

**National University of Singapore  
Division of Graduate Medical Studies**

**Master of Science (Speech & Language Pathology)**

**SLP 5116 RESEARCH PROJECT TITLES**

Student	Title of Project	Abstract
<b>Claudine Chua</b>	<i>A Speech and Language Screening Tool for 5-year-old Singaporean Children</i>	There are many well established language screening tests available internationally for pre-school children. However, these are not suitable for the Singapore population due to the heterogeneous development of language in this multilingual society and the vast differences that exist between the local variety of spoken English and Standard English. Also, the current language screening tool available in every child's health booklet, which is given at birth, is brief and does not provide a complete understanding of a child's language problems. This research project is thus undertaken to develop an instrument for screening speech, language and/or communication development in 4-5-year old Singaporean children. This screening checklist, named the Singapore Pre-School Language Screener (SPLS) was completed by 35 parents. A test of receptive vocabulary, the Bilingual Language Assessment Battery (BLAB) (Rickard-Liow, S., personal communication) was also administered to the children of these parents to allow comparison of the results of the SPLS and the BLAB. The results indicated that the SPLS has high reliability ( $\rho = 0.913$ ) and validity. The correlation between parental report on the SPLS and the child's performance on the BLAB was moderately positive ( $r = .485$ ) significant ( $p = 0.003$ ). As a reliable, user-friendly tool the SPLS shows good potential for facilitating fast, affordable and effective parental screening of 5 year old children for speech, language and communication impairment, in the absence currently of a similar alternative.
<b>Joyce Tan</b>	<i>Differentiating Subtypes of Developmental Dyslexia in Singapore: Spelling Test Battery</i>	A Spelling Test battery was developed to support the assessment of the subtypes of developmental dyslexia. This battery is based on a cognitive-linguistic model and comprises three spelling subtests (Regularity, Nonword and Homophone). 20 dyslexic children and 20 age-matched typically developing children (age range 9;1 to 11;11) participated in this study. It was hypothesized that psycholinguistic testing can provide insight into the profiles of the developmental dyslexia subtypes in the local context. Results showed that the test battery was able to differentiate children with dyslexia from the typically developing children and can be further fine-tuned to identify the three main subtypes (phonological, surface and mixed) within the dyslexic group. This battery has the potential to help Speech and Language therapists to plan for more effective remediation programmes.
<b>Ho Shuet Lian</b>	<i>Differentiating Subtypes of Developmental Dyslexia in Singapore: Reading Test Battery</i>	To differentiate different subtypes of developmental dyslexia, a battery of reading tests was developed and administered to 20 children (aged 9-11 years) who had been attending the Dyslexia Association of Singapore (DAS) for between 9 and 18 months. The design of the battery was based on the DRC cognitive model of visual word recognition (Coltheart, Rastle, Perry, Langdon & Ziegler, 2001), and comprised tasks that assessed the children's phonological, orthographic and semantic processing. The subtests included phonemic encoding and decoding, single word reading, letter search, real word recognition as well as homophone reading and definition. The results supported significant differences in the performance of the dyslexic and normal children on all the subtests in the experimental reading test battery with the exception of phonemic encoding and decoding subtests, and facilitated the classification of the dyslexic children into phonological, surface and mixed subtypes. Moreover, the battery revealed considerable heterogeneity in the processing problems amongst the dyslexic children that have important implications for the design of intervention programmes at DAS.

