Tests Screening Writing Difficulty in Malayalam among Upper Primary Students

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ABSTRACT Design of a screening test for identifying students with writing difficulty in Malayalam and validation thereof among upper primary students of Kerala is made to help schools to understand factors leading to such difficulty and to intervene with such students. A battery of tests was developed based on extant literature on screening tests, reviewed difficulties in writing Malayalam, and discrimination power of the draft tests. 135 students identified as writing difficult and 476 students normal on writing in grade 5 to 7 were identified with clear criteria. Scored by cut-points, the battery of tests comprising tasks on ordering words by vowels or consonants, spelling (identification), choosing signs and glides, combining words correctly (phonology), vocabulary (picture), using appropriate one word (morphology), dictation and story development significantly screen upper primary writing difficult students with around 90percent sensitivity and specificity.

INTRODUCTION

Importance of students' ability to communicate through writing during and even after the school yearsneed not be highlighted. If reading is the door to vistas of knowledge, writing forms the wall that holds the entire edifice of knowledge together. Writing is the medium through which students mainly express their knowledge in and out of school. Naturally, it forms a big part of elementary school curriculum. However, it is one of the most complex and sometimes the most difficult skills among the language skills to teach and learn during primary school years. Learning to write is a complex procedure. Unsurprisingly, many students especially those with difficulties in learning are poor in transmitting their thoughts in logical, orderly or precise writing. Writing skill is the most vulnerable to insult, injury and adverse genetic influences as it is among the last and the most complex language skills to emerge during development (Deuel 1994). As children progress from primary to secondary school, they are expected to express more through writing. Accordingly, if children fails to develop the basic skills in writing in primary schools, they will be unable to write with the speed and fluency required to excel in later schools. Such difficulties in writing

unsettle education and self-esteem of grown up children. Struggling with writing interferes with learning through other modes. Difficulties in writing have an adverse impact on academic achievement in school and subsequently on business and industry (Saltzman 1981) too.

Significance of Screening Tests for Identifying Writing Difficulty

Reading and writing skills are critical to student success across the curriculum, and they need to be an integral focus to "form a supportive web of related learning" (Langer 2001: 877). Unfortunately, these realizations of the significance of writing to academic and otherwise development of young human beings has not resulted in concomitant importance being given to identification, analysis and understanding the reasons of student difficulties in writing, say, at par with such researches in relation to reading skills. Theory and research on writing development, and on its risk factors and their measurement, are not as strong as those on reading. Moreover, much of the researches available on writing and related skills in primary schools have their focus on spelling only. Lately, there is an 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). And, as can be expected, a growing body of research on students with learning difficulties show that such students can become better spellers if their learning is not left

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to chance (Vedora and Stromer 2007; Canado 2006; Foorman et al. 2006).

An efficient system of education will not wait for students to fail before coming to their assistance. Instead, good schools and teachers identify those on path to failure and provide valuable preventive interventions. Such screening for preventive interventions may be conducted with all students (Jenkins and Johnson 2011), though they can be applied in a more targeted mode too. Screening test for language difficulties is required in all languages which a substantial number of learners depend for schooling and hence personal development. However, screening is not practiced in a regular and organized way in schools of Kerala for reasons including unavailability of the tests for the purpose (Gafoor 2014). This is no surprise, as most of the evaluations, even in developed counties and in languages such as English is not designed for screening purposes (Nelson et al. 2006). The argument that in languages like Malayalam where native language users depend predominantly on English during postsecondary education, difficulties in mother tongue skills persists well beyond schools has some basis. For instance, around 1/3 of would-be secondary teachers fail to demonstrate competency at the level expected of secondary students in writing and ¼ them fail to do so in translation, and sentence structure (Gafoor and Sujila Rani 2013).

Previous studies suggest that the most difficult area in writing Malayalam for grade 1 and 2 students is signs (Gafoor and Remia 2012) and that such children show improper use of vowel symbols in Malayalam (Gafoor and Sajeev 2009). Gafoor and Remia (2013) found that four factors namely ordering words according to alphabet, identifying incorrect spelling involving but not limited to glides, spelling of simple vocabulary, and use of symbols for vowels distinguish learners with dyslexia from normal learners and low achievers in Malayalam. However, Malayalam though being used by millions of adults and young children as the medium for their learning and development has no systematically developed screening test for identifying writing difficulty among primary school learners yet. This clearly evidences the value of attempting screening tests for Writing Difficulty (WD) in Malayalam, a language spoken by nearly 40 million people world over.

