

Validation of Reading and Writing Tests for Identification of Children with Specific Learning Difficulties

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Abstract

Children with deficiency in different academic performance in reading, writing usually perform their daily life activities comparatively better. As a result, these children have to face many difficulties regarding the academic achievements. If there is no problem of vision and auditory abilities with these children then they are declared children with specific learning difficulties (SLD) in one or more specific area of learning. A Test Battery containing Reading Comprehension Test (RCT) and Writing Comprehension and mechanics Test (WCT) for diagnosis different problems relating to these students wick was developed and validated. All the tests of Test Battery were administered to 1013students from 6th and 7th class with high scores on Screening Checklist. Their IQ score ranged between 90 and 110 and their achievement scores in Urdu were below 50%. The data collected from the Test Battery, were analyzed. For establishing the content validity of the tests, judgmental procedure was used. A panel of experts was consulted. The discriminant validity was determined for these tests with help of Screening Checklist making two categories of low scoring (0 - 7) Group 1 and high scoring (8 - 13) Group 2 of the Screening Checklist. It was then determined with achievement scores in Urdu and IQ test scores. Ravens Progressive Matrices was used for the IQ. Reliability of tests was determined in terms of internal consistency and stability. The stability of the test was determined using the test-retest reliability analysis. All the content analyses indicated that Tests had an adequate validity. These tests can be used for the identification of the children with specific difficulties in reading and writing in Urdu. These tests had good reliability index and supportive in the validation of these tests. These tests can be used in regular schools and in clinical setting for children at risk with SLD.

Key words: Academic performance, Ravens Progressive Matrices, Content validity, Discriminant validity, Internal consistency, Stability reliability, Reading Comprehension Test, Writing Comprehension and mechanics Test.

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Introduction

Schoolchildren with deficiencies in different academic achievements in reading, writing and spelling usually perform their daily life activities comparatively better. They commit some common mistakes in reading words; omit some letters in reading or in writing after copying it from any source. Such types of problems of the children deprive them in academic achievements in subjects in which reading and writing carry matter. If there is no problem of vision and auditory abilities with these children then they are declared SLD in one or more specific area of learning. These children in the school start attaining experiences in reading and writing skills at early stages of the first year, but after some time there appear some symptoms of problems. As a result, these children have to face many difficulties regarding the academic achievements. They become slow achiever in the class as compared to their age mates. For the differential diagnosis of these problems, specialized assessment is necessary which is possible at school age.

Among educational psychologists, SLD is a well recognized problem which leads towards dysfunction in different areas of skills. Children with SLD are found in every classroom. There are no specific procedures for the identification of the SLD in reading, writing and spelling in local language Urdu. It is desirable to identify schoolchildren when they have spent some years in learning reading, writing and spelling. But existing situation of the identification and classification with reference to the SLD of children in classroom is not encouraging in the country. Preparation of the diagnostic procedures for these children enables a teacher in the classroom to identify these students for developing an individualized educational plan. This is probably a leading and innovative task in identification of these children in the developing country.

These children are also associated with strengths and weaknesses in different areas. Bangor Dyslexia Unit (2002) described the difficulties and abilities as a combination, which affects the learning process in one or more of reading, spelling, writing and some time numeracy or language. The weaknesses in the areas of speed of processing, short-term memory, sequencing, auditory perception, visual perception, spoken language and fine or gross motor skills are usually diagnosed as dyslexia. The dyslexic preschool children have problems with nursery rhymes and other language games. They avoid reading activities, are often disorganized and forget things easily. SLD literature uses the term 'dyslexia' synonymously for children who face difficulties in language related areas. Word 'Dyslexia' can be broken down into letter groups 'dys' and 'lexia', which means distorted words in reading and writing. According to Spafford and Grosser (1996) the term 'dyslexia' is

not present in literature until late 1800. Hinshelwood (as cited in Spafford & Grosser, 1996) reported that the similar difficulty of language was termed as “dyslexia” by Berlin in 1877. In 1962, Kirk used the term “learning disability” in the following definition.

