

# Neuropsychological Profile of Adopted Children - A Clinic Based Study

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**Abstract:** The study aims to see the level of neuropsychological functions Intelligence, Memory, Attention & Concentration and other mental abilities and Specific Learning Disability (SLD) in adopted children. A clinic based sample of 22 adopted children, Male 13, Female 9. Besides demographic variables, intelligence, memory, other mental abilities and SLD were assessed by Standardized Psychological Tests and HELP CHILD Learning Disability Assessment Tool. Neuropsychological profile showed more percentage of adopted children have average IQ and above average PQ. One fifth of children have impairment in memory, attention and concentration. Almost all the adopted children have Specific Learning Disability.

**Keywords:** Adoption, Memory, Intelligence, Specific Learning Disability

## 1. Introduction

Adoption is a substitute form of child rearing practice, wherein the parent child status is conferred upon one or more adults and a child. It meets a child's biological needs, gives physical security and provides emotional as well as social support. Adoption is a means of fulfilling the emotional needs of a childless couple [1]. Child adoption is a ubiquitous and time-honored practice [2].

After World War II, adoption became more common and more widely accepted than it had been before. For the first time, a broad white middle-class consensus proclaimed adoption the 'best solution' to the 'problem' of pregnancy out of wedlock.

The face of adoption changed significantly over time. The term Closed adoption was introduced where neither the child nor the biological parents knew the identity of the adoptive parents. Starting in the 1980s, adoption agencies began to utilize the concept of open adoption. The concept was that birth mothers who were ambivalent about giving up their children into anonymity forever might be willing to grant adoption if they knew more about where and with whom their children were placed [3]. The provision of adoptive or

foster placement is seen as providing optimum care solution for those children whose parents are unable or unwilling to care for them. Hence, adoption is more likely than not to transform as deprived or disadvantaged child's life [4].

Most of the research done with regard to adoption and the dilemma of adoptive parents and adopted children has been in the Western countries. Currently, adoption is gaining new grounds in India and is open to single unmarried women. Most of the studies are related to behavioral problems, adjustment and relationship of the adopted children with their adoptive parents [5].

Various studies revealed that the number of adopted children registered in clinics ranges from 2.9 to 21.2% [6], [7].

Adopted children show more psychological / behavioral problems than non adopted children [8], [9].

Hence, we made an attempt to study the level of neuropsychological functions – Intelligence, Memory, Attention & Concentration and other mental abilities and Specific Learning Disability (SLD) in adopted children.

## 2. Methodology

The sample of the study is 22 adopted children consisting

of 13 Male, 9 Female who were referred by Pediatricians, Neurologists, Psychiatrists, School counselors and school authorities to our clinic. They were referred for Neuropsychological functions and language assessment. These adopted children were between the ages of 2 years to 16 years. The sample was collected over a period of ten years. Demographic variables such as gender, occupation of parents, age of adoption of the child, sources of adoption, motor milestones, speech and language, and neuropsychological functions namely intelligence, memory, attention, concentration, other mental abilities and Specific Learning Disability (SLD) were assessed [10].

These children were assessed by Standardized Psychological Tests and HELP CHILD Learning Disability Assessment Tool.

### 2.1. Neuropsychological and Language Functions Assessment

Stanford-Binet Intelligence Scale – Stanford-Binet Intelligence Scale is used from age 2 to young adult. It contains wide variety of short, one to six item sub-tests measuring intellectual abilities. Besides intelligence it also measures mental abilities such as memory, comprehension, arithmetic reasoning, and perception of form, vocabulary & Colour perception. Sub-tests are arranged in order of difficulty starting from year 2. There are six sub-tests and an alternate at each level. Each sub-test has its own administration and scoring instructions [11].

Wechsler Memory Scale is the most commonly used Comprehensive Memory Scale consisting of seven sub tests – Personal & current information, Orientation, Mental control, Logical memory, Digits Span, Visual reproduction and associate learning. Memory Quotient (MQ) is derived as per the manual, which is comparable to Intelligence Quotient (IQ) [12].