<b>Marilyn Ong</b>	<i>Determining Language Dominance in English-Mandarin Bilingual Preschoolers: A Parent Questionnaire</i>	<p>This study investigated how language dominance can be determined in English-Mandarin bilingual preschoolers. The aims of this study were (a) to test the reliability and accuracy of a parent-report classification tool for determining language dominance in bilingual children (b) to compare different criteria for interpreting ratings of frequency of language use so as to achieve an optimum outcome for determining language (c) to explore the relationships between the age of acquisition and the length of language exposure, with the self-reported ratings of language.</p> <p>Parents (N=83) of K1/K2 preschoolers completed a questionnaire on their children's language history. Each child completed a single word receptive vocabulary tests in both languages and an expressive language test.</p> <p>The results of a discriminant analysis revealed a reliable three-way classification of dominance (English, Mandarin and unclear dominance). The receptive and expressive language scores obtained on Bilingual Language Assessment Battery (BLAB) and the Singapore Expressive Action Picture Test (SEAPT) supported and validated these dominance classifications.</p>
<b>Ho Choy Ling</b>	<i>Adaptation of the CELF-P2<sup>UK</sup> Word Structure Subtest for Singaporean Preschoolers</i>	<p>Children in Singapore with suspected language disorders have been assessed mainly using formal assessment tools which have been developed and normed on a Standard English speaking population. However, as a result of the factors of Singapore Colloquial English and bilingualism, there are many differences between Standard English and the language in use in Singapore, specifically in morphology and syntax. It is therefore very likely that adaptations are needed before these assessment tools can be effectively used as a valid screener for language disorders in Singapore. To investigate the performance of Singaporean children on a commonly used assessment CELF- P2<sup>UK</sup> (Semel, Wiig, &amp; Secord, 2004), seventy preschoolers (aged 4;6-5;7) were assessed on three core subtests, Sentence Structure, Word Structure and Expressive Vocabulary. Results showed that typically developing Singaporean children tested on the CELF-P2<sup>UK</sup> performed below the published UK norms, but were subsequently able to improve their performance on an adapted version of the Word Structure subtest, adapted to take into account cultural and linguistic differences. Influences of other factors including age, gender and semantic development on grammatical development are also examined.</p>
<b>Cheryl Ho</b>	<i>Adaptation of the CELF-P2<sup>UK</sup> Sentence Structure Subtest for Singaporean Preschoolers</i>	<p>Bilingual children in Singapore acquire language under diverse sociolinguistic environments. Given the variability in language background in Singapore, the prevalent use of Singapore Colloquial English (SCE) and a lack of local normative data on standardized clinical assessment tools of English language development in Singapore for preschool children, this present study aimed to (1) collect normative data on the Core Language Scale (CLS) Subtests of the CELF-P2<sup>UK</sup> from typically-developing Kindergarten One (K1) preschool children (N= 70, mean age 4.97 years) that have been exposed to SCE and/or Singapore Standard English, and (2) assess the feasibility of an adapted version of the Sentence Structure (SS) subtest in the assessment of local K1 preschoolers. Normative data for K1 Singaporean children indicated lower mean scores across all three CELF-P2<sup>UK</sup> CLS subtests as compared to UK norms. The children also showed significantly better performance on the adapted than original SS subtest, suggesting that the adapted items reduced lexical, semantic and visual ambiguity associated with the original stimulus items. These results have clinical implications for Speech and Language therapists in Singapore in using the original CELF-P2<sup>UK</sup> subtests to assess and interpret the linguistic abilities of Singaporean K1 children with heterogeneous language backgrounds.</p>

