

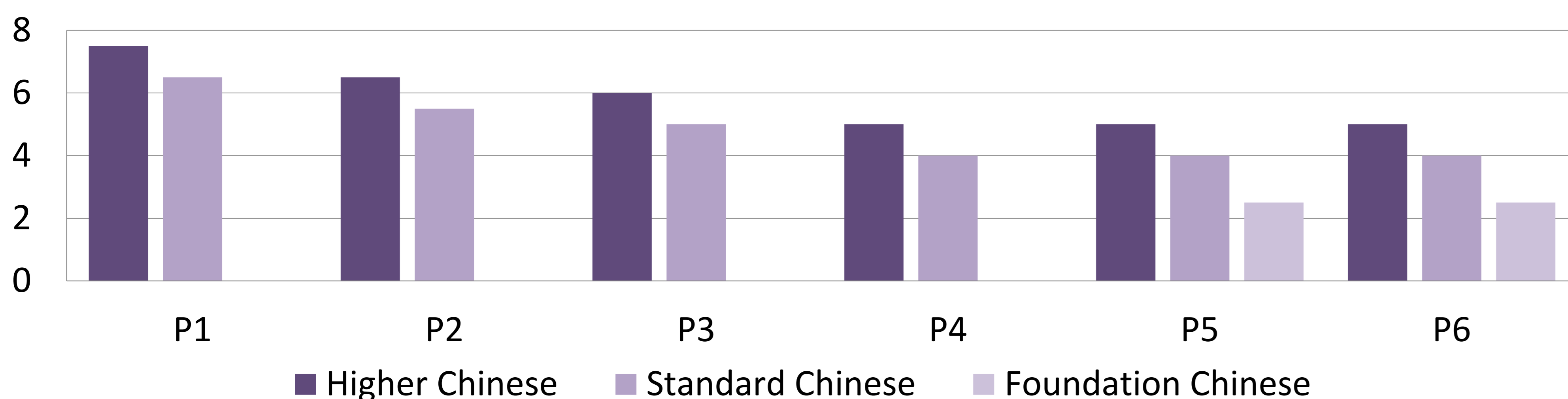
## ABSTRACT

The study is a follow-up from the previous research “Dyslexia and the Chinese Language in Singapore” presented at the IDA Conference in 2013. In its attempt to develop a remediation programme that caters to the unique difficulties children with dyslexia face in Singapore, the DAS Chinese Project Team has put in much research and development effort to have better understanding of how our students learn Chinese as a second language. The DAS Chinese remediation programme was rolled out in the beginning of 2013, based on the findings of the previous research in 2011. The current phase of research is to evaluate the effectiveness of this programme, using the revised Battery of Chinese Literacy Tests developed for the previous phase in 2011. Findings of this evaluation study have shown significant improvements in overall Chinese literacy skills, especially in the areas of orthographic awareness, reading and morphological awareness.

## INTRODUCTION

Singapore’s bilingual education policy has placed many of our Chinese children in a very unique environment in learning at least two languages of different orthographies and sound-symbol mapping systems. Singaporean Chinese students learn English as the first language and Chinese as the second language. The number of hours to learn Chinese language in schools decreases as children progress to upper primary levels.

Teaching Hours for Chinese language in School per Week



Some children with dyslexia struggle with Chinese language and need support to cope with the subject in school. However, there has been no widely accepted theory or intervention for dyslexia in Chinese language.

## RESEARCH STUDY (2010-2011)

The interest to help our children with dyslexia to achieve has resulted in research efforts at the DAS since 2009. Our previously concluded research study on 26 ‘low-risk’ Mainstream students (mean age = 9.85 years, S.D. = 0.29 years) and ‘at-risk’ DAS students (mean age = 9.84 years, S.D. = 0.43 years) was conducted to identify difficulties that are unique to dyslexia in learning Chinese language.

**Visual memory** was found to be the only visual perceptual skill that underlies the learning of Chinese characters, which is also found to be relatively weaker in dyslexia based on the performance on the visual perceptual skills by the ‘at-risk’ DAS students. Literacy skills that involve metalinguistic processes such as **visual-orthographic skills**, **morphological awareness** and **visual-motor integration skills**, are the observed differences with regards to ‘risk of dyslexia’ in Chinese language acquisition. Findings from this study brought about the development of remediation programme in 2012 that caters to the needs of students with dyslexia.

## DAS CHINESE REMEDIATION PROGRAMME

Based on the findings yielded from previous study, the remediation programme was developed focusing on four main areas:

Orthographic Understanding	Oracy (Thematic-based)
a) Shapes and structures of Chinese characters b) Radical positions 	
Strokes and Stroke Patterns	Morphological Awareness
	To build vocabulary network 

While the programme does not follow the school's curriculum, the coverage of the vocabulary used is based on the Ministry of Education (MOE) Primary School syllabus for Chinese (2007).

