

Differential Achievements of Students with Autism in Reading, Writing and Numeracy

Hina Fazil¹, Rukhsana Bashir²

Department of Special Education, University of the Punjab,
Lahore, PAKISTAN.

¹ hinafazil@hotmail.com, ² rukhsana.dse@gmail.com

ABSTRACT

The present study was conducted to know the current levels of performance of children with autism in functional academics reading, writing and numeracy skills. The type of the research was descriptive. Population of the study included the teachers of children with autism. In this study, the convenient sampling technique was used to select sample of 35 teachers from different special schools of two major cities of Pakistan i.e., Lahore and Islamabad. Self-made questionnaire was used as an instrument for the purpose of data collection. It consisted of 46 items based on reading, writing and numeric skills. The teachers were required to respond on two point scale i.e. No = 0, Yes = 1. The reliability of the instrument was .989. Major findings are: children with autism can match alphabets with correct picture and word, children with autism can write A-Z and can count number from 1-10. Mean of reading skill was higher than writing and numeric skills.

Keywords: Autism, reading, writing, numeracy, academic achievement

INTRODUCTION

Autism is a persistent developmental disorder of early childhood. Its onset is from zero to 3 years. Autism spectrum disorder (ASD) is characterized by social deficits, particularly impairments in verbal and non-verbal communication, problems with social reciprocity and failure to develop and maintain peer relationships. It is also characterized by restricted, repetitive patterns of behaviors, interests and activities (American Psychiatric Association, 2010; Gillberg 1991). Currently, the Diagnostic and Statistical Manual of Mental Disorders-IV-TR (American Psychiatric Association, 2000) distinguishes between autistic disorder and Asperger Syndrome (AS).

In recent years, the term autism spectrum disorders (ASD) has been applied to describe children with the full autism syndrome and variants such as Asperger's disorder and pervasive developmental disorder-not otherwise specified (PDD-NOS). According to American Psychiatric Association (2000) and World Health Organization (2007) Asperger syndrome and autistic disorder are differentiated in that individuals with AS do not demonstrate a general delay in language before the age of three years nor do they possess a clinically significant delay in cognitive development. In contrast, individuals with autistic disorder do experience language delays in that they would not be using full words by age two or meaningful phrases or sentences by age three. Furthermore, individuals with autistic disorder do not necessarily have typical cognitive development (American Psychological Association, 2000).

According to Chakrabarti and Fombonne (2001, 1005); Yeargin- Alsopp, Rice, Karapurkar, Doernberg, Boyle, and Murphy (2003) autism spectrum disorder affect between 30 and 60 children per 10,000. There has been an increase in the number of children identified with autism spectrum disorders (Fombonne, 2005). Now autism became third most common developmental disorder after mental retardation and cerebral palsy (Webbber, 2002).

According to the contemporary research, one out of 88 children is affected by autism all over the world, and boys are more susceptible to autism than girls. The research also proclaims that autism is more prevalent in children as compared to Aids, diabetes, cerebral palsy and even cancer (Mirza, 2013).

The prevalence of students with autism spectrum disorders (ASD) within school settings is increasing steadily (Centers for Disease Control and Prevention, 2002). These students provide unique challenges to educational professionals because they often demonstrate weaknesses across areas that are critical to educational success (e.g., communication, socialization). Fortunately, many researches have demonstrated the efficacy of interventions used for the development of communication (Ogletree, Oren, & Fischer, 2007) and social competencies among children with autism (Rogers, 2000), as well as in the reduction of problem behavior of children with autism (Horner, Carr, Strain, Todd, & Reed, 2002). Consequently, educational programming for many students with autism has mainly focused these core deficits areas, most often within the context of functional skills training.

Individuals with autism are increasingly placed in general education classrooms and engaged in academic curricula in the western society (Dunlap, Kern, & Worcester, 2001); this is especially true of students with Asperger syndrome (Marks, et. al.). The concept “academic skills” refers to “the basic skills of reading, writing, and arithmetic and, more generally, to the range of cognitive and problem-solving activities that involve these basic repertoires” (Dunlap, et. al., p. 129). According to a report by Yell, Drasgow, and Lowrey in 2005 the president of United Nation and Congress believe that students with disabilities should receive instruction on academic skills. It was also noted that the No Child Left Behind Act of 2001 requires students with disabilities to be included in reports of adequate yearly progress in reading, math, and science. For students with ASD, academic performance may be affected by difficulties regarding text comprehension.

