# 9th Asia Pacific Conference on Speech, Language and Hearing (APCSLH 2013)

**October 31 – November 3, 2013**
**Taichung City, Taiwan**

**Venue**

Chung Shan Medical University
Nan Shan Education & Training Convention Center

**Host Organizations**

- Asia Pacific Society for the Study of Speech, Language and Hearing
- Chung Shan Medical University
- Chung Shan Medical University Hospital
- Maria Social Welfare Foundation
- Taichung City Speech and Language Therapists Union
- Health Bureau, Taichung City Government

**Program Book**

傳遞美好聲音
豐富人類生活

美律實業與你一起關懷社會

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## Welcome Message

Dear Colleagues and Friends,

On behalf of the Organizing Committee of the 9th Asia Pacific Conference on Speech, Language and Hearing, I extend my warmest welcome to you all for coming to Taichung to attend the "APCSLH 2013". The presence of so many overseas experts and scholars is heartening as you are gathered here to share with us your valuable insight and knowledge.

This conference will be conducive to the exchange of research and clinical ideas relating to all aspects of normal and disordered speech, language, and hearing as well as planning together future developments. The lectures by experts and scholars from around the globe will provide an excellent platform for gaining the latest trends and frontiers of research.

We earnestly look forward to a lively exchange of information and experiences at these lecture so that all participants both at home and abroad will greatly benefit from the proceedings of the four-day program from October 31 to November 3, where valuable experiences will be shared and learnt, innovative ideas exchanged, all of which will no doubt lead to more concerted endeavors to build this field into a premium and sustainable field for the benefit of the patients.

In closing, I take this opportunity to wish you all, my distinguished guests, continued good health and fulfilling careers and lives. I also wish this Conference a resounding success. Once again, my hearty thanks to you all for taking out precious time from your busy schedule to be here for this important Congress.

*Frances Nan Mai Wang.*

Frances Nan Mai Wang
President
9th Asia Pacific Conference on Speech, Language and Hearing (APCSLH 2013)
Asia Pacific Society for the Study of Speech, Language and Hearing (APSSLH)

*Te-Jen Lai*

Te-Jen Lai
Honorary President
9th Asia Pacific Conference on Speech, Language and Hearing (APCSLH 2013)
President
Chung Shan Medical University

## Organization

| Organizing Committee | |
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| Secretary General | Shu-Fen Tseng |
| Secretary General | Meng-Ju Tsai |

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| Members | Ming-Chung Chen | Shu-Yu Liu |
| | Sheng Hwa Chen | Yea-Tzy Chen |
| | Yu-Chun Chih | Chiu-Ling Wang |
| | Jing-Yi Jeng | Edward Yih-Liang Yang |
| | Hung-Ching Lin | Chih-Kang Yang |

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| Social Committee | Kuo-You Huang | |
| | Hsiu-Ching Lee | |

## Host Organizations

- Asia Pacific Society for the Study of Speech, Language and Hearing
- Chung Shan Medical University
- Chung Shan Medical University Hospital
- Maria Social Welfare Foundation
- Taichung City Speech and Language Therapists Union
- Health Bureau, Taichung City Government

## Co-host organization in Mainland China

暨南大学附属第一医院
广州华侨医院

廣東省殘疾人康復協會
Guangdong Association of Rehabilitation for People with Disabilities

## Co-Host Organizers

- School of Speech Language Pathology & Audiology, Chung Shan Medical University Hospital
- The Speech-Language-Hearing Association, Taiwan
- The Taiwan Society for Augmentative and Alternative Communication

台灣音聲醫學研究會
TAIWAN VOICE SOCIETY

- Special Education Association of the Republic of China
- Chinese Association of Early Intervention Program for Children with Developmental Delays (CAEIP)
- Taiwan Child Neurology Society (TCNS)
- Taiwan Communication Disorder Association
- Taiwan Academy of Physical Medicine and Rehabilitation

## Bruce Tomblin

### Education
- 1967-1970 Ph.D. (Comm. Dis.), Univ. of Wisc-Madison
- 1966-1967 M.A. (Speech Pathology), Univ. of Redlands
- 1963-1966 B.A. (Psychology), La Verne College

### Professional and Academic Positions
- 1999-Spriestersbach Distinguished Professor of Liberal Arts & Sciences, University of Iowa
- 2000-Professor, Department of Otolaryngology, University of Iowa
- 1983-Professor, Dept. of Speech Path.& Audiology, University of Iowa

### Honors and Awards
- 2011 Callier Prize
- 2010 Honors of ASHA
- 2009 Editors' Award, Hearing, Journal of Speech & Hearing Research
- 2009 Alfred K. Kawana Council of Editors Award (ASHA)

## Fan-Gang Zeng

### Education
- 1982 B.S. (Electrical Engineering), University of Science and Technology of China, Hefei
- 1985 M.S. (Biomedical Engineering), Institute of Physiology, Academia Sinica, Shanghai
- 1990 Ph.D. (Audiology and Neuroscience), Syracuse University, New York

### Professional Employment
- 2011-Present Director, Center for Hearing Research, University of California, Irvine (UCI)
- 2004-Present Professor (Step II, 2004, Acceleration proposed by CAP; Step IV, 2007, Acceleration proposed by CAP; Step V, 2010), Departments of Anatomy and Neurobiology, Biomedical Engineering, Cognitive Sciences, and Otolaryngology, University of California, Irvine (UCI)
- 2000-Present Research Director, Department of Otolaryngology – Head and Neck Surgery, University of California, Irvine (UCI)

### Honors and Awards
- IEEE Transactions on Biomedical Engineering 2010 Outstanding Paper Award presented at the 32nd Annual International Conference of IEEE Engineering in Medicine and Biology Society, 1 September 2010, Buenos Aires, Argentina (for paper entitled "Encoding Frequency Modulation to Improve Cochlear Implant Performance in Noise" by Nie, Stickney and Zeng, IEEE TBME, V.52, No.1, 64-73, 2005).
- IEEE Fellow, 2011 ("For contributions to auditory prostheses").

## Elizabeth Ward

Professor Ward is a speech pathologist and is the Director of the Centre for Functioning and Health Research (CFAHR) within Queensland Health and a conjoint Professor within the School of Health and Rehabilitation Sciences, The University of Queensland. She has a keen interest in clinical research and has made significant contributions to health service policy and practice particularly relating to speech and swallowing disorders in a range of clinical populations including head and neck cancer and critical care populations. Her research interests also extend to different service delivery models such as telehealth and new workforce training models, including simulation. Prof Ward has over 120 peer reviewed journal publications, 29 book chapters as well as 2 academic text books titled: "Ward EC & van As Brooks, CJ (2007) Head and Neck Cancer: Treatment Rehabilitation and Outcomes" and "Ward EC & Morgan AT (2009) Dysphagia Post Trauma". She has received numerous research and teaching awards and has over 2 million in competitive grant funding to date. She has presented multiple invited speaker presentations and workshops across Australia, as well as internationally in New Zealand, Hong Kong, Taiwan, The Netherlands, Germany, and Switzerland.
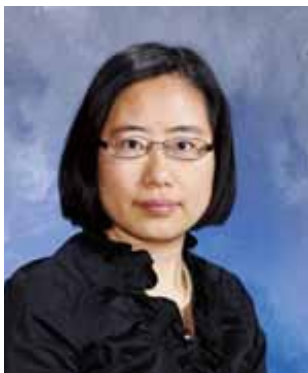
## Lena Wong

Dr Lena Wong is the Head and an Associate Professor at the Division of Speech and Hearing Sciences, the University of Hong Kong. She was formerly a research and clinical audiologist at the House Ear Institute. She received her Ph.D. from the University of Queensland. Her research interests include outcome measurement of amplification devices, and speech and tone perception in native and non-native speakers. She has published many papers in these areas and recently edited the book on "Evidence-Based Practice in Audiology: Evaluating Interventions for Children and Adults with Hearing Impairment". She is an elected Fellow of the International Collegium of Rehabilitative Audiology. She is a reviewer for many top journals in the field of Audiology. She is also a consultant/advisor for various charitable professional organizations and a member of the Executive Committee of the International Society of Audiology.

