# Psycholinguistic screening test for Tamil children with reading difficulties in Sri Lanka

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## Abstract

Reading development forms the cornerstone of every child's educational journey, yet not all naturally acquire proficient reading skills, necessitating early identification and intervention. Sri Lanka currently lacks a comprehensive national programme to address reading difficulties. This study aims to create and validate a Psycholinguistic Screening Test (PST) tailored for Grade 6 (junior secondary) Tamil-speaking students (N=78) in Sri Lanka who struggle with reading. Grounded in the Simple View of Reading (SVR), the PST evaluates crucial dimensions of reading proficiency, including phonological awareness, sound-symbol association, syllable knowledge, word morphology, word syntax, semantic skills, and reading comprehension. The PST demonstrates robust face and content validity, with an I-FVI score of 0.88 and I-CVI scores of 0.89 for all items among all raters, confirming its validity. Test-retest reliability analysis indicates improved scores from pre-test (M=33.0, SD=14.5) to post-test (M=39.1, SD=14.5), with a strong positive correlation ($r = 0.919$, $p < .01$, 2-tailed) between the measures. Overall, the PST exhibits promising validity and reliability. Its development and validation offer significant potential for addressing reading difficulties among Grade 6 Tamil-speaking students in Sri Lanka. Practical implications encompass early identification and intervention strategies, tailored instruction methods, increased awareness, inclusive educational practices, research avenues, multilingual adaptation, policy implementation, parental involvement, and longitudinal studies.

## Keywords

Psycholinguistic screening test, Tamil children, reading difficulties, simple view of reading

## Link to article

## Introduction

Reading is a sophisticated cognitive process that requires a number of fundamental abilities such as comprehension, phonological awareness, memory, visual recognition, and vocabulary (Handler and Fierson, 2017). It involves both decoding written symbols and comprehending the textual content (Franchi *et al*., 2023). Proficiency in reading fluency and comprehension is paramount for extracting meaning from written language (Carretti *et al*., 2019), highlighting the central role of these skills in education. The Simple View of Reading supports the idea that reading comprehension in Tamil relies on two essential components: decoding and linguistic comprehension, both of which are vital for understanding written Tamil text. However, not all children naturally acquire proficient reading abilities, and some encounter challenges on their path to becoming skilled readers, necessitating additional support (Poulsen, 2018).

Early identification and intervention play a pivotal role in preventing and addressing learning challenges, ensuring uninterrupted educational progress for children. The availability of effective screening tests is crucial for identifying a diverse range of learning difficulties and tailoring customised interventions accordingly. This study is dedicated to the development of a screening test explicitly crafted for Tamil-speaking children who face reading difficulties in Sri Lanka. The development and validation of such a screening test constitute a significant and indispensable endeavour within the Sri Lankan educational landscape. To provide a comprehensive foundation for this study, the researcher reviewed relevant literature encompassing previous research on early identification, existing screening tests, and the application of the Simple View of

Reading (SVR) theoretical framework in developing the Psycholinguistic Screening Test (PST).

## Related works

### *Early identification of children with reading difficulties*

Early identification of reading difficulties is paramount for ensuring the academic success and well-being of students. Several studies underscore the significance of timely recognition and intervention for children who face challenges in developing adequate reading skills. Kim *et al*. (2020) highlight how students' acquisition of reading skills varies, with some making significant progress and others having significant difficulties. Colenbrander *et al*. (2018) stress that, while early identification is a complex process, it is essential for optimizing outcomes in children with reading difficulties.

Pulkkinen *et al*. (2022) provide insight into the timing of identification, highlighting that the majority of children with arithmetic and comorbid fluency problems in Grade 3 were already identifiable by Grade 1. In contrast, children with low reading fluency could be reliably identified as early as the beginning of second grade. Rahman and Ismail (2019) emphasise the importance of early diagnosis, as an inability to read or write simple words or sentences during primary school can signal the need for continuous support from teachers and parents to ensure normal learning progress. Schmitterer and Brod (2021) emphasise the critical role of accurate identification as the first step toward providing necessary interventions for struggling students.

Poulsen (2018) highlights the benefits of early identification, as it enables timely support and, ideally, the prevention or mitigation of reading difficulties. Kaye *et al*. (2022) stress that early interventions, when implemented during the early schooling years, can significantly alter the trajectory of students' learning, emphasising the transformative potential of expert teaching. Colenbrander *et al*. (2018) assert that intervention is essential, regardless of the underlying causes of difficulties, be they related to neurodevelopmental issues, socioeconomic factors, inadequate early instruction, or other relevant factors.