In 2006 Nation, Clarke, Wright, and Williams observed reading skills (e.g., word recognition, non-word decoding, text reading accuracy, and text comprehension) in children with ASD (including 16 with autism, 13 with atypical autism and 12 with Asperger syndrome). Their study concluded that a large proportion of the participants showed impairments in comprehension of text, vocabulary, and oral language.

Previously, in 2002 Griswold, Barnhill, Myles, Hagiwara, and Simpson found a wide range of academic achievement among students with Asperger syndrome. These participants’ scores on the reading comprehension and listening comprehension subtests, as measured by *Wechsler Individual Achievement Test* (Wechsler, 1992), were lower than on the basic reading and oral expression subtests. Another study conducted by Venter, Lord, and Schopler in 1992 concluded that children with high-functioning autism did not perform at age level on the *Neale Analysis Reading Ability Test* (Neale, 1958) reading comprehension was their most weak area. According to Wahlberg and Magliano (2004) and O’Connor and Hermelin (1994) individuals with high-functioning autism had difficulty understanding written text.

No reading without reading comprehension. It has been considered “the most important academic skill learned in school” (Mastropieri & Scruggs, 1997, p. 1). Research suggests that students with high-functioning autism spectrum disorders have much weakness in the area of writing. These writing difficulties are out of keeping with their average to above average intelligence. Previously, six studies conducted by Mayes and Calhoun (2003a, b, 2006, 2007, 2008; Smith-Myles et al. 2003) compared the writing of students with high functioning autism spectrum disorder (HFASD) to age-matched participants without ASD, using intelligence tests and standardized academic achievement tests. Researches conducted by Mayes & Calhoun in series, these authors found that approximately 60% of students with

HFASD showed a discrepancy of about one standard deviation between their full-scale IQ scores and their writing achievement scores. Mayes and Calhoun (2003b, 2006, 2007 & 2008) found and reported that a majority of children with HFASD had a specific learning disability in writing.

PROBLEM STATEMENT

Keeping in view the previous discussion the statement of the problem is “differential achievements of students with autism in reading, writing and numeracy”

RESEARCH OBJECTIVES

The present study was conducted to achieve the following objectives:

1. To know the current levels of performance of children with autism in functional academics;
2. To know in what academic skill the children with autism are better;
3. To compare the difference between the performance of children with autism on the basis of their gender;
4. To compare the difference between the performance of children with autism on the basis of cities

METHODOLOGY

The type of research is descriptive. Survey of Lahore and Islamabad cities were conducted to complete the study.

Sample and Sampling Method

Population of the study included all the teachers of children with autism working in Lahore and Islamabad cities. In this study, the convenient sampling technique was used to select sample of 35 teachers of students with autism from different special schools of two major cities of Pakistan i.e., Lahore and Islamabad. 20 teachers of students with autism were conveniently selected from Lahore city and 15 were conveniently selected from Islamabad city. These 35 teachers reported the functional academic skills of 35 students with autism out of which 8 were girls and 27 were boys.

Data Collecting Methods

Data were collected through survey method with the help of questionnaire.

Development and Validation of Instruments

A Self-made questionnaire was used as an instrument for the purpose of data collection. It is comprised on two parts. Part one is based on demographic information such as name, gender, school, city etc. Second part is consisted of 45 items based on reading, writing and numeric skills. 18 items were about reading, 15 were about writing and 12 were about numeric skills, on each item the teachers were required to respond on two point scale i.e. Yes =1, No = 0. The instrument was validated by the expert opinion. Sequence of some items was changed. The reliability of the instrument was .989.

Data Collection

The researchers personally distributed and posted the questionnaires among 35 respondents of both major cities of Pakistan i.e., Lahore and Islamabad.