## Pat Mirenda

Pat Mirenda is a Professor in the Department of Educational and Counseling Psychology and Special Education, and Director of the Centre for Interdisciplinary Research and Collaboration in Autism (CIRCA) at the University of British Columbia. She is a doctoral-level Board Certified Behavior Analyst (BCBA-D) and teaches courses on augmentative communication, autism, inclusive education, and positive behavior supports. In 2004, she was named a Fellow of the American Speech-Language-Hearing Association (ASHA); and in 2008, she was named a Fellow of the International Society for Augmentative and Alternative Communication (ISAAC). The fourth edition of her co-authored book "Augmentative and alternative communication: Supporting children and adults and complex communication needs" was published in 2013; and her latest co-edited book, "Autism spectrum disorders and AAC" was published in December, 2009. She has published over 100 research articles and chapters and presents frequently at internatona1, national and regional conferences. Her current research includes a Canada-wide study of developmental trajectories in children with autism; and a study of the relationship between bilingual language exposure and language development in young children with autism.

## Murray Douglas Morrison

- Department: Surgery (Division of Otolaryngology), University of British Columbia
- Faculty: Medicine
- Present rank: Professor Emeritus  since:  2007

### Education

1960-66 U of Saskatchewan (Doctor of Medicine)

### Special Professional

1969-70 Resident II (Gen. Surgery), U of Saskatchewan
1/72-7/72 Head and Neck Fellowship, U of Liverpool (Stell)
7/72-6/73 Research Fellowship, Karolinska (Stockholm)

### Pecialty Board Qualifications

1966 Medical Council of Canada (Licensee)
1971 Otolaryngology, RCPSC (Fellow)
1986 American Board of Otolaryngology (Diplomate)

## Julie A.G. Stierwalt

### Education

- 1997 Ph.D., Speech Pathology, University of Iowa
- 1989 M.A., Speech Pathology, University of Northern Iowa
- 1984 B.A., Speech Pathology, University of Northern Iowa

### Professional Employment

- 2007-present Associate Professor, Department of Communication Disorders, Florida State University
- 2001-2006 Assistant Professor, Department of Communication Disorders, Florida State University
- 1996-2001 Assistant Professor, Department of Communication Disorders,Southwest Missouri State University
- 2001 Tenure granted

### Honors

- Letter of Appreciation for Teaching Excellence – Provost Larry Abele (2009)
- Letter of Appreciation for Teaching Excellence – Provost Larry Abele (2008)
- Letter of Appreciation for Teaching Excellence – Provost Larry Abele (2007)

### Awards

- 2009 ASHA Fellow
- 2006-2007 Florida State University Graduate Teaching Award
- 2006 Society of National Association Publications (SNAP) Awards: -Bronze award for Newsletter - General Excellence -Silver award for Newsletter -Most Improved

### Invited Speakers

## Chia Yine Lee

Dr. Chia-Ying Lee's research examines the neurobiological basis of spoken and written Chinese language processing by using electrophysiological techniques, including both electroencephalography (EEG) and magnetoencephaolography (MEG), in combination with behavioral, eye movement, and other brain imaging methods. Her current research include where, when, and how Chinese is represented and processed in the brain, how brain's language architecture may change over time during language acquisition, development of speech perception in infants and children, and its relation to later literacy development, including Dyslexia. The ultimate goal is to establish a comprehensive neurocognitive model for Chinese language processing and to apply the empirical evidence to clinical and educational settings.

## 來自聽損兒家長的心情分享：
### A story sharing from a hearing impaired kid's mother:

在一個花開茂盛的春天，奕婷正在睡覺。我動作相當的小心，只因為怕將熟睡的孩子吵醒，一個不注意，一只鍋子不小心掉在地上，產生極大的聲響，但奕婷卻一點反應也沒有，繼續熟睡著。我和先生覺得很奇怪，便帶著奕婷到醫院檢查，檢查結果為80-90分貝的聽損，這件未預料到的事竟然就發生在我們身上，我和先生頓時不知該如何是好，措手不及。

在醫生的建議下，我們來到雅文基金會上課，當時奕婷一歲，連ㄅㄆㄇ、爸爸、媽媽都不會講。雅文的老師很用心的教導她每一個注音符號、每一個字，讓奕婷越來越進步，不久之後，奕婷可以開口叫爸爸、媽媽，我們覺得很不可思議。

現在，奕婷已經十歲了，和一般的孩子一樣，很難看出有聽損的問題。因為她一開口就滔滔不絕，有時我們唸她一句，她也能回個十句。看著奕婷的進步和成長，再多的辛苦，我也甘之如飴。

On a spring day with flowers blooming beautifully, my daughter Yi-Ting was sound asleep. I was careful not to make too much noise to wake her up. While I accidentally dropped a pot, the sound did not disturb her at all. My husband and I were puzzled and took her for a check-up, and she was diagnosed of hearing deficit in the range of 80-90 dB. We were caught in complete surprise and didn't know what to do.

The doctor recommended us to take Yi-Ting to Children's Hearing Foundation. She was one year old but couldn't say any basic words such as mommy and daddy. The instructors at Children's Hearing Foundation taught her each word patiently and Yi-Ting was making great progress. Soon after, we heard Yi-Ting call us mom and dad the first time! It was incredible!

Yi-Ting is now 10 years old and looks just like any other child with normal hearing. Once she starts talking, it's hard to make her stop. And she can easily argue back with more words that what we do when correcting her. Seeing how far she has come along, I found all the trials and challenge all worthwhile!

## 每天都有這樣的故事在雅文發生‧‧
### These kinds of stories happen in Children's Hearing Foundation everyday…

**17年來，雅文兒童聽語文教基金會已幫助超過3000個聽損兒童走出無聲，有您的支持，我們會繼續努力朝著「幫助更多聽損兒童學習聽與說」的目標而努力！**
Children's Hearing Foundation has helped more than 3000 hearing-impaired children to listen and speak over 17 years.
Please give us your support.
We will continue the missions of giving deaf and hearing-impaired children opportunities to listen and speak!



www.chfn.org.tw

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財團法人
雅文兒童聽語文教基金會
Children's Hearing Foundation
幫助聽損兒童學習聽與說
Helping Deaf Children Learn to listen and Speak

免費諮詢專線：北區 0800-889-881‧南區 0800-800-832

Invited Speakers

### Min-Hua Hsing

Professor, Department of Special Education,
National University of Tainan
Professional fields:
Deaf education, sign language, bilingual deaf education experiment for young children.
Prof. Min-Hua Hsing holds a Ed.D from University of Washington in 1994. She served over ten years in Taipei School for the Hearing Impaired and now she serves at the Department of Special Education, National University of Taiwan. Her professional fields are deaf education, sign language and bilingual deaf education experiment for young children.

### Yi-Ping Chang

Present Appointment:
Director, Chi-De Hearing and Speech Center, Taichung Branch of the NWL Foundation for the Hearing Impaired R.O.C.
Career Highlight: (in the past 5 years)
1. Director, Chi-De Hearing and Speech Center, Taichung Branch of the NWL Foundation for the Hearing Impaired R.O.C.
2. Audiologist, Chi-De Hearing and Speech Center, Taichung Branch of the NWL Foundation for the Hearing Impaired R.O.C.
3. Adjunct Lecturer, School of Speech Language Pathology and Audiology, Chung Shan Medical University
Academic Background: (please indicate period)
1. 2004-2007, Au.D., Department of Speech and Hearing Sciences, Indiana University
2. 1995-2000, M.A. Graduate Institute of Linguistics, National Taiwan University
3. 1991-1995, B.A. Department of English Language and Literature, National Chengchi University

### Yu-Shan Ku

Mr. Yu-shan Ku is a famous Deaf leader in Deaf field in Taiwan. He is an expert with ample experiences in teaching sign language to hearing college students and young deaf children. He has a hearing wife and 2 hearing children. His older child is currently studying deaf education Ph.D. at Lamar University, USA.