Moreover, Valdois *et al*. (2020) draw attention to a substantial portion of secondary school children who fail to reach expected reading competence levels, highlighting the need for more efficient intervention strategies that consider the cognitive weaknesses and deficits specific to each individual. In conclusion, early identification of reading difficulties is a vital step in ensuring that students receive the necessary support and interventions to overcome these challenges and succeed academically.

## *Screening tests for children with reading difficulties*

The assessment and screening of reading abilities are intricate processes, given the diverse origins and manifestations of reading difficulties. These tasks necessitate the consideration of several factors, including the range of potential causes, various reader profiles, assessment materials, and emerging evaluation techniques.

A multitude of factors can contribute to poor reading skills, complicating attempts to generalise findings from cross-sectional and correlational research studies that encompass cognitive and neuropsychological dimensions (Miciak *et al*., 2018). Reading challenges within a school environment presents substantial complexities for educators, as classrooms often contain a diverse mix of reader subtypes. Even among typically developing children, some may encounter reading difficulties despite the absence of discernible impairments (Auphan *et al*., 2018).

The evaluation of reading proficiency can employ diverse materials, encompassing both non-words and full texts. Unlike reading individual words or non-words, reading a complete text integrates reading comprehension as an essential component (Carretti *et al*., 2019). Surprisingly, there is no prevailing consensus regarding standardised tests that specifically assess reading comprehension or the integration of such data with other assessment metrics (Franchi *et al*., 2023). Reading screening assessments help educators identify students who are at risk of reading and determine the need for intervention and support (VanMeveren *et al*., 2018)

Innovative approaches have emerged in reading assessment. These encompass web-based assessments of phonological awareness (PA) (Carson, 2017), the measurement of readers' comprehension utilising probabilistic test theory models (Støle *et al*., 2020), cognitive diagnostic assessment (CDA) (Toprak and Çakır, 2020),

computerised game-based assessment (GBA) systems (Hautala *et al*., 2020), the computer-administered Multiple-Choice Online Causal Comprehension Assessment (MOCCA) (Davison *et al*., 2017), oral language tasks grounded in the Simple View of Reading (Kelso *et al*., 2020), comprehensive screening tests evaluating phonemic awareness, rapid naming, letter knowledge, paired associate learning, and reading proficiency (Poulsen *et al*., 2017), experimental word reading list (Vaughn *et al*., 2018), curriculum-based oral reading fluency (ORF) assessments, including one-minute fluency measures (Martins and Capellini, 2021), eye-tracking technology (Bingel *et al*., 2018), Arabic psycholinguistic screening Tool (Aziz *et al*., 2012), Response to Intervention (RtI) model (Siegel, 2020; Gutiérrez *et al*., 2019), fine motor movements screening e-Tool (Bai *et al*., 2016), and neuroimaging techniques (Ozernov-Palchik and Gabrieli, 2018).

These assessments gauge specific skills or groups of skills associated with reading proficiency. However, the existing PST is designed to evaluate various aspects of reading proficiency skills. This test aims to assess an individual's linguistic and cognitive abilities, including aspects encompassing phonological awareness, sound-symbol association, syllable knowledge, word morphology, word syntax, semantic skills, and reading comprehension skills. This test can be used to identify potential language and cognitive difficulties in individuals, especially children, which may impact their reading and overall language skills. They help in early detection and intervention.

Nonetheless, the implementation of this screening test may not adequately address the requirements for screening in the context of the Tamil language. Tamil possesses distinctive characteristics that distinguish it from other languages. Notably, Tamil is a language rich in morphology, and its agglutinative nature sets it apart of particular significance is the complexity inherent in the structural and functional aspects of verbs, which serve as the repository for essential grammatical functions within the language (Sarma, 2013). The learning task here is therefore quite different from the learning task in other akshara systems where diacritics are ligatured or connected to a point in a base consonant. In Tamil, novice readers should learn to gather up the right number of unconnected elements and not treat each as separate akshara. The number of symbols in Tamil can be expected to take time to learn. The sheer number of symbols also implies a potential for confusion when selecting the appropriate akshara for

spelling, and this confusion may be at the level of closely similar sounds (phonological confusion) or similar-looking symbols (visual confusion) (Nag and Narayanan, 2019).

Furthermore, it's important to note that this PST is designed for junior-secondary children who have completed the elementary level. They were not diagnosed with reading difficulties, attending regular classes, appearing with normal IQ, and mixed with garden variety poor readers (Farukh *et al*., 2020). They are not typically targeted for reading instruction because, beyond the elementary grades, the emphasis shifts from basic word reading and foundational skills to reading for content acquisition and literary analysis (Vaughn *et al*., 2018). Nevertheless, it remains crucial to identify junior-secondary students using an appropriate screening test and provide timely interventions to foster the development of their reading proficiency.