Data Analysis

The return rate was 100%. After data collection, Frequency distribution of the responses was run to analyze the data. The measure of central tendency mean was used to see the mean score of all three academic skills. The independent sample t-test was run to compare the mean scores of different two groups of Lahore and Islamabad, and mean scores of male and female groups of students. The data was tabulated and analyzed to approach findings and conclusions.

RESULTS AND FINDINGS

Frequency distribution and independent samples t-test were run to reach the results. Results and finding are as bellow:

The research objective No.1 “to know the current levels of performance of children with autism in functional academics” was addressed in table No.1, 2 and in 3. Following three tables explain current levels of performance of children with autism in detail.

Table 1. Frequency distribution of the responses pre- reading skills

Sr. No.	Statement Items on Reading Skills	Yes		No	
		F	%	F	%
1.	Recognize alphabets A-Z	21	60	14	40
2.	Read alphabets A-Z in order	20	57.1	15	42.9
3.	Read alphabets without order	19	54.3	16	45.7
4.	Match alphabets with correct picture	21	60.0	14	40.0
5.	Match alphabet with correct word	21	60.0	14	40.0
6.	Read three letter word	15	42.9	20	57.1
7.	Read four letter word	13	37.1	22	62.9
8.	Read five letter word	13	37.1	22	62.9
9.	Read two word sentence	13	37.1	22	62.9
10.	Read three word sentence	13	37.1	22	62.9
11.	Read four word sentence	13	37.1	22	62.9
12.	Read his/her name	17	48.6	18	51.4
13.	Read father’s name	12	34.3	23	65.7
14.	Read mother’s name	12	34.3	23	65.7
15.	Read his/her address	8	22.9	27	77.1
16.	Read his/her telephone number	12	34.3	23	65.7
17.	Read his/her teacher’s name	11	31.4	24	68.6
18.	Read his/her school’s name	10	28.6	25	71.4

The above table 1 depicts pre- reading skills of the students with autism studying in Lahore and Islamabad cities.

Table 2. Frequency distribution of responses on numeracy skills

Sr. No.	Statement Items on Numeracy Skills	Yes		No	
		F	%	F	%
1.	Count number 1-10	28	80	7	20
2.	Count numbers 11-20	19	54.3	16	45.7
3.	Count numbers 21-30	17	48.6	18	51.4
4.	Count numbers 31-40	16	45.7	19	54.3
5.	Count numbers 41-50	15	42.9	20	57.1
6.	Count numbers 51-60	15	42.9	20	57.1
7.	Count numbers 61-70	15	42.9	20	57.1
8.	Count numbers 71-80	14	40	21	60
9.	Count numbers 81-90	13	37.1	22	62.9
10.	Count numbers 91-100	13	37.1	22	62.9
11.	Read name of days	15	42.9	20	57.1
12.	Read name of months	10	28.6	25	71.4

Table 2 shows responses of numeracy skills of students with autism studying in Lahore and Islamabad cities.

Table 3. Frequency distribution of responses on writing skills

Sr. No.	Statement Items on Writing Skills	Yes		No	
		F	%	F	%
1.	Copy alphabets A-Z	20	57.1	15	42.9
2.	Write alphabets A-Z	22	62.9	13	37.1
3.	Write his/her name	18	51.4	17	48.6
4.	Write his/her father's name	14	40	21	60
5.	Write his/her mother's name	13	37.1	22	62.9
6.	Write his/her teacher's name	12	34.3	23	65.7
7.	Write his/her home address	10	28.6	25	71.4
8.	Write his/her schools' name	14	40	21	60
9.	Write telephone numbers	13	37.1	22	62.9
10.	Write two words sentences	14	40	21	60
11.	Write three words sentences	14	40	21	60
12.	Write four word sentences	13	37.1	22	62.9
13.	Write five word sentences	10	28.6	25	71.4
14.	Write days in a week	12	34.3	23	65.7
15.	Write name of months	12	34.3	23	65.7

Table 3 explains the responses on writing skills of students with autism.

The research objective No.2 was to know in what academic area children with autism are better; the mean score of reading, writing and numeracy were calculated.

