

中華民國聽力師公會全國聯合會健康台灣深耕計畫講座

【跳脫診斷標籤：兒童聽覺及口語處理困難的多面評估與數位介入】 Thinking beyond diagnostic labels: Multidimensional Assessment and Digital Intervention for Childhood Auditory and Spoken Language Processing Difficulties

1. 主辦單位：中華民國聽力師全國聯合會、台灣聽力語言學會
2. 協辦單位：台北市聽力師公會、中山醫學大學語言治療與聽力學系、臺北市立聯合醫院
3. 時間與地點
【台中場】2026/10/17（六）9:00-16:30 中山醫學大學正心樓 0322 教室
【台北場】2026/10/18（日）9:00-16:30 臺北市立聯合醫院中興院區會議廳
4. 費用：聽力師公會會員、台灣聽力語言學會會員—免費
聽語系所研究生—\$200/天
非會員—\$1500/天
5. 名額：每場各 150 位
6. 學分認證：聽力師、語言治療師專業積分申請中
7. 報名方式：<https://forms.gle/bBxEMgUT3wUmt9Lf8>
8. 注意事項
 - * 會員資格將於報名後進行查核；研究生請上傳學生證。
 - * 報名成功將於課前收到本會開課通知 MAIL。
 - * 上下午課程簽到簽退共四次，上課時間超過每節三分之二，方可取得積分。
 - * 為尊重講師的智慧財產權，學員請勿擅自錄影。
 - * 本演講提供中餐，若報名後不克前來請提前告知。
9. 聯絡人：黃上維 hearingcare.taiwan@gmail.com
10. 演講時程表

台中場	講題	講者	主持人
09:10-09:15	開場致詞	葉文英理事長 聽力師全國聯合會	
09:15-10:30 (75 分)	基於口語語言處理機制的聽能口語評估框架 A new comprehensive framework for assessing auditory and spoken language processing functions in young children with developmental disorders associated with audition, cognition, and spoken language	袁志彬 副教授	鄧菊秀 副教授
10:30-10:45	休息		
10:45-12:00 (75 分)	跨越診斷標籤：剖析兒童聽語認知表現特徵 Thinking beyond ill-defined diagnostic labels: Profiling children's performance in speech recognition, language & literacy and cognition domains		
12:00-13:15	午餐		
13:15-14:15 (60 分)	雙耳異訊圖片辨識測驗揭示大腦半球偏側化之發展 The Low-Pass Filtered Spoken Word Dichotic Listening Picture Identification Test reveals how children develop hemispheric laterality for spoken language	袁志彬 副教授	羅敦信 副教授

14:15-14:30	休息		
14:30-15:15 (45 分)	電子耳兒童的空間聽覺力：雙模態輔具與否之比較 Binaural redundancy, binaural squelch, head-shadow, and spatial release from masking of preschool cochlear implantees with and without bimodal hearing aid fitting		
15:15-15:45 (30 分)	聽常青少年的雙耳優勢：伴隨語言學習障礙與否之比較 Spatial release from masking and ear advantage in normal-hearing adolescents with and without language-learning disorders		
15:45-16:30	綜合討論		

台北場	講題		
09:10-09:15	開場致詞	陽尚錡理事長 台北市聽力師公會	
09:15-10:30 (75 分)	基於口語語言處理機制的聽能口語評估框架 A new comprehensive framework for assessing auditory and spoken language processing functions in young children with developmental disorders associated with audition, cognition, and spoken language	袁志彬 副教授	鄭秀蓮 理事
10:30-10:45	休息		
10:45-12:00 (75 分)	跨越診斷標籤：剖析兒童聽語認知表現特徵 Thinking beyond ill-defined diagnostic labels: Profiling children's performance in speech recognition, language & literacy and cognition domains		
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15:45-16:30	綜合討論		

Dr. Kevin Chi Pun Yuen is a male professional with short dark hair, wearing a light blue suit, white shirt, and a blue and white striped tie. He is standing behind a wooden podium with a microphone, gesturing with his right hand while speaking. In the background, a presentation slide is visible with text related to hearing loss and cochlear implants.

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 聽力學家 | 言語治療師 | 人工耳蝸聽力學家

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袁博士致力於研究說粵語和普通話的聽障兒童在安靜和嘈雜環境中的聲音感知和語音識別，並開發相關的評估工具，包括「粵語詞彙鄰近度測試 (CLNT)」、「粵語雙音節詞語噪音環境自適應識別測試 (CANDIWIT-N-A)」及「普通話口語詞彙噪音環境自適應圖片識別測試 (MAPID-A)」。

袁博士的一項重點研究領域是識別華人社區中患有聽覺處理障礙(APD)的幼兒，並調查 APD 和言語、語言及學習發展的關係。他的研究團隊近期開發了「兒童粵語聲調雙耳異訊分聽測試」(Cantonese Pediatric Lexical Tone Dichotic Listening Test, CaPeLeToDLT) 以評估母語為粵語的幼兒的聽覺處理功能。袁博士的研究團隊正在開發一項「定向注意力低通濾波字詞雙耳異訊分聽圖片識別測試」(The Directed-Attention Low-Pass Filtered Spoken Word Dichotic Listening Picture Identification Test, DiALoPaDLT)，以識別說粵語、阿拉伯語、及英語的幼兒在語音和語言處理上的大腦半球偏側化正常與否。同時，團隊也在開發一款應用程式，以漢字字素(logographeme)作為主要學習單位，為有讀寫困難的幼兒進行正字法覺識的評估與訓練。

