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Validation of Graded Spelling List for Children with Learning Disabilities

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ABSTRACT This study report uses standard group comparison paradigm in attempting to develop and standardize a 300 item graded spelling test in English. The survey covers a sample of 259 children identified as having specific learning disabilities in spelling, from grade levels of kindergarten to class four and hailing from different streams of curriculum. Their chronological age ranges from 5-16 years. The steps in the tool development process, procedures of administration, scoring and the interpretative norms are described. Results show that children with spelling skills are characteristically located at different grade/developmental levels. The derived norms could help identify contemporary spelling levels in a given child or groups of children. Content validity coefficients and odd-even split half reliability estimates are also reported thereby staking claim as a useful diagnostic tool for planning or programming spelling remediation activities in children having spelling problems with or without learning disabilities.

INTRODUCTION

After several years of neglect, there is sudden upsurge of interest in the general public, parents and teachers on spelling competencies, development of spelling and/or its teaching for school children (Fresch 2007; Louden and Rohl 2006; Johnston 2001). Either right or wrong, the spelling standard or proficiency of an individual is often taken as indication of his intelligence and scholarship. Spelling errors are seen as source of embarrassment and are frequently cloaked under the euphemism of 'printer's devil'. While teachers continue to debate whether spelling should be taught exclusively in a systematic manner, or should they do it only through corrective feedback on student's written work, or still better, encourage memorization of spelling patterns, or should they teach students to apply particular self- inventive strategies for learning and remembering words (Kervin and McKenzie 2005). There is no denial that children diagnosed as having learning disabilities are notorious for their frequent misspellings, spelling alphabets in wrong order, mirror writing, letter reversals, inversion of letters, spelling words as they sound, display bizarre spelling, omissions, faulty sequencing, confusion, guessing or addition of letters, difficulties in matching letters, despite knowledge, making sparing use of punctuation (MacArthur et al. 1996; Moats 1994).

Darch et al. (2000) explained that students with learning disabilities have difficulties because they are less skilled at deducing/using spelling strategies, understanding their rules or since they do not use their knowledge of sound symbol correspondences effectively. They often substitute an incorrect vowel or leave out the vowel altogether. Jones (2001) stated that these children also have difficulty detecting their spelling errors. Error detection or teaching them to monitor their own misspelled words is crucial to their growth as writers. A weekly test, for instance, it is argued does not encourage them to monitor their spelling within the context of their writing. Gill and Scharer (1996) developed a rubric for providing parents to rate their child's spelling performance without administering a spelling test to discover how they were more appreciative than results obtained from weekly tests.

Spelling disabilities can be grouped into perceptual, linguistic, motor, executive and affective categories. Children with language- based learning disabilities have severe delays/deficits in grade appropriate reading, spelling, and/or writing. The specific forms of spelling difficulties seen in children are inability to decode, comprehend syntactic or semantic meaning, integrating information, and connecting text. Many children with reading problems have had delays in spoken language (Venkatesan and Puru-

sotham 2006). The growing body of resear-ch on students with learning difficulties show that they can become better spellers if their learning is not left to chance (Vedora and Stromer 2007; Canado 2006; Foorman et al. 2006; Joseph and Orlins 2005; Strattman and Hodson 2000).

All children with/without disabilities or difficulties progress through recognized sequence of developmental stages in spelling acquisition, such as, emergent spelling (3-5 years), letter name-alphabet spelling (5-7 years), within word pattern spelling (7-9 years), syllables and affixes spelling (9-11 years), and derivational relations spelling (11-14 years). If this is so, children with spelling disabilities find it arduous to transgress the last two stages (Croft 2004). Other developmental theorists have argued that spelling acquisition could be viewed more as continuum than as going through distinct stages (Carreker 2005; Caravolas 2004; Caravolas et al. 2001; Ehri 1991, 1989).