<b>Holly Yau</b>	<i>Mandarin Articulation Test for Bilingual Singaporean Preschool Children</i>	<p>To date, most of the published data has been on the acquisition of Mandarin phonology of monolingual children. However, these data are not applicable in the Singapore context. There is some anecdotal evidence that suggests that the acquisition of Singapore Mandarin differs from that of Modern Standard Mandarin but this has not been explored empirically. An articulation and tone perception test was developed and 24 Singapore English-Chinese bilingual children, aged between 2;6 to 5;6, were assessed to investigate the ages of emergence and acquisition of Mandarin phonemes and lexical tones. Results showed that all Mandarin phonemes are relatively acquired by 4;6, whereas complex vowel production and tonal discrimination abilities are still incomplete.</p>
<b>Grace Gan</b>	<i>Adapting a Listening Comprehension Test for Singaporean Children</i>	<p>This study aimed to identify elements in a narrative subtest, known as the Understanding Spoken Paragraphs subtest in the Clinical Evaluation of Language Fundamentals 4 UK (CELF-4 UK) (Semel, Wiig &amp; Secord, 2003), which is culturally and linguistically unfamiliar to Singaporean children. It sets the stage for the development of a listening comprehension assessment tool suitable for use in the local context. Forty-five healthy Singaporean children (mean age of six years and four months) were administered the original version or one of two adapted versions of the listening comprehension test. It was found that the children performed worse on the original test than their UK counterparts. On the other hand, performance improved significantly when participants took the adapted tests. The results suggest that it is important to adapt the CELF-4 narrative subtest to our Singaporean population that is culturally different from that of the United Kingdom</p>
<b>Lynne Tan</b>	<i>Focus Therapy for People with Cochlear Implant Patients : Two Case Studies</i>	<p>Persons with early onset hearing loss (PWHL) present with poor speech intelligibility as a result of poor auditory feedback. This is attributable to difficulty in monitoring, subsequently altering their speech production. This altered speech production is often characterised by a posterior tongue posture and back-focused voice resulting in a compromised speech intelligibility and voice clarity. The purpose of this study is to look at a modified Focus therapy, which aims to alter the voice focus to improve the voice quality of a PWHL. Two cochlear implanted participants were recruited to undergo an 8-week treatment program. Voice parameters and nasalance measures were obtained. Participants were required to rate the Voice Handicap Index (VHI) while two independent speech therapists were asked to rate voice samples on the Buffalo Voice Profile to complement the objective data obtained. The results showed significant changes in nasalance and voice parameters in one of the subjects but not in the other. Data obtained could suggest that Focus therapy is effective in improving the voice quality of PWHL.</p>

<p><b>Li Wanyu</b></p>	<p><i>Picture Description and Story Recall Test: An Assessment of Episodic Memory for Elderly Chinese with Dementia</i></p>	<p>Increased understanding of immediate and long-term episodic memory in the normal and dementing elderly populations has significant implications for cognitive assessment and language rehabilitation. The aim of Study 1 was to determine if the immediate, delayed and long-term memory of non-dementing elderly persons (N=31, aged 64 to 92 years) is enhanced by the dual presentation of material in the visual and auditory modalities, and personal participation. To test this, three story recall tasks were developed and administered under three different conditions: (1) picture stimulus with self-generated story; (2) verbal story with picture stimulus; and (3) verbal story without picture stimulus. Participants were asked to recall all three stories sequentially at different time points (<i>Immediate, Delayed</i> and <i>Remote Memory Trials</i>) with counterbalanced conditions. As expected, the results showed that story recall was most accurate when visual and auditory stimuli were presented (<i>Condition 1</i> and <i>2</i>) during story encoding. In Experiment 2, case-study analyses of the story recall of two patients with different forms of dementia (Alzheimer's disease and vascular dementia) are presented and compared to the normative data obtained in Experiment 1. The performance of the patient with vascular dementia was of similar pattern as the normal participants, whilst story recall of the patient with Alzheimer's disease was most accurate when visual and auditory stimuli were presented, with personal participation. Differences in their performance suggest that this new story recall task might be useful for diagnostic clarification as well as intervention planning and treatment evaluation by speech-language pathologists working in clinical settings.</p>
<p><b>Lee Er Ker</b></p>	<p><i>Personal Narrative Intervention for Adult AAC Users: Two Case Studies</i></p>	<p>Adults with unclear speech can use Augmentative and Alternative Communication (AAC) devices but they often experience difficulties producing personal narratives. The study investigates the effectiveness of improving personal narratives through 1) the understanding and use of story structures and 2) the understanding and use of temporal and causal linguistic markers using single case experimental design. The participants were two cognitively normal male adults diagnosed with cerebral palsy (spastic diplegia), aged 29 and 49. Personal photograph description and conversation narrative tasks were used to assess progress, with non-personal informational report production acting as control. Pre- and post-intervention narratives were analyzed for number of story elements, number of unique words, narrative discourse length and story complexity. Single case analyses showed significant quantitative and qualitative post-intervention improvements compared to baselines. However, further investigation would be required to extend the functional outcomes of the study.</p>
<p><b>Cheryl Ng</b></p>	<p><i>Factors Influencing Quality of Life in Patients with Nasopharyngeal Carcinoma</i></p>	<p>Nasopharyngeal carcinoma (NPC) is prevalent in South China and Southeast Asian countries. At present, radiation therapy (RT) alone or in combination with chemotherapy is the primary mode of treatment for NPC. Dysphagia is a common sequelae of RT, however, little is known about how factors involved in the treatment of dysphagia could influence its impact on the quality of life. The present study investigated if individuals with NPC had better quality of life (QOL) scores if they had more rehabilitation. As the development of dysphagia is progressive, we also studied the effect of time post RT to speech therapy assessment on individuals and its impact on QOL. QOL were collected using a locally adapted Swallowing Quality of Life questionnaire (SWAL-QOL) from thirty-four participants. The results of the present study suggest that participants who had received earlier treatment to manage dysphagia have better symptom frequency and overall QOL outcomes. In contrast, the length of swallow rehabilitation did not make a difference in either of these outcomes, which is indicative that swallow rehabilitation may not be useful in helping to regain the use of highly fibrosed tissue or nerve damage. These results reflect a need for more dysphagia awareness in individuals with NPC as well as in physicians for prompt referrals to dysphagia management.</p>