Presentation A (estimated time – 75 mins)	簡報 A (預計時間 – 75 分鐘)
A new comprehensive framework for assessing auditory and spoken language processing functions in young children with developmental disorders associated with audition, cognition, and spoken language, based on Medwetsky's Spoken Language Processing Mechanisms	一個基於 Medwetsky「口語語言處理機制」的新綜合框架：用於評估與聽覺、認知及口語語言相關之發展障礙幼兒的聽覺及口語語言處理功能
Kevin Chi Pun YUEN, Michael Chun Wing FOK, & Arnold Ho Tat YEUNG	袁志彬、霍俊穎、楊浩達
Department of Special Education and Counselling, The Education University of Hong Kong, Hong Kong	香港教育大學特殊教育與輔導學系
Background & Aim The assessment of auditory functions in young children should reflect a series of skills to prepare for the understanding of spoken language. My team proposes a new comprehensive framework based on Medwetsky's Spoken Language Processing Mechanism (2009, 2011, 2024), with new modifications, for assessing a hierarchy of auditory and spoken language processing functions in young children using auditory behavioural testing techniques reflecting the functional integrity of the auditory neural system from peripheral level of hair cells level and all the way up to the auditory cortex. Methodology This hierarchy of assessments would help identify point/s of breakdown in the hierarchy from (1) acoustic signal transduction, (2) speech and non-speech sound detection, sound discrimination, (3) phonological awareness and spoken word recognition, (4) attention allocation to degraded signals, (5) selective attention to signals with masking or contralateral competition, (6) auditory-linguistic integration, (7) sequencing of auditory words/ sentences. Results I will present the development of our new cross-language The Directed-Attention Low-Pass Filtered Spoken Word Dichotic	背景和目的 幼兒聽覺功能的評估應反映一系列有助於理解口語語言的技能。我與團隊根據 Medwetsky 的「口語語言處理機制」(2009、2011、2024)，並作出新的修訂，提出一個新的綜合框架，用於評估幼兒一系列具層級性的聽覺及口語語言處理功能。評估將採用聽覺行為測試技術，以反映聽覺神經系統的功能完整性；評估範圍由周邊層面的毛細胞開始，一直延伸至聽覺皮層。 方法 這套具層級性的評估有助於辨識整個層級架構中可能出現功能失效的環節，包括： 1. 聲學訊號轉導； 2. 言語及非言語聲音的偵測，以及聲音辨別； 3. 音韻意識及口語詞彙辨識； 4. 對失真正訊號的注意力分配； 5. 在有掩蔽或對側競爭的情況下，對訊號的選擇性注意； 6. 聽覺與語言的整合； 7. 聽覺詞語 / 句子的排序。 結果 我將介紹我們新開發的跨語言 指導注意力低通濾波口語字詞雙耳異訊分聽圖片辨識測驗 (DiALoPaDL)。該測驗目前涵蓋廣東話、阿拉伯

Listening Picture Identification Test (DiALoPaDL) in Cantonese, Arabic, English, and possibly in Maltese which serves levels (4) & (5) in the hierarchy. I will also present a new **Cantonese phoneme sound discrimination and identification assessment and intervention online platform** for young children with phonological awareness difficulties, which serves levels (3) & (4) in the hierarchy.

Discussion & Implications

The assessment of the early stages of spoken language processing should include speech-sound detection, discrimination, and recognition in quiet, competing, and noisy listening environments. Speech-language pathologists and audiologists are equally responsible for thoroughly assessing every child with communication difficulties in various stages of spoken language processing. The time for both disciplines to work together to solve this clinical research gap is long overdue.

語、英語，並可能包括馬耳他語，主要用於評估上述層級架構中的第（4）及第（5）層級。

我亦將介紹一個全新的**廣東話音素聲音辨別及辨識評估與介入網上平台**，供具有音韻意識困難的幼兒使用；該平台主要用於評估上述層級架構中的第（3）及第（4）層級。

討論與啟示

口語語言處理早期階段的評估，應包括在安靜、有競爭聲音及有噪音的聆聽環境中，對言語聲音進行偵測、辨別及辨識。

語言治療師及聽力師家均有責任，全面評估每一名具有溝通困難的兒童在口語語言處理不同階段的能力。兩個專業領域共同合作，以解決這項臨床研究空白，已經是刻不容緩的事。

Presentation B (estimated time – 75 mins)	簡報 B (預計時間 – 75 分鐘)
Childhood learning disabilities, language disorders and auditory processing disorders – thinking beyond ill-defined diagnostic labels to profiling children’s performance in speech recognition, language & literacy and cognition domains	兒童學習障礙、語言障礙及聽覺處理障礙 — 跳出從定義不清的診斷標籤思考框架，到為兒童在言語辨識、語言與讀寫能力及認知各範疇表現的詳細分析
Kevin Chi Pun YUEN	袁志彬
Department of Special Education and Counselling, The Education University of Hong Kong	香港教育大學特殊教育與輔導學系
We will discuss the definitions of these developmental disorders related to (1) language and literacy, (2) speech discrimination and recognition under challenging listening conditions, and (3) cognition including working memory and attention, from DSM-5 and ICD-11, and position statements. It’s surprising that some of these disorders are not operationally defined. Even professionals in the same discipline define these terms differently. We will discuss if those definitions have been helping or hindering the screening, diagnostic, intervention and educational services for children and adolescents with special needs in speech, language and literacy, hearing, communication, cognition, and learning. Rather than providing ill-defined diagnostic labels, we call professionals to holistically present children’s performance profiles in the domains of peripheral hearing and vision functions, phoneme discrimination & word recognition, auditory and visual working memory and attention span, nonverbal intelligence, phonological-orthographic awareness, spoken language production and comprehension, reading and writing. Such a profile would be instrumental in informing intervention planning.	我們將根據《精神疾病診斷與統計手冊》第五版 (DSM-5)、《國際疾病分類》第十一版 (ICD-11) 及相關立場聲明，討論以下與發展障礙相關的定義： 1. 語言及讀寫能力； 2. 在具挑戰性的聆聽條件下進行言語辨別及辨識； 3. 認知能力，包括工作記憶及注意力。 令人意外的是，部分這些障礙並沒有獲得操作性定義。即使是同一專業領域的專業人士，對這些術語的定義也可能有所不同。 我們將討論，這些定義究竟有助於，還是阻礙了為在言語、語言及讀寫能力、聽覺、溝通、認知及學習方面有特殊需要的兒童和青少年提供篩查、診斷、介入及教育服務。 我們不應提供定義不清的診斷標籤，而應呼籲專業人士以整體方式呈現兒童在以下範疇的表現概況： • 周邊聽覺及視覺功能； • 音素辨別及詞彙辨識； • 聽覺及視覺工作記憶，以及注意力持續時間； • 非言語智力； • 音韻—正字法意識； • 口語語言產出及理解； • 閱讀及書寫。 這樣的表現概況將有助於制定介入計劃。