## *Psycho-linguistic screening test based on the simple view of reading theory*

The development of the Psycholinguistic Screening Test (PST) for Tamil-reading children is firmly rooted in the Simple View of Reading (SVR) theory. SVR offers a valuable framework for understanding the challenges children face in reading comprehension (Colenbrander *et al*., 2018). It aids speech-language pathologists (SLPs) in evaluating school-age children with language difficulties and offers insights into different subgroups of struggling readers based on their listening comprehension and word recognition abilities (Ebert and Scott, 2016).

At its core, the Simple View of Reading (SVR) posits that reading comprehension is a product of two fundamental components: decoding and language comprehension. Decoding refers to the ability to recognise words in print, while language comprehension pertains to the understanding of spoken language (Gough and Tunmer, 1986). Challenges in either component can lead to difficulties in reading comprehension, resulting in distinct subtypes of readers (Auphan *et al*., 2018). Research by Ebert and Scott (2016), grounded in the SVR framework, identifies four specific groups based on different language dimensions: listening comprehension, word recognition, oral expression, and reading comprehension. A practical approach to screening, as suggested by Kelso *et al*. (2020), involves beginning with linguistic comprehension tasks, followed by a reading assessment. This method effectively

identifies poor comprehenders and streamlines the testing process by focusing on at-risk children. Thus, the SVR framework provides a comprehensive and efficient structure for diagnosing and addressing reading difficulties.

The rationale for embracing the Simple View of Reading is clear: both decoding and linguistic comprehension are indispensable for reading comprehension, and neither is sufficient in isolation. According to the SVR model introduced by Gough and Tunmer in 1986, successful reading comprehension arises from the interplay between decoding and linguistic comprehension. Decoding allows readers to translate printed words into their spoken equivalents, while linguistic comprehension enables them to make sense of these words within a broader context of spoken language. If either process is absent or impaired, reading comprehension will falter, even if decoding is flawless (Nation, 2019). Given that the goal of screening is to identify children in need of specialized instructional attention, evaluating the effectiveness of an SVR-based screening tool is invaluable (Poulsen, 2018).

This SVR-based psycholinguistic screening test is a valuable tool for identifying potential language and cognitive challenges in children. Its primary purpose is early detection and intervention, aiming to pinpoint areas where individuals may require additional support in their language and reading development, ultimately contributing to improved reading and overall language proficiency.

While early diagnosis and intervention are crucial, this study targets grade six students to fill a gap in current practices. In the Sri Lankan education system, Grade 6 marks the onset of junior secondary education for students typically aged 11. The curriculum emphasises achieving reading fluency by grades 2-4 (ages 7-9), with primary class teachers focusing on early reading development activities during these formative years.

However, attention shifts in grade four towards preparing students for the Grade 5 scholarship exam, which they take in Grade5. This exam becomes a priority, leading teachers to prioritise training students to pass it. As the saying goes, ‘’the rich get richer, the poor get poorer’,’ students who have developed strong reading skills tend to excel not only in reading but also in other academic areas. Conversely, poor readers

may fall behind in class due to their lack of reading ability, resulting in lower academic performance.

After the grade five scholarship exam, there is often no specific focus on improving reading fluency. Since struggling readers are often left behind in primary classes, they are promoted to Grade 6 without adequate support. Therefore, the Psycho-linguistic Screening Test (PST) was developed to identify poor readers and implement remedial programs to enhance their reading skills.

Most current screening tools target younger children, often neglecting older students who may still struggle with reading. Screening at Grade 6 is significant because it coincides with a crucial academic transition where reading demands increase. Identifying and supporting students at this stage can prevent further academic difficulties and provide timely interventions that complement early screening efforts.

Additionally, reading development in Tamil presents unique challenges and features that differ from those in other languages. Tamil, a Dravidian language, has an alphasyllabary script where each character represents a syllable rather than a single phoneme. This orthographic complexity can influence the development of decoding skills. Additionally, Tamil's diglossic nature, with distinct literary and colloquial forms, can impact language comprehension. Recent research by Verhoeven and Perfetti (2020) on cross-language reading highlights the importance of understanding these orthographic and linguistic particularities. Comparing Tamil with other orthographies helps to contextualise the specific challenges faced by Tamil-speaking children and underscores the need for tailored screening tools.

## Research problem

Sri Lanka currently lacks a comprehensive national program dedicated to identifying and addressing reading difficulties among its students, with a particular gap in understanding and managing specific learning disorders like dyslexia (Hettiarachchi, 2021). This deficiency is exacerbated by limited awareness among healthcare professionals, preschool educators, and primary school teachers, resulting in delayed identification of struggling students (Kasturiarachchi, 2020). Shockingly, a significant

portion of educators lack a clear understanding of dyslexia, contributing to the late identification of students facing reading challenges (Indrarathne, 2019).