Based on developmental perspectives, a tradition in spelling research has conceived and continued with the notion of age- graded spelling lists or tests for individual assessment of ability to spell words correctly (Joshi and Aaron 2003; Joshi 1995; Kamii et al. 1990). The assessments are usually based on the most recent spelling lesson. There are generally four types of spelling tests: (a) Oral Spelling Tests; (b) Proof-Reading Style Test; (c) Multiple Choice Spelling Test; and, (d) Spelling Bee Competitive Tests. The main difference between the other spelling tests and spelling bee is that the students do not get to know in advance which words will be tested as they do for the others.

Some well- known standardized spelling assessment devices are: Graded Word Spelling Test (Vernon 2006), Diagnostic Spelling Tests (Crumpler and McCarty 2006), Developmental Spelling Assessment (Ganske 1999), Test of Written Spelling (Larsen et al. 1999; Larsen and Ham-mill 1976), NIMHANS Specific Learning Disability Battery (Kapur et al. 1992), Spellmaster Assessment and Teaching System (Greenbaum 1987), SPAR Spelling and Reading Tests (Young 1976), Richmond Spelling Test (France and Fraser 1975), Dictation Spelling Test (Clarke 1975), Diagnostic Spelling Test (Kottmeyer 1970), Word Recognition Test (Carver 1970), Durrell Analysis of Reading Difficulty (Durrell 1955), Schonell Graded Spelling Test (Schonell 1932), etc.

Apart from these specific spelling tests, many standard achievement tests usually carry a subtest on spelling assessment, such as, Wide Range Achievement Test (Wilkinson and Robertson 2006), Woodcock-Johnson Tests of Achievement (Woodcock et al. 2006), Peabody Individual Achievement Test (Markwardt 2002), Bader Reading and Language Inventory (Bader 1998), Iowa Test of Basic Skills (Hoover et al. 1996), Classroom Reading Inventory (Silvaroli 1996), Stanford Diagnostic Reading Test (Karl-

sen and Gardner 1995), Observation Survey of Early Literacy Achievement (Clay 1993), California Achievement Test (CTB 1992), Bodel's Test of Reading-Spelling Patterns: A Diagnostic Test for Subtypes of Reading Disabilities (Bodel and Jarrico 1982).

Some researchers have focused on issues related to scoring spelling test performance simply as 'right' or 'wrong' as not quite adequate to give quantitative counts of a child's spelling performance at any given point of time. It is argued that the right/wrong scoring technique does not fully reflect the child's spelling ability. A child may err in spelling for a variety of reasons. The child might be simply unfamiliar with the word. If it is so, consequently, the misspellings cannot be considered as genuine spelling error. For example, it has been shown that when word familiarity was eliminated from graded spelling list presentations for average spellers in third grade, almost 13 % of the children initially classified as 'below average' spellers got replaced into the group of 'above average' spellers. Thus, familiarity with words indicated in terms of ability to pronounce them plays an important role in children's ability to spell correctly (Joshi and Aaron 1991). Sometimes, children are fairly inventive in their spelling though apparently they may be erroneous (Read 1986). For example, a kindergarten grader who misspells 'cat' as 'kat' is definitely superior by virtue of his letter-sound correspondence than his same grade peer who also misspells the same word as 'td'. To overcome these issues, some investigators have recommended Likert type of scoring on spelling tests with scores ranging from 0-6 with 0 given to random symbols with no alphabetical representation and 6 given to correct spelling (Tangel and Blachman 1995). Other techniques of scoring spelling misspelled words are: phonetically legal or illegal; or as

'dysphonetic' (Example, 'gla' for 'girl'), 'dysdeidetic' (Example, 'bloo' for 'blue'), or 'mixed' or through a detailed phonological analysis based on substitution of consonants in blends, omission of unaccepted vowels or syllables, and omission or confusion of inflections, such as, 'ed' and 's' (Moats 1995; Treiman 1993).