Table 4. Mean score of reading, writing and numeric skills

		<i>Writing Skills total score</i>	<i>Numeric skills total score</i>	<i>Reading Skills total score</i>
N	Valid	35	35	35
	Missing	0	0	0
	Mean	6.0286	4.7143	8.2571

Above table shows that mean of reading skills is higher than writing and numeric skills of students with autism studying in Lahore and Islamabad cities.

The third objective is “to compare the difference between the performances of children with autism on the basis of their gender”, the independent samples t-test was calculated to see the findings are as below:

Table 5. Independent samples t- test comparing the performance of students with autism on the basis of their gender

		<i>Gender of the Student</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>F</i>	<i>Sig</i>	<i>Sig(2 tailed)</i>
<i>Total Score</i>		Female	8	18.7500	16.43820	1.53	.224	.965
		Male	27	19.0741	18.83721			

Independent sample t-test depicts that the mean score of boys and girls with autism (Female=18.75, male=19.07) do not differ in reading, writing and mathematics. Since (F=1.53, p=.965) indicates that there is no significance difference in the performance of students with autism on the basis of their gender.

The final and last research objective is to compare the difference between the performances of children with autism on the basis of cities. The independent samples t-test was calculated. The results and findings are as below;

Table 6. Independent samples t- test comparing the performance of students with autism on the basis of cities

		<i>Name of Cities</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>F</i>	<i>Sig</i>	<i>Sig(2 tailed)</i>
<i>Total Score</i>		Lahore	20	20.0000	17.80893	3.98220	.024	.879
		Islamabad	15	17.6667	18.98370			

Independent sample t-test indicates that the mean score of students with autism studying in Lahore and Islamabad (Lahore= 20.00, Islamabad =17.66) differ in reading, writing and numeracy skills. Since (F=.024, p=.879) indicates that there is significance difference in the performance of students with autism on the basis of cities. Students of Lahore city performed better in reading, writing and numeric skills as compared to students of Islamabad city.

DISCUSSION

This study identifies the academic achievement of children with autism rated/perceived by their teachers. The major academic areas were reading, writing and mathematics. The purposes of research were to compare the achievement in mathematics, reading and writing and compare the mean score on the basis of gender and cities. The major findings were: (a) Children with autism can recognize and read alphabets (A-Z) in sequence and without sequence. (b) Most can count the number up to 20; and can write alphabets (A-Z) and their names. (c) Significant differences were not found in the mean on the basis of gender. (d) Significant differences were found in the mean on the basis of cities. The performance score of students with autism studying in Lahore city were better than the score of students studying in Islamabad city. The reason of the difference may be the number of institutes; variety of services provided to autistic children and professionals available in institutes of Lahore is more in numbers. Lahore city is the capital of the province of Punjab, and is the second most densely populated city in Pakistan many public and private institutes are working for the training and rehabilitation of students with autism. Students with autism able to match alphabets with picture however poor reading skills were found in word recognition and sentence reading. So, this article assumes that either students have not yet learned to read, or are below grade level. **Hamm (2009)** claims that autistic students have trouble learning to read because they have “limited auditory short term memories. Students diagnosed with autism have different levels of decoding ability, but many experience difficulty with reading comprehension (Winn, 2009). Samina & Mudassara (2010) identified that students with autism were better in area of General Knowledge than reading and writing skills. Students have poor pre-writing skills and unable to count. Similar results were found in writing skills, students could not narrate personal information about their family.

Previous literature suggests that many students with autism hate to write even simple sentences and four aspects of writing are most problematic for students with autism, language, organization, sensory, and visual motor skills.

For many children with autism, comprehending the text can be difficult. There are several studies which point out particular strategies that can be helpful for students with autism. Special education teachers must have strategies to help students understand what they read. Each child or adult with autism is unique and, so, each autism intervention plan should be tailored to address specific learning needs. Pakistan is still amongst those countries in which the general population confuses autism with other disorders such as mental retardation, down syndrome or cerebral palsy. Parent and teacher should be trained enough to identify the symptoms and condition of a child affected by autism; their needs are very different from the other special categories and should be addressed immediately by parents and teachers (Mirza, 2013). Majority of teacher’s training institute do not offered short courses, PGD and Master,s program for autism. Only few schools for autistic children were formed by private sector, these institutes were governed by parents of autistic children. This challenging special need would not be addresses properly until government take initiative for establishment of schools for autism and offer short and other training program for teachers