Bhatia's Battery of Performance test of Intelligence is an intelligence test standardized in Indian population both literate and illiterate. It measures both performance IQ and full scale IQ [13].

Bender Visual Motor Gestalt test is a set of nine designs used to demonstrate the tendency of the perceptual system to organize visual stimuli. It measures visuomotor function [14].

Seguin -Goddard Form Board test is a visuo-spatial performance task which is used to assess the non-verbal intelligence of children [14].

Digit Span test is a sub test used in the Wechsler Intelligence scale comprised of two different tests, Digits forward (DF) and Digits backward (DB) [14].

HELP CHILD Learning Disability assessment tool is a comprehensive tool to assess writing, spelling, reading in English and second language i.e., Hindi / Tamil and Mathematics. It is standardized in regional population.

### 2.2. Procedure

A detailed case history was collected from the parents / care givers of these adopted children before the assessment. Each adopted child was assessed on the above Neuropsychological and Language tests in two to three sessions. Each session lasted for approximately ninety minutes. Assessment was done in English and regional language (Tamil).

## 3. Results & Discussion

The data was analyzed using SPSS (Statistical Package for Social Sciences). The analysis showed 70% of adopted children have average and 30% have above average IQ. 45% of adopted children have average and 55% have above average Performance IQ (PIQ). Memory, Attention & Concentration were impaired in 20% of children. 14 children were assessed for Specific Learning Disability and all of them were found to have writing disorder, i.e., 100%. 86% of children have reading disorder. Level of significance  $Z=3.11$ ,  $P=0.01$  (*Mann Whitney U-test*).

Comprehension was impaired in 20% of the adopted children. Impairment in Arithmetic reasoning 63%, Vocabulary 26% and Perception of form 58% was seen in these children. Disturbance of the visuomotor function was seen in 18% of children. 18 fathers and 7 mothers were employed.

None of the children in the sample have biological siblings. 6 years 9 months was the mean age of adopted children. Mean age of adoption of children was 8 months 13 days (lowest age -7 days; highest age - 3 years).

**Table 1.** Neuropsychological functions vs Male –Female children.

	Gender				Independent Sample t-test	
	Male		Female		t- Value	P
	Mean	SD	Mean	SD		
IQ	103.7	18.2	97.4	24.9	.673	.509
PQ	116.2	16.5	103.9	28.0	1.183	.254
Immediate Memory - DF	5.0	.8	4.3	.8	1.665	.117
Immediate Memory - DB	3.9	1.1	3.3	.6	1.000	.350
Memory	7.8	2.6	6.0	2.1	1.405	.179
Comprehension	7.1	2.3	6.4	.9	.643	.530
Arithmetic reasoning	6.2	2.1	5.8	2.8	.322	.752
Perception form	6.2	2.7	5.2	2.6	.748	.466
Vocabulary	6.8	2.6	5.8	1.8	.809	.431

Note: None of the parameters has any statistical significance with gender of adopted children

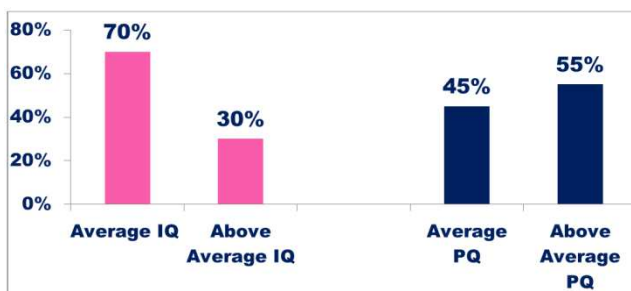
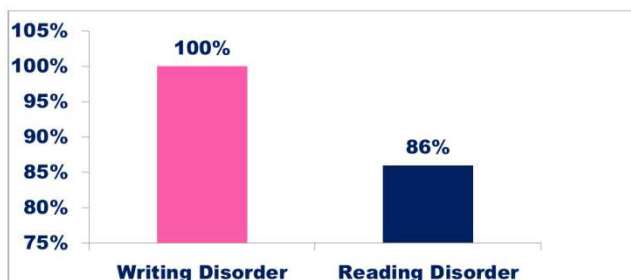
**Table 2.** Neuropsychological functions vs Age of children.