Scientific initiatives, investment and investigations on academic problems in preschool or primary school education in India, especially from a clinical perspective as overt symptoms of a larger hidden disease at home, school, teaching process or the student's environment is relatively a recent notion and enterprise (Venkatesan 2004, 2010a, b, 2011). More and more children with scholastic problems are being brought nowadays for clinical consultation about their poor reading, writing, spelling or arithmetic curriculum than ever before when such students usually stagnated or were dumped out of schools (Sukumara 2011; Govindaraju and Venkatesan 2010a, 2010b; Nair et al. 2003; Pratinidhi et al. 1992)

Aims and Objectives

In view of the several unaddressed problems, unresolved issues, inadequate or almost absent spelling research India, it was the proposed aim of this study:

- to initiate an investigation by survey for development and administration of a 'Graded Spelling List' (GraSp_List)' for identification of various aspects of spelling difficulties in a group of children identified with 'Learning Disabilities';
- to establish internal/external validity and reliability of the 'Graded Spelling List' (GraSp_List)' developed and administered on a clinical sample of children identified with 'Learning Disabilities'; and,
- to determine trends in spelling difficulties of children with 'Learning Disabilities' in relation to variables like their age, sex, current grade placement, stream of schooling etc.

MATERIAL AND METHODS

The present study was undertaken on a clinical sample of 259 children (Age Range in months: 60-192; Mean Age: 141.3; SD: 29.4) with Learning Disabilities (WHO 1994) drawn from cases attending Department of Clinical Psychology at All India Institute of Speech and Hearing, under Ministry of Health and Family Welfare, Government of India, located at Mysore, between January-December, 2010. Following an informed consent, and after ensuing the practices as enshrined by the 'Ethics Committee' in the institute (Venkatesan 2010), each participant of this study underwent individual assessment through case history and diagnostic assessment which combined opinions from specialists including ENT, neurology, clinical psychology, physiotherapy, occupational therapy, audiology and speech language pathology. Case history and individualized assessment on standardized intelligence tests was carried out to exclude mental retardation and/or associated conditions like attention deficit disorders, disorders of conduct or emotion.

(a) Sample

The sample included 207 boys (Mean Age; 141.6 months; SD: 29.7; 79.9%) and 52 girls (Mean Age: 140.4 months; SD: 30.6; 20.1%). There were 79 children (30.5 %) studying under Central Board of Secondary Education (CBSE) or Indian Council of Secondary Education (ICSE) syllabi scheme and 180 kids (69.5%) under stream of state government recommended syllabus. Their grade placements ranged from Kindergarten (KG) Levels to Class X (Mean: 6.3 grade; SD: 2.6). But, their spelling grade performance levels ranged between kindergarten and class four. The difference between the sitting grade and the child's actual grade level performance on the test for each child was calculated as 'Grade Discrepancy Score' (GDS). This was measured to be at the mean of 4.1 grades (SD: 1.8) for the sample in this study. The boys in this sample (N: 207; Mean Grade: 6.3; SD: 2.5) did not show any significant difference from the girls (N: 52; Mean Grade: 6.3; SD: 2.6) either in terms of their mean sitting grades or with regard to their grade discrepancy (Boys-N: 207; GDS: 4.1; SD: 1.9; Girls-N: 52; GDS: 4.2; SD: 1.7) (p: >0.05).

(b) Tools

Data on spelling difficulties in children with 'Learning Disabilities' was collected by administering the 'Graded Spelling List' (GraSp_List)

along with another tool to gather demographic details of individual cases exclusively prepared for this study. The 300-item individual examination word list contains key words typically seen under different grades for English and other subjects in elementary school curriculum of our country between kindergarten and class five. Care was taken to give adequate representation for key words across subjects as well as syllabi scheme (CBSE/ICSE/State) such that each prospective child to be tested for spelling competency would get evaluated against an already existing hypothetical standard group of similar grade or curriculum level as normative children representative of their larger population in the country. Initially the word list contents were arranged under each grade level in alphabetical order between KG to class V. Further, 10 teachers across grade levels from KG-V with minimum of three years experience in English teaching were recruited for securing their judgments on grade location, relevance and appropriateness of the key words to enable cross validation of the word list. The inter-rater agreement as measured by Fleiss Kappa for multiple raters (contrasting Cohen's Kappa applicable only for two raters) (Fleiss 1981; Fleiss and Cohen 1973) was 0.84 which is interpreted as 'almost perfect agreement' (Landis and Koch 1977).