## PURPOSE AND RATIONALE

Over 50 primary school students with dyslexia were enrolled in the programme since it started in the beginning of 2013. Because the remediation programme was developed based on the findings of the previous research, there is a need for more accumulated evidence to ensure effectiveness of intervention. Hence, the Battery of Chinese literacy tests developed in the previous research phase was revised and utilised for pre- and post- assessments.

REVISED BATTERY OF CHINESE LITERACY TESTS	Components Assessed
<b>1. Chinese Character Orthographic Awareness</b> 	

# for Children with Dyslexia in Singapore

By: Priscillia Shen . Liu Yimei . Kong Yun Rui

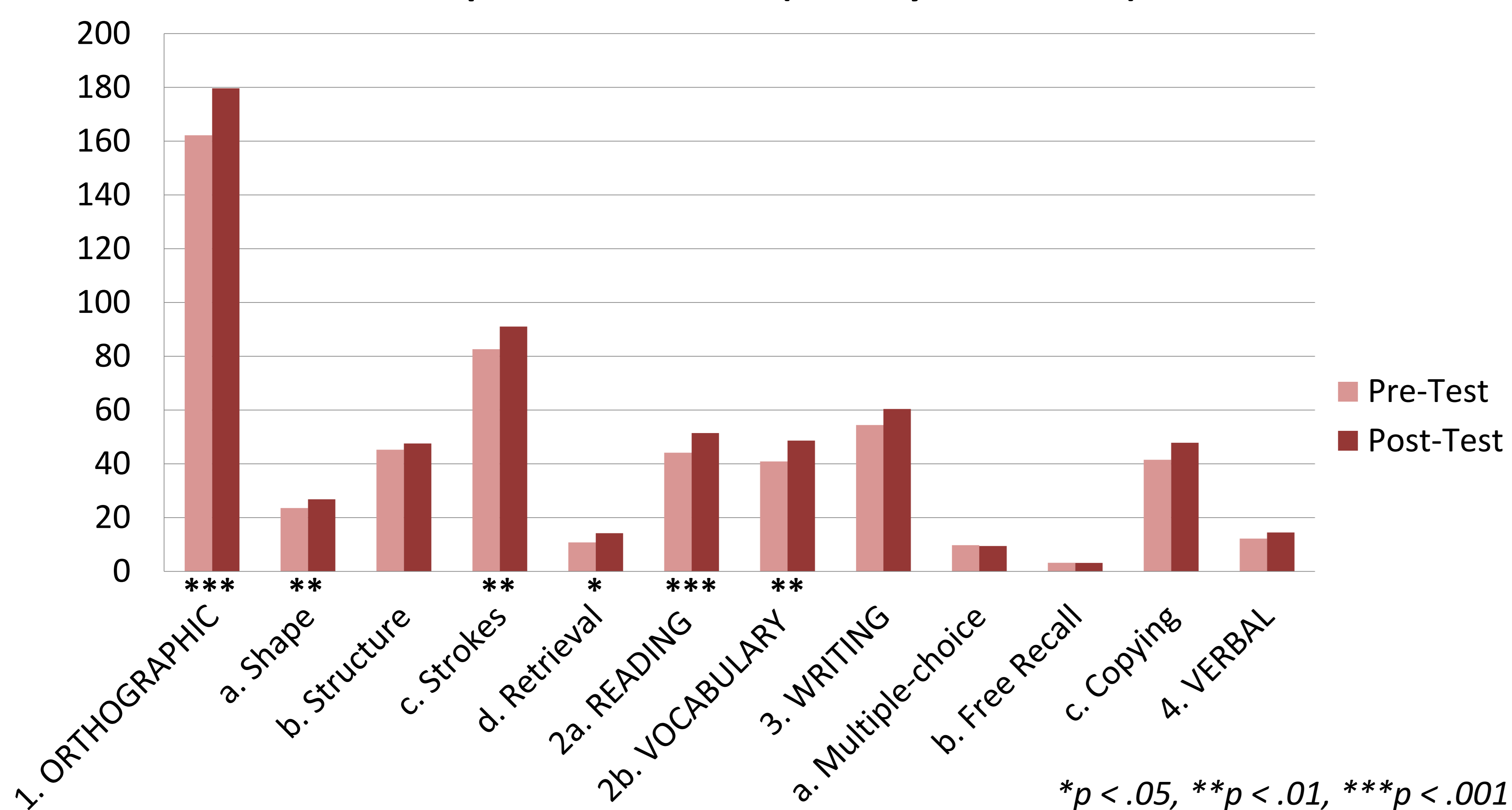
## PARTICIPANTS

16 students (4 girls & 12 boys, Primary 1 to 6) participated in this study. Mean Pre-Test age is 8.90 years (s.d. = 1.15) and mean Post-Test age is 9.71 years (s.d. = 1.13). Mean intervention period is 8.19 months (s.d. = 0.98).