### Yu-Chih Huang

Edcuation
▪ 1994-2001 Ph.D. (Sp. Ed.), National Taiwan Normal University
▪ 1989-1991 M.A. (Sp. Ed.), National Taiwan Normal University
▪ 1985-1988 B.A. (Sp. Ed.), National Changhua University of Education
Professional Employment
▪ 2003-present Associate Professor, Department of Special Education, National Pingtung University of Education
▪ 2002-2003 Assistant Professor, Department of Special Education, National Pingtung University of Education
▪ 1991-2002 Assist ant & lecture, Department of Special Education, National Taipei University of Education
▪ 1988-1989 Special education teacher

### Ying-Chuan Julie Ma

Present Appointment:
1. Director of Audiology Department, Audiology Department, Children's Hearing Foundation
2. Committee Board Member of Taipei City Association of Audiologists
3. Lecturer, Department of Special Education, Chung Yuan Christian University
Career Highlight:
1. Clinical Supervisor, School of Speech Language Pathology and Audiology, Chung Shan Medical University
2. Clinical Supervisor, Department of Speech and Hearing Disorders and Sciences, National Taipei University of Nursing and Health Science
3. Examiner of National Audiologist Qualification Exam, Ministry of Examination
Academic Background:
1. Doctor of Audiology, Osborne College of Audiology, Salus University, 2006-2010
2. Master of Audiology, Faculty of Medical and Health Sciences, University of Auckland, 2002-2004
3. Bachelor of Technology in Biomedical Sciences, Faculty of Medical and Health Sciences, University of Auckland, 1998-2001

### Hsiu Tan Liu

Present Job Information:
▪ Associate Professor and chair of School of Speech Language Pathology & Audiology,Chung Shan Medical University, Taichung, Taiwan
▪ President of Taiwan Association for Understanding Individuals with Disabilities(TAUID)
▪ Secretary of Habitual Domain Association
Highest Education and Specialized Field:
Ph.D., National Changhua University of Education : Department of Special Education
Major Field: Special Education, Reading and Deaf Education, Sign Language, TSL/Chinese Bilingual Language

### Chii-Yuan Huang

Education
▪ 1981-1984 Taipei Municipal Chien Kuo High School, Taipei, Taiwan
▪ 1984-1991 School of Medicine , Taipei Medical University , Taipei, Taiwan. M.D.
▪ 2002-2006 Institute of Biomedical Engineering, National Cheng-Kung University, Tainan, Taiwan. Ph.D.
Clinical Training / Positions
▪ 2005-2006 TAttending Staff of Otolaryngology Head & Neck Surgery Department, Wang-Fang Municipal Hospital, Taipei
▪ 2006~ Attending Staff of Otolaryngology Head & Neck Surgery Department, Taipei Veterans General Hospital
▪ 2013~ Chief of Otology Division, Otolaryngology Head &Neck surgery Department, National Yang Ming University Hospital, Yilan
Educational / Teaching Positions
▪ 1995-1996 Cnical Lecturer, School of Medicine, National Yang-Ming University,
▪ 2006-2007 Assistant professor, School of Medicine, Taipei Medical University
▪ 2007~ Assistant professor, School of Medicine, National Yang-Ming University
Honors and Awards
▪ 2010~ Resident Teaching Award
Taipei Veterans General Hospital

## Hung-Ching Lin

### Education
- 1979-1986 Undergraduate: Chinese Medical University (Taichung, Taiwan) M.D. in Medicine Department
- 1995-1996 MSc of Audiological Medicine , University College London, U.K.

### Prior experience :
- (1992- )Senile consultant , Mackay Memorial hospital, Taipei
- (2008- ) Associate Professor , Chung-Shan Medical University
- (2008- ) Assiociate Professor , National Taipei College of Nursing
- (2009-) Chief of Department of Otolaryngology-Head & Neck Surgery, Mackay Memorial hospital, Taipei
- (2011-) Associate Professor & Chief. Department of audiology & speech language pathology, Mackay Medical College , Taipei, Taiwan

### Leicensure and credentials
- (1992- )Consultant of Taiwan Otorhinolaryngoly Society
- (1991) Research in Otology, House Ear Institute, LA, USA
- (2004-)Director, Taiwan Otorhinolaryngoly Society

## Jiunn-Liang Wu

Dr. Wu was born in Tainan, Taiwan 1963. He graduated from China Medical University (Taichung, Taiwan) and received his resident program of Otolaryngology-Head & Neck Surgery at National Cheng Kung University Hospital and became a member of Taiwan Otolaryngological Society since 1989. He has been an attending physician of Department of Otolaryngology-Head & Neck Surgery, National Cheng Kung University Hospital since 1995 and became the chairman in 2009. He is also a faculty of School of Medicine, National Cheng Kung University since 2003 and became an associate professor in 2009. Dr Wu's major interest is in Otology, Cochlear Implant & Tinnitus.

## Michael Piskosz

Michael started with ReSound as an Audiologist Regional Manager in New Zealand, and has been part of the organization since 2004. His clinical experience includes working as a clinical audiologist at the University of Miami, in Miami, FL, as well as a private ENT practice in Hollywood, FL. He has a dual undergraduate degree in Communication Sciences and Disorders and Psychology from Syracuse University, and earned his M.S. in audiology at the University of Washington, in Seattle, WA. Michael serves as a senior global audiologist on the Global Audioloy team for GN ReSound and his primary responsibilities include the development of training materials based on research and development activities, and training of ReSound personnel and hearing care professionals in the audiology industry. He also has a special focus on tinnitus and helping deliver innovative tinnitus solutions from ReSound.

## Ming-Chung Chen

Dr. Ming-Chung Chen, professor at the Department of Special Education, National Chiayi University (NCYU), serves as the chairman of the Department of Special Education and the director of the Center of Special Education currently. Dr. Chen obtained his Doctor degree from Taiwan Normal University in 2001. He teaches classes on assistive technology and digital learning for students with disabilities. Dr. Chen has clinical and research experience in computer access, augmentative and alternative communication, and digital learning.

## Brooke Hallowell

Brooke Hallowell, Ph.D., CCC-SLP is Co-Director of the Global Health Initiative, Professor and Coordinator of Ph.D. Programs in Communication Sciences and Disorders, Director of the Neurolinguistics Laboratory, Adjunct Professor of Family Medicine, Adjunct Professor of Biomedical Engineering, and Professor of Southeast Asia Studies at Ohio University. Additionally, she serves as Clinical Professor of Neurology at the University of West Virginia. She served over eight years as Associate Dean for Research and Sponsored Programs in Ohio University's College of Health and Human Services and six years as Director of the School of Hearing, Speech and Language Sciences. Given her extensive experience in boosting successful publication and extramural funding successes of students and faculty members, she is frequently invited to provide action-focused workshops on research career development and on ways to foster productive interdisciplinary and international collaboration in research and education.

## Jiann-Jou Yang

### Position
Associate Professor
Department of Biomedical Sciences,
Chung Shan Medical University

### Diploma
Ph.D. in Institute of Medicine, Chung Shan Medical University

### Experience
- 2011.02-present Associate Professor, Department of Biomedical science, Chung Shan Medical University, Taichung, Taiwan
- 2008.02-2011.01 Assistant Professor, Department of Biomedical science, Chung Shan Medical University, Taichung, Taiwan
- 2007.08-2008.01 Adjunct Assistant Professor, Department of Speech Language Pathology & Audiology and School of Medicine, Chung Shan Medical University, Taichung, Taiwan

### Interests in Research
Molecular Genetics, Genetics, Animal model, zebrafish

## Kartini Ahmad

Assoc Professor Dr Kartini Ahmad came from Universiti Kebangsaan Malaysia (UKM) and is currently the Deputy Dean of Postgraduate & International Affairs of the Faculty of Health Sciences in UKM. She began her career as a medical doctor in 1984 in the Ministry of Health Malaysia and later joined as a resident and trainee lecturer in the Otorhinolaryngology department in UKM. In 1989 she accepted the responsibility to pioneer the development of a speech pathology program for UKM- the first in the South East Asia region and from then on began her involvement in the area of Communicative Sciences. Recently she served as a Fulbright Visiting Professor with the Ohio University Communication Science Disorders, College of Health Sciences and Professions.