Presentation C (estimated time – 60 mins)	簡報 C (預計時間 – 60 分鐘)
The Directed-Attention Low-Pass Filtered Spoken Word Dichotic Listening Picture Identification Test (DiALoPaDL) reveals how young and older Cantonese-speaking children develop hemispheric laterality for spoken language	指導注意力低通濾波口語字詞雙耳異訊分聽圖片辨識測驗 (DiALoPaDL) 揭示講廣東話的幼兒及兒童如何發展口語語言的大腦半球側化
Bonnie Pui Kwan CHOW ¹ , Cherry Tsz Yui KWOK ¹ , Matthew King Hang MA ² , Bernard Shing Cheung AU ¹ , John Cheuk-Hon LEE ¹ , & Kevin Chi Pun YUEN ¹	鄒佩筠 ¹ 、郭芷睿 ¹ 、馬敬恆 ² 、歐承璋 ¹ 、李卓瀚 ¹ 、袁志彬 ¹
¹ Department of Special Education and Counselling, The Education University of Hong Kong ² Department of Chinese and Bilingual Studies, The Hong Kong Polytechnic University	¹ 香港教育大學特殊教育與輔導學系 ² 香港理工大學中文及雙語學系
Background This study is part of a groundbreaking cross-language central auditory processing assessment tool that incorporates low-pass filtered (LPF) spoken-word recognition testing into a dichotic listening (DL) testing protocol. Combining LRF and DL will be a breakthrough in the central auditory processing literature, especially in identifying young children with abnormal hemispheric laterality in spoken language processing from 3 years onward. Abnormal hemispheric laterality for spoken language processing in young children, including disproportionally large right ear advantage, in other words, left ear disadvantage, is a clinical marker for language-learning disorders. This project will provide a theoretical foundation and a clinical solution for early intervention for young children at risk for spoken-language developmental difficulties. Aim This project proposed an unprecedented method that uses low-pass filtered speech recognition performance to quantify hemispheric laterality via an innovative series of newly developed outcome measures in directed-attention dichotic-listening tasks. These outcomes will be obtained from over 400 3- to 13-year-olds in Hong Kong, The United Arab Emirates, Australia, and Malta .	背景 本研究是突破性的跨語言中樞聽覺處理評估工具的一部分。該工具把低通濾波 (low-pass filtered, LPF) 口語詞辨識測試納入雙耳異訊分聽 (dichotic listening, DL) 測試程序中。 將低通濾波與雙耳異訊分聽結合，將會是中樞聽覺處理研究文獻中的一項突破，尤其有助於辨識自三歲起，在口語語言處理方面出現大腦半球側化異常的幼兒。 幼兒口語語言處理的大腦半球側化異常，包括右耳優勢過大，即左耳劣勢比正常值過大，這些均是語言學習障礙的臨床指標。本計劃將為有口語語言發展困難風險的幼兒早期介入，提供理論基礎及臨床方案。 目的 本計劃提出一種前所未有的方法，運用低通濾波語音辨識表現，透過一系列創新且新近開發的結果測量，在指導注意力雙耳異訊分聽任務中量化大腦半球側化。 這些結果將來自香港、阿拉伯聯合酋長國、澳洲及馬耳他，超過 400 名年齡介乎 3 至 13 歲的兒童。 這套新的結果測量建基於一個理論模型，用以揭示典型發展兒童如何透過聽覺處理口語語言，以及具有中樞聽覺處理缺陷的兒童如何偏離其典型發展同齡兒童的表現。

This new set of outcome measures is generated by a theoretical model that uncovers how typically developing children auditorily process spoken language and how children with central auditory processing deficits deviate from their typically developing peers. An international cross-language, time-efficient, and easy-to-administer central auditory processing assessment Directed-Attention Low-Pass Filtered Spoken Word Dichotic Listening Picture Identification Test (DiALoPaDL) – will offer an unprecedented window to identify abnormal hemispheric laterality for spoken language processing in young children. In this presentation, we will present and discuss test results from with suspected or confirmed language or literacy disorders, and their age-matched healthy controls.

Method

In DiALoPaDL, monosyllabic words were identified with initial fricatives or affricates as minimal-pair contrasts. Two auditory stimuli carrying that contrast were presented simultaneously to two separate channels via insert headphones. This test innovatively incorporated the low pass filtered (LP) speech stimuli at 1000 Hz, and the unfiltered speech stimuli in the opposite channels. The directed listening test condition requires the participant to focus on a target channel using cartoon figures “piggy” or “kitten” displayed on screen as the visual anchor, not requiring any prior knowledge of “left” and “right”. In the EASY listening condition, the unfiltered stimuli were presented to the target channel and the LP ones to the to-be-neglected opposite ear channel, letting the participants to focus on the target channel easily. Whereas in the HARD listening condition, the LP stimuli were presented to the target channel and the unfiltered stimuli to the to-be-neglected opposite channel. This posted additional challenges for participants to identify the degraded targets as they may be unable able to hold their attention to the target side and shift to the opposite side;`

Results

一項國際跨語言、節省時間且容易施行的中樞聽覺處理評估 — 指導注意力低通濾波口語詞雙耳聆聽圖片辨識測驗 (Directed-Attention Low-Pass Filtered Spoken Word Dichotic Listening Picture Identification Test, DiALoPaDL) — 將提供一個前所未有的視角，用以辨識幼兒在口語語言處理方面的異常大腦半球側化。

在本次演講中，我們將呈現及討論疑似或已確診語言或讀寫障礙兒童，以及與其年齡匹配的健康對照組之測試結果。

方法

在 DiALoPaDL 中，測試使用以詞首擦音或塞擦音作為最小對立的單音節詞。兩個承載該對立的聽覺刺激，會透過插入式耳機同時呈現至兩個獨立聲道。

本測驗創新地納入以 1000 Hz 為低通濾波頻率的低通濾波 (LP) 語音刺激，並在相反聲道呈現未經濾波的語音刺激。

指導聆聽測試條件要求參與者集中注意於目標聲道。螢幕上會顯示「小豬」或「小貓」卡通人物作為視覺定位線索，因此不要求參與者事先知道「左」和「右」。

在 EASY 聆聽條件中，未經濾波的刺激呈現於目標耳聲道，而低通濾波刺激呈現於需要忽略的對側耳聲道，讓參與者較容易集中於目標耳聲道。

相對地，在 HARD 聆聽條件中，低通濾波刺激呈現於目標耳聲道，而未經濾波刺激呈現於需要忽略的對側耳聲道。這對參與者辨識失真的目標刺激構成額外挑戰，因為他們可能無法持續注意目標耳，並轉移至對側耳。

結果

神經典型成人在整體準確率方面優於初小及中學初年級學生。與典型發展同儕相比，典型發展學生在語音訊號失真時，表現下降幅度明顯較大；在 EASY 聆聽條件下，他們也更有可能對來自相反耳朵的刺激作出反應。我們將進一步報告典型發展組與語言及讀寫障礙組之間的比較數據。