Factors Useful In Identifying Writing Difficulty

This study adopts procedure in parallel with another study on screening reading difficulty in Malayalam among Upper Primary School students (Gafoor 2014). Accordingly, in constructing the screening test for writing difficulty, qualities of a screening test advocated by Jenkins (2003) and procedure followed in developing the screening test for reading difficulty in Malayalam (Gafoor 2014), along with other suggestions obtained from review were followed. To the extent possible the tests and individual items were parallel with the elementary curriculum, are in tune with extant beliefs about how students learn, and appropriate for providing useful data for all stakeholders in helping students in furthering ability to write, and assessing critical pre-requisite skills related to writing. Yet the test battery is kept brief enough to assess all students, and easy to score. A summary description of the procedure followed in the development of the test battery is presented here. Readers may refer previous sources for a more detailed account of the characteristics of the screening tests in general (Jenkins 2003) and the steps followed by the earlier study in developing the screening test in Malayalam (Gafoor 2014).

Screening testsfor identifying potential writing difficulty (WD) are constructed on three related premises. One, many students fail to develop the prerequisite skills in writing. Two, such children show incongruity among the various academic abilities especially in those related to language. And, three, such children demonstrate marked difficulties with spelling tasks.Importance of phonological awareness in writing achievement is recognized from researches on writing in other languages and with younger children in pre-primary grades and grades 1 and 2 (Wanzek et al. 2006; Erdogan 2011; Mannet al. 1987). Phonological awareness, a pre-requisite for language use, promotes children's understanding of the relationship between speech and alphabetic orthography. Phonological decoding concerns the correspondence between printed letters and the sounds of the language, especially phonemes. Problem in word recognition process is exhibited as difficulty in acquiring the identities, sounds and written forms of individual letters. In kindergarten, children with noticeable

reading and writing problems are slow in developing phonemic awareness, letter and sound knowledge, and vocabulary. Hence, screening tests in kindergarten for language difficulties bases on phonological awareness, especially various combinations of letter naming fluency, letter sound identification, phoneme segmentation, and sound repetition (Foorman et al. 1998; O'Connor and Jenkins 1999) including of nonsense words. In 1st and 2nd grades, students grow in phonemic spelling, decoding, and word identification. Logically, screening tests in 1st grade use various combinations of word identification fluency, letter naming fluency, letter sound identification, and phoneme segmentation (Foorman et al. 1998; O'Connor and Jenkins 1999). Learning, as a language based activity, is fundamentally and profoundly dependent on vocabulary knowledge (Baker et al. 1998) also.

Discrepancy between the different tasks in reading/writing and school achievements also show the way for the diagnosis of children with specific disabilities related to language development. 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 are common features of the specific learning difficulties in language (Mahmood Khan 2013). Children diagnosed with learning disabilities are marked for their frequent mis-spellings, spelling alphabets in wrong order, mirror writing, letter reversals, inversion of letters, spelling words as they sound, bizarre spelling, omissions, faulty sequencing, confusion, guessing or addition of letters, difficulties in matching letters despite knowledge, and making sparing use of punctuation (MacArthur et al. 1996; Moats 1994).

Students with learning disabilities have difficulties because they are less skilled at deducing or using spelling strategies, understanding spelling rules or due to ineffective use of knowledge of sound symbol correspondences (Darch et al. 2000). Such children often substitute an incorrect vowel or leave out the vowel altogether. Some typical spelling mistakes among students with specific language difficulties are wrong order of letters of spelling, mirror writing for number and letter, producing incorrect shape, writing reverse letters, such as, b as d, and inverting letters, such as, n as u. Students with

WD may show problem in all writing processes viz., primary (spelling, punctuation, capitalization, handwriting, legibility, grammar, spacing between letters and spacing between words and paragraphs), and middle, and secondary writings(qualitative components of writing like grammar). Spelling disabilities may be perceptual, linguistic, motor, executive and affective categories (Venkatesan and Holla 2011). Though spelling acquisition is viewed more as continuum than as going through distinct stages (Carreker 2005; Caravolas 2004; Caravolas et al. 2001; Ehri 1991, 1989), at least from an assessment perspective, children with spelling disabilities find it arduous to transgress the last two (Croft 2004) of the five stages in spelling acquisition, viz., 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).