REFERENCES

- [1] American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorder (text revision)*. Washington, DC: Author
- [2] American Psychiatric Association. (2010). *American Psychiatric Association DSM-5 development: proposed revision: 299.110 Autistic disorder: Autism spectrum disorder*. Retrieved on August 9, 2010 from <http://www.dsm5.org/ProposedRevisions/Paacs/proposedrevision.aspx?rid=94>
- [3] Brown, H. M., & Klein, P. D., Writing, Asperger Syndrome and Theory of Mind. Published online: 5 January 2011.
- [4] Discord(2010) 40:485-493). Hsu-Min Chiang and Yueh-Hsien Lin *Focus Autism other Developmental Disabilities*, on line version of the article at: <http://foa.sagepub.com/> 22: 259 DOI: 10.1177/10883576070220040801.
- [5] Fombonn, K. (2005). The changing epidemiology of autism. *Journal of Applied Research in Intellectual Disabilities*, 18, 281-294.
- [6] Gillberg, C. (1991). Clinical and neurobiological aspects of Asperger syndrome in six family studies. In U. Erith (Ed.), *Autism and Asperger syndrome* (pp. 207-242). Cambridge: Cambridge University Press.
- [7] Griswold, D., Barnhill, G., Myles, B., Hagiwara, D., & Simpson, R. (2002). Asperger syndrome and academic achievement. *Focus on Autism and Other Developmental Disabilities*, 17, 94-102.)
- [8] Hamm, J. (2009). Teaching Reading, Comprehension, and Communication Skills to Students with Autism Retrieved from <http://hammerprofolio.wordpress.com/teaching-reading-skills-to-students-with-autism/> July 11, 2012.
- [9] Hess, L. K., Morrier, J. M., Heflin, J. L., & Ivey, L. M. (2007). Autism Treatment Survey: Services Received by Children with Autism Spectrum Disorders in Public School Classrooms Published (inline: I I October 2007).
- [10] Mayes, S. D., & Calhoun, S. L. (2006). Frequency of reading, math and writing disabilities in children with clinical disorders *Learning and Individual Differences*, 16, 145-157.
- [11] Mayes, S. D., & Calhoun, S. L. (2007). Learning, attention, writing, and processing speed in typical children and children with ADHD, autism, anxiety, depression, and Oppositional/Defiant Disorder. *Child Neuropsychology*, 13, 469-493
- [12] Mayes, S. D., & Calhoun, S. L. (2008). WISC-IV and WIAT-II profiles in children with high-functioning autism. *Journal of Autism and Developmental Disorders*, 38, 428-439
- [13] Mayes, S. D., & Calhoun, S. L. (2003b). Analysis of WISC-III, Stanford-Binet: IV, and academic achievement test scores in children with autism. *Journal of Autism and Developmental Disorders*, 33, 329-341.
- [14] Mayes, S. D., & Calhoun, S. L. (2003a). Ability profiles in children with autism: Influence of age and IQ. *Autism*, 6, 65-80.
- [15] Mirza, F. (2013). Autism acceptance. Dawn. Retrieved on July 11, 2013, from <http://beta.dawn.com/news/727541/autism-acceptance/?commentPage=1&storyPage=3>