<b>Joel Tay</b>	<i>Intra-Oral Tongue Pressure Measures of Amplitude and Duration</i>	Diagnosis of oral phase dysphagia is subjective in nature and dependent on clinician experience and skill. Tongue strength is often used as an indicator of oral phase dysphagia, but this is inferred from subjective resistance exercises or from oral residue. Objective, quantitative measures of swallowing are important for accurately describing and understanding of tongue physiology during swallowing. However, quantitative measures must be compared against normal data for measurements to be meaningful in clinical settings, which are currently unavailable for adults in Singapore. Oral tongue pressures measures of amplitude (anterior, middle and posterior tongue bulbs) and duration will be measured in healthy adults with the Digital Swallowing Workstation from KayPentax™, using the tongue bulb array. Data obtained from this data can then be used in clinical settings as a measure of tongue strength, coordination and oral transit time during the oral phase, which is a strong predictor of dysphagia of other phases. We were interested differences in measures of amplitude and duration across dry and 10ml water swallows. We found that there were no significant differences between dry and 10ml swallows across all anterior, middle and posterior tongue bulbs. Data obtained from the study is useful as a preliminary data for future normative studies.
<b>Goh Huai Zhi</b>	<i>Improving Voice Quality: Vocal Function Versus Choral Singing Exercises in Adults</i>	The physiological approach to voice therapy emphasizes direct exercise or manipulation to effect physiological changes in voice, which share similarities with principles of vocal training in singers. Based on this approach, the efficacies of two exercises were evaluated with Singapore choristers – Stemple’s Vocal Functioning Exercises (SVFE) and choral exercises (CE). Results: SVFE effected significant changes to maximum phonation time (MPT) and minimum volume, and was significantly different from the CE group in terms of maximum volume produced. With the control group, SVFE approached statistical significance in terms of minimal volume produced. For CE, significant changes occurred with maximum volume, and approached significance for MPT, pre and post-treatment. No other significant changes were observed in the control group.
<b>Choong Yea Jye</b>	<i>Expressive Language Assessment Battery for Mandarin-speaking Dysphasics</i>	Most dysphasic patients experience some anomia - a persistent difficulty in naming people, places or things. The aim of this study was to develop a cognitive-neuropsychological battery (c.f., PALPA, Kay, Lesser, & Coltheart, 1992) for expressive language in Mandarin. Five subtests were developed (Spoken Picture Naming Subtest-Nouns, Spoken Picture Naming Subtest-Verbs, Written Picture Naming Subtest-Nouns, Written Picture Naming Subtest-Verbs and Object-Picture Matching Subtest) using the principles of cognitive neuropsychology but taking account of the linguistic features of Mandarin. Norms were then developed by assessing the performance of normal Mandarin-speaking adults (N = 89, males = 44) living in Singapore across three different age ranges (20 - 40, 40 - 60 and 60 – 80 years). Subsequent data analyses revealed significant modality effects (spoken>written) and word class effects (nouns>verbs). The five subtests also sufficiently reliable across age, gender, educational level, and exposure to Mandarin. This new battery of tests will support clinical assessment and intervention planning for Mandarin-speaking adults with dysphasia.
<b>Teo Chiewgee</b>	<i>Receptive Language Battery for Mandarin-speaking Dysphasics</i>	This research project aimed to develop a receptive language battery for Mandarin-Chinese dysphasics for the local Mandarin-speaking population. The four sub-tests were based on cognitive neuropsychological models of language processing and were normed against 67 healthy Mandarin-speaking adults between 21 and 84 years of age ( $M = 47.3$ ; $SD = 16.7$ ). The Receptive Language Battery for Mandarin-speaking dysphasics would be able to provide speech language therapists with information on the nature and severity of semantic impairment in patients with acquired dysphasia. Results showed a statistically significant difference in performance between noun and verb items across all four sub-tests.