Specifically in Malayalam writing, on an average, the students at the end of 3rd grade make error on more than 10 letters of 119 letters. Higher difficultyoccursfor lower primary school children in the areas of signs - both vowel signs and diacritic signs. Substitution of signs in large extent, and omission of them to a lesser extent, causes spelling errors (Gafoor and Remia 2012). As for precursor skills in writing Malayalam among 1st and 2nd graders, morphological Awareness was contributing more than Phonological Awareness to the dictated spelling in Malayalam. Together, the two variables accounted for nearly 1/3 of variance in students' dictated spelling (Gafoor and Remia 2013). Among upper primary students high extent of difficulty is observed in story development and dictation writing. Difficulty occur with writing one word for phrase, Combining words, Copying sentences, Vocabulary (written), and Knowledge of consonants also. Use of Signs for vowels, Letter identification, and Knowledge of vowels also need further strengthening (Gafoor and Sajeev 2009). At least with precursor writing skills boys match girls, though boys are behind girls in composition and completion tasks; boys get poorer as task become complex. This study on difficulties in Malayalam writing could see no significant difference between boys and girls in the areas of knowledge of consonants in alphabet, letter identification, and knowledge of vowels in the alphabet, spelling and use of glides.

Research Question

Can a combination of spelling, and morphological and phonological tasks in Malayalam, identified from previous researches viz., Dictation, Order words (vowels), Order words (consonants), Spelling (identification), Signs (choosing), glides (choosing), Combining words correctly (phonology), Story development, Vocabulary (picture), and Use appropriate one word (morphology)significantly predict Writing Difficulty in Malayalam among students in grades 5 to 7? If so, what would be the level of sensitivity and specificity of the grade specific test batteries formed by assembling the significant predictor tasks?

METHODS

The selection of participants for validation of the battery of screening tests and procedure followed in the development of the battery are described in this section.

Participants

Six hundreds twelve (612) students in upper primary grades 5-7 at the start of the academic year (2013-14) consisting of 425 boys and 187 girls were drawn. Teachers identified more boys as learning backward in language skills than girls; and hence proportionate weightage was given to girls with normal writing achievement as well. This sample was categorised as Writing Difficult (WD) and Normal Writers (NW) based on their performance on four observations.1) Do teachers nominate the student as WD? 2) Do the student perform <25 percentile on a language test including writing (inclusion criteria)? 3) Do the student perform <25 percentile on reading tasks (exclusion criteria)? And, 4) Do the student perform <25th percentile on arithmetic tasks (exclusion criteria)? A student was identified as WD if all the four criteria were met. There were 135WDs and 477 NWs in the sample. The grade-

wise distribution of WD and Students sampled for the study is in Table 1.

Procedure of Development of Battery of Screen Tests

While constructing the screening tests, characteristics of screening tests mentioned in previous section along with other suggestions obtained from review were followed. Theprocedure followed in the development of the test battery is to ensure the qualities of a screening test advocated by Jenkins (2003). The major steps in the procedure were as follows.

1. Defining the Future Outcome That the Screening Test Seeks to Predict [WD and NW]: Being identified as poor on writing (<25th percentile), and teacher identification as student with difficulty in language was applied as inclusion criteria for WD, but from this pool, students who were identified as poor readers (<25th percentile) and students who were poor on arithmetic also (<25th percentile) were excluded. Existing reading, writing, and arithmetic tests were used for this purpose. A student was identified as WD if all the four criteria were met.

2. Identification of Early Predictors of Later Writing Outcomes: Ten tests viz., Dictation, Order words (vowels), Order words (consonants), Spelling (identification), Signs (choosing), glides (choosing), Combining words correctly (phonology), Story development, Vocabulary (picture), and Use appropriate one word (morphology) were included in the initial test battery.

3. Development of Tasks for the Screening Tests: Malayalam words chosen from prescribed Malayalam textbook for grades 1 to 3 were used in Dictation, ordering words, spelling, choosing signs and glides, combining words correctly to form compound words, vocabulary and Use Appropriate One Word. The pattern of student response requires in the ten tests used are as obvious from the test names. Dictation requires students to write down in paper the word the

Table 1: **Grade-wise distribution of WD and NW boys and girls sampled for the study**

Grade	Girl			Boy			Grand total
	WD	NW	Total	WD	NW	Total	
V	15	61	76	44	102	147	223
VI	14	48	62	27	98	125	187
VII	8	41	49	27	126	153	202

test administrator reads one by one. Ordering words involved arranging the words in alphabetic order. Spelling test involved identifying correctly spelt words. The tests on signs and glides required the students to choose suitable symbol to complete the given word. Combining Words Correctly (Phonology), Story Development, Vocabulary (Picture) and Use Appropriate One Word (Morphology) asked for students to write down their response. The number of items in each of the ten tests is indicated in Table 2.