	Age						One way ANOVA	
	< 5 Years		5 -10 Years		> 10 Years			
	Mean	SD	Mean	SD	Mean	SD	F-Value	Sig.
IQ	100.6	29.4	104.4	16.2	94.8	14.5	.298	.746
PQ	113.8	16.1	113.9	26.3	102.8	19.2	.374	.694
Immediate Memory - DF	4.0	.0	4.9	.9	5.3	.6	3.231	.070
Immediate Memory - DB	3.0	.	3.8	1.0	3.7	1.2	.280	.764
Memory	5.2	1.3	7.7	1.8	12.0	.0	14.075	.000
Comprehension	5.7	.8	6.8	1.4	11.0	1.4	14.012	.000
Arithmetic reasoning	3.5	.6	6.6	1.7	9.0	.0	11.811	.001
Perception form	3.4	.5	5.8	2.0	10.0	.0	16.651	.000
Vocabulary	5.0	.0	6.5	2.2	10.5	2.1	6.439	.010

**Table 3.** Neuropsychological functions vs Age of adoption.

	Age of adoption (Months)								One way ANOVA	
	1 month or less		2 -5 months		6 -10 months		> 10 Months			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F-Value	Sig.
IQ	82.8	34.4	105.3	10.6	97.7	16.2	110.2	18.0	1.763	.192
PQ	115.5	9.2	108.1	16.9	109.0	26.2	115.0	30.7	.120	.947
Immediate Memory - DF	5.0	1.0	4.8	.4	5.7	.6	4.0	.7	4.380	.024
Immediate Memory - DB	4.0	1.4	3.2	.4	4.3	1.2	.	.	1.686	.253
Memory	9.3	3.1	6.4	2.2	10.0	2.0	5.8	1.1	3.876	.033
Comprehension	8.0	4.0	6.3	1.4	8.7	1.2	6.0	.0	1.993	.161
Arithmetic reasoning	8.5	.7	5.2	2.2	8.0	1.0	4.8	1.5	3.749	.045
Perception form	6.7	3.5	5.9	2.4	8.7	1.5	3.6	.9	3.539	.043
Vocabulary	6.3	3.1	6.3	2.1	9.7	2.1	5.0	.0	3.701	.040

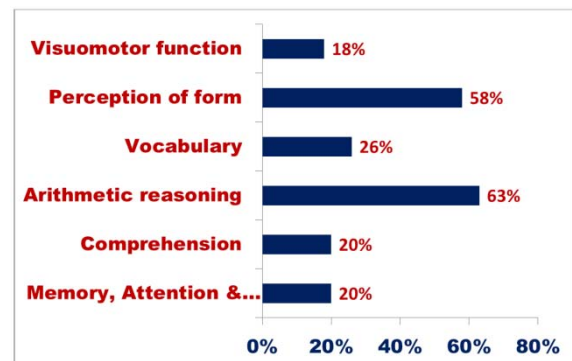
The above results showed significant difference in overall Memory function, Arithmetic Reasoning, Perception of form and Vocabulary among children with different age of adoption. Children who were adopted between 6 to 10 months of age have no disturbance in Memory, perception of form, and vocabulary. Children who were adopted in less than one month had no disturbance in Arithmetic reasoning. Neuropsychological functions were found to be impaired in children who were adopted after 10 months of age.

**Figure 1.** Comparison of IQ vs PQ in adopted children.**Figure 2.** Presence of Specific Learning Disorder in adopted children.