(c) Administration and Scoring

Each child was subjected to detailed examination on the word list. During testing, children were progressively examined along the graded difficulty level of spelling of each word item beginning at KG to class V. Despite several options on procedures or formats for administration of spelling tests with their relative merits and demerits, the single word dictation format has been consistently recommended over use of multiple choice and/or passage dictation formats. Clarke (1975) obtained a correlation of 0.9 between word and passage dictation formats on Schonell's Spelling Test (Schonell 1932) with no advantage of one format over the other. In fact, use of passages, although meaningful, was found to be time-consuming to administer and mark. Practical constraints such as ease of scoring, rapid group administration, and low cost are major issues on whether or not an assessment device is accepted by teachers both for formal and informal assessment of spelling errors. Going by these considerations, the present study used the method of single word dictation and scoring a child's spelling performance on the word list on all or none basis by awarding one mark for passed items and zero for failed items. The maximum/overall score possible on the word list for any child passing all items was 300; and minimum score upon failing all items was zero. The Composite Spelling Score (CSS) for each child was taken as sum of their individual credits across all grade levels. A Grade Equivalent Score (GES) of spelling performance age was additionally calculated for each child between KG to Grade V levels depending on the range of items passed at designated levels along the assessment device.

RESULTS AND DISCUSSION

For convenience of reporting, the results of this study are arranged sequentially under the following sub-headings:

- Distribution of mean scores and variance on *spelling performance* for overall sample and in relation to associated variables like gender, type of syllabus stream, grade levels, school change, etc.;
- *Comparative norms and standard scores* convertible into grade level equivalents on the *'GraSp_List';*
- *Reliability and validity* checks on the *'GraSp_List'; and*,
- *Item analysis* for deriving suggested trends or spelling profiles in the studied sample of students with implications for further research

(a) Spelling Performance

The mean '*GraSp_List*' score for overall sample (N: 259) was 113.58 (SD: 72.86). In relation to gender variable, the score for girls (N: 52; Mean: 115.52; SD: 81.58) is found to be almost close/similar to the boys in this sample (N: 207; Mean: 113.09; SD: 70.71)(t: 0.2146; df: 257; SED: 11.323; p: >0.05). A comparison of 'Spelling Scores' of children hailing from State syllabus (N: 79; Mean: 115.00; SD: 77.33) and ICSE/CBSE syllabus stream (N: 180; Mean: 112.95; SD: 71.02) did not reveal statistically significant differences (t: 0.2081; df: 257; SED: 9.851; p: > 0.05). It can be noted that less or greater 'grade discrepancy' and influence of 'school change' as many number of times for a

given child does not emerge as statistically significant variables on spelling competencies of children across various grade levels in this study (p: >0.05) (Table 1).

Table 1: Mean and standard deviation 'GraSp_List' in relation to various variables

Variables	*N*	*Mean*	*SD*	*Probability*
Overall	259	113.58	72.86	
Sex				
Boys	207	113.09	70.71	t: 0.215; df: 257;
Girls	52	115.52	81.58	SED: 11.32; p: >0.05
Stream				
State	180	112.95	71.02	t: 0.208; df: 257;
CBSE/ ICSE	79	115.00	77.33	SED: 9.85; p: >0.05
GES				
KG (LKG/ UKG)	46	27.28	24.83	t: 5.762; df: 91;
Grade I	47	63.47	34.80	SED: 6.28; p:<0.0001
Grade I	47	63.47	34.80	t:5.456; df: 94;
Grade II	49	103.63	37.21	SED: 7.36; p:<0.0001
Grade II	49	103.63	37.21	t:5.315; df:107;
Grade III	60	148.63	48.79	SED: 8.47; p: <0.0001
Grade III	60	148.63	48.79	t: 4.149; df: 104;
Grade IV	46	188.83	50.29	SED: 9.69; p: <0.0001
Grade IV	46	188.83	50.29	t: 2.263; df: 55;
Grade V	11	226.91	49.46	SED: 16.83; p: <0.05
GDiS				
Two	52	107.44	65.04	t: 0.205; df: 97;
Three	47	104.66	70.10	SED: 13.58; p: >0.05
Three	47	104.66	70.10	t: 0.704; df: 100;
Four	55	115.76	86.56	SED: 5.78; p: >0.05
Four	55	115.76	86.56	t: 0.115; df: 97;
Five	44	113.91	69.11	SED: 16.04; p: >0.05
Five	44	113.91	69.11	t: 1.181; df: 78;
Six	36	141.50	65.85	SED: 15.21; p: >0.05
Six	36	141.50	65.85	t: 3.903; df: 49;
Seven	15	66.93	51.82	SED: 19.11; p: <0.001
Seven	15	66.93	51.82	t: 0.629; df: 23;
Eight	10	55.30	32.69	SED: 18.50; p: >0.05
Change of School				
Nil	123	109.54	75.35	t:0.232; df: 203;
One	82	111.90	65.12	SED: 10.19; p: >0.05
One	82	111.90	65.12	t: 0.763; df:113;
Two	33	122.64	75.68	SED: 14.08; p: >0.05
Two	33	122.64	75.68	t: 0.215; df:52;
Three or More	21	127.10	72.56	SED: 20.80; p: >0.05