## Hsiu-Wen Chang

### Educational Background
- 2006-2012 Doctoral degree, Department of Biomedical Engineering, National Yang-Ming University, Taipei, Taiwan
- 1999-2001 Master's degree, Department of Speech and Hearing Sciences, Washington University in St. Louis, Missouri, USA

### Professional Experience
- 2011-2012 Research pediatric audiologist, Children's Hearing Foundation, Taipei, Taiwan
- 2010-2011 Educational audiologist, Taipei Resource Center for the Hearing Impaired, Taipei, Taiwan
- 2010-2011 Deputy Editor, Journal of Taiwan Speech-Language-Hearing Association

### Academic Appointments
- 2012-present Assistant Professor, Department of Speech and Hearing Disorders and Sciences, National Taipei University of Nursing and Health Sciences

### Academic/Professional Awards
- 2010　Doctoral Student Research Travel Award, National Science Council, Taiwan
- 2010　Doctoral Student Research Travel Award, Ministry of Education, Taiwan

## Pao Hsiang Chi

Professor Chi obtained her doctoral degree in speech-language pathology from University of Wisconsin - Madison. Currently she is the chairperson of Department of Special Education, National Taipei University of Education/Taiwan. Dr Chi's experience spans more than twenty years in the assessment of speech and language abilities of children with language disorders. She has developed 5 standardized language tests and scales. Another area of her interest has been on the phonological processing and narrative abilities of children with specific language impairment and children with hearing loss. In the past few years, Dr Chi has investigated phonological short-term memory, verbal working memory capacity, lexical learning, the acquisition of Chinese classifiers, and narrative abilities in children with specific language impairment. In addition, Dr Chi has published two text books in child language development and disorders, and many other articles and research papers in communication disorders.

# Hsiao-Chuan Chen

Hsiao-Chuan Chen is a professor of Graduate Institute of Audiology and Speech therapy in National Kaohsiung Normal University, Taiwan. She got her PH. D. degree in hearing science from University of Tennessee in 1989. Her research interests include auditory and speech perception of CI children, central auditory processing disorder, the effectiveness of the hearing conservation program, the effectiveness of the aural rehabilitation program, and FM systems.

# Sheng Hwa Chen

### Current Position
• Professor and Chair, Department of Speech and Hearing Disorders and Sciences, National Taipei University of Nursing and Health Sciences, Taipei, Taiwan

### Education
• Doctor of Philosophy, Department of Communicative Disorders, University of Wisconsin-Madison, Wisconsin, USA
• Master of Science, Department of Communicative Disorders, University of Wisconsin-Madison, Wisconsin, USA
• Bachelor of Education, Department of Health Education
National Taiwan Normal University, Taipei, Taiwan

### Previous Position
• 2012-2013 Vice President, National Taipei University of Nursing and Health Sciences, Taipei, Taiwan
• 2009-2012 Dean of Academic Affairs, National Taipei University of Nursing and Health Sciences, Taipei, Taiwan

### License
• Certificate of Clinical Competence in Speech-Language-Pathology
• American Speech-Language-Hearing Association

### Research Interests
• Voice and Voice Disorders • Swallowing Disorders
• Laryngectomee Speech Rehabilitation

# "Hope" HyangHee KIM

• Professor at Graduate Program in Speech-Language Pathology & Department of Rehabilitation Medicine, Yonsei University College of Medicine, Korea
• Former President(2011-2012) of the KASA (Korean Academy of Speech Pathology and Audiology) (http://www.kasa1986.or.kr)
• Vice President(2010- current) of the KSSS (Korean Society of Speech Science) ( http://society.kisti.re.kr/~kass/)
• Executive Council member (2011-2014) of the APSSLH (Asia Pacific Society for the Study of Speech, Language, and Hearing).
• PhD, Department of Communicative Disorders, University of Wisconsin-Madison, USA
• ASHA CCC-SLP
• BC-ANCDS (Board Certified-Academy of Neurologic Communication Disorders & Sciences)

# Zulin Dou

Professor Dou Zulin is chairman director of department of rehabilitation medicine, 3rd affiliated hospital Sun Yat-sen university, graduated from Department of Rehabilitation Sciences, The Hong Kong Polytechnic University as PhD in 2006.
His clinical research and interests include muscle spasticity, functional dysphagia and cognitive deficits assessment and treatment. He has extensive experiences in using modified catheter dilatation treating cricopharyngeal achalasia and ultrasound guided Botox injection treating spasticity.
More than 80 publications in total, including 7 books as editor in chief. 60 refereed papers (published and accepted for publish), 8 papers covered by the SCI or SSCI. 20 conference refereed presentations and poster and other publications, 35 presentations in international and local invited lecture and plenary sessions. 2 computer softwares, and website for public communication (www.zssykfk.com) and service.
There are more than 10 projects in research which are aided financially by country, Guangdong province and Sun Yat-sen univercity respectively. including international cooperation research between China and Finland, The national natural science foundation of China etc
Professor Dou is associate editor in chief in Journal of Chinese Physical Medicine & Rehabilitation; vice-president of Rehabilitation Medicine Association of Guangdong Province; associate – president of neurorehabilitation committee of Chinese Rehabilitation Medicine Association; etc.

# Sally Hewat

Dr Sally Hewat is the Head of the Speech Pathology at the University of Newcastle, Australia. Sally is a certified practicing speech pathologist with specialist expertise in the area of stuttering. Sally leads a team of clinical researchers at the University of Newcastle Stuttering Research Clinic. Sally has presented and published internationally and is recognized for her work in the development and evaluation of treatments for people who stutter and innovative service delivery models in speech therapy. Sally has been an investigator on numerous competitive research grants totaling in excess of $4 million. She has been invited to various Universities throughout Australasia to teach in her areas of speciality. Sally is on the Board of Directors of the Trinh Foundation Australia, a non-government organization supporting the training and development of speech-language pathology in Vietnam.

# Jing-Yi Jeng

Graduate Institute of Audiology and Speech Pathology, National Kaohsiung Normal University
My research focuses on the area of speech acoustics, speech timing and speech perception. I am particularly interested in the topics of speech rhythm, for example what's the relationship between the speech production and perception about the role of speech isochrony. The key importance to my research is how individuals perceive speech rhythm and how they integrate contextual information to segmentation speech into comprehesible units or fragments. Utilizing acoustic analysis and perceptual experiments, I hope to elucidate the role of speech timing in the trajectory from children to adults, and identify means of intervention for those at-risk for dyslexia. I also have broad interests in speech testing, particularly the phonological tests for children. Currently, I have a research project about developing a articulatory test for preschool children. The ultimate goal of this project is to establish a testing battery for spech sound disorders.

# Jen-Tsung Lai

## Education
- (1976~1983) School of Medicine, Taipei Medical University, Taipei, Taiwan
- (1985~1989) Resident, Chief of Residents of Department of Otolaryngology, Taichung Veterans General Hospital, Taichung, Taiwan
- (1990~1991) Fellow of Massachusett's Eye and Ear Infirmary, Harvard Medical School, Boston, Massachusetts, USA

## Work experience
- (2011~Present) Supervisor of Taichung County Medical Association
- (2001~2007) Chief Editor of Taiwan Otolaryngological Society Newsletter
- (2010~Present) Chief Editor of Taiwan Otolaryngological Society Newsletter

## Present job
- Executive Directors of Taiwan Otolaryngological Society
- Director of Taiwan Otolaryngological Society Specialist Training Committee

## Clinical feature and Awards
- Symbol of National Quality (SNQ) for temporal bone dissection course in KTGH, 2009~2010

# Henry L. Lew

Henry L. Lew, MD, PhD, CCC-A, is a board-certified physician in Physical Medicine and Rehabilitation (PM&R), as well as a certified audiologist by ASHA. He received his PhD training (Audiology and Communication Sciences) at Baylor College of Medicine in Houston, followed by PM&R residency and fellowship training at the University of Washington in Seattle.

Dr. Lew served as Clinical Assistant and Associate Professor at Stanford University School of Medicine (2000-2008), Associate Professor at Harvard Medical School (2008-2010), Rehabilitation Consultant for the Defense and Veterans Brain Injury Center (DVBIC), and Adjunct Professor in the Department of PM&R at Virginia Commonwealth University (2010-present).

Currently, Dr. Lew is a Tenured Professor and Chair of the Department of Communication Sciences and Disorders at the University of Hawaii, School of Medicine (2010-present). To date, he has published 125 scientific articles, 11 book chapters, and 2 textbooks. In the past decade, Dr. Lew has been awarded multiple federal grants to study the diagnosis and rehabilitation of brain injury, with emphasis on promoting evidence-based clinical practice.