討論 / 啟示

研究結果顯示，聽覺選擇性注意及由上而下的認知控制的關鍵部分，在初中階段早期仍然持續發展。雖然典型發展學生能夠妥善處理

Neurotypical adults outperformed early primary and secondary school students in overall accuracy. The TD students, compared with their TD peers, showed a significantly larger decline in performance when the speech signal was degraded and were much more likely to respond to stimuli from the opposite ear under the EASY listening conditions. More data will be reported on the comparison between the TD and the group with language and literacy disorders. Discussion/ implications These findings suggest that key aspects of auditory selective attention and top-down cognitive control are still developing during the early secondary school years. Although TD students could manage the EASY listening condition adequately, they became less able to maintain focus and suppress competing auditory information in the more challenging HARD listening condition. This pattern is consistent with the continued maturation of the corpus callosum and related cognitive control networks during adolescence.	EASY 聆聽條件，但在更具挑戰性的 HARD 聆聽條件下，他們維持注意力及抑制競爭聽覺資訊的能力有所下降。 這種模式與青春期間胼胝體及相關認知控制網絡持續成熟的情況一致。
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Presentation D (estimated time – 45 mins)	簡報 D (預計時間 – 45 分鐘)
Within-participant binaural redundancy, binaural squelch, head-shadow, and spatial release from masking of preschool cochlear implantees with and without bimodal hearing aid fitting	使用或不使用雙模式助聽，即配搭或不配搭在對側耳使用助聽器的人工電子耳兒童使用者的雙耳冗餘、雙耳抑制、頭影效應及空間性解除掩蔽的自身比較
Ida Xin Yue QIU ¹ , & Kevin Chi Pun YUEN ²	仇心悅 ¹ 、袁志彬 ²
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Aims Our understanding of within-participant speech recognition-in-noise binaural benefits in preschool cochlear implantees is poor because age-appropriate and sensitive test materials are unavailable. This study is one of the world's very first studies that offer an intra-participant statistical check on bimodally-fitted (CIHA) preschool implantees' binaural squelch (BS), binaural redundancy (BR), head shadow (HS), and spatial release from masking (SRM). Population The Mandarin Spoken Word-Picture Identification Test tested Thirty-three Mandarin-speaking preschoolers aged 3.5 to 6.6 with CIHA - Adaptive [MAPID-A] (Yuen, Qiu, Mou, & Xi, 2019), which yielded an adaptive signal-to-noise ratio for 50% correct scores (aSNR-50%) as the outcome measure. Methods Participants were tested in two aided conditions: (1) CI-only and (2) CIHA. Speech stimuli were always presented from 0° azimuth, and a speech-spectrum weighted noise from a) 0° azimuth, b) the CI side at 90° azimuth, and (c) the hearing aid side at 90° azimuth. Within a participant, if the mean difference of aSNR-50% scores from two test conditions exceeded the 95% critical difference level (95% CD), the binaural benefit was deemed significantly different.	目的 由於缺乏適合年齡且具敏感度的測試材料，我們目前對學前人工耳蝸植入兒童在噪音中進行言語辨識時所獲得的參與者內雙耳效益，理解仍然有限。 本研究是全球最早提供雙模式配搭人工耳蝸及助聽器（CIHA）學前人工耳蝸植入兒童之參與者內統計檢驗的研究之一，檢視其： • 雙耳抑制（binaural squelch, BS）； • 雙耳冗餘（binaural redundancy, BR）； • 頭影效應（head shadow, HS）； • 空間性解除遮蔽（spatial release from masking, SRM）。 研究對象 研究以《普通話口語詞圖片辨識測驗—人工耳蝸及助聽器適應版》（Mandarin Spoken Word-Picture Identification Test with CIHA - Adaptive, MAPID-A；Yuen、Qiu、Mou & Xi, 2019），測試 33 名以普通話為母語、年齡介乎 3.5 至 6.6 歲、使用 CIHA 的學前兒童。測驗所得的自適應 50% 正確率信噪比（adaptive signal-to-noise ratio for 50% correct scores, aSNR-50%）作為結果測量。 方法 參與者在兩種輔助聽覺條件下接受測試： 1. 只使用人工耳蝸（CI-only）； 2. 同時使用人工耳蝸及助聽器（CIHA）。 語音刺激一律從 0° 方位角呈現；具有語音頻譜權重的噪音則來自：

Results. Intra-participant comparison results revealed that 39%, 55%, and 55% of participants exhibited statistically significant improvement from CI-only to CIHA for BR, SQ, and HS, respectively, and 82% of them gained at least one or more binaural benefits, but 15% did not show any binaural benefit at all. 42% of them showed SRM from 0° to the HA side, whereas only 6% showed SRM from 0° to the CI side. Interestingly, one outlier performed worse in CIHA than CI-only in BS.

Interpretation. The binaural benefits of adding a hearing aid on the contralateral side for monaurally implanted preschoolers vary across individuals. Most of them showed clear benefits. Some did not show any at all or even with binaural interference. Rather than inferring from group results, testing binaural benefits for individual preschool implantees in the clinical setting is crucial to ensure CIHA outperforms CI-only. Or refitting one or both devices would be deemed necessary to maximise binaural outcomes.

Conclusion. This is one of the world's first paediatric cochlea implant studies, which exhaustively revealed individualised CIHA binaural benefits using the validated, reliable speech recognition-in-noise MAPID-A test tailored for preschool children. This intra-participant investigation revealed significant performance variability across participants. Compared with past studies, which mainly offer group results, this study's individualised statistical performance outcomes offer much clearer evidence-based practice directions on device fitting and aural rehabilitation.

a. 0° 方位角；

b. 人工耳蝸一側的 90° 方位角；

c. 助聽器一側的 90° 方位角。

在同一名參與者內，如果兩個測試條件所得的 aSNR-50% 平均分數差異超過 95% 臨界差異水平（95% critical difference, 95% CD），則該雙耳效益被視為具有顯著差異。

結果

參與者內比較結果顯示，從只使用人工耳蝸轉為使用 CIHA 時：

- 39% 的參與者在雙耳冗餘方面出現統計學上顯著的改善；
- 55% 的參與者在雙耳抑制方面出現統計學上顯著的改善；
- 55% 的參與者在頭影效應方面出現統計學上顯著的改善。