However, a comparison of GES in spelling performance shows statistically significant differences at all grade levels (p: <0.001) (Table 1). This lends evidence to the observation that children with spelling skills are characteristically located at different grade or possibly even different developmental levels which can be identified, discriminated and grouped separately from one child to another. That there is a developmental sequence in spelling acquisition, competence or performance in children has been repeatedly asserted by several researchers (Carreker 2005; Croft 2004; Varnhagen et al. 1997).

(a) Comparative Norms and Standard Scores

This evidence for developmental sequence in spelling of children at different ages, stages, or class levels also facilitates construction of comparative or interpretative norms for conversion of individual spelling scores into grade equivalent scores in spelling skills for children (Table 2). This finding has direct application for identifying the spelling grade level of any given child on this standardized tool before planning an age/ grade appropriate remedial instruction program for such affected children in school or home settings.

Table 2: Grade norms for spelling scores on 'GraSp_List'

Raw score	*Mid-points*	*Grade equi-valent level*	*Normalized value*	*Raw score range*
< 28	28	KG	-1.05 to +1.00	1-52
29 - 64	64	I	-0.99 to +1.02	29-99
65 - 104	104	II	-1.01 to +1.00	66-141
105 - 149	149	III	-0.99 to +1.03	100-199
150 - 189	189	IV	-1.01 to +1.01	138-240
190 – 227	227	V	-1.01 to +1.01	177-277
>227	227+	V		277+

In this study, following convention, the scores on '*GraSp_List*' were normalized using –/+1 standard deviation from the mean to indicate grade equivalences. Thus, for example, a child scoring below or equal to 28 words correctly on the administered list is interpreted as equal to 'kindergarten' level of spelling grade. Likewise, another child with score of 72 correct words on this spelling list is equivalent of 'II Grade' spelling. These interpretations are made irrespective of associated variables, such as, the test taking child's chronological age, gender, type of school curriculum, and/or frequency of earlier changes in school. However, the interpretation must be guarded when the test takers have had change of medium of instruction from non-English to English schools, if they have never gone to school at all, frequently missed schooling, or have been diagnosed as being on the spectrum of other developmental disabilities, such as, mental retardation, autism, etc.

(a) Reliability and Validity

Content validity coefficients or item total correlation coefficients (Table 3) consistently show range of high values between r: 0.926 to 0.989 between grades KG-V thereby indicating high internal consistency (p: <0.01).