Recognizing the urgent need for a screening tool that can be used in both Sinhala and Tamil languages, Hettiaarachi *et al*. (2018) recommended its development and validation. This tool would facilitate early identification and treatment of reading difficulties, raising awareness among healthcare workers and teachers. While Kariyawasam *et al*. (2019) made efforts to screen children with specific learning disabilities and provide interventions through a mobile game, their studies were limited to children aged six and seven, and their long-term effectiveness remains uncertain. Furthermore, existing screening tests in Sri Lanka primarily target Sinhala-speaking children, leaving a significant gap in identifying and assisting poor readers, particularly among Tamil-speaking children. The absence of research-based instruments for identification and intervention poses a substantial challenge.

In light of these circumstances, the development and validation of a culturally and linguistically adapted psycholinguistic screening test tailored to local settings become imperative. Such a test has the potential to accurately identify children facing reading difficulties, particularly among junior secondary Tamil-speaking students, and guide effective reading instruction practices in Sri Lanka.

## Aim of the study

The aim of this study is to develop and validate a culturally and linguistically adapted psycholinguistic screening test designed specifically for junior secondary students in Sri Lanka who speak Tamil and struggle with reading. The objectives are to develop a psycholinguistic screening test to identify the reading level of the junior secondary Tamil children with reading difficulties, and to validate the psycholinguistic screening test.

## Hypothesis

The newly developed screening test will effectively differentiate between Grade 6 students with and without reading difficulties.

## Methodology

This pilot study aims to evaluate the Psycholinguistic Screening Test (PST) for junior secondary Tamil-speaking students in Sri Lanka who experience reading difficulties. The sample includes 78 Grade 6 students from schools in the Puttalam South Educational Division, aged 11 years, with five years of formal primary education. These students, identified by their teachers as having reading difficulties, are low-achieving students who had taken the Grade 5 scholarship exam. In Sri Lanka, Grade 6 students are focused due to early reading instruction in primary classes and preparation for the Grade 5 scholarship exam. After this, they're promoted to junior secondary school, where they learn 12 subjects, including languages, science, mathematics, and social sciences, but not reading. Some schools provide unstructured remedial programs to address this gap.

The sample size of 78 participants was due to practical constraints and the preliminary nature of the research. Despite this, the study provided valuable insights into the test's feasibility and initial validity. Future studies will involve larger samples to further validate the PST and ensure its robustness and generalizability.

The PST is designed specifically for Grade 6 students due to their unique developmental and educational characteristics. At this stage, students are transitioning from learning to read to reading to learn, with increased reading demands. Early identification of reading difficulties at this grade can prevent further academic challenges and facilitate timely interventions. While the current focus is on sixth graders, future research will involve comparative analysis to validate these findings and refine the test for different grade levels.

The primary instrument used in this study is the Psycholinguistic Screening Test (PST), developed based on the Simple View of Reading (SVR) theoretical framework. The PST is a criterion-based test is designed to measure a student's performance against a set of specific skills of decoding and linguistic comprehension. The PST assesses various dimensions critical for reading proficiency, including phonological awareness, sound-symbol association, syllable knowledge, word morphology, word syntax, semantic skills, and reading comprehension.

The PST was developed based on the Simple View of Reading (SVR) theoretical framework. It is a criterion-based test designed to measure specific skills in decoding and linguistic comprehension. The development process involved consultation with a panel of experts in reading development and language assessment to ensure the test items were culturally and linguistically appropriate for Tamil-speaking students in Sri Lanka.

The PST is subjected to evaluation by a panel of experts consisting of professionals in special education, and language assessment. Each expert assesses the PST items based on criteria such as grammar, clarity, spelling accuracy, appropriateness of content, format, and difficulty level. To assess the internal consistency of the PST, Cronbach's alpha was calculated. The correlation value of +.958 indicates good internal consistency of the PST at $p<0.5$. The Item-Level Face Validity Index (I-FVI) is calculated to determine the level of agreement among raters. Content validity is assessed through expert judgment to ensure that the PST adequately measures the intended dimensions of reading proficiency. A Content Validity Index (I-CVI) is computed for each item to assess the degree of agreement among the panel of experts.

To establish test-retest reliability, the PST was administered to a subgroup of participants on two occasions, with a two-week interval between tests. Pearson's correlation coefficient (r) was calculated to determine the stability of the test over time. SPSS version 28 was used for data analysis. Descriptive statistics summarized participant characteristics, while inferential statistics examined the relationships between variables. Item-level reliability data were presented to highlight the consistency of individual test items. The study adhered to ethical guidelines, including obtaining informed consent from participants and ensuring the confidentiality and anonymity of their data. Moreover, institutional ethical clearance also obtained.