其中 82% 的參與者獲得至少一項或以上的雙耳效益，但 15% 的參與者完全沒有顯示任何雙耳效益。

42% 的參與者顯示從 0° 至助聽器一側的空間性解除遮蔽，而只有 6% 的參與者顯示從 0° 至人工耳蝸一側的空間性解除遮蔽。

值得注意的是，有一名離群參與者在使用 CIHA 時的雙耳抑制表現，比只使用人工耳蝸時更差。

詮釋

對於單側植入人工耳蝸的學前兒童，在對側加入助聽器所帶來的雙耳效益因人而異。

大多數兒童顯示出明顯效益；然而，有些兒童完全沒有顯示任何效益，甚至出現雙耳干擾。

因此，在臨床環境中，為每一名學前人工耳蝸植入兒童測試其雙耳效益至關重要，而不應單純根據群組結果作出推論，以確保 CIHA 的表現優於只使用人工耳蝸的情況。

此外，為了最大化雙耳結果，可能有必要重新配搭其中一個或兩個裝置。

結論

這是全球最早的兒科人工耳蝸研究之一，運用針對學前兒童而設、經驗證且可靠的 MAPID-A 噪音中言語辨識測驗，全面揭示個別化的 CIHA 雙耳效益。

這項參與者內研究揭示了不同參與者之間顯著的表現差異。

		相較於過往主要提供群組結果的研究，本研究的個別化統計表現結果，為裝置配搭及聽覺復康提供更清晰、以實證為本的實務方向。	
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Presentation E (estimated time – 30 mins)	簡報 E (預計時間 – 30 分鐘)
Within-participant spatial release from masking and ear advantage in normal-hearing adolescents with and without language-learning disorders	具有及不具有語言學習障礙的正常聽力青少年，其參與者內空間性解除掩蔽及耳朵優勢
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Aims Past studies on spatial release of masking (SRM) and ear advantage (EA) mainly reported group results but rarely individual ones, especially in providing error estimates. This project aims to develop a testing and analysis regime to determine the presence of within-participant SRM and EA, a promising method for assessing individualised central auditory processing or listening performance. Population. Thirty adolescents aged 10-15 (ADOLE) and 30 adults (ADULT) aged 19-28 were tested by the CANTonese Disyllabic Word Identification Test in Noise-Adaptive (CANDIWIT-N-A), which yielded adaptive signal-to-noise ratio for 50% correct scores (aSNR-50%) as the outcome measure for three noise direction conditions (front, left and right). In contrast, the speech direction was fixed to the front. A third group of participants (ADOLE-LD) who are age-matched with ADOLE with language-learning disorders is under recruitment and testing. Methods. The difficulty level of 120 disyllabic-word test items of CANDIWIT-N-A was homogenised by aligning individual items' performance to signal-to-noise ratio (SNR) functions obtained from another 26 normal-hearing participants. Each test item's	目的 過往有關空間性解除掩蔽 (spatial release of masking, SRM) 及耳朵優勢 (ear advantage, EA) 的研究，主要報告群組結果，較少報告個別參與者內部比較 (within-participant comparison) 的結果，尤其甚少提供誤差估算。 本計劃旨在發展一套測試及分析制度，以判定參與者內的 SRM 及 EA 是否存在。這是一種具有潛力的方法，可用於評估個別化的中樞聽覺處理或聆聽表現。 研究對象 研究以《廣東話雙音節詞噪音中辨識測驗—自適應版》(CANTonese Disyllabic Word Identification Test in Noise-Adaptive, CANDIWIT-N-A)，測試 30 名年齡介乎 10 至 15 歲的青少年 (ADOLE)，以及 30 名年齡介乎 19 至 28 歲的成人 (ADULT)。 測驗所得的自適應 50% 正確率信噪比 (aSNR-50%) 作為結果測量，並測試三種噪音方向條件： • 前方； • 左方； • 右方。 相對地，語音方向固定為前方。

absolute intensity level was adjusted to match its 50% correct point in the function to the grand mean SNR-50% point of all items to complete the homogenisation. Ninety-eight test items were selected for the adaptive testing procedures to obtain the aSNR-50% outcome measure.

Speech stimuli were always presented from the front, and a speech-spectrum weighted noise from three test conditions: (1) Noise Front, F, (2) Noise Left, L, and (3) Noise Right, R. Pairwise comparisons were conducted among the three test conditions to reveal intra-participant SRM (i.e., R vs. F and L vs. F) and ear advantage (i.e., L vs. R). The standard error of the difference between the mean aSNR-50% obtained from two test conditions (SED) was calculated from their respective SEs. The SEs were inflated twice to account for the potential lack of independence among adaptive testing excursion midpoints. A 95% critical difference (95% CD) was calculated from the SED. If the absolute difference of the two mean aSNR-50% exceeds the 95% CD, the two conditions were deemed significantly different for the participant.

Results. Significant SRMR (L outperforms F) was found in 83% of participants in ADULT and 93% in ADOLE. Significant SRML (R outperforms F) was found in 80% of participants in ADULT and 67% in ADOLE. No participants in either group yielded negative SRM. Right EA (L outperforms R) was found in 7% of participants in ADULT and 33% in ADOLE. Left EA (R outperforms L) was found in 7% of participants in ADULT and 33% in ADOLE. Preliminary results from ADOLE-LD will be provided.

Interpretation. SRMR of ADOLE have reached ADULT level. However, SRML of ADOLE has not yet reached the ADULT level, which can be explained by the fact that 24% more participants in ADOLE than ADULT have significant REA (L outperforms R). In L, noise presented to the left ear creates a head shadow and better SNR for the right ear than the left one and vice versa in R. In ADOLE, the masked signal received from the left shadow was not processed as efficiently as from the right shadow. Conversely, the

目前正在招募及測試第三組參與者，即與 ADOLE 年齡匹配、具有語言學習障礙的青少年 (ADOLE-LD)。

方法

CANDIWIT-N-A 包含 120 個雙音節詞測試項目。研究首先根據另外 26 名正常聽力參與者所得的信噪比 (signal-to-noise ratio, SNR) 函數，將個別測試項目的表現對齊，以同質化各項目的難度。為完成同質化處理，每個測試項目的絕對強度水平平均經過調整，使其函數中的 50% 正確率點，與所有項目的整體平均 SNR-50% 點一致。其中 98 個測試項目被選用於自適應測試程序，以取得 aSNR-50% 結果測量。

語音刺激一律從前方呈現；具有語音頻譜權重的噪音則來自以下三種測試條件：

1. 噪音前方 (Noise Front, F)；
2. 噪音左方 (Noise Left, L)；
3. 噪音右方 (Noise Right, R)。

研究進行三種測試條件之間的兩兩比較，以揭示：

- 參與者內的空間性解除掩蔽，即 R 對 F，以及 L 對 F；
- 耳朵優勢，即 L 對 R。

兩個測試條件所得的 aSNR-50% 平均值，其差異的標準誤差 (standard error of the difference, SED) 根據各自的標準誤差 (SE) 計算。

為了考慮自適應測試中各次測試偏移中點可能缺乏獨立性，研究將標準誤放大兩倍。

研究再根據 SED 計算 95% 臨界差值 (95% critical difference, 95% CD)。

如果兩個平均 aSNR-50% 之間的絕對差異超過 95% CD，則該參與者在兩個條件之間的表現被視為具有顯著差異。

結果

在 ADULT 組中，83% 的參與者出現顯著的右側空間性解除遮蔽 (SRMR, 即 L 優於 F)；ADOLE 組則有 93% 的參與者出現此結果。在 ADULT 組中，80% 的參與者出現顯著的左側空間性解除遮蔽 (SRML, 即 R 優於 F)；ADOLE 組則有 67% 的參與者出現此結果。

R and L auditory processing pathways were equally efficient in ADULT. The discrepancies in these results suggested that the corpus callosum in ADOLE has not yet fully matured to the adult form. If ADOLE-LD underperforms ADOLE, central auditory processing deficits in the language-learning disordered population would be possible.

Conclusion. CANDIWIT-N-A reliably detected subtle within-participant statistically significant SRM. CANDIWIT-N-A also revealed asymmetrical auditory processing pathways between the two ears - right ear advantage (REA), in adolescents but not adults, suggesting that adolescents' auditory neural pathway for speech-recognition-in-noise had not yet reached adult level.