# Masae Shiroma

## Degree
- 1981 M.A. Speech-Language Pathology and Audiology University of Oregon
- 2000 Ph.D. Medical Sciences The University of Tokyo

## Academic Appointments
- 2002-Current (2013) Professor, International University of Health and Welfare, Department of Speech, and Hearing Sciences, Tochigi, Japan (Director)

## Areas of Research Interest
- Development of Speech Recognition Test in Japanese
- Speech Perception of Cochlear Implant
- Perception of Music in Cochlear Implant Recipients
- Development of Hearing in Noise Test in Japanese
- Speech reading training system

## Teaching Activities
- Undergraduate students and Graduate students: Classroom, Seminar or Teaching Laboratory, Clinical Training, Individual instruction (graduate students)
- Subjects: Introductory and Advanced Audiology, Introductory and Advanced Hearing Science, Speech and Hearing Processes, Cochlear Implants, Seminars in Clinical Audiology, Pediatric Audiology, Adult Hearing Impairments

# Manwa L. Ng

## Education
- 1996 Ph.D. in Speech Science, University of Connecticut, U.S.A. Dissertation: A Perceptual and Acoustic Study of Alaryngeal Speech in Adult Cantonese-Speaking Males
- 2000 M.A. in Applied Computer Science, Illinois State University, U.S.A. Project: A Web-based Conversational Academic Scoring System – Development using Voice Extensible Markup Language
- 1993 M.A. in Speech Science, University of Connecticut, U.S.A. Thesis: An Aerodynamic and Acoustic Study of Laryngitic Hoarseness

## Teaching Experience
- Associate Professor (2006 - present) Organization: Division of Speech and Hearing Sciences, Faculty of Education, University of Hong Kong, Hong Kong.
- Associate Professor (2004 - 2006) Organization: Department of Communication Sciences and Disorder, Long Island University, U.S.A.
- Associate Professor (Spring 2006) Organization: Department of Physics, Long Island University, U.S.A.
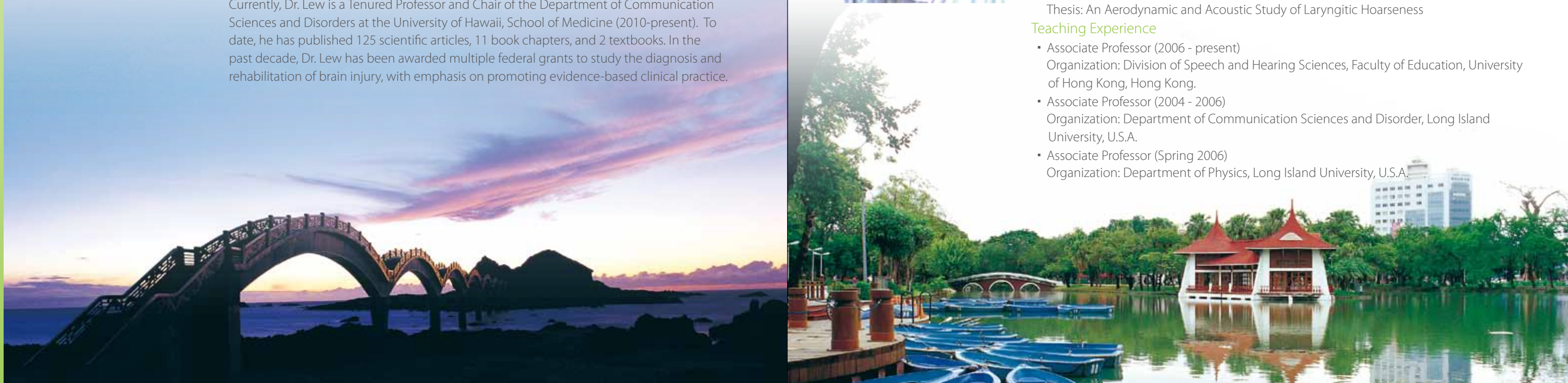
# Isamu Shibamoto

## Education
- 2000 University of Arkansas at Little Rock
  Dept. of Audiology and Speech Pathology
- 2002 Tokyo Medical and Dental University
  Dept. of Gerodontology

## Work experience
- 1988 Nakaizu Onsen Hosp.  Dept. of Speech and Language Therapy
- 1994 Seirei Mikatahara General Hosp. Dept. of Rehabilitation Medicine
- 2001 Seirei Hamamatu General Hosp. Dept. of Rehabilitation Medicine

## Certification
- Japanese National License in Speech Language Hearing Therapy
  Certified Clinician in Swallowing therapy
- Japanese Association of Speech Language Hearing Therapists

# Chu-Hsiu Teng

Dr. Teng received her Ph.D. degree from National Kaohsiung Normal University (NKNU) with a major in communication disorders.  She is a part-time Assistant Professor teaching AR-related courses at the Graduate Institute of Audiology and Speech Therapy in NKNU, the Department of Speech and Hearing Disorders and Sciences in National Taipei University of Nursing and Health Sciences (NTUNHS), and the School of Speech Language Pathology and Audiology in Chung Shan Medical University (CSMU). She is a certified audiologist and a certified speech-language pathologist, and also a Listening and Spoken Language Specialist Certified Auditory-Verbal Therapist (LSLS Cert. AVT). She was formerly the chief executive officer, supervisor, and mentor at Southern Center in Children Hearing Foundation. She has provided auditory-verbal therapy for hearing-impaired children with hearing aids and cochlear implants since 1997. Currently, Dr. Teng's clinical expertise is mainly focused on auditory habilitation/rehabilitation, and her research interests include speech and tone perception in cochlear-implant users.
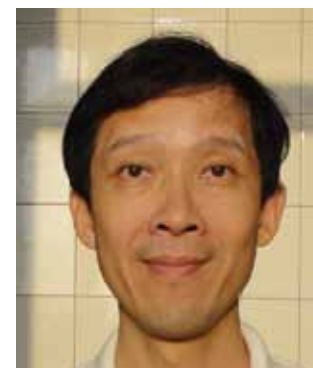
# Yi-Min Tien

Dr. Yi-Min Tien is an Assistant Professor in the Department of Psychology at the Chung Shan Medical University. He received his Ph.D. from the National Chung Cheng University of Taiwan in 2004. He received the scholarship funded by National Science Council of Taiwan to be a visiting scholar in the Department of Linguistics at University of Maryland in 2004-2005. His research interests include Mandarin sentence processing and cognitive control. Using both behavioral and electrophysiological (event-related potentials; ERPs) methods, his current research focuses on sentence processing of gifted students, emotional Stroop effect of patients with depression, and cross-modalities cognitive control of children with AD/HD.

# Meng-Ju Tsai

Meng-Ju Tsai is an Assistant Professor in the School of Speech Language Pathology & Audiology at Chung Shan Medical University in Taichung, Taiwan. His major research interests are augmentative and alternative communication (AAC) and conversations analysis. He is also a member of the International Society of Augmentative and Alternative Communication (ISAAC) and a member of American Speech, Language, and Hearing Association (ASHA) Special Interest Division 12. He is currently serving the President of Taiwan Society of Augmentative and Alternative Communication (2013-2016) and the Secretary of the Asia Pacific Society for the Study of Speech, Language and Hearing (2010-2014).

# Chih-Kang Yang

Dr. Yang earned his doctoral degree from University of Nebraska-Lincoln in the area of augmentative and alternative communication. His adviser is world renowned AAC scholar Dr. David R. Beukleman. Presently, Dr. Yang is one of faculty members in the Department of Special Education with the Graduate Institute of Special Needs and Assistive Technology, National Dong Hwa University. In addition, Dr. Yang has served as the International council chairperson of International Society for Augmentative and Alternative Communication from 2012 to 2014. He has devoted his life to promote the communication right for individuals with complex communication needs.