4. Pilot Administration of the Test Battery: This was done to ensure item discrimination power using conventional procedure of significant difference between high-low groups. All the ten tests were retained.

5. Deciding the Cut Score on the Tests: Cut score which optimally discriminates between WD and NW categories were found out by checking the frequency distribution of the scores on each test and identifying the score on which the difference in proportion of students passing in WD and NW is maximal (see Table 2).

6. Finalising Test Battery: Tests to accurately classify the students as WD and NW with scoring done in terms of cut score; having to examine only whether the examinee scores the cut score or not on the ten tests in the battery; was finalised.

7. Validation of the Battery: The classification accuracy indicating the extent to which a screening tool is able to accurately classify students into WD and NW was done using logistic binary multiple regression analysis. Two indices, sensitivity and specificity, are used to gauge a screen's accuracy in classifying students. Sensitivity is the true positive identification; the ability of the screen battery to identify WD. Specificity is the true negative rate, the screen's ability to identify individuals as NW. Specificity is calculated by dividing the number of true negatives by the total number of individuals who perform successfully on the outcome measure. Sensitivity increases as the screen correctly identifies more and more of the students who have later WD, whereas specificity increases as the screen correctly identifies more and more of the students who write satisfactorily.

RESULTS

Screening Tests Significant in Identifying Writing Difficulty in Malayalam

Ten tests were used as predictors in binary logistic multiple regression to predict membership of in WD or NW categories with forward method to arrive at the most parsimonious mod-

Table 2: Data set for logistic regression by grade, also showing the screening tests for WD, number of items in each, cut point and percent of students above the cut score

Tests (brief description of the task)	Cut point	No.of items	Sensitivity (%)	Status	Grade 5	Grade 6	Grade 7
Dictation	≤4	24	75	NW	174	149	169
				WD	48	38	33
Order Words (Vowels)	=0	4	54	NW	188	151	170
				WD	34	36	32
Order Words (Consonants)	=0	4	91	NW	124	105	124
				WD	98	82	78
Spelling (Identification)	=0	3	40	NW	195	159	186
				WD	27	28	16
Signs (Choosing)	≤1	4	65.2	NW	141	134	170
				WD	81	53	32
Glides (Choosing)	≤2	4	55.6	NW	175	143	177
				WD	47	44	25
Combining Words Correctly (Phonology)	=0	5	81.5	NW	113	112	143
				WD	109	75	59
Story Development	=0	6	49.6	NW	173	139	139
				WD	49	48	63
Vocabulary (Picture)	=3	9	65	NW	149	129	164
				WD	73	58	38
Use Appropriate One Word (Morphology)	=0	3	87	NW	86	92	113
				WD	136	95	89

*% of students who performed better than the cut score in the pilot sample

el. Logistic regression was applied to calculate the probability of NW over the probability of WD. The screening tests, the number of items in each, the cut point in each and the percentage of students banded by the cut score are summarised in Table 2.

Table 2 shows the tests used for screening the WD students, the number of items in each test, the cut score on which WD children were tentatively identified, the percentage of students in thepilot sample who were provisionally identified as WD or not (based on the cut score), and the number of students who were identified as WD or NW using the given cut score by grade.

Number of items indicates the total possible score on the respective test. Cut score is the score above which the student will be considered a normal writer as per performance of that particular test. For instance, having score above 4 (out of 24) on dictation of 24 words was used as the criterion to provisionally classify the learner as NW based on the dictation task. Thus, there were 48 (out of 223), 38 (out of 187) and 33 (out of 202) students in grades 5, 6 and 7 respectively who were identified as potential WDs; and the remaining 174, 149 and 169 students in the respective grades were as NWs, based on dictation test. Likewise, using the respective cut score criterion, potential WDs (and NWs) were identified based on the remaining nine tests, namely Order Words (Vowels), Order Words (Consonants), Spelling (Identification), Signs (Choosing), Glides (Choosing), Combining Words Correctly (Phonology), Story Development, Vocabulary (Picture) and Use Appropriate One Word (Morphology).