The study strictly followed ethical guidelines to ensure the protection and well-being of participants. Informed consent was obtained from all participants, including parental consent for children, ensuring that they fully understood the purpose, procedures, and potential risks of the study. Additionally, the confidentiality and anonymity of participants' data were safeguarded, with all personal information securely stored and

accessible only to authorized researchers. Institutional ethical clearance was secured prior to conducting the research.

To further strengthen ethical compliance, child assent was also obtained, ensuring that the children willingly participated in the study. Participants were informed of their right to withdraw from the study at any time without penalty, and procedures were in place to honor this right.

These ethical standards were carefully adapted to the Sri Lankan context by considering cultural sensitivities, linguistic diversity, and community expectations. Special care was taken to explain the study's purpose and procedures in the participants' native language to ensure comprehension. Culturally appropriate methods were used to build trust with parents, teachers, and children, fostering a supportive environment for ethical research practices.

## Results

### *Development of the Psycholinguistic Screening Test*

Diagnostic tests are designed to identify particular strengths, weaknesses, and problems in the aspect with which they are concerned (Cohen *et al*., 2018). Tests can be used to compare a student to whether s/he has achieved a particular fixed criterion or not. Psycholinguistic methods are especially useful for studying the cognitive processes of language learning and use, from phonetics and phonology to discourse-level pragmatics (Grey and Tagarelli, 2018). The PST is developed with the Simple View of Reading theoretical background to identify the reading level of children with reading difficulties in junior secondary levels.

The SVR-based psycho-linguistic skills, as evaluated by the existing PST, encompass a comprehensive range of abilities that are crucial for reading proficiency and overall language development. This assessment targets clusters of skills associated with the mastery of reading. The test is meticulously designed to assess an individual's linguistic and cognitive capacities, particularly in the context of language and reading. It delves into various critical dimensions, including:

*Phonological Awareness**:*** This skill involves the ability to recognize and manipulate the individual sounds (phonemes) within words. It's essential for decoding words and understanding their phonetic structure.

*Sound-Symbol Association**:*** Assessments in this area focus on the connection between spoken sounds and written symbols (letters or graphemes), which is fundamental for effective reading and word recognition.

*Syllable Knowledge**:*** Syllables are the building blocks of words, and understanding syllable structure aids in word decoding and pronunciation.

*Word Morphology:* Morphology pertains to the structure and formation of words. Evaluations in this domain examine an individual's grasp of word roots, prefixes, and suffixes, which play a vital role in vocabulary development.

*Word Syntax:* Word syntax involves the rules governing word order and sentence structure within a language. Proficiency in this area contributes to sentence comprehension and construction.

*Semantic Skills:* Semantic skills encompass an individual's ability to comprehend word meanings, understand word relationships, and interpret the overall meaning of texts.

*Reading Comprehension Skills:* The ability to understand and extract meaning from written text is central to reading comprehension. This skill evaluates an individual's capacity to comprehend and interpret written material.

As the study primarily focused on Tamil children, the test paper is prepared in Tamil in eight pages with 40 items. 1-30 questions were structured with selective-type-multiple-choice questions and 30-40 were structured with probing questions to assess reading skills. Questions 1- 6 based on phonemic and phonological awareness, 7-12 sound-symbol association, 13-16 syllable knowledge, 17-23 morphology of words, 24-26 syntax, 27-30 semantic skills, and 30-40 reading comprehension skills. Please refer to Appendix A for the Psycho-linguistic Screening Test. Much of the text is in Tamil script, but hopefully the reader will be able to see the format of the test. Table 1 shows the SVR based psycho-linguistic screening test.

| Questions | Skills assessed | Question type |
|---|---|---|
| 1 - 6 | Phonemic and phonological awareness | Selective type- MCQ |
| 7 - 12 | Sound-symbol association | Selective type- MCQ |
| 13 - 16 | Syllable knowledge | Selective type- MCQ |
| 17 - 23 | Morphology of words | Selective type- MCQ |
| 24 - 26 | Syntax | Selective type- MCQ |
| 27 - 30 | Semantic skills | Selective type- MCQ |
| 30 - 40 | Reading comprehension and writing ability | Probing questions |

*Table 1: VR-based psycho-linguistic screening test*

## *Validation of the Psycholinguistic Screening Test*

The PST has undergone a validation process following its development which includes assessments for both face validity and content validity. Subsequently, the test was piloted during a two-week remedy teaching intervention, serving as both a pre-test and a post-test to evaluate its effectiveness.