A learning disability refers to retardation, disorder, or delayed development in one or more of the processes of speech, language, reading, writing arithmetic, or other school subjects resulting from a psychological handicap caused by a possible cerebral dysfunction and / or emotional or behaviour disturbance. It is not the result of mental retardation, sensory deprivation, or cultural and instructional factors (p. 263).

There are three main assumptions to consider this definition for diagnosis. First, the learning problem is specific; individual has disorder in one or more basic psychological process or cognitive area. Siegel (as cited in Obrzut, 1991) argues that this kind of specificity is unrealistic. Siegel maintained that if these kinds of children have problems in one cognitive area it could affect a variety of other tasks as reading, writing, speaking and listening as well.

Nowadays people use the terms “dyslexia” and “specific learning difficulties” synonymously. However, the clinicians, voluntary organizations and lay people prefer to use the first term and at very general level educationists and particularly educational psychologists the second one. Anyhow, the term “specific learning difficulties” is an umbrella for a range of difficulties and used for variety of conditions where the other term “dyslexia” is a unitary term with some specific deviant conditions (Pumfrey and Reason 2003). This study used the SLD as an umbrella term, which includes a diverse group of children with learning problems in area of reading and writing Urdu. These students may have internal or external reasons for failing to learn. Irrespective of reason for failure in learning the intervention, process is the same for all students. The following definition given by Australian National Health and Medical Research Council (1990) is used for this study.

There are obvious reading and writing problems in these children. They are slow and face some more difficulties. Slow speed of work, copying from board, reading and dictation problems are frequently seen with these children in school (Riddick 1995). In primary age they showed confusion with left and right, difficulty in saying word, problem in doing subtraction, difficulty in learning table, recalling digits, and recalling months of years (Miles & Miles 1990). The “reading process” consists of two sub-processes: Word Recognition and Reading Comprehension. These two processes contribute to orthographic development that is needed to reading

skill acquisition. These students can have three types of reading problems; firstly, problem in word recognition process, child may exhibit difficulty in acquiring the identities, sounds and written forms of individual letters. Secondly, if child acquires letter sound he may exhibit difficulty in applying them to the decoding of unfamiliar forms. Thirdly, difficulty may be with the learning to link them to their meanings. Reading, an aspect of language, essential for learning language, is also closely related to other aspects of languages, like oral language speaking and writing (Seymour and Evans, 1999).

Assessment of these children is possible by using different measures. Discrepancy assessment during reading with respect to the age of the child is one of the indicators of these problems. If age and reading assessment is not consistent with the norms then problem is suspected as Doyle and Snowling (2002) described that actually assessment started with two basic questions: 1- How well a child should be expected to read?, 2- How well (or badly) is the child reading?. It is useful to know how much individual has actually understood of what he has just read. They further described, "A measure of a child's comprehension of text is valuable in diagnosing difficulties" (P: 113-14). Comprehension of language can be examined by a number of methods. These methods include ability to copy, ability to take dictation, ability to assess the accuracy of spelling and speed. Free writing may also be judged. Pollock and Waller (1995) described some typical SLD reading mistakes, such as read very slowly and show hesitations, follow list with his figure, and lose places by missing word chunks.

Discrepancy between the different tasks in reading and writing and school achievements lead us for the diagnosis of these children. According to web team Department of Psychology University of Kentucky UK (2003) the common features of the SLD are, the significant discrepancy between verbal and written performance, misreading when copying or taking notes, trouble in following a sequence or keeping pace when reading, problems in ordering things sequentially, and persistent or severe problems with spelling. Mann and Suiter (as cited in Alper, Ryndak&Schloss, 2001) developed Handbook in Diagnostic Teaching, which seemed to be a good source of idea about informal spelling and reading assessment. Smith's (as cited in Alper, Ryndak&Schloss, 2001) Teacher Diagnosis of Educational Difficulties was also a source of SLD diagnosis, which included the area of spelling, reading, written expression, speech and language, arithmetic and personal emotional-social skills. Dyslexia Association of Ireland (2003) has given the following criteria for the psycho-educational assessment of the SLD.