Three separate binary logistic regression analyses were conducted to statistically verify the significance of the above identifications of

WDs (and NWs) from the ten screening tests. These analyses statistically estimate the efficiency of the ten screening tasks to predictWD among 5th, 6th, and 7th graders (Table 3).

A test of the model with 8 predictors from among the 10 tests for identifying WD among grade 5 students (Table 3) against a constant only model was statistically significant, indicating that the predictors as a set reliably distinguished between WD and NW (Chi-square (8) = 174.28, p<.01). The other four predictor tasks were dropped from the model as their effects are not significant by the Wald statistic. Nagelkerke's R^2 of .79 indicated a fairly strong relationship between prediction and writing status. Prediction success overall was 92.8 percent, [79.7.9% for WD (sensitivity) and 97.5 percent for NW (specificity)]. Wald statistic to test the significance of individual tests demonstrated that the eight tests make significant contribution to prediction (p<.03).

The Exp(B) presents effect sizes of select tests, the extent to which raising the corresponding measure by one unit influences the odds ratio of being identified as WD. EXP(B) value in Table 3 indicates that when student is failing in Spelling identification and judged as prone to WD (judged in terms of cut score of "0" out of total score of 3, see Table 2), the odds ratio is 44 times as large for the student to become actual WD than NW (identified in this study based on the four-fold criteria described in the section-participants). The ratio of odds ratios of the independents is the ratio of relative importance of the independent variables in terms of effect on the dependent variable's odds. Other tests, in the order of decreasing importance forpredicting WD in Malayalam among 5th grade students, as indicated by the odds ratio in terms of EXP(B) values are Order Words-Consonants

Table 3: Logistic regression analysis of screening tasks for identifying WD of 5th graders

Predictor	B	S.E.	Wald	df	Sig.	Exp(B)
Order Words (Vowels)	2.12	0.83	6.56	1	.01	8.35
Order Words (Consonants)	2.61	0.74	12.39	1	.00	13.64
Spelling (Identification)	3.80	0.98	14.95	1	.00	44.70
Signs (Choosing)	2.18	0.67	10.56	1	.00	8.88
Glides (Choosing)	1.63	0.64	6.60	1	.01	5.12
Combining Words Correctly (Phonology)	1.87	0.79	5.63	1	.02	6.50
Use Appropriate One Word (Morphology)	2.29	1.07	4.59	1	.03	9.84
Vocabulary (Picture)	2.28	0.70	10.61	1	.00	9.81
Constant	-9.39	1.81	26.86	1	.00	0.00

Cox & Snell R^2=.54 Nagelkerke R^2=.79 Model Chi-square (8)= 174.28, p<.01

[EXP (B) =13.64], Use Appropriate One Word – Morphology [EXP(B) =9.84], Vocabulary -Picture [EXP(B) =9.81], Signs – choosing[EXP(B) =8.88], Order Words (Vowels) [EXP (B) =8.35], Combining Words Correctly (Phonology) [EXP(B) =6.50], and Glides (Choosing) [EXP(B) =5.12], respectively.

A test of the model with 6 predictors from among the 10 tests for identifying WD among grade 6 students (Table 4) against a constant only model was statistically significant, indicating that the predictors as a set reliably distinguish between WD and NW (Chi-square (6)= 152.08, p<.01). The other predictors were dropped from the model as their effects are not significant by the Wald statistic. Nagelkerke's R² of .86 indicated a strong relationship between prediction and writing status. Overall prediction success was 95.7 percent [87.8% for WD (sensitivity) and 97.9 percent for NW (specificity)]. Wald statistic demonstrated that the six tests make significant contribution to prediction (p<.03), except for Order Words (Vowels) (p<.1).

The Exp(B) presents effect sizes of the six tests (in Table 4); an index of the extent to which raising the corresponding measure by one unit influences the odds ratio of being identified as WD. EXP(B) value in Table 4 indicates that when student is failing to Order Words (Consonants) and judged as prone to WD (judged in terms of

cut score of "0" out of total score of 4, see Table 2), the odds ratio is 420 times as large for the student to become actual WD than NW (identified in this study based on the four-fold criteria described in the section- participants). Other tests, in the order of decreasing importance for predicting WD in Malayalam among 6th grade students, as indicated by the odds ratio in terms of EXP(B) values are Combining Words Correctly (Phonology)[EXP(B) =36.67], Signs (Choosing) [EXP(B) =15.91], Spelling (Identification) [EXP(B) =9.59], Story Development [EXP(B) =7.90], and Order Words (Vowels) [EXP(B) =4.70], respectively.