## Frances Nan Mai Wang

- Professor Wang currently serves as the President of the Asia Pacific Society for the Study of Speech, Hearing and Language (APSSLH) until 2014. She is also holding the 2013 Asia Pacific Conference on Speech, Hearing and Language as the Presidency.
- She is holding teaching position as an associate professor at the School of Speech Language Pathology and Audiology in Chung Shan Medical University, Taichung City, Taiwan. She is a certified speech language pathologist in Taiwan and had been conducting many speech language workshops nationally and internationally
- She had been served as the first Chairperson of the School of Speech Language Pathology and Audiology in Chung Shan Medical University for five years
- She had been served as the Editor of Chief of the Official Journal of Taiwan Speech-Language-Hearing Association (TSLHA).
- She was the recipient of the Best Contribution Award in the Speech, Language, and Hearing profession from the TSLHA.
- Her major research interests are speech perception tests of cochlea implanted children, life of quality of Mandarin cochlea implanted children, clinical assessment of voice disorders and had presented and published over 30 research papers.
- Her teaching courses include Aural rehabilitation, Assessment and diagnosis of communication disorders, Voice disorders, craniofacial anomaly and communicative disorders, SLP clinical supervisor

## Edward Y. Yang

### Present Appointment
Professor, Speech and Hearing Disorders and Sciences, Taipei University of Nursing and Health Sciences

### Career Highlight
Professor and Chair, Speech and Hearing Disorders and Sciences, Taipei University of Nursing and Health Sciences

### Academic Background:
- 1986   Ph.D. Communication Disorders, University of Texas at Dallas, Dallas, Texas, USA
- 1981   M.C.D. Audiology, Louisiana State University Medical Center, New Orleans, Louisiana, USA

### Honor and Awards:
Editor's Award for Outstanding Paper, 1987, Ear and Hearing:Yang, E.Y., Rupert, A.L. and Moushegian, G.  A developmental study of bone-conduction auditory brainstem response in infants.  Ear and Hearing, 8:244-251, 1987

## Shu-Lan Yang

- 2011-present  Board member of Speech-language Therapist Examination, Examination Yuan,   ROC
- 2006-present  Board member of Medicine-related Department Evaluation, Higher Education   Evaluation and Accreditation Council for Taiwan
- 2011-present  Country representative, International Cluttering Association
- 2013-present  Advisory Board member, Chowanna, Poland

### Specialty Board Qualifications
- 2008-present  Editor Consultant of Journal of the Speech-Language-Hearing Association of Taiwan
- 2011-2015 Trustee of Taiwan Academy of Learning Disabilities
- 2005-2011 Supervisor of Taiwan Academy of Learning Disabilities
- 2003      Certification of Counseling Psychologist, ROC

## Congress Venue

Nan Shan Education & Training Center (ETC), Taichung, Taiwan

Address: No. 300, Chenggong W. Rd., Wuri Dist., Taichung City, Taiwan

( 台中市烏日區成功西路 300 號 )

Tel: 886 4 2389-1000

Website: http://www.ns-etc.com.tw/etc/

## Official Language

English is the official language. No simultaneous interpretation will be offered.

## Participant Badge & Certificate of Attendance

Participant badge, congress satchel and the program book will be distributed at Registration counter. Please wear the participant badge to access the scientific session and exhibition area.

## Shuttle Bus Information

| Congress Free Shuttle Bus | Departure date & time |
|---|---|
| Taiwan High Speed Rail Taichung Station ▶ Nan Shan Education & Training Center | 11 / 01  07 : 20 |
| | 11 / 02  07 : 20 |
| | 11 / 03  07 : 20 & 08 : 20 |
| Nan Shan Education & Training Center ▶ Taiwan High Speed Rail Taichung Station | 11 / 01  17 : 50 |
| | 11 / 02  16 : 50 |
| | 11 / 03  12 : 20 |
| **Conference Dinner** Freshfields Hotel ▶ Taiwan High Speed Rail Taichung Station | 11 / 02  21 : 10 |

## Operation Hours and Location

| Registration Location: B1F | 10/31 (Thu) | 08:00-15:00 |
| | 11/01 (Fri) | 08:00-17:30 |
| | 11/02 (Sat) | 08:00-17:30 |
| | 11/03 (Sun) | 08:00-12:00 |
| Exhibition & Poster Location: Lounge, B1F | 11/01 (Fri) | 08:30-17:30 |
| | 11/02 (Sat) | 08:30-17:30 |
| | 11/03 (Sun) | 08:30-12:00 |
| Secretariat Room Location: 1F, Rm 110 | 10/31(Thu)- 11/02 (Sat) 11/03(Sun) | 08:00-17:30 08:00-12:00 |
| Preview Room Location: 1F, Rm 111 | 10/31(Thu)- 11/02 (Sat) 11/03(Sun) | 08:00-17:30 08:00-12:00 |

| Welcome Reception | 18:30-21:00, Oct 31 |
| Unique Inn 非常棧會館 | Add: No. 150, Sec. 2, Dongxing Rd., Nantun Dist., Taichung City ( 台中市東興路二段 150 號 ) Tel: 04- 24732799 |
| Conference Dinner | 18:30-21:00, Nov 2 |
| Freshfields Hotel 清新溫泉酒店 | Add: NO.2, Wen-Quan Road, Wurih Taichung, Taiwan ( 台中市烏日區溫泉路 2 號 ) Tel: 04-23829888 *By reservation only* |

## Floor Guide

### Nan Shan Education & Training Center, Taichung City, Taiwan
### B1 Floor Guide

A01 Phonak Taiwan
A02 Formosa Medical Instruments Co., Ltd.
B01-02 Bay Audio Taiwan
B04 Maney Publishing
B05 Utechzone Co., Ltd.
B06-07 Sentosa Taiwan
B08 The Speech-Language-Hearing Association, Taiwan

B10-11 Pentax Medical Singapore Pte. Ltd.
B12-13 Clinico Instrument Co., Ltd.
B14 Northern Digital Inc.
B16-17 Jen Sound Enterprise Co., Ltd.

T01 IOPI Medical LLC
T02 (Unlimiter) Assistive Technology Engineering Lab

## Oral Presentation Guideline

- It's obliged that we receive your presentation slides before the presentation starts. **Please upload and test your slides at Preview Room.**
- 10-20 mins of Q&A allocated at the end of the session.
- For those who bring Mac laptop, please bring the **Apple DVI to VGA** display adapter. The connector of the projector is D-SUB, if you prefer to use your own laptop, please advise the secretariat prior to the meeting and be sure the correct adapter is brought with you.
- The projector we use does not **support** Full HD video mode. If you are preparing a video to share, please avoid using this kind of file format.

## Poster Presentation Guideline

- Posters will be displayed in the exhibition, B1 Floor in Nan Shan Education & Training Center
- It's optional that presenting authors stand-by their poster at the coffee break during their assigned date or authors can also elect to stay longer. The presenting author should be available and willing to engage in dialogue about their work displayed, printing material is also optional to be prepared.

| Mounting | Begin mounting poster from 08:00<br>Necessary office supplies for mounting will be provided on-site and Staple guns are strictly prohibited |
|---|---|
| Removal | Posters must be removed immediately at the end of each session, so that the boards may be prepared for the next session. The Congress Secretariat will dispose it without further notice. |

## Program at a Glance

| | Day 1 | | Day 2 | | Day3 |
|---|---|---|---|---|---|
| | 10/31 Thu | | 2013/11/01 (Fri.) | | 2013/11/02 (Sat.) |

**Day 1 — 10/31 Thu**

| | | Chung Shan Medical University Rm 1313 | 3F, Rm 312 |
|---|---|---|---|
| AM | | Cross Strait Forum | APEC SLP Meeting |
| | Lunch | | |
| PM | | Cross-strait forum | APEC SLP Meeting |
| 1830–2100 | Welcome Reception@ Unique Inn 非常棧會館 | | |