## FINDINGS

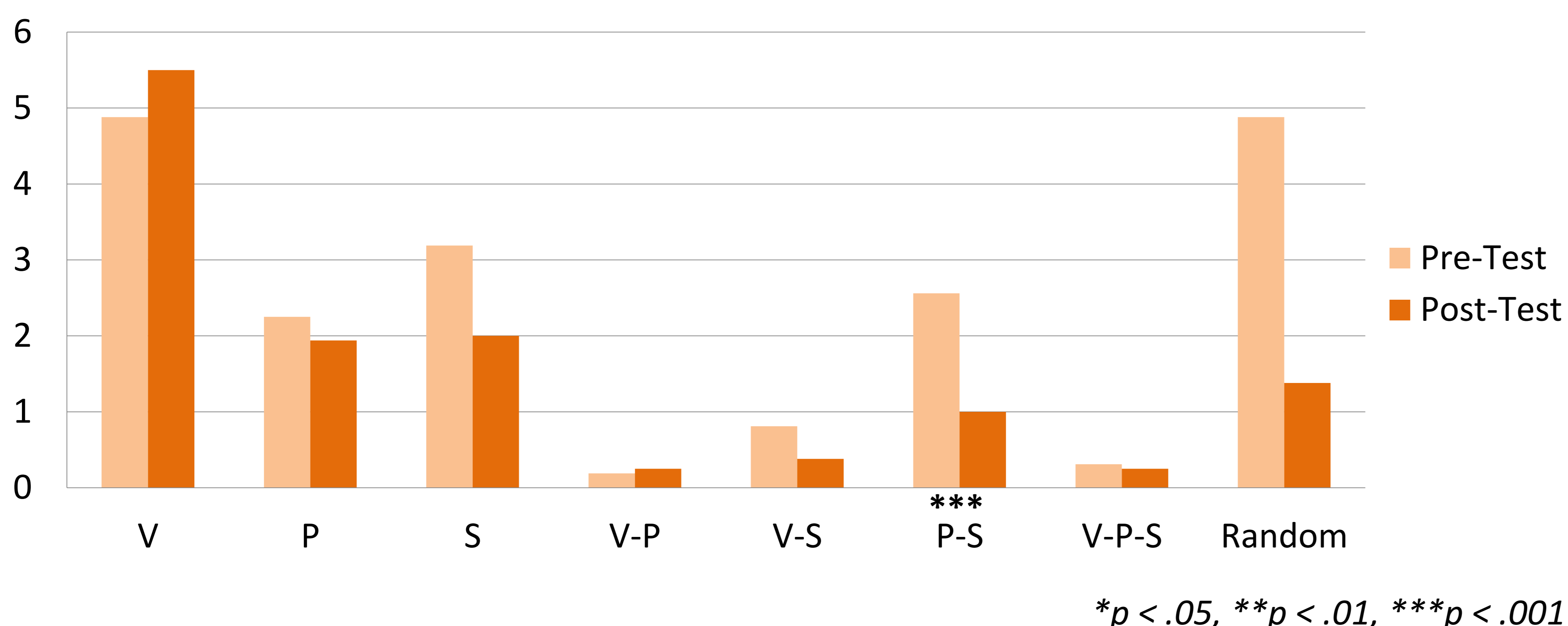
Significant difference in overall Chinese Literacy scores between Pre-Test (mean = 313.81, s.d. = 91.37) and Post-Test (mean = 354.5, s.d. = 93.35),  $t(15) = -5.106, p < .001$ . This shows that the students' Chinese literacy skills improved significantly after intervention.

Comparison of Means (Literacy Test Scores)



Although the mean number of reading errors in Post-Test was comparatively less than those in Pre-Test, only the Phonetic-Semantic Error showed a significant difference,  $t(15) = 4.155, p < .001$ . This shows that after intervention, students are not easily confused with semantically related characters and mispronounce them. This error was quite commonly observed in our students due to less exposure to use of Chinese language.