Table 3: Inter-correlation matrix between grades on 'GraSp_List'

	I	*II*	*III*	*IV*	*V*
UKG	0.984	0.971	0.983	0.926	0.928
I	-	0.972	0.989	0.953	0.959
II		-	0.982	0.974	0.976
III			-	0.964	0.969
IV				-	0.984

Further, an attempt was made to undertake split half odd-even reliability exercise on the 300 item full scale by dividing the tool into two equal alternate halves (Table 4a and 4b). Thereafter, the 'halves reliability' estimate was stepped up to the full test length using Spearman-Brown prediction Formula for overall and grade wise measures on the '*GraSp_List*'. These results along with the measure of internal consistency by Cronbach's alpha, Kuder-Richardson Formula 20 are all high (Table 5). The divide has helped the investigators to derive two truncated and equivalent 150-item versions (Form L and M) of the original word list,

The concurrent validity of scores achieved on this word list as against respective class teacher (N: 25) and parent (N: 250) estimates or ratings of the spelling competencies in a randomized sub- group of this sample for their spelling competency against an assumed group of hundred grade peers was found to be a correlation coefficient equivalent of r: 0.861.

(a) Item Analysis

A qualitative item analysis of spelling performance of different age/grade levels of children in this sample reveals that there are several different types of spelling errors that children can make, such as, simplification error (the pupil's spelling contains fewer letters than the target word), substitution error (swap one or more letters in a word for another), order error (all letters are present but in the wrong order), omission or addition error (a letter or two is added or reduced), distortion error (the spelling is fully bizarre or deformed), etc. In addition, behavioral observations reveal concomitant emotional responses like diffidence, fear of making errors, spelling anxiety, need to be coaxed, assured, and encouraged, inability to detect errors despite evident cueing, use of error detection or spontaneous correction strategies, word attack skills, etc., seen in children with learning disabilities can all become promising areas for future research in the country. The development and standardization of this graded spelling tool further opens vistas for converting the present paper-pencil format of this tool along with another similar tool already standardized on number skills (Venkatesan and Purusotham 2010) into a computerized software version to match contemporary trends and requirements for assessment of children with special needs (Ted et al. 1982).

CONCLUSION

In conclusion, the results of the study has shown that it is possible

(i) to construct a simple and easy to use hierarchical and graded word list for testing spelling levels, difficulties or competencies in school children ranging from kindergarten to class five respectively;
(ii) to establish referential and graded local norms for identification of contemporary spelling levels in a given child or groups of children with or without learning difficulties;
(iii) to demonstrate the internal/external validity and reliability of developed graded spelling test on a population of children with learning disabilities having spelling problems; and,
(iv) to explore use of the developed graded word list even for planning individualized or small group based remediation or intervention strategies and programs for children with spelling difficulties.

RECOMMENDATIONS

There is scope for further developing and validating this graded spelling test in English in a computerized format with appropriate gaming tutorials for enabling hierarchical software enabled remediation programs for students identified with such difficulties in the country.