**Day 2 — 2013/11/01 (Fri.)**

| Time | Speech, Language & Pathology Rm B101 | Time | Audiology B1, Rm B102 |
|---|---|---|---|
| 0900–0930 | Opening Remarks@Rm B102 | | |
| 0930–1030 | [S1] Keynote Speech DOES THE CORTICOSTRIATAL SYSTEM CONTRIBUTE TO SLI? Speaker: Bruce Tomblin Moderator: Pao-Hsiang Chi | 0930–1030 | [A1] Keynote Speech ADVANCES IN AUDITORY PROSTHESES Speaker: Fan-Gang Zeng Moderator: Hsiao-Chuan Chen |
| 1030–1050 | Morning Tea | | |
| 1050–1200 | [S2] Oral Presentation Moderator: Julie A.G. Stierwalt Zulin Dou | 1050–1200 | [A2] Oral Presentation Moderator: Sumalai Maroonroge Hung-Ching Lin |
| 1200–1330 | | 1200–1330 | Lunch at Rm B102 |
| 1330–1500 | [S3] Oral Presentation Moderator: Sheng Hwa Chen Manwa L. Ng | 1330–1500 | [A3] Oral Presentation Moderator: Hsiu Wen Chang |
| 1510–1540 | [S4] Special Topic @ Rm B101 MATURATION OF MISMATCH NEGATIVITY TO CHANGES OF MANDARIN LEXICAL TONES IN INFANTS AND YOUNG CHILDREN AND ITS RELATIONSHIP TO LITERACY DEVELOPMENT Speaker: Chia Yine Lee Moderator: Yi-Min Tien | | |
| 1540–1600 | Afternoon Tea | | |
| 1600–1730 | [S5] Oral Presentation Moderator: Pao-Hsiang Chi Bruce Tomblin | 1600–1730 | [A4] Round Table REHABILITATION FOR THE HEARING-IMPAIRED CHILDREN Speaker: Yi-Ping, Chang, Min-Hua Hsing, Yu-Chih Huang, Yu-Shan Ku, Ying-Chuan Julie Ma Moderator: Hsiao-Chuan Chen Sumalai Maroonroge |
| 1830–2100 | At Leisure | | |

Registration / Exhibition / Poster

**Day 3 — 2013/11/02 (Sat.)**

| Time | Speech, Language & Pathology B1, Rm B101 |
|---|---|
| 0830–0930 | [S6] Keynote Speech DYSPHAGIA MANAGEMENT FOR HEAD AND NECK CANCER: CLINICAL CHALLENGES AND FACTORS INFLUENCING FUTURE SERVICE DELIVERY Speaker: Elizabeth Ward Moderator: Sheng Hwa Chen |
| 0930–0950 | Morning Tea |
| 0950–1200 | [S7] Oral Presentation Moderator: Frances Nan Mai Wang |
| 1200–1330 | |
| | Speech, Language & Pathology Rm B102 |
| 1310–1530 | [S8] Oral Presentation Moderator: Kartini Ahmad Jing-Yi Jeng |
| 1510–1530 | Afternoon tea |
| 1530–1630 | [S9] Oral Presentation Moderator: Sally Hewat Shu-Ian Yang |
| 1830–2100 | |

Registration / Exhibition / Poster 2

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| | Day3 | | | Day 4 |
|---|---|---|---|---|
| | 2013/11/02 (Sat.) | | | 2013/11/03 (Sun.) |

**Day 3 — 2013/11/02 (Sat.) (continued)**

| Time | Audiology B1, Rm B102 | Time | AAC 3F, Rm 301.302 | Time | |
|---|---|---|---|---|---|
| 0900–1000 | [A5] Keynote Speech EVIDENCE-BASED PRACTICE (EBP) AND CLINICAL PRACTICE Speaker: Lena Wong Moderator: Edward Yih-Liang Yang | 0900–1000 | [C1] Keynote Speech AAC ASSESSMENT ISSUES FOR INDIVIDUALS WITH AUTISM SPECTRUM DISORDER Speaker: Pat Mirenda Moderator: Chih-Kang Yang | | |
| 1000–1030 | Morning Tea | 1000–1030 | Morning Tea | | |
| 1030–1200 | [A6] Oral Presentation Moderator: Edward Yih-Liang Yang | 1030–1100 | Special Topic [C2] WHAT WE LEARN FROM THE AAC RESEARCHES IN TAIWAN? Speaker: Ming-Chung Chen | | |
| | | 1100–1130 | [C3] HARNESSING THE POWER OF THE EYE-MIND RELATIONSHIP: USING EYETRACKING FOR CLINICAL RESEARCH ON COGNITIVE AND LINGUISTIC PROCESSING Speaker: Brooke Hallowell Moderator: Meng-Ju Tsai | | |
| 1200–1330 | [A7] Lunch Symposium Bay Audio Rm B102 | 1200–1330 | | 1200–1245 | [T1] Lunch Symposium Taiwan Voice Society B1, Rm B101 |
| | Audiology 3F, Rm 301&302 | | AAC Master Class 3F, Rm 312 | 1245–1330 | Taiwan Voice Society Rm B101 General assembly of TVS |
| 1300–1500 | [A8] Special Topic TAIWAN SIGN LANGUAGE ABILITY ASSESSMENT AND RELATED STUDIES Speaker: Hsiu-Tan Liu Moderator: Chu-Hsiu Teng | 1330–1630 | AAC Master Class By Reservation Only Sponsored by Utechzone Speaker: Pat Mirenda Moderator: Ming-Chung Chen | 1330–1400 | [T2] LEMG GUIDED HYALURONIC ACID VOCAL FOLD INJECTION FOR UNILATERAL VOCAL FOLD PARALYSIS Speaker: Chen-Chi Wang Moderator: Ka-Wo Lee |
| | | | | 1400–1430 | [T3] IRRITABLE LARYNX SYNDROME AND CENTRAL SENSITIVITY DISORDERS Speaker: Murray Morrison Moderator: Pen-Yuan Chu |
| 1430–1500 | Afternoon tea | | | 1430–1500 | Afternoon tea |
| 1500–1630 | [A9] Round Table TINNITUS MANAGEMENT Speaker: Hung-Ching Lin, Jiunn-Liang Wu, Tien-Chen Liu, Chii-Yuan Huang Moderator: Jen-Tsung Lai Fan-Gang Zeng | | | 1500–1530 | [T4] MANAGEMENT OF CHRONIC UNEXPLAINED COUGH & LARYNGOPHARYNGEAL REFLUX Speaker: Murray Morrison Moderator: Tuan-Jen Fang |
| | | | | 1530–1600 | [T5] INTRALESIONAL STEROID INJECTION FOR BENIGN VOCAL FOLD DISORDERS Speaker: Chi-Te Wang Moderator: Tzer-Zen Huang |
| 1630–1730 | | 1630–1730 | APSSLH General Assembly @ Rm 312 | 1600–1630 | 1600–1605 Closing Remark 1605–1630 TVS Committee Meeting |
| 1830–2100 | Conference Dinner @ Freshfields Hotel - Moon& Star Banquet Room 清新溫泉星月廳 | | | | |

Registration / Exhibition / Poster 3

**Day 4 — 2013/11/03 (Sun.)**

| Time | Speech, Language & Pathology B1, Rm B101 | Time | Audiology B1, Rm B102 |
|---|---|---|---|
| 0830–0930 | [S10] Keynote Speech PRINCIPLES OF MOTOR LEARNING: APPLICATION TO AOS AND OTHER SPEECH PRODUCTION IMPAIRMENTS Speaker: Julie A.G. Stierwalt Moderator: Hyang Hee Kim | 0930–1000 | [A10] Special Topic INSIGHT INTO CONNEXIN GENES IN NON-SYNDROMIC HEARING LOSS: FROM PHENOTYPE TO GENOTYPE TO MOLECULAR MECHANISM AND THE APPLICATION ON DIAGNOSIS Speaker: Jiann-Jou Yang Moderator: Henry Lew, Lena Wong |
| 0930–0950 | Morning Tea | 1000–1030 | Morning Tea |
| 0950–1130 | [S11] Oral Presentation Moderator: Elizabeth Ward Isamu Shibamoto | 1030–1130 | [A11] Oral Presentation Moderator: Henry Lew Lena Wong |
| 1130–1200 | Closing Remarks B1, Rm B102 | | |