These students show problem in all writing processes according to Zaragoza (as cited in Spafford, & Grosser, 1996). The writing process may be divided into primary, middle, and secondary writings. Primary writing refers to mechanics of writing, which includes spelling, punctuation, capitalization, handwriting, legibility, grammar, spacing between letters and spacing between words and paragraphs. The middle and secondary writing deal with qualitative components of writing. Punctuations, capitalizations, and grammar errors are sometimes ignored for young children. Some typical SLD spelling mistakes described by Hornsby (1984) are wrong order of letters of spelling, mirror writing for number and letter, producing in incorrect shape, writing reverse letters, such as, b as d, and inverting letters, such as, n as u.

Assessment of these children is not so simple. Their problems in reading and writing are multi-facet. They come from different backgrounds, which interact with their difficulties. Assessment of children and adults should be made with different measures. Turner (2000) suggested that in some children early signs of SLD are overcome with some effort or behavioral modification but not seen at adulthood although being SLD. Bryant and Bradley (as cited in Riddick, 1995) depicted same features in three and four years age children who were at risk but not bad for rhyming. They recommend that the child should not be diagnosed as SLD until at 7 years of age.

For SLD diagnosis and assessment, measures of IQ are not enough and some other tests are also used. Woodcock Reading Mastery Tests- Revised (WRMT-R 1987) is used to pinpoint student's weaknesses and strengths in reading. Its form (G) contained Visual Auditory Learning, Letter Identification and Supplement Letter Checklist of Reading Readiness, which are commonly used for SLD diagnosis. Test of Written Spelling -2 (TWS-2) is used for spelling skill. Its both subtests are standardized dictation tests (Gregorey, 1996). Test of Written Language -2 (TOWL-2) comprised on 16 subtests and used for reading and writing skills. It is also a standardized test (McLoughlin and Lewis, 1994).

The assessment of children with SLD can be ensured by comparing IQ test scores with the school achievements. Learning disorders is diagnosed when the individual's achievement on individually administered, standardized tests in reading, mathematics, or written expression is substantially below that expected for age, schooling, and level of intelligence. The learning problems significantly interfere with academic achievement or activities of daily living that require reading, mathematical, or writing skills (Washington 1994).

Methodology

A Test Battery to diagnose different problems relating to students with SLD was developed and validated. Content and discriminant validities of tests were established. Reliability of the tests was determined with stability coefficient of the test retest method. Internal Consistency of the tests was analyzed with Cronbach Alpha. The methods and techniques used in the study were described under the subheadings of construction of instruments, administration, scoring procedures, selection of samples, data collection, Selection of outside criteria, treatment of data and interpretation of results.

Preparation of Reading and Writing Tests

Reading and Writing Tests of the Test Battery were based on The Bangor Dyslexia Test (Miles, 1983) "Differential Diagnosis of Reading Disabilities" (Aaron, 1995) and findings about the "Learning Disabilities: from Identification to Intervention" (Marcia, Fletcher, & Fuchs, 2007) These tests containing, three paragraphs were selected separately for reading, writing and dictation in Urdu from the Urdu textbooks of 6th and 7th grades. These paragraphs were representing the Reading Comprehension Test (RCT) and Writing Comprehension and mechanics Test (WCT). All the tests of Test Battery were administered to 169 students 50 boys and 119 girls, 91 from 6th class and 78 from 7th class with high scores on Screening Checklist (Mahmood, 2010). Their IQ score ranged between 90 and 110 and their achievement scores in Urdu were below 50%. All the tests of the Test Battery were administered to the students according to directions for each test. Directions were further improved, in the light of pilot study. The data collected from the Test Battery, were analyzed. Concurrent validity was determined with outside criterions, which were achievement scores in Urdu and IQ test scores as determined by Ravens Standard Progressive Metrics.