Table 4a: Rearranged word list by frequency count: Form L

S. No.	KG			I			II			III			IV			V		
	List	N	%	List	N	%	List	N	%	List	N	%	List	N	%	List	N	%
1	In	238	91.9	Book	218	85.5	Green	168	69.4	Flower	127	59.1	Cattle	70	40.0	Electricity	33	21.4
2	No	236	91.1	Tree	199	78.0	Water	165	68.2	Yellow	111	51.6	Atmosphere	61	33.0	Instrument	30	19.5
3	Sun	235	90.7	Moon	196	76.9	Going	159	65.7	Brother	107	49.8	Vegetables	52	28.1	Sparrow	26	16.9
4	Ant	233	90.0	Four	193	75.7	School	158	65.3	Station	101	47.0	Cabbage	50	27.0	Buffalo	21	13.6
5	Go	232	89.6	Eight	192	75.3	Monkey	154	63.6	Behind	98	45.6	September	49	26.5	Laughter	19	12.3
6	Six	231	89.2	Room	187	73.3	Elephant	140	57.9	Newspaper	96	44.7	Chocolate	41	22.2	Achievement	18	11.7
7	Bus	228	88.0	Fast	186	72.9	Snake	138	57.0	Uniform	92	42.8	Inspector	40	21.6	Dictionary	16	10.4
8	But	223	86.1	Mark	181	71.0	Year	132	54.6	Parrot	86	40.0	Accident	37	20.0	Literature	15	9.7
9	On	223	86.1	From	180	70.6	Forest	131	54.1	Jungle	85	39.5	Scientist	36	19.5	Architecture	14	9.1
10	Hat	218	84.2	Tiger	180	70.6	Garden	129	53.3	Queen	84	39.1	Furniture	30	16.2	Neighbor	14	9.1
11	Fox	217	83.8	Back	177	69.4	Sweets	126	52.1	Question	82	38.1	Corporation	28	15.1	Cousin	13	8.4
12	My	215	83.0	That	173	67.8	Morning	124	51.2	Insect	75	34.8	Delicious	25	13.5	Circumstance	12	7.8
13	Are	213	82.2	Rain	169	66.3	Rabbit	123	50.8	Sudden	75	34.8	Scholar	24	12.9	Character	11	7.1
14	Men	204	78.8	Come	163	63.9	Banana	119	49.2	Stranger	71	33.0	Frighten	23	12.4	Comprehension	11	7.1
15	Up	202	78.0	Girl	160	62.7	Orange	116	47.9	Laugh	68	31.6	Detective	22	11.8	Photosynthesis	11	7.1
16	Old	200	77.2	Doing	159	62.4	Cycle	114	47.1	Shoulder	64	29.7	Giraffe	22	11.8	Quarrel	10	6.5
17	Get	197	76.1	Slow	158	62.0	Hungry	112	46.2	Choice	55	25.5	Binoculars	21	11.3	Temporary	10	6.5
18	Sky	195	75.3	Cart	152	59.6	Doctor	111	45.8	Borrow	53	24.6	Proteins	21	11.3	Ceiling	8	5.2
19	Has	193	74.5	Train	145	56.9	Evening	107	44.2	Guest	53	24.6	Requirement	19	10.2	Magnificent	7	4.5
20	Yes	190	73.4	Doll	143	56.1	Again	105	43.3	Dolphin	51	23.7	Tomorrow	16	8.6	Immediately	6	3.9
21	Leg	188	72.6	Join	140	54.9	Woman	103	42.5	Library	50	23.2	Pigeon	13	7	Dialogue	5	3.2
22	Now	783	70.7	Some	137	54.1	Bangle	99	40.9	Purple	45	20.9	Necessary	12	6.5	Vengeance	4	2.6
23	Bin	181	69.9	Boat	134	52.5	Uncle	96	39.6	Umbrella	36	16.7	Drizzle	10	5.4	Vigilance	3	1.9
24	Bed	175	67.6	Fail	130	51.0	Touch	88	36.3	Caterpillar	31	14.4	Whistle	9	4.9	Embarrassed	1	0.6
25	Dry	161	62.2	Swim	118	46.3	Heavy	73	30.1	Treasure	28	13s	Chimpanzee	6	3.2	Vacuum	1	0.6
Mean		208.4		Mean	166.8		Mean	123.6		Mean	73.0		Mean	29.5		Mean	12.8	
SD		21.7		SD	25.2		SD	24.5		SD	26.2		SD	16.9		SD	8.3	