A test of the model with 6 predictors from among the 10 tests for identifying WD among grade 7 students (Table 5) against a constant only model was statistically significant, indicating that the predictors as a set reliably distinguished between WD and NW (Chi-square (6)= 141.12, p<.01). Four predictors were dropped from the model as their effects were not significant by the Wald statistic. Nagelkerke's R² of .84 indicated a strong relationship between prediction and writing status. Overall prediction success was 96 percent [88.6% for WD (sensitivity) and 7.6 percent for NW (specificity)]. Wald statistic demonstrated that the six tests make significant contribution to prediction (p<.02).

Table 4: Logistic Regression analysis of screening tasks for identifying WD of 6th graders

Predictor	B	S.E.	Wald	df	Sig.	Exp(B)
Order Words (Consonants)	6.04	1.75	11.89	1	.00	420.09
Spelling (Identification)	2.26	0.99	5.27	1	.02	9.59
Signs (Choosing)	2.77	0.95	8.57	1	.00	15.91
Constant	-7.16	1.73	17.08	1	.00	0.00
Order Words (Vowels)	1.55	0.97	2.55	1	.11	4.70
Combining Words Correctly (Phonology)	3.60	0.95	14.44	1	.00	36.67
Story Development	2.07	0.95	4.75	1	.03	7.90

Cox & Snell R²=.58 Nagelkerke R²=.86 Model Chi-square (6)= 152.08, p<.01

Table 5: Logistic regression analysis of screening tasks for identifying WD of 7th graders

Predictor	B	S.E.	Wald	df	Sig.	Exp(B)
Order Words (Consonants)	4.03	1.37	8.65	1	.00	56.28
Signs (Choosing)	2.69	1.07	6.38	1	.01	14.75
Glides (Choosing)	2.39	0.88	7.33	1	.01	10.93
Constant	-9.48	2.33	16.52	1	.00	0.00
Order Words (Vowels)	2.44	1.02	5.70	1	.02	11.45
Story Development	3.27	1.07	9.41	1	.00	26.38
Dictation	3.43	1.03	11.16	1	.00	30.82

Cox & Snell R²=.50 Nagelkerke R²=.84 Model Chi-square (6)= 141.12, p<.01

The Exp (B) presents effect sizes of the six tests (in Table 5) on writing status of grade 7 students. Exp(B) gives an index of the extent to which changing the status of student from NW to WD (based on the corresponding test criterion indicated in Table 2) influences the odds ratio of being actual WD. EXP(B) value in Table 5 indicates that when student is failing to Order Words (Consonants) and judged as prone to WD (judged in terms of cut score of "0" out of total score of 4, see Table 2), the odds ratio is 56.28 times as large for the student to become actual WD than NW. Other tests, in the order of decreasing importance for predicting WD in Malayalam among 7th grade students, as indicated by the odds ratio in terms of EXP(B) values are Dictation [EXP(B)=30.82], Story Development [EXP(B)=26.38], Signs (Choosing) [EXP(B)=14.75], Order Words (Vowels) [EXP(B)=11.45], and Glides (Choosing) [EXP(B)=10.93], respectively.

Ten screening tests used in the study (Table 6) if used with their respective cut score can reliably demarcate upper primary students with and without WD in Malayalam. The extent of influence of each test on the writing status along with the sensitivity and specificity of the battery of screening tests for grade 5 to 7 students are given in Table 6.

Overall effectiveness of the screening tests to identify WD in Malayalam among upper primary boys is high, with 92 to 96 percent of them being rightly screened using 6 to 8 tests in the battery of 10 screening tests. The efficacy of the battery of screening tests (assembled using the identified significant predictors) in terms of correct classification of students as WD or NW tends to increase from grade 5 (classification accuracy 92.8%) through grade 7 (classification accuracy 96%).