兩組均沒有參與者出現負的 SRM。

右耳優勢 (right ear advantage, REA, 即 L 優於 R) 在 ADULT 組中出現於 7% 的參與者, 在 ADOLE 組中出現於 33% 的參與者。

左耳優勢 (即 R 優於 L) 在 ADULT 組中出現於 7% 的參與者, 在 ADOLE 組中出現於 33% 的參與者。

ADOLE-LD 組的初步結果將於會議中提供。

詮釋

ADOLE 組的右側空間性解除遮蔽已達到 ADULT 組的水平。

然而, ADOLE 組的左側空間性解除遮蔽尚未達到 ADULT 組的水平。

這可以由以下事實解釋: ADOLE 組出現顯著右耳優勢 (L 優於 R) 的參與者, 比 ADULT 組多 24%。

在 L 條件中, 呈現於左耳的噪音會產生頭影效應, 使右耳比左耳獲得更佳的信噪比; 在 R 條件中則相反。

在 ADOLE 組中, 來自左側陰影的受遮蔽訊號, 其處理效率低於來自右側陰影的訊號。

相反地, ADULT 組左右兩側的聽覺處理路徑效率相若。

這些結果上的差異顯示, ADOLE 組的胼胝體尚未完全成熟至成人的形態。

如果 ADOLE-LD 組的表現低於 ADOLE 組, 則語言學習障礙群體出現中樞聽覺處理缺陷的可能性便值得考慮。

結論

CANDIWIT-N-A 能可靠地偵測參與者內具有統計學顯著性的細微空間性解除遮蔽。

CANDIWIT-N-A 亦揭示了兩耳之間不對稱的聽覺處理路徑: 青少年出現右耳優勢 (REA), 但成人沒有出現此現象。這表示青少年用於噪音中言語辨識的聽覺神經路徑, 尚未達到成人水平。

Presentation F (estimated time – 30 mins)	簡報 F (預計時間 – 30 分鐘)
Discrimination and identification of syllable-final Cantonese stop consonants in pre-primary and early primary schoolers with and without language and literacy difficulties	具有及不具有語言與讀寫困難的學前及初小兒童對廣東話音節末塞音的辨別及辨識
Hatty Ho Kiu NG, Michael Chun Wing FOK, Arnold Ho Tat YEUNG, & Willie Wai Hey IP, Karlsson Kei Kwan LUI, & Kevin Chi Pun YUEN	吳可蕎、葉偉禧、雷淇鈞、霍俊穎、楊浩達、袁志彬
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Background Children with language and developmental language disorders (DLD) have been shown to process auditory information less efficiently than typically developing (TD) peers, who often exhibit weaker performance in phoneme identification and rely more on semantic cues than fine auditory-phonological details. This study investigates young Cantonese-speaking children's ability to discriminate and identify the syllable-final stops /-p/, /-t/, and /-k/, which are unreleased, unaspirated, and voiceless. The ability to discriminate and identify syllabic final contrast reflects how competent listeners can perceive the subtle differences in formant transitions from the preceding vowel to the closure of the place of articulation. Cantonese final stops are unreleased and without burst noise, so the formant transition cues are even more limited than their syllabic initial counterparts. There is a potential to use the subtle acoustic contrasts to assess children's auditory and phonological processing for spoken language development. Aim The objective of this study is to compare how Cantonese-speaking children with and without developmental language disorder (DLD) perceive unreleased final stops, /-p, -t, -k/, in monosyllabic words, using both discrimination and identification tasks, and to characterise which final stop contrasts and error patterns are most vulnerable. Method A dedicated iOS-based application was developed to offer a game-based computerized testing for the participants. The final	背景 研究顯示，具有語言及發展性語言障礙（developmental language disorders, DLD）的兒童，處理聽覺資訊的效率低於典型發展（typically developing, TD）的同齡兒童。後者在音素辨識方面通常表現較弱，並且較依賴語義線索，而非精細的聽覺—音韻細節。本研究探討以廣東話為母語的幼兒辨別及辨識音節末塞音 /-p/、/-t/ 及 /-k/ 的能力。這些音節末塞音均不除阻、不送氣及不帶聲。辨別及辨識音節末對立，反映聽者能否有效感知由前置元音至發音部位閉塞之間共振峰轉變的細微差異。廣東話音節末塞音不除阻，也沒有爆破噪音，因此，其共振峰轉變線索比音節初塞音的相關線索更加有限。運用這些細微的聲學對立，可以評估兒童的聽覺及音韻處理能力，並了解其口語語言發展情況。 目的 本研究旨在比較具有及不具有發展性語言障礙（DLD）的廣東話兒童，如何透過辨別及辨識任務，感知單音節詞中的不除阻音節末塞音 /-p/、/-t/ 及 /-k/，並描述哪些音節末塞音對立及錯誤模式最容易受到影響。 方法 研究團隊開發了一個專用的 iOS 應用程式，為參與者提供以遊戲為基礎的電腦化測試。音節末塞音由彼此形成最小對立的單音節詞承載。換言之，在每一組承載詞中，除了音節末塞音不同之外，其他所有音素及詞調均相同。例如，其中一組承載詞的三個成員為：

stops are carried by monosyllabic words which are with minimal pair contrasts with one another. That means except for the final stop difference, in each carrier, all other phonemes and the lexical tone are the same, e.g. in one carrier the three members are - /tshap3/ “plug”, /tshat3/ “wipe”, and /tshak3/ “book”. In the discrimination task, the sound files of two members were played sequentially, and the participants were asked to respond whether the two members were the same or different, using “OO”, or “XO” as the visual response options on the touch screen monitor. All possible pairings were tested including different presentation orders of the same two members, and two repetitions of the same member. In the identification test, the target member was played, and then then all three members was played one by one accompanying by the pictures representing them.

Results. TD and DLD children differed in the distribution of their misidentifications across final-stop contrasts, even though their total error rates were similar. These findings support the view that differences between TD and DLD children may be more evident in the fine structure of error patterns than in global accuracy measures alone, particularly for contrasts that rely on subtle vowel–consonant formant transitions, as is the case for unreleased Cantonese final stops.

Discussion

There is potential to use the discrimination and identification tasks as a screening tool to early-identify children with phonological awareness difficulties for the timely provision of language assessment and intervention services.