Face validity and content validity of the test were assessed by a panel of experts consisting of professionals in special education and Tamil language teaching (N=5). A face validity checklist consisting of 10 questions with binary (yes or no) responses was utilised. These questions pertained to various aspects of the test, including the appropriateness of grammar, clarity of items, spelling accuracy, sentence structure, font size, and spacing, legibility of printouts, adequacy of instructions provided, format, difficulty level, and reasonableness of test items. Please refer to Appendix B for the detailed face validity checklist. Based on these ratings, necessary modifications and restructuring of the questionnaire were carried out.

$$\text{I-FVI} = \frac{\text{(agreed item) / (number of experts)}}{\text{No agreed raters per question}}{\text{Total number of raters per question}}$$

Content validity was assessed by consulting experts in the fields of special education and Tamil language teaching to confirm that the reading skills addressed in the test align with the desired objectives. The expert panel utilised a 12-item Likert rating scale, accompanied by a section for suggestions. This comprehensive evaluation aimed to

ascertain the alignment of the test questions with the skills being assessed, relevance to the field, appropriateness of content, depth of coverage, construct stability, clarity, absence of contradictions, optimal length, cultural suitability, layout or format, extent of variation, allotted answer time, and the ability to sustain participants' interest. Please refer to Appendix C for the detailed content validation rating scale.

The ratings were compiled using MS Excel to compute the Content Validity Index (CVI). The CVI is determined by considering the number of experts (N=5) who provided ratings ranging from ‘strongly disagree’ to ‘strongly agree’ for each item, divided by the total number of experts. Items that achieved a CVI value of at least 0.80 were retained in the questionnaire, while numerical values for non-essential items were removed.

Following the completion of face and content validation, a pilot study was carried out using the Psycholinguistic Screening Test. The study involved 18 low-achieving students who had taken the Grade 5 scholarship examination in 2022 and were attending junior secondary schools in the Tamil medium schools within the Puttalam South Education Division. The two-week remedial teaching intervention commenced with the administration of a pre-test, which took place one day before the start of the pilot intervention. Subsequently, a post-test was administered immediately upon the conclusion of the pilot intervention.

The test-retest method is employed to ensure the reliability of results obtained from the psycholinguistic screening test. This method involves administering the test to the same group of participants on multiple occasions to evaluate the extent of score changes over time (Kurtz, 2017). Test-retest reliability serves as a means to gauge the degree to which a measurement method remains consistent across different time points. Smaller differences between the two sets of results indicate higher test-retest reliability, as noted by Middleton (2023).

To analyse the data, the scores from both the pre-test and post-test were collected and computed using SPSS version 28. Additionally, the internal consistency of the pre-test and post-test scores was assessed, and the reliability correlation coefficient was determined using Pearson's two-tailed correlation coefficient. The Cronbach's

alpha correlation coefficient value of +.80 or greater at p<0.5 was considered the reliable item.

## *Face validity of Psycholinguistic Screening Test*

The expert ratings for the face validity of the psycholinguistic screening test were calculated using MS Excel. Table 2 shows the face validity expert ratings on the psycholinguistic screening test items, as well as the calculation of the Item Face Validity Index (I-FVI). The I-FVI is a measure of the proportion of agreement among the expert raters on the relevance of each item.

| | Expert 1 | Expert 2 | Expert 3 | Expert 4 | Expert 5 | Number of Agreement | Item FVI |
|---|---|---|---|---|---|---|---|
| Item 1 | 1 | 1 | 1 | 1 | 1 | 5 | 1.00 |
| Item 2 | 1 | 1 | 1 | 1 | 1 | 5 | 1.00 |
| Item 3 | 0 | 1 | 1 | 1 | 1 | 4 | 0.80 |
| Item 4 | 0 | 1 | 1 | 1 | 1 | 4 | 0.80 |
| Item 5 | 1 | 1 | 1 | 1 | 1 | 5 | 1.00 |
| Item 6 | 1 | 0 | 1 | 1 | 1 | 4 | 0.80 |
| Item 7 | 1 | 1 | 0 | 1 | 1 | 4 | 0.80 |
| Item 8 | 1 | 1 | 1 | 0 | 1 | 4 | 0.80 |
| Item 9 | 1 | 1 | 1 | 1 | 0 | 4 | 0.80 |
| Item 10 | 1 | 1 | 1 | 1 | 1 | 5 | 1.00 |
| Proportion Relevant | 0.8 | 0.9 | 0.9 | 0.9 | 0.9 | | 0.88 |

*Table 2: Face validity expert rating on the psycholinguistic screening test*

I-FVI = (agreed item) / (number of raters)

$$= \frac{44}{50}$$

$$= 0.88$$

Based on the above calculation the researcher concludes that the I-FVI scores for all the items judged by all raters 0.88 meet a satisfactory level and the psycholinguistic screening test has achieved a satisfactory level of face validity.