The most effective task for delineating WD in Malayalam among upper primary students is Ordering Consonants Words. Ability to Order Consonants Words (if given with four such words) will significantly predict students writing status in grades 5 to 7; those who fail on this task are highly possible to be WD (with odds ratios ranging from 10 to 420). The task of Ordering words(vowels) also significantly predict students writing status (WD vs. NW) in grades 5 to 7; those who fail on this task are highly possible to be WD (with odds ratios ranging from 4.7 to 11.45). Further, this study corroborates findings from previous researches that the most difficult area in writing Malayalam for students is signs and that WD children show improper use of vowel symbols in Malayalam as present findings reveals that task of choosing signs can effectively identify WD children (from NWs) among upper primary students as well. Likewise, phonological task on Combining Words Correctly is also able to discriminate WD children from others in upper primary grades - 5 to 7. The value of vocabulary (picture identification as well as Appropriate One Word) and spelling (identification) in screening WD diminishes from grade 5 to 7. The value of dictation, sequencing words and choosing signs and glides as well as generative writing tasks like story development in screening WD increases from grades 5 to 7.

CONCLUSION

The findings establishes that factors namely ordering words according to alphabet, identifying incorrect spelling involving but not limit-

Table 6: Summary of Exp (B) of the screen tests and the sensitivity and specificity of the significant models for identifying WD among grade 5, 6 and 7 students

Tests	Cut score*	Grade 5	Grade 6	Grade 7
Dictation	≤4/24	-	-	30.82
Order Words (Vowels)	0/4	8.35	4.70	11.45
Order Words (Consonants)	0/4	13.64	420.09	56.28
Spelling (Identification)	0/3	44.67	9.59	-
Signs (Choosing)	≤1/4	8.88	15.91	14.75
Glides (Choosing)	≤2/4	5.12	-	10.93
Combining Words Correctly (Phonology)	0/5	6.50	36.67	-
Story Development	0/6	-	7.90	26.38
Vocabulary (Picture)	≤3/9	9.81	-	-
Use Appropriate One Word (Morphology)	0/3	9.84	-	-
Sensitivity (% of Students Rightly Identified As WD)	79.7	87.8	88.6	
Specificity (% of Students Rightly Identified As NW)	97.5	97.9	97.6	
Overall (% Of Students Rightly Screened As WD or NW)	92.8	95.7	96.0	

ed to glides, spelling of simple vocabulary, and use of symbols for vowels distinguish learners with dyslexia from normal learners in Malayalam. From a theoretical perspective, this study confirms the importance of phonological awareness in attainment of writing in Malayalam that too among older children in upper primary grades 5 to 7, as recognized from researches on acquisition of writing skillsin other languages but with younger children in pre-primary grades and grades 1 and 2.

IMPLICATIONS

As the screening test developed in this study has desirably high sensitivity and specificity this battery will prove useful for teachers and counsellors for screening students with WD in Malayalam from others. The battery as a whole or the individual tests can be used for quick identification of risk for WD in Malayalam. Though the test is validated for upper primary grades, the increasing trend observed in the overall efficacy of test from grades 5 to 7 implies that the test battery can be useful for teachers in high school as well for identification of need for special writing instruction. Those who fail to pass the screen test even in the upper primary classes may be provided with research supported interventions to develop literacy.

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REFERENCES

Baker SK, Simmons DC, Kame'enui EJ 1998. Vocabulary acquisition: Research bases. In: DC Simmons (Ed.): *What Reading Research Tells Us About Children with Diverse Learning Needs: Bases and Basics*, London: Routledge, pp. 183-217.

Canado MLP 2006. The effects of explicit spelling instruction in the Spanish EFL classroom: Diagnosis, development and durability. *Language Awareness,* 15(1): 20-37.

Caravolas M, Hulme C, Snowling MJ 2001. The foundations of spelling ability: Evidence from a 3-year longitudinal study. *Journal of Memory and Language*, 45(4): 751-774.

Caravolas M 2004. Spelling development in alphabetic writing systems: A cross-linguistic perspective. *European Psychologist*, 9(1): 3-14.

Croft C 2004. *Monitoring Progress in Spelling Using Developmental Information*.Wellington: New Zealand Council for Educational Research.

Darch C, Kim S, Johnson S, James H 2000. The strategic spelling skills of students with learning disabilities: The results of two studies. *Journal of Instructional Psychology*, 27(1): 15-27.

Ehri LC 1989. The development of spelling knowledge and its role in reading acquisition and reading disability. *Journal of Learning Disabilities*, 22(6): 356-365.

Ehri LC 1991. The development of reading and spelling in children: An overview. In: M Snowling, M Thomson (Eds.): *Dyslexia: Integrating Theory and Practice*. London: British Dyslexia Association, pp. 63-79.

Erdogang 2011. Relationship between the phonological awareness skills and writing skills of the first year students at primary school. *Educational Sciences: Theory & Practice,*11(3): 1506-1510.