Table 4b: Rearranged word list by frequency count: Form M

S. No.	*KG*			*I*			*II*			*III*			*IV*			*V*		
	List	*N*	*%*	*List*	*N*	*%*	*List*	*N*	*%*	*List*	*N*	*%*	*List*	*N*	*%*	*List*	*N*	*%*
1	Dog	237	91.5	Food	215	84.3	Father	167	69	Children	116	53.9	Beautiful	64	34.5	Government	31	20.1
2	Man	235	90.7	Time	197	77.2	Mother	160	66.1	Friend	109	50.7	Discovery	61	32.9	Language	27	17.5
3	And	234	90.3	Hand	194	76.1	House	158	65.2	Afternoon	104	48.4	Healthy	51	27.6	Automatic	25	16.2
4	Is	233	89.9	King	193	75.7	Mango	157	64.8	Student	100	46.5	Hockey	49	26.5	Tourist	20	12.9
5	One	232	89.5	Pant	187	73.3	River	148	61.5	Dinner	97	45.1	Builder	46	24.9	Passenger	19	12.3
6	The	228	88	Sand	186	72.9	Teacher	140	57.8	Lesson	92	42.8	Traveler	41	22.2	Twilight	18	11.7
7	Egg	225	86.9	Play	184	72.2	Word	137	56.6	Mountain	86	40	Diamond	39	21.1	Perspective	16	10.4
8	Cow	223	86.1	Work	181	70.9	Basket	132	54.4	Famous	85	39.5	Difficulty	37	20	Scorpion	15	9.7
9	Car	221	85.3	Nose	180	70.6	Family	129	53.3	Cricket	84	39.1	Knowledge	33	17.8	Luxury	14	9.1
10	Me	218	84.1	Duck	179	70.2	Because	127	52.5	Control	83	38.6	Passenger	29	15.7	Consequence	13	8.4
11	Bag	216	83.4	Pink	175	68.6	Camel	124	51.2	Popular	77	35.8	Tourist	28	15.1	Individual	13	8.4
12	Big	215	83	With	171	67.1	Shout	124	51.2	Picture	75	34.8	Favorite	24	12.9	Commercial	12	7.8
13	Two	207	79.9	Bird	163	63.9	Driver	122	50.4	Suddenly	74	34.4	Disturbance	23	12.4	Chlorophyll	11	7.1
14	Cap	202	77.9	Want	163	63.9	Between	118	48.9	Manager	69	32.1	Gorilla	23	12.4	Congratulation	11	7.1
15	You	202	77.9	Baby	160	62.7	Spoon	116	47.9	Feather	67	31.1	Exercise	22	11.9	Legislature	10	6.5
16	Dad	197	76.1	Crow	158	61.9	Watch	114	47.1	Heaven	58	26.9	Balloon	21	11.3	Successful	10	6.5
17	Van	196	75.7	Grass	155	60.8	Chair	111	45.9	Circus	55	25.6	Naughty	21	11.3	Luggage	9	5.8
18	How	193	74.5	Show	149	58.4	Farmer	110	45.5	Cottage	53	24.7	Precious	19	10.3	Unconscious	8	5.2
19	Bun	190	73.4	Hair	144	56.5	Hotel	106	43.8	Juice	52	24.2	Tortoise	17	9.2	Peculiar	7	4.5
20	Pin	189	72.9	Fire	143	56.1	Angry	103	42.6	Coffee	50	23.3	Guitar	13	7	Leisure	6	3.9
21	New	183	70.7	Feet	140	54.9	Shirt	102	42.1	Kitchen	48	22.3	Leopard	12	6.5	Inauguration	5	3.2
22	Sit	182	70.3	Away	135	52.9	Clever	96	39.7	Thirsty	45	20.9	Squirrel	12	6.5	Philanthropist	3	1.9
23	Jam	176	67.9	Bulb	133	52.2	Empty	92	38	Afraid	35	16.3	Excursion	10	5.4	Courteous	2	1.3
24	Lip	174	67.2	Leaf	120	47.1	Aunt	88	36.4	Screamed	31	14.4	Bouquet	6	3.2	Recruitment	1	0.6
25	Lid	159	61.4	Said	116	45.5	Picnic	56	23.1	Jealous	14	6.5	Eucalyptus	4	2.2	Exaggerate	0	0
	Mean	206.7		Mean	164.8		Mean	121.5		Mean	70.4		Mean	28.2		Mean	12.2	
	SD	82.2		SD	25.5		SD	25.7		SD	25.9		SD	16.6		SD	7.9	

Table 5: Overall and grade wise reliability measures on the 'GraSp_List': Form L and M

Test statistic	*KG*	*I*	*II*	*III*	*IV*	*V*	*Form L*	*Form M*
Cronbachs Alpha	-0.039	0.997	0.995	0.996	0.998	0.997	0.350	0.975
Split-Half Odd- Even Reliability 'r'	-0.053	0.996	0.991	0.991	0.996	0.996	0.276	0.993
Spearman-Brown Prophecy	-0.112	0.998	0.996	0.996	0.998	0.998	0.432	0.996
Kuder Richardson 20	16.52	46.50	26.72	9.77	4.99	4.26	6.94	8.69

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