- /ts^hap3/ 「插」；
- /ts^hat3/ 「擦」；
- /ts^hak3/ 「冊」。

在辨別任務中，系統會依次播放兩個成員的聲音檔案，然後要求參與者使用觸控螢幕上的「OO」或「XO」視覺反應選項，回答兩個成員是相同還是不同。

測試涵蓋所有可能的配對，包括同一對成員的不同呈現次序，以及同一成員重複呈現兩次。

在辨識測試中，系統先播放目標成員，然後逐一播放全部三個成員的聲音，同時呈現代表它們的圖片。

結果

雖然典型發展（TD）兒童與發展性語言障礙（DLD）兒童的總錯誤率相近，但兩組兒童在不同音節末塞音對立中的誤認分布有所不同。

研究結果支持以下觀點：TD 兒童與 DLD 兒童之間的差異，可能在錯誤模式的細緻結構中比單純的整體準確率更為明顯；尤其是在處理依賴細微元音—子音共振峰轉變的對立時，廣東話不除阻音節末塞音便屬於這種情況。

討論

辨別及辨識任務具有作為篩查工具的潛力，可及早識別具有音韻意識困難的兒童，以便及時提供語言評估及介入服務。

Presentation G (estimated time – 30 mins)	簡報 G (預計時間 – 30 分鐘)
Divided- & Directed- Attention Cantonese/ English Dichotic Listening Performance in Cantonese-speaking Children with High-Functioning Autism Spectrum Disorder and their typically developing peers using English as their second language	具有高功能自閉症譜系障礙及其典型發展同儕、以英語為第二語言講廣東話的兒童，在分散注意及指導注意廣東話-英語雙耳異訊分聽的表現
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Background Dichotic listening is commonly used to examine hemispheric lateralisation for speech processing, typically showing a right ear advantage for verbal stimuli. In bilingual children, however, lateralisation may differ across languages depending on language experience and proficiency, and these effects may be further shaped by autism spectrum disorder. This study therefore used a new Cantonese-English monosyllabic dichotic listening test to compare spoken-language lateralisation in Cantonese-speaking children with high-functioning autism spectrum disorder (HFASD) and their typically developing peers. Aims This study aimed to compare the extent of hemispheric lateralisation for processing English and Cantonese target words in each ear, while controlling for the effect of competing minimal-pair distractor words presented to the opposite ear. A baseline-corrected approach was used to estimate right ear advantage even when the paired words differed in difficulty. The study also examined whether children with HFASD showed a different lateralisation pattern from typically developing children in divided-attention and directed-attention listening conditions.	背景 雙耳聆聽通常用於檢視言語處理的大腦半球側化；對言語刺激而言，測試通常顯示右耳優勢。 然而，在雙語兒童中，側化模式可能因語言經驗及語言熟練程度而在不同語言之間有所差異，而自閉症譜系障礙亦可能進一步影響這些效應。 因此，本研究採用一項新的廣東話—英語單音節詞雙耳聆聽測驗，比較具有高功能自閉症譜系障礙（high-functioning autism spectrum disorder, HFASD）的廣東話兒童與典型發展同儕在口語語言方面的側化情況。 目的 本研究旨在比較參與者以每隻耳朵處理英語及廣東話目標詞時，大腦半球側化的程度，同時控制呈現於相反耳朵、具有競爭作用的最小對立干擾詞的影響。 即使配對詞的難度不同，研究仍採用經基線校正的方法估算右耳優勢。 本研究亦探討 HFASD 兒童在分散注意及指導注意聆聽條件下，其側化模式是否不同於典型發展兒童。 方法

Method

An English monosyllabic word was presented to one ear and a Cantonese monosyllabic word generated by the same male AI speaker was simultaneously presented to the opposite ear. The paired words formed minimal pairs that differed by substitution, addition, or deletion of one phoneme, without crossing the phonemic boundary of the other language. For example, /tʰɛŋ/ (“living room” in Cantonese) was paired with /tʰen/ (“ten” in English). Right ear advantage was assessed under two conditions: divided attention, in which participants freely recalled words from either ear, and directed attention, in which they were instructed to attend to one ear. These conditions were used to determine whether the HFASD group showed atypical hemispheric lateralisation for Cantonese and English speech processing relative to their typically developing peers.

Results

The results suggested a language-asymmetric profile in the HFASD group. In the divided-attention condition, participants with ASD more often identified English than Cantonese when both languages competed for attention. In the directed-attention condition, they also performed better on English than on Cantonese stimuli. Opposite-ear analysis further showed that Cantonese was more vulnerable to intrusion when English served as the competing stream. Together, these findings suggest that English was the more accessible language in this auditory competition setting, despite Cantonese being the participants’ first language.

Discussion

These findings suggest that bilingual exposure in ASD is better understood as experience-sensitive rather than as a simple L1-first developmental pattern. Recent reviews show that bilingualism does not harm language or communication in autistic children, and that outcomes depend more on exposure, use, and context than on bilingualism itself. The English advantage observed here may therefore reflect greater functional

一個英語單音節詞呈現於其中一隻耳朵；與此同時，由同一名男性人工智能（AI）講者錄製的廣東話單音節詞，呈現於另一隻耳朵。配對詞形成最小對立，差異來自替換、增加或刪除一個音素，而且不跨越另一種語言的音位界線。例如，/tʰɛŋ/（廣東話「廳」）與 /tʰen/（英語「ten」，即「十」）配對。