### *Content validity of Psycholinguistic Screening Test*

The Psycholinguistic Screening Test was checked for content validity with five experts' ratings. Table 3 shows the experts' ratings on the items.

| | Expert 1 | Expert 2 | Expert 3 | Expert 4 | Expert 5 | Number Of Agreement | Item CVI |
|---|---|---|---|---|---|---|---|
| Item 1 | 5 | 4 | 4 | 5 | 4 | 22 | 0.88 |
| Item 2 | 5 | 4 | 4 | 4 | 4 | 21 | 0.84 |
| Item 3 | 4 | 4 | 5 | 5 | 4 | 22 | 0.88 |
| Item 4 | 5 | 4 | 4 | 4 | 4 | 21 | 0.84 |
| Item 5 | 5 | 4 | 4 | 3 | 5 | 21 | 0.84 |
| Item 6 | 5 | 5 | 4 | 5 | 4 | 23 | 0.92 |
| Item 7 | 5 | 4 | 5 | 5 | 4 | 23 | 0.92 |
| Item 8 | 5 | 4 | 4 | 4 | 5 | 22 | 0.88 |
| Item 9 | 5 | 4 | 5 | 5 | 4 | 23 | 0.92 |
| Item 10 | 5 | 4 | 4 | 5 | 5 | 23 | 0.92 |
| Item 11 | 5 | 5 | 5 | 5 | 5 | 25 | 1.00 |
| Item 12 | 5 | 5 | 4 | 5 | 4 | 23 | 0.92 |
| Proportion Relevant | 0.98 | 0.85 | 0.86 | 0.91 | 0.86 | 269 | 0.89 |

*Table 3: The experts' ratings on the items of content validity for the psycholinguistic screening test*

I-CVI = (agreed item) / (number of raters)

$$= \frac{269}{300}$$

$$= 0.89$$

Following the aforementioned calculation, it can be deduced that the I-CVI scores, which reached a consensus of 0.89 for all items as assessed by every rater, indicate a commendable level of content validity. Consequently, the psycholinguistic screening test successfully attained a satisfactory degree of content validity.

## *Test-retest reliability of Psycholinguistic Screening Test*

To ensure the internal consistency of the pre-test and post-test scores obtained in the pilot study, the researcher looked at test-retest reliability. The reliability correlation coefficient of the two sets of marks was calculated using Pearson's two-tailed

correlation coefficient. The test-retest reliability of the pre-test and post-test scores obtained in the pilot study is displayed in Tables 4 and 5.

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Pre-test | 33.0897 | 14.56039 | 78 |
| Post-test | 39.1026 | 14.57501 | 78 |

*Table 4: The descriptive statistics of the pre-test and post-test marks obtained in the pilot study*

The descriptive statistics of the pre-test and post-test results are shown in Table 4. The post-test score (M=39.1, SD=14.5) is higher than the pre-test score (M=33.0, SD=14.5). Furthermore, the test-retest reliability of the Pearson 2-tailed correlations coefficient is shown in Table 5.

| | | Pre-test | Post-test |
|---|---|---|---|
| Pre-test | Pearson Correlation | 1 | .919** |
| | Sig. (2-tailed) | | .000 |
| | N | 78 | 78 |
| Post-test | Pearson Correlation | .919** | 1 |
| | Sig. (2-tailed) | | .000 |
| | N | 78 | 78 |

*Table 5: The correlation of the pre-test and post-test marks obtained in the pilot study*

Referring to Table 5, the correlation analysis between pre-test and post-test scores reveals a strong and statistically significant positive correlation of r = 0.919 ($p < .01$, 2-tailed) between the two measures. This indicates a robust relationship between participants' performance on the pre-test and post-test assessments. The correlation coefficient of 0.919 suggests a very high degree of association, implying that individuals who scored higher on the pre-test tended to also score higher on the post-test, and vice versa. With a sample size of 78 participants for both measures, these findings provide compelling evidence of the stability and consistency of individual performance across the two testing occasions.

In conclusion, the psycholinguistic screening test demonstrates favourable face validity, as indicated by a high I-FVI score of 0.88, signifying strong agreement among raters. Similarly, the content validity, gauged through I-CVI scores of 0.89 for all items across raters, underscores its robust validity. The test-retest reliability analysis reveals an improvement in scores from pre-test (M=33.0, SD=14.5) to post-test (M=39.1,

SD=14.5). Furthermore, the correlation analysis between pre-test and post-test scores reveals a strong and statistically significant positive correlation of $r = 0.919$ ($p < .01$, 2-tailed) between the two measures. Given the promising validity and reliability demonstrated by the psycholinguistic screening test, we accept the hypothesis (H01) that the newly developed screening test effectively distinguishes between grade six students with and without reading difficulties.