Administration, Scoring and Interpretation Procedures for SLD Test Battery

Test Battery was prepared in booklet form and instructions for the students were written on the first page. Two examples were also cited to facilitate the students. The students who got high score on Screening Checklist and IQ within range of 90-110, and achievements score in Urdu below 50% were administered the Test Battery.

The students had to write name and class, school on the top of the test in the given space. In RCT, they had to read the paragraph and write it again on the same page in the given space. In WCT the students were dictated a paragraph for writing. RCT consisted of two paragraphs and the students were required to rewrite the paragraph in the given space. Fifteen selected words of each paragraph were adjudged

for scoring and one score for each correct word was assigned. In WCT, a paragraph was dictated to students. If student provided write words, one score for each word was assigned and total scores for this test were 15.

Total time of completion of test by 80% of students was also recorded for the time standardization of the test. Low Scores on each test indicated the problem area of the student in learning. Means and standard deviations were calculated on all the tests. Grade and gender norms for each test were established. Descriptive statistics in terms of Means, SD and Percentiles were obtained for 6th, 7th class boys and girls separately for each test of the Test Battery. Cut off score for identification of children with SLD was calculated by subtracting 2 SD from mean score on each test of the Test Battery. The students obtaining scores lower than this cut off were labeled as children with SLD in the respective areas.

Population

Sixth and Seventh grade boys and girls students of government schools constituted the population of the study.

Sample

The sample of the study was selected from the population considering each school as cluster of Lahore city. Forty schools clusters were randomly selected for the study out of the total 152 girls and boys government schools using balloting method. In each school all the teachers teaching Urdu to 6th and 7th class were involved for identification of children with SLD. Screening Checklist was administered to 2100 students including 702 boys and 311 girls, 583 from 6th class and 430 from 7th class with SLD symptoms as identified by the teachers teaching Urdu. Based on the analysis of Screening Checklist 1013 students were selected, the remaining 1087 students were not included, as they did not meet the criteria laid down for SLD in this study. Distribution of boys and girls of 6th and 7th class students included in the sample.

Content Validity

For establishing the content validity of the tests, judgmental procedure was used. A panel of experts was consulted. The experts had a long experience of teaching Urdu language at school level and educational and psychological test construction. On the recommendations of the experts the content, items and paragraphs of the test were finalized for further study.

Discriminant Validity

The discriminant validity was determined for the RCT and WCT with help of Screening Checklist (Mahmood, 2010) making two categories of low scoring (0-7) Group 1 and high scoring (8-13) Group 2 of the Screening Checklist. The discriminant validity was then determined with achievement scores in Urdu and IQ test scores. Ravens Progressive Matrices was used for the ability IQ.

Reliability

Reliability of tests was determined in terms of internal consistency and stability. The stability of the test was determined using the test-retest reliability analysis. Consistency in the factors was established using exploratory factor analysis and Cronbach Alpha.

Data Analysis

Discriminant Validity

Discriminant Validity was established by comparing the means of Urdu and IQ scores of high scoring Group 1 and low scoring Group 2 of the RCT, and WCT. Test of significance, t-test was applied to establish the Discriminant Validity (Nunnally 1978. p. 453). The results of t-test for the Independent Samples are presented in Table 1.

Table 1: Independent Samples T-Test for Comparison of Low with (N=69) and High With (N=944) Scoring Groups of the Screening Checklist with the Test Battery Scores

Tests	Groups	M	SD	T
RCT	Low	13.85	5.10	.21
	high	13.99	4.88	
WCT	Low	1.48	2.45	6.81**
	high	3.78	2.72	

** P < .01 Level of significance, * P < .05 Level of significance

RCT, and WCT had t-values .21, and 6.81 respectively indicated in Table 1. The t-values for WCT was significant at $\alpha = .01$. For RCT t-value, .21 was not significant. So following null hypothesis was accepted

- There is no significant difference between the RCT mean scores of the students of low scoring (0 - 7) Group 1 and high scoring (8 - 13) Group 2 of the Screening Checklist, and the hypothesis that