研究在以下兩種條件下評估右耳優勢：

- **分散注意條件**：參與者自由回憶來自任一耳朵的詞語；
- **指導注意條件**：參與者被指示注意其中一隻耳朵。

這些條件用於判定，與典型發展同儕相比，HFASD 組在廣東話及英語語音處理方面是否呈現異常的大腦半球側化。

結果

結果顯示，HFASD 組呈現語言不對稱的表現概況。

在分散注意條件下，當兩種語言同時競爭注意力時，ASD 參與者辨識英語的次數多於辨識廣東話。

在指導注意條件下，他們處理英語刺激的表現亦優於廣東話刺激。相反耳朵分析進一步顯示，當英語作為競爭聲流時，廣東話更容易受到侵入性干擾。

綜合而言，儘管廣東話是參與者的第一語言，在這種聽覺競爭情境中，英語似乎是較容易接觸及處理的語言。

討論

研究結果顯示，ASD 兒童的雙語接觸，應被理解為對經驗敏感的發展歷程，而不是簡單的「第一語言優先」發展模式。

近期文獻回顧顯示，雙語教育不會損害自閉症兒童的語言或溝通能力；兒童的發展結果更多取決於接觸、使用及情境，而不是雙語本身。

因此，本研究所觀察到的英語優勢，可能反映參與者在日常生活中較多功能性地使用英語，並獲得較多英語強化，而不是反映廣東話本身存在固有弱點。

總體而言，研究結果支持以下觀點：ASD 兒童的雙語語言發展，是由溝通經驗及任務要求所塑造，而不單是由語言習得次序決定。

	use and reinforcement of English in the participants' daily lives, rather than an inherent weakness in Cantonese. Overall, the results support the view that bilingual language development in ASD is shaped by communicative experience and task demands, not by acquisition order alone.		
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Presentation H (estimated time – 30 mins)	簡報 H (預計時間 – 30 分鐘)
A new, computerised, Traditional-Chinese logographeme-based orthographic awareness assessment and intervention application for young Cantonese-speaking children with language-learning difficulties.	一個新的電腦化繁體中文字形構件 (logographeme) 正字法意識評估及介入應用程式：供具有語言學習困難的廣東話幼兒使用
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Background An iPad iOS application was designed to offer an innovative orthographic awareness assessment and intervention tool for young Cantonese-speaking children. Over 3000 Traditional Chinese characters classified as Key Stages 1 and 2 from The Hong Kong Cantonese Lists for Primary Learning (Leung & Lee, 2002) were analysed into their logographeme constituents according to Liu et al. (2009). In the application, participants are provided with a list of constituent logographemes for each Chinese character, and they finger-drag each logographeme to the desired position in the character grid. Aim This study examined the treatment efficacy of the logographeme-based application designed to enhance orthographic awareness skills in young Cantonese-speaking children with and without specific learning difficulties (SpLD). We would like to investigate if the character structures, i.e. the left-right versus and top-down, affects the learning of unfamiliar characters. We also wanted to investigate the outcome of this new logographeme-based training application, in comparison to that from conventional paper-and-pencil copying training Method Nineteen Cantonese-speaking children with confirmed or suspected SpLD, and another 14 children with typical	背景 研究團隊設計了一個 iPad iOS 應用程式，為以廣東話為母語的幼兒提供創新的正字法意識評估及介入工具。 根據 Liu 等人 (2009) 的研究，我們將《香港小學學習字詞表》(Leung & Lee, 2002) 中超過 3,000 個列入第一及第二學習階段的繁體中文字，分析為其字形構件。 在此應用程式中，參與者會獲得每個中文字的構成字形構件即字素 (logographeme) 的清單，並以手指拖曳每個字形構件，將其放置於中文字格的適當位置。 目的 本研究探討以字形構件為基礎、旨在提升正字法意識技能的應用程式，對具有及不具有特殊學習困難 (specific learning difficulties, SpLD) 的廣東話幼兒之治療成效。 我們希望研究中文字結構，即左右結構與上下結構，是否會影響兒童學習不熟悉中文字的表現。 我們亦希望將這種新的字形構件訓練應用程式的成效，與傳統紙筆抄寫訓練的成效進行比較。 方法 十九名已確認或疑似具有特殊學習困難 (SpLD) 說粵語的兒童，以及另外 14 名典型發展兒童參與了一項介入計劃。

development participated in a 3-session intervention programme sandwiched by two assessment sessions. All children were early primary students aged from 7 years 1 month to 9 years 3 months. In the intervention module, a hierarchy of training levels is provided with increasing difficulty: (1) the character is displayed with colour-coded logographemes with their colours matching their respective list of constituent logographemes; (2) the character is changed to a grey shadow; and (3) the character shadow is removed, leaving just the character grid. There is an option to provide distractor logographemes which are orthographically similar to the target ones, aiming to heighten the participants' awareness to discriminate them. Another training option is to pre-set a certain percentage, i.e., from 20-80%, of logographemes displayed in the character grid to accommodate participants with different performance and motivation levels. The participant can listen to the spoken form of the character and see the picture with a written sentence including the target character.

In the assessment module, none of the cues in the intervention module are provided except for the option of logographeme distractors. Two attempts were allowed for moving each logographeme to the construction frame of each character in the iPad screen. The total score was calculated based on correct placement of target logographeme. The character size shown on screen was 280 x 280 points. If the logographeme was placed within ± 30 points of its designated position in the character frame, in both the horizontal and vertical dimensions, the placement was deemed correct. Tracking children's correct positioning of logographemes within the character structure reveals the participant's orthographic awareness. We will discuss pilot intervention results for early primary students with language-learning difficulties.

Results

Participants, both the clinical group and the typically developing group demonstrated substantial improvement following the

計劃由兩次評估環節開始及結束，中間包括三節介入課程。所有兒童均為初小學生，年齡介乎 7 歲 1 個月至 9 歲 3 個月。

在介入模組中，訓練層級按難度遞增排列：

1. 以不同顏色標示中文字中的字素構件，而字素構件的顏色與其構成字形字素構件清單中的顏色一致；
2. 將中文字轉換為灰色陰影；
3. 移除中文字陰影，只保留中文字格。

系統提供加入干擾字素的選項。這些干擾字素在正字法上與目標字素相似，目的是提高參與者辨別它們的意識。

另一項訓練選項，是預先設定中文字格中顯示的字素構件百分比，即由 20% 至 80%，以配合不同參與者的表現及動機水平。

參與者可以聆聽該中文字的粵語讀音，並觀看一幅包含目標中文字的圖片及書面語句子。

在評估模組中，除了可選擇提供字形構件干擾字素之外，不會提供介入模組中的任何提示。

參與者每次有兩次機會，將每個字形構件移動至 iPad 螢幕上每個中文字的構成框內。

總分根據目標字形構件是否被正確放置計算。

螢幕上顯示的中文字大小為 280 × 280 點。如果字形構件在中文字框內，於水平及垂直方向上均位於指定位置 ± 30 點的範圍內，便視為放置正確。

追蹤兒童在中文字結構內正確放置字形構件的情況，可以揭示參與者的正字法意識。

我們將討論針對具有語言學習困難的初小學生所進行的先導介入結果。

結果

臨床組及典型發展組的參與者在介入後均有顯著改善。

中文字結構具有顯著效應：參與者在左右結構（left-right, LR）中文字的基線及後測準確率，一致高於上下結構（top-down, TD）中文字。

淨增益比較顯示，無論以字形構件數量或整個中文字作為結果測量，LR 與 TD 結構之間的改善幅度均沒有統計學上的顯著差異。

intervention. There was a significant effect of character structure, with participants consistently exhibiting higher baseline and post-test accuracy for left-right character structures (LR) than top-down (TD) ones. Net gain comparisons indicated no statistically significant difference in the magnitude of improvement between LR and TD structures across both logographeme count and whole character outcome measures. The intervention offered from this new training application was as good as the traditional paper-and-pencil intervention method.

Discussion

This new logographeme-based Chinese character orthographic awareness intervention tool is effective for improving orthographic awareness skills in children with early literacy difficulties. The treatment yields uniform, generalized learning benefits across different orthographic structures, successfully overcoming baseline disparities in structural complexity. These findings underscore the clinical utility of targeting sub-lexical components while highlighting the facilitative role of holistic, semantic character contexts in maximizing intervention outcomes for children who struggles with Chinese character learning.

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這種新訓練應用程式所提供的介入，效果與傳統紙筆介入方法一樣理想。

討論

這種新的、以字素字形構件為基礎的中文字正字法意識介入工具，能有效改善具有早期讀寫困難兒童的正字法意識技能。

無論不同的正字法結構為何，這項治療均能帶來一致且可泛化的學習益處，並成功克服兒童在基線階段因結構複雜程度不同而出現的差異。

研究結果凸顯了以次詞彙層面的構成要素作為介入目標的臨床效用，同時亦指出，完整且具語義的中文字語境，有助於最大化具有中文字學習困難兒童的介入成效。

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