## Conclusion

This study underscores the urgent need for early detection and intervention in addressing reading difficulties, particularly within the Sri Lankan educational landscape. With the absence of a comprehensive national programme and limited awareness among educators regarding specific learning disorders like dyslexia, timely identification of struggling students is hindered. Hence, the development and validation of a culturally and linguistically tailored psycholinguistic screening test become paramount.

This study highlights the relevance of the Simple View of Reading theory as a framework for comprehending reading difficulties, stressing the significance of both decoding and linguistic comprehension in reading proficiency. Grounded in this theory, the newly devised psycholinguistic screening test evaluates a spectrum of crucial skills associated with reading, offering a comprehensive assessment tool.

The test exhibits robust face and content validity, evident in its high I-FVI and I-CVI scores. Moreover, the test-retest reliability analysis indicates an improvement in scores from pre-test to post-test. Additionally, a strong positive correlation between pre-test and post-test scores further validates the test's consistency over time.

Overall, the psycholinguistic screening test shows promise in effectively distinguishing between Grade 6 students with and without reading difficulties, aligning with the accepted hypothesis. In essence, it represents a valuable resource for identifying reading challenges among junior secondary Tamil-speaking students in Sri Lanka. Its development and validation mark a significant stride toward addressing the critical need for early intervention and support within the education system, ultimately fostering enhanced reading proficiency and language skills among struggling learners.

## Practical implications for Sri Lankan education and future directions

The development and validation of the Psycholinguistic Screening Test tailored to junior secondary Tamil-speaking children in Sri Lanka facing reading difficulties hold significant practical implications for Sri Lankan education. This tool addresses a crucial gap in the educational landscape and can pave the way for more effective reading interventions and support systems. This study provides some practical implications and future directions as follows

The Psycholinguistic Screening Test enables early identification of students with reading difficulties. This is critical because early intervention is often more effective in addressing these challenges. Schools and educators can use this tool to pinpoint struggling students and provide them with targeted support.

Once students with reading difficulties are identified, educators can tailor their instruction to meet the specific needs of these students. This could involve specialised reading programmes, additional resources, or one-on-one tutoring to address their weaknesses in phonological awareness, sound-symbol association, syllable knowledge, word morphology, syntax, semantics, and reading comprehension.

The study is adaptable for various age groups, making it a versatile educational resource. For younger students, it uses games, animations, and visual aids to boost engagement. Older students benefit from critical thinking exercises and advanced tasks tailored to their cognitive levels. Practical applications include teaching foundational literacy in primary grades through interactive word games, facilitating discussions and projects at junior levels, and implementing flipped classroom models for senior classes. Teacher-training workshops focus on integrating the tool into curricula, addressing diverse learning needs, and fostering inclusive environments, ensuring its full educational potential is realised.

The introduction of this screening test can also help raise awareness among educators and healthcare professionals in Sri Lanka about the existence and nature of reading difficulties, including dyslexia. Training programmes can be developed to equip teachers and healthcare workers with the knowledge and skills to identify and

support students with reading challenges. The test can contribute to making education in Sri Lanka more inclusive. By identifying students who may require additional support, schools can work towards accommodating their needs and ensuring that every child has an equal opportunity to succeed in their education.

The development of this screening test opens avenues for further research and development. Continuous refinement and validation of the test can lead to improvements in its accuracy and effectiveness. Additionally, research can explore the long-term impact of interventions guided by the test results. Given Sri Lanka's linguistic diversity, efforts should be made to adapt and translate the screening test into other languages spoken in the country, such as Sinhala, to ensure that it can be used effectively across different regions.

The government and educational authorities in Sri Lanka should consider integrating this screening tool into their educational policies and initiatives. This would require a commitment to allocate resources for training, dissemination, and implementation at the national level. Parents play a crucial role in supporting their children's reading development. Schools can use the results from this test to engage parents and provide them with guidance on how to support their children's literacy skills at home.

To assess the long-term impact of interventions guided by the screening test, longitudinal studies can be conducted to track the progress of identified students as they move through their educational journey. Collaboration between educational institutions, government agencies, NGOs, and researchers is essential for the successful implementation of the screening test and related interventions. Partnerships can help in resource-sharing, training, and advocacy efforts.

In conclusion, the development and validation of the Psycholinguistic Screening Test offer a significant step forward in addressing reading difficulties among junior secondary Tamil-speaking students in Sri Lanka. By identifying these difficulties early and providing targeted interventions, Sri Lanka can work towards a more inclusive and equitable education system, ensuring that all students have the opportunity to develop strong reading skills and succeed academically. However, it is crucial to continue refining and expanding the use of this tool to maximize its impact on the educational landscape of Sri Lanka.

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