Foorman BR, Fletche, JM, Frances DJ, Carlson CD, Chen D, Mouzaki A, Taylor R 1998. *Technical Report: Texas Primary Reading Inventory Technical*. Houston: Center for Academic and Reading Skills, University of Texas Health Science Center at Houston and University of Houston.

Foorman BR, Schatschneider C, Eakin MN, Fletcher JM, Moats LC, Francis DJ 2006. The impact of instructional practices in grades 1 and 2 on reading and spelling achievement in high poverty schools. *Contemporary Educational Psychology*, 31(1): 1-29.

Fresch M 2007. Teachers concerns about spelling instruction: national survey. *Reading Psychology*, 28(4): 301-330.

Gafoor AK, Sajeev T 2009. Difficulties in writing Malayalam among upper primary school pupils. *GCTE Journal of Research and Extension in Education,* 4(2): 15-26.

Gafoor KA, Remia KR 2012. Spelling difficulties in Malayalam among lower primary students. *Journal of Studies in Teacher Education* 5(2): 31-40.

Gafoor KA, Remia KR 2013. Influence of phonological awareness, morphological awareness and nonverbal ability on reading comprehension in Malayalam. *Guru Journal of Behavioral and Social Sciences,* 1(3): 129-138.

Gafoor KA, Sujila Rani VM 2013. Competency in Malayalam among B.Ed students of Kerala, *Endeavours in Education,* 4(1): 78-86.

Gafoor KA 2014. Tests screening reading difficulty in Malayalam among upper primary school boys. *Guru Journal of Behavioral and Social Sciences, 2*(1): 271-282.

Jenkins JR 2003. Candidate Measures for Screening At-Risk Students. *Paper presented at the National Research Center on Learning Disabilities Responsiveness-to-Intervention symposium*. Kansas City, MO.

Jenkins JR, Johnson E 2011. Universal Screening for Reading Problems: Why and How Should We Do This? From <http://www.rtinetwork.org/essential/assessment/screening/readingproblems> (Retrieved on 10 October 2014).

Johnston FR 2001. Exploring classroom teachers' spelling practices and beliefs. *Reading Research and Instruction,* 40(2): 143-156.

Langer JA 2001. Beating the odds: Teaching middle and high school students to read and write well. *American Educational Research Journal,* 38: 837-880.

Louden W, Rohl M 2006. Too many theories and not enough instruction: Perceptions of pre-service teacher preparation for literacy teaching in Australia. *Literacy,* 40(2): 66-78.

MacArthur CA, Graham S, Haynes JB, DeLaPaz S 1996. Spelling checkers and students with learning disabilities: Performance comparisons and impact on spelling. *The Journal of Special Education*, 30(1): 35-57.

Mahmood Khan T, SherAwan A, Naeem Mohsin M 2013. Validation of Sequential Problem Test (SPT) for identification of the children with specific learning difficulties. *Journal of Educational & Developmental Psychology,* 3(1): 64-71.

Mann VA., Tobin P, Wilson R 1987. Measuring phonological awareness through the invented spellings of kindergarten children. *Merrill-Palmer Quarterly,* 33: 365-391.

Moats LC 1994.Assessment of spelling in learning disabilities research. In: GR Lyon (Ed.): *Frames of Reference for the Assessment of Learning Disabilities.* Baltimore, MD: Paul H. Brookes, pp. 333-349.

Nelson HD, Nygren P, Walker M, Panoscha R 2006. Screening for speech and language delay in preschool children: systematic evidence review for the US Preventive Services Task Force. *Pediatrics*, 117(2): e298-e319.

O'Connor RE, Jenkins JR 1999.The prediction of reading disabilities in kindergarten and first grade. *Scientific Studies of Reading*, 3: 159–197.

VedoraJ, Stromer R 2007. Computer-based spelling instruction for students with developmental disabilities. *Research in Developmental Disabilities*, 28(5): 489-505.

Venkatesan S, Holla MJ 2011.Validation of graded word list for testing spelling competencies in children with learning disabilities. *Indian Journal of Psychology,* 2(2): 73-82.

Wanzek J, Vaughn S, Wexler J, Swanson EA, Edmonds M, Kim AH 2006. A synthesis of spelling and reading interventions and their effects on the spelling outcomes of students with LD. *Journal of Learning Disabilities*, 39(6): 528-543.