<p><b>Ong Su Chern</b></p>	<p><i>Spoken Naming and Auditory Comprehension Tests for Hokkien-speaking Dysphasics</i></p>	<p>Using the principles of cognitive neuropsychology, a <i>Spoken Naming Sub-test</i> and an <i>Auditory Word-Picture Matching Sub-test</i>, comprising the same familiar nouns (n=40) and verbs (n=30) in Hokkien Chinese, were developed to facilitate the assessment of Hokkien-speaking adults in Singapore. The final versions of these tasks were then administered to proficient Hokkien-speakers (N=36, aged between 40-88 years) from a range of educational backgrounds and living in Singapore. Performance on both tests was appropriately close to ceiling suggesting this basic normative data is sufficiently reliable for clinical use. Scores for the listening task were significantly higher than those for the naming task, and performance for nouns was significantly better than that for verbs in both sub-tests. Interestingly, there was also a significant effect of age and education level on <i>verb</i> performance in the naming task: Participants aged 70+, and those with only primary school education, named fewer actions. The results of this landmark study enable local speech-language pathologists to plan and evaluate more effective rehabilitation programmes for Hokkien-speaking dysphasics.</p>
<p><b>Sajlia Bte Jalil</b></p>	<p><i>Semantic Assessment Battery for Malay-speaking Dysphasics</i></p>	<p>There are no formal language assessment tools for Malay speakers (estimated: n = 650, 000) in Singapore. Using the principles of cognitive neuropsychology a battery, comprising six subtests for both the auditory and written input modalities, was developed to detect and locate any semantic impairment in Malay-speaking adults at-risk for dysphasia: Word-to- Picture Matching – WPM, Picture Naming – PN, and Semantic Matching – SM, for both nouns and verbs. Normative data for three age groups (20-40, 41-60 and above 60 years) were collected from neurologically-intact (N = 63) adults, and analysed for modality, word class, processing modality and age effects in normal Malay language processing. The results showed modality effects (oral &gt; written) in PN, word class effects (nouns &gt; verbs) across all subtests, and a processing modality effect (receptive WPM &gt; expressive PN). The performance of those over 60 years was poorest and the three effects above were largest for them. These findings are interpreted as cohort changes in overall Malay language proficiency. This new assessment tool appears reliable and can be used by local Speech and Language Pathologists (SLPs) to support evidence-based practice with the Malay-speaking dysphasic population.</p>