- There is no significant difference between the WCT mean scores of the students of low scoring (0 - 7) Group 1 and high scoring (8 - 13) Group 2 of the Screening Checklist, was rejected

Table 2: Independent Samples T-Test for Comparison of Low and High Scoring Groups of Tests of the Tests with Urdu Test Scores

Tests	Groups	N	M	SD	T
RCT	Low	31	43.16	4.48	2.02*
	high	982	45.15	5.42	
WCT	Low	148	44.13	4.02	-2.95**
	high	865	45.26	5.59	

** p < .01 Level of significance, * p < .05 Level of significance

RCT, and WCT had t-values 2.02, and 2.95 respectively indicated in Table 2. The t-value for WCT was significant at $\alpha = .01$ and t-value for RCT significant at $\alpha = .05$. Following the null hypotheses were rejected

- There is no significant difference between the Urdu test mean scores of students of low scoring (0 - 4) Group 1 and high scoring (5 - 30) Group 2 of RCT of the Test Battery
- There is no significant difference between the Urdu test mean scores of students of low scoring (0) Group 1 and high scoring (1 - 15) Group 2 of WCT of the Test Battery

Table 3: Independent Samples T-Test for Comparison of Low and High Scoring Groups of Tests of the Tests with IQ Test Scores

Tests	Groups	N	M	SD	T
RCT	Low	31	94.23	14.48	2.03*
	High	982	100.12	15.99	
WCT	Low	148	89.98	14.54	-8.92**
	High	865	101.64	15.57	

** p < .01 Level of significance, * p < .05 Level of significance

RCT, and WCT had t-values 2.03, and 8.92, respectively indicated in Table 3 The t-values for WCT was significant at $\alpha = .01$ and t-value for RCT significant at $\alpha = .05$. Following null hypotheses were rejected

- There is no significant difference between the IQ test mean scores of students of low scoring (0 - 4) Group 1 and high scoring (5 - 30) Group 2 of RCT of the Test Battery

- There is no significant difference between the IQ test mean scores of students of low scoring (0) Group 1 and high scoring (1 - 15) Group 2 of WCT of the Test Battery

All the preceding analyses indicate that Test Battery had an adequate discriminant Validity.

Reliability

Stability reliability of the Test Battery was assessed with correlation between the two sets of observation. Test-retest reliability was used and the Test Battery was administered to the 6th and 7th grade students and after five weeks, the same test was administered with the same conditions to the same students. The results of correlation coefficients were given in the Table 4.

Table 4: Correlation Coefficient between Test and Re Test of Students (N=44) of the Test Battery

Tests	r with test-retest
RCT	0.49**
WCT	0.59**

** p < .01 Level of significance, * p < .05 Level of significance

RCT, and WCT had positive correlations of 0.55, and 0.49 respectively indicated in Table 4 Correlations of the test-retest of RCT, and WCT were significant at $\alpha = .01$ So following null hypotheses were rejected.

- There is no significant correlation between test-retest scores of RCT of the Test Battery.
- There is no significant correlation between test-retest scores of WCT of the Test Battery.

Most of the above reported correlations were significant. Tests correlation coefficients supported the reliability of the Test Battery.

Table 5: Percentiles of Girls 6th Class for Grade and Gender Norms for the Test Battery

Tests	Percentiles						
	5 th	10 th	25 th	50 th	75 th	90 th	95 th
RCT	7	9	12	15	18	20	21
WCT	0	1	2	3	5	7	8

Table 6: Percentiles of Girls 7th Class for Grade and Gender Norms for the Test Battery

Tests	Percentiles						
	5 th	10 th	25 th	50 th	75 th	90 th	95 th
RCT	7	8	12	15	18	21	23
WCT	0	1	3	4	6	8	10

Table 7: Percentiles of Boys 6th Class for Grade and Gender Norms for the Test Battery