Comparison of Means (Reading Errors)



## Types of Reading Error

### Visual error (V):

永 → 水; 漂 → 標

### Semantic error (S):

然 → 虽 (虽然)

### Visual-Semantic confusion (V-S):

淳 → 享 → 受 (享受)

### Visual-phonetic-semantic confusion (V-S-P):

揉 → 柔 → 软 (柔软) → /luǎn/

### Phonetic error (P):

永 → /yòng/; 乱 → /ruàn/; 標 → /bāo/;  
包 → /biāo/

### Visual-Phonetic confusion (V-P):

淳 → 亨 → /héng/

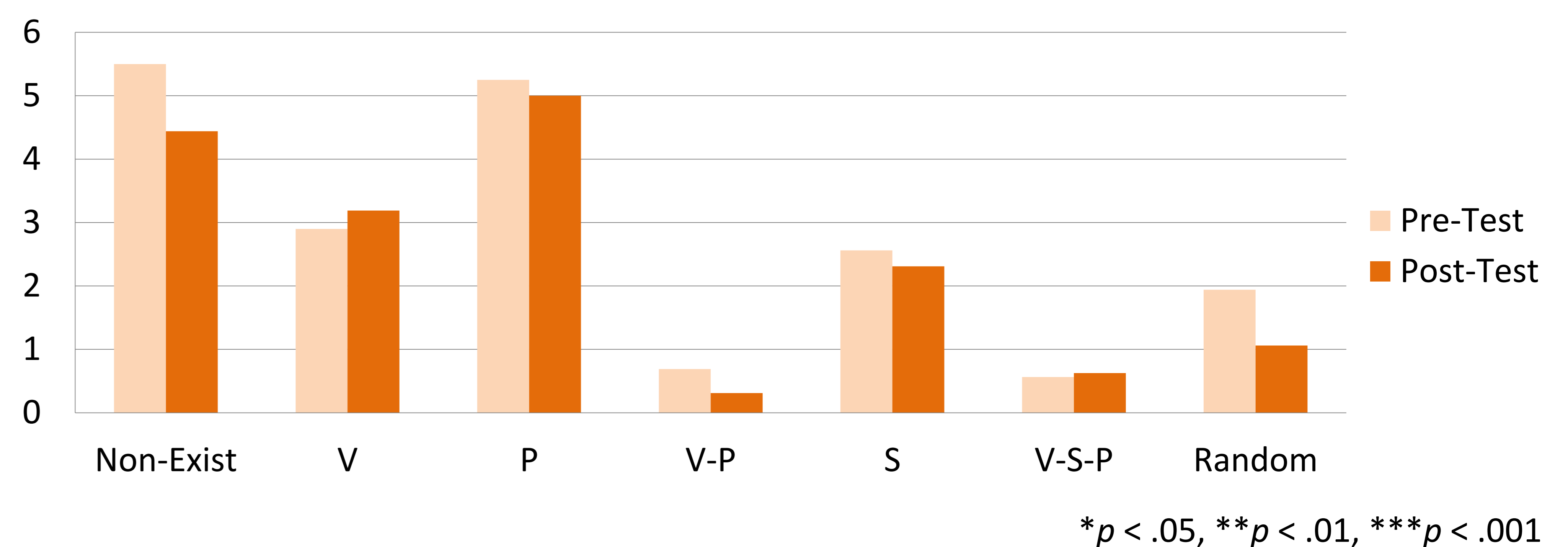
### Phonetic-Semantic confusion (P-S):

享 → 受 (享受) → /shǒu/

### Random error

Although the mean number of spelling/writing errors in Post-Test was comparatively less than those in Pre-Test, none of the differences were found to be statistically significant.

Comparison of Means (Spelling/Writing Errors)



## Types of Spelling/Writing Error

### Non-existent character

明 → 明;  
想 → 想;  
鲜 → 鲜

### Incorrect character

Visual error (V): 本 → 木; 情 → 请;  
Phonetic error (P): 图 → 土; 难 → 男;  
Semantic error (S): 姓 → 名 (姓名)

### Random error

Visual-Phonetic confusion (V-P): 钟 → 中;  
Visual-Semantic-Phonetic confusion (V-S-P): 馆 → 饭 (饭馆)

## CONCLUSION AND IMPLICATIONS

Students have gained better awareness of how characters are formed through strokes and stroke patterns, which may also have helped them in learning and remembering unfamiliar characters better. They are also able to recognise more Chinese characters and construct meaning. Greater sample size may yield stronger results, as there was observed improvement in mean scores but not significant enough. Although parents' informal feedback reported improvements in their children's interest in learning and confidence in verbal expressiveness, students' views have not been reflected or captured in this evaluation study. It would be vital that we gather such information to evaluate further if the objectives of remediation programme are successfully met. Remediation support should also look into enhancing the spelling component, other literacy skills such as comprehension skills and composition writing, and strategies to prepare students to cope with Chinese language examination papers.

## REFERENCE

Shen, P. P., Liu, Y., Kong, Y. R., See, L. Y., & Sha, L. (2014). Chinese Language and Remediation Support for Children with Dyslexia in Singapore. *Asia Pacific Journal of Developmental Differences*, 1(2), 136-171.