- [16] Samina, A., & Mudassara, A. (2010). The study of academic achievement of students with down syndrome and ADHD. Unpublished Master's Thesis. Department of Special Education. University of the Punjab, Lahore.
- [17] Smith-Mylcs, B., Rome-Lake, M., Barnhill, G. P., Huggins, A., Hagiwara, T. & Griswold, D. E. (2003). Written language profile of children and youth with Asperger syndrome: From research to practice. *Education and Training in Developmental Disabilities*, 38, 362-369.
- [18] Venter, A., Lord, C., & Schopler, E. (1992). A follow-up study of high-functioning autistic children. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 33, 489-507.
- [19] Wahlberg, T., & Magliano, J. (2004). The ability of high function individuals with autism to comprehend written discourse. *Discourse Processes*, 38, 119-144.
- [20] Wechsler, D. (1992). *Wechsler individual achievement test*. San Antonio, TX: Psychological Corp.)
- [21] Winn, K. (2009). Autism and Reading Comprehension: Improving the Reading Skills of Children Diagnosed with Autism. Retrieved on July 12, 2012, from <http://suite101.com/article/autism-and-reading-comprehension-a157746#ixzz20NjxnDxv>
- [22] World Health Organization (2007). *International statistical classification of diseases and related health problems. 10th revision*. Chapter V. Mental and behavioural disorders (including disorders of psychological development). Geneva. Switzerland Author. [Electronic Version.] Retrieved on August 9, 2010, from <http://apps.who.int/classifications/apps/icd/ii/icd10onlme/>
- [23] Yeargin-Allsopp, M., Rice, C., Karapurkar, T., Doernberg, N., Boyle, C., & Murphy, C. (2003). Prevalence of autism in a US metropolitan area. *Journal of the American Medical Association*, 289, 49-55.
- [24] Yell, M. L., Drasgow, E., & Lowrey, K. (2005). No Child Left Behind and students with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, 20, 130-139.

A Comparative Analysis of the Effectiveness of Mathematics Curriculum Taught at GCE (O-Level) and SSC Systems of Schools in Karachi

Muhammad Akhtar¹, Ahmad Saeed²

HIESS, Hamdard University, Karachi, PAKISTAN.

¹akhtar_kang29@yahoo.com

ABSTRACT

This study compares the mathematics curricula of General Certificate of Education (GCE: O-Level) and Secondary School Certificate (SSC: Matriculation) courses of studies. The purpose of this comparison was to trace out the factors accountable for the shortcomings in instructional objectives, contents, approaches, methods of teaching and patterns of assessment in the local (SSC) system of education. The population of study was all teachers, students and textbooks of SSC and GCE systems in Pakistan. The overall size of the sample was of 300 teachers, 200 students and 20 subject experts. The data were collected through questionnaires, interviews and document/ record analysis. The quantitative data were analyzed by using t-test. A comparative content analysis was made for the textbooks and question papers of both SSC and GCE examination boards. The study concluded that the implementation of GCE (O-Level) mathematics curriculum is relatively more effective than SSC curriculum although no significant difference was been found in the methods of teaching in two systems. The major factor for the difference was the structure of examination in both systems. The other key factor traced out as major contributor in this difference of effectiveness was the approaches of teachers and students. The study recommended a radical change in the internal school examinations as well as the pattern of assessment of Board of Secondary Education Karachi (BSEK). It has also been strongly recommended to convert the approaches of teachers and students of SSC from accumulation of content and procedural knowledge towards the construction (problem solving) and application of knowledge.

Keywords: GCE (O-Level), SSC (Matriculation), mathematics curriculum, approaches, methods, contents, assessments

INTRODUCTION

It is a well-known fact that school education, especially secondary education is a key for success in overall educational attainment because it is where students can either “make it or break it” (World Bank, 2013; OECD, 2011) and the most significant subject in the secondary school curriculum is mathematics (Sullivan, 2011; Rani, 2008; Sharan and Sharma, 2008; Sidhu, 2008; Kaur, 2004; Becker et al., 1990). It helps to attain a number of expected educational outcomes (Bruhlmeier, 2010; Sidhu, 2008; Sharma 2008; Ediger & Rao, 2000; Cockcroft, 1982).

The worth of this subject has been recognized by different authorities at different times (NCERT, 2006; Cockcroft, 1982; Sharif Commission, 1959). Zakir Hussain Committee in the subcontinent in 1937, the Secondary Education Commission India in 1952 & Kothari Commission India in 1964, all put a special emphasis on mathematics education at school level (Rani, 2008; Sharan and Sharma, 2008; Sidhu, 2008).

The common feature of the school education in the Asian countries, especially the East Asian countries, is a special emphasis and focus on mathematics (Tu, 2010; Soh, 2008; Lim, 2007; Ginsberg et al., 2005; Kaur, 2004; Mastrul, 2002; Skiba, 2001). The other interesting thing common which is an obvious output of this special attention is the outstanding results of the