skills	Pearson Correlation	.221**	.204**	0.07	0.072	.136**	1					
	Sig. (2-tailed)	0	0	0.163	0.151	0.006						
	N	400	400	400	400	400	400					
Information	Pearson Correlation	.319**	.288**	0.049	.101*	-0.033	.896**	1				
	Sig. (2-tailed)	0	0	0.33	0.043	0.509	0					
	N	400	400	400	400	400	400	400				
Comprehension	Pearson Correlation	0.06	.108*	.121*	0.087	.266**	.880**	.646**	1			
	Sig. (2-tailed)	0.232	0.03	0.015	0.083	0	0	0				
	N	400	400	400	400	400	400	400	400			
Visual perception	Pearson Correlation	.184**	.203**	.100*	.101*	.134**	.957**	.845**	.918**	1		
	Sig. (2-tailed)	0	0	0.045	0.044	0.007	0	0	0			
	N	400	400	400	400	400	400	400	400	400		
Memory	Pearson Correlation	.208**	.197**	0.08	0.073	.141**	.971**	.880**	.871**	.935**	1	
	Sig. (2-tailed)	0	0	0.109	0.144	0.005	0	0	0	0		
	N	400	400	400	400	400	400	400	400	400	400	
Object vocabulary	Pearson Correlation	.191**	.177**	0.066	.119*	.131**	.881**	.816**	.850**	.897**	.889**	1
	Sig. (2-tailed)	0	0	0.19	0.017	0.009	0	0	0	0	0	
	N	400	400	400	400	400	400	400	400	400	400	400

** Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at 0.05 level (2-tailed)

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