Tests	Percentiles						
	5 th	10 th	25 th	50 th	75 th	90 th	95 th
RCT	5	7	10	14	17	20	22
WCT	0	0	1	3	5	7	8

Table 8: Percentiles of Boys 7th Class for Grade and Gender Norms for the Test Battery

Tests	Percentiles						
	5 th	10 th	25 th	50 th	75 th	90 th	95 th
RCT	4	7	10	14	17	20	21
WCT	0	0	1	3	5	8	10

Table 9: Descriptive Statistics of Girls for Grade and Gender Norms for the Test Battery

Tests	Class	N	M	SD	(M-2SD)	Score used for discrepancy
RCT	6 th	150	14.88	4.10	6.68	7
	7 th	161	14.96	4.63	5.69	6
WCT	6 th	150	3.70	2.23	0.74	1
	7 th	161	4.56	2.70	0.82	1

Table 10: Descriptive Statistics of Boys for Grade and Gender Norms for the Test Battery

Tests	Class	N	M	SD	(M-2SD)	Score used for discrepancy
RCT	6 th	433	13.62	5.02	3.58	3
	7 th	269	13.59	5.14	3.31	3
WCT	6 th	433	3.37	2.81	2.24	0
	7 th	269	3.46	2.92	2.38	0

Tables 5 to 10 indicated the gender and grade norms, which were computed in terms of percentiles, means, and SDs for girls and boys of 6th and 7th classes. A score of 2 SD below the mean was considered discrepancy score. The discrepancies

in each test were calculated and arranged for boys and girls of 6th and 7th grades respectively.

Discussions and Conclusions

Reading and writing comprehension tests are the basic component of the identification of symptom of the SLDs. The discriminatory analysis of these tests with external criterion and was one the requisite. For this purpose Screening Checklist was used as one of the validated tools for the identification of SLDs. RCT was not significantly discriminated by the screening Checklist. But WCT was significantly discriminated. Another discriminatory analysis of these tests was conducted with scores in Urdu and IQ test scores. The low and high achiever in Urdu and IQ test scores were also discriminated by low and high achiever of these tests. Discriminant validity of the Test Battery was determined while making groups of low achievers and high achievers of the Screening Checklist with in each test of the Test Battery. In this discriminatory analysis both tests of the Test Battery were significantly discriminated. It provided a sufficient need of the external criterion for establishing the validity of the Test Battery. The groups of low achievers and high achievers in each test of the tests and Screening Checklist were made with respect to 2SD discrepancy from the mean scores of each test. The discriminant validity of RCT, and WCT was established with scores in Urdu and IQ test scores. The use of scores in Urdu and IQ test scores are another source of validation of the tests of reading and writing comprehension. T-test has been applied for the discriminatory analysis of the low achiever group and high achiever group of the Screening Checklist

Stability reliability of the Test Battery was also determined by the test-retest reliability method. There was significant correlation coefficient in all the tests of the Test Battery at $\alpha = .01$. This shows that these tests have sufficient stability reliability.

All the Discriminant analyses indicate that Tests had an adequate validity index. These tests can be used for the identification of the children with specific difficulties in reading and writing in Urdu. These tests had good reliability index and supportive in the validation of these tests. In order to identify the children with SLD, teachers should keep the record of their observations during the reading and writing activities in the classroom. It has been observed that norms indicated for the gender and grade computed were different for girls and boys of 6th and 7th classes. A score of 2 SD below the mean was indicating discrepancy score. The discrepancies in each test are useful to identify the students with SLD according to local norms for boys and girls of 6th and 7th grades respectively. It is recommended that teacher training workshop should be arranged for the 6th and 7th grade teachers of Urdu about the identification

of children with SLD, using procedures developed in this study. Teachers should prepare achievement tests in accordance with the item analysis used in this study. Teachers should record the performance of students focusing at errors in reading, writing, sequential and perceptual activities. Involvement of parents for recording errors in daily life, in reading, writing, sequential and perceptual activities can be helpful. These tests can also be used in clinical setting for children at risk with SLD.

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