**Daily Program**    Speech, Language and Pathology

| Session code | Time | Title | Speaker | Moderator |
|---|---|---|---|---|
| S-1 | 09:30-10:30 | Keynote Session:<br>DOES THE CORTICOSTRIATAL SYSTEM CONTRIBUTE TO SLI? | Bruce Tomblin | Pao-Hsiang Chi |
| | 10:30-10:50 | Morning Tea | | |
| S2-1 | 10:50-11:00 | "SEVERITY" OF THE APHASIC SUBJECTS | Ching-Ching Lu | Julie A.G. Stierwalt<br>Zulin Dou |
| S2-2 | 11:00-11:10 | OBJECTIVE MEASUREMENT ON KOREAN MICROGRAPHIA IN PARKINSON'S DISEASE | Hyang Hee Kim | |
| S2-3 | 11:10-11:20 | INCREASING ALIGNMENT IN CONVERSATION DURING APHASIA COUPLES THERAPY | Larry Boles | |
| S2-4 | 11:20-11:30 | VALIDATION OF THE MANDARIN CHINESE VERSION OF THE EYE-TRACKING-BASED MULTIPLE-CHOICE TEST OF AUDITORY COMPREHENSION | Brooke Hallowell | |
| S2-5 | 11:30-11:40 | THE ASSESSMENT OF FIDELITY IN A MOTOR SPEECH TREATMENT APPROACH | Roslyn Ward | |
| S2-6 | 11:40-11:50 | A STUDY ON MYELINATION OF PRIMARY CORTICES AND LANGUAGE CENTERS IN BRAIN USING MRI | Peijen Su | |
| | 11:50-12:00 | Q&A | | |
| | 12:00 13:30 | Lunch at B1F, Cafeteria | | |
| S3-1 | 13:30-13:40 | EFFECTS OF SURFACE ELECTRICAL STIMULATION ON VOICE PRODUCTION IN NORMAL NON-DYSPHONIC ADULTS | Edwin Yiu | Sheng Hwa Chen<br>Manwa L. Ng |
| S3-2 | 13:40-13:50 | EFFECTS OF LOW CURRENT ELECTRICAL STIMULATION OF NECK MUSCLES ON VOICING | Edwin Yiu | |
| S3-3 | 13:50-14:00 | THE MORE THE MERRIER: THE ROLE OF GROUP CLIMATE IN EFFECTIVE GROUP VOICE THERAPY | Thomas Law | |
| S3-4 | 14:00-14:10 | ACOUSTIC CHARACTERISTICS OF BREATHINESS IN CONNECTED SPEECH | Emily Lin | |
| S3-5 | 14:10-14:20 | META-PERCEPTION OF ATTITUDE JUDGMENT IN INDIVIDUALS WITH VOICE PROBLEMS | Estella Ma | |
| S3-6 | 14:20-14:30 | ABCLOVE VOICE TRAINING FOR THE MANAGEMENT OF SPASMODIC DYSPHONIA | Laishyang Ouyoung | |
| S3-7 | 14:30-14:40 | SCREENING FOR DYSPHONIA IN SCHOOL-AGE CHILDREN USING A MULTI-PARAMETRIC APPROACH | Estella Ma | |
| | 14:40-15:00 | Q&A | | |
| | 15:00-15:10 | INTERVAL | | |
| S4 | 15:10-15:40 | Special Topic:<br>MATURATION OF MISMATCH NEGATIVITY TO CHANGES OF MANDARIN LEXICAL TONES IN INFANTS AND YOUNG CHILDREN AND ITS RELATIONSHIP TO LITERACY DEVELOPMENT | Chia Yine Lee | Yi-Min Tien |
| | 15:40-16:00 | Afternoon Tea | | |
| S5-1 | 16:00-16:10 | CONTRIBUTIONS OF MORPHO-SYNTAX AND DISCOURSE SKILLS TO READING IN HONG KONG CHINESE-SPEAKING ADOLESCENTS WITH DYSLEXIA | Kevin K H Chung | Pao-Hsiang Chi<br>Bruce Tomblin |
| S5-2 | 16:10-16:20 | THE EFFECTS OF THE EMERGENT LITERACY CURRICULUM ON THE LANGUAGE DELAYED YOUNG CHILDREN | Chiu-Ling Wang | |
| S5-3 | 16:20-16:30 | NARRATIVE ABILITIES IN BILINGUAL CHILDREN WITH CLEFTS: THE INFLUENCE OF VOCABULARY AND COGNITION | Xin Yin Cara Chong | |
| S5-4 | 16:30-16:40 | A RANDOMIZED CONTROLLED TRIAL OF SYNTAX INTERVENTION IN CANTONESE-SPEAKING SCHOOL AGE CHILDREN | Kit Sum To | |
| S5-5 | 16:40-16:50 | SEMANTICS AND SYNTAX OF MOTION VERBS IN VIDEO DESCRIPTIONS AND NARRATIVES BY ENGLISH- AND MANDARIN-SPEAKING CHILDREN | Shanju Lin | |
| S5-6 | 16:50-17:00 | VERBAL LEARNING IN CHILDREN WITH SPECIFIC LANGUAGE IMPAIRMENT | Hsin-Jen Hsu | |
| S5-7 | 17:00-17:10 | SPEECH PERCEPTION DEFICITS IN CHILDREN WITH READING DIFFICULTIES | Huei-Mei Liu | |
| | 17:10-17:30 | Q&A | | |

# Nov 2
## B1F, RM B101

| Session code | Time | Title | Speaker | Moderator |
|---|---|---|---|---|
| S6 | 08:30-09:30 | DYSPHAGIA MANAGEMENT FOR HEAD AND NECK CANCER: CLINICAL CHALLENGES AND FACTORS INFLUENCING FUTURE SERVICE DELIVERY | Elizabeth Ward | Sheng Hwa Chen |
| | 09:30-09:50 | Morning Tea | | |
| S7-1 | 09:50-10:00 | ADVOCATING FOR FIJI ISLANDERS WITH COMMUNICATION DISABILITY. | Suzanne C. Hopf | Frances Nan Mai Wang Masae Shiroma |
| S7-2 | 10:00-10:10 | CLINICAL LEARNING AND PRACTICE: THE HOPES AND CONCERNS OF SPEECH PATHOLOGY STUDENTS | Anne Hill | |
| S7-3 | 10:10-10:20 | SIMULATED LEARNING ENVIRONMENTS VIA VIDEOTELECONFERENCING TECHNOLOGY FOR SPEECH PATHOLOGY STUDENTS IN AUSTRALIA: BARRIERS AND FACILITATORS TO IMPLEMENTATION. | Simone Howells | |
| S7-4 | 10:20-10:30 | SPEECH-LANGUAGE PATHOLOGY IN MALAYSIA- CHALLENGES IN DEVELOPMENT AND SUSTENANCE. | Kartini Ahmad | |
| S7-5 | 1030-10:40 | RESEARCH STATUS ON SPEECH AND LANGUAGE PATHOLOGY IN LAST TWENTY YEARS IN MAINLAND OF CHINA | Xing Jin | |
| S7-6 | 10:40-10:50 | LANGUAGE DIVERSITY, USE, MAINTENANCE, AND LOSS IN YOUNG AUSTRALIAN CHILDREN | Sarah Verdon | |
| S7-7 | 10:50-11:00 | MULTILINGUAL SERVICES IN AUSTRALIAN SPEECH-LANGUAGE PATHOLOGY | Sarah Verdon | |
| S7-8 | 11:00-11:10 | CORE VOCABULARY SELECTION FOR CHILDREN WITH COMPLEX COMMUNICATION NEEDS IN THAILAND | Nitha Ungsuprasert | |
| S7-9 | 11:10-11:20 | STORY STRUCTURE IN THE ORAL NARRATIVES TOLD BY STUDENTS WITH INTELLECTUAL DISABILITIES | Pao-Hsiang Chi | |
| S7-10 | 11:20-11:30 | LANGUAGE IMPAIRMENTS (SLI/LI) IN MONOLINGUAL AND MULTILINGUAL CHILDREN SPEAKING TURKISH | Seyhun Topbas | |
| | 11:30-12:00 | Q&A | | |
| T1 | 12:00 12:45 | Lunch Symposium MUSCLE TENSION DYSPHONIA & MUSCULAR ASSESSMENT OF THE LARYNX | Murray Morrison | Tzu-Yu Hsiao |
| Lunch Break & Interval | | - SLP Session: B1F, Room B102     - Audiology Session: 3F, Rm 301&302 <br> - AAC Master Class: 3F, Rm 312     - Taiwan Voice Society Symposium: B1F, Room B101 | | |

## B1F, RM B102

| Session code | Time | Title | Speaker | Moderator |
|---|---|---|---|---|
| S8-1 | 13:30-13:40 | PHONOLOGICAL TREATMENT OF ARABIC-SPEAKING CHILDREN | Manal Alsaad | Kartini Ahmad Jing-Yi Jeng |
| S8-2 | 13:40-13:50 | EFFECT OF PRENATAL MATERNAL DEPRESSION ON EARLY SPEECH SOUND ACQUISITION | Kei Yan Gillian Wong | |
| S