The above figure showed all the children have writing disorder and 86% of children have reading disorder.

**Figure 3.** Presence of Specific Learning Disorder in adopted children vs Gender difference.

The above results showed writing disorder seemed to be more in both male and female children.

**Figure 4.** Impairment of Neuropsychological functions in adopted children.

Above figure shows that more than 50% of children have impairment in perception of form and arithmetic reasoning.

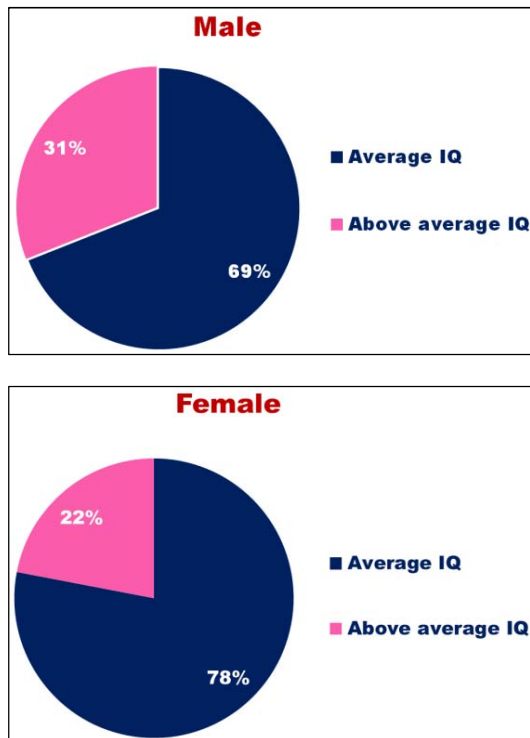


Figure 5. IQ vs Gender difference.

31% of male children have average IQ and 69% have above average IQ. 22% of female children have average IQ and 78% above average IQ.

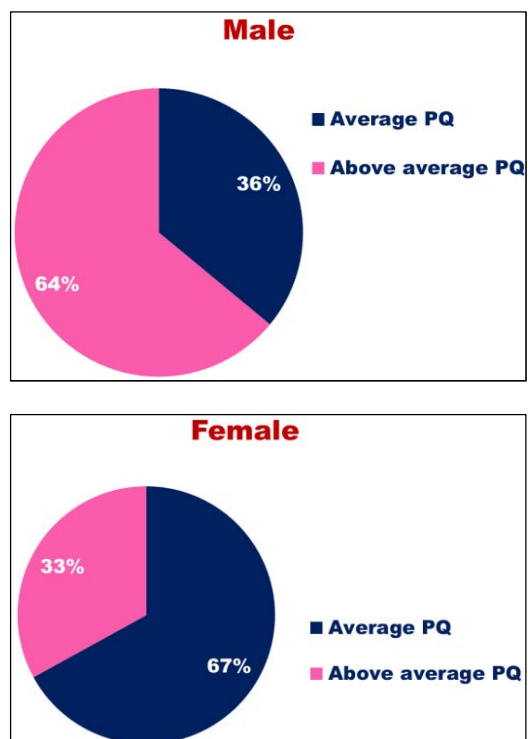


Figure 6. PQ vs Gender difference.

36% of male children have average PQ and 64% have above average PQ. 33% of female children have average PQ and 67% above average PQ.

## 4. Conclusions

Neuropsychological profile showed majority of adopted children have average IQ and above average PQ. 1/5<sup>th</sup> of the children have impairment in memory, attention and concentration. Almost all the adopted children have Specific Learning Disorder. 3/5<sup>th</sup> of the children have impairment in arithmetic reasoning and perception of form. Adopted children need to be screened not only for neuropsychological functions but also for language functions - writing, reading and arithmetic. This assessment helps in planning appropriate management and remedial intervention for the adopted children to overcome the psychological impairment and learning disorders. Early identification and appropriate remedial intervention will be helpful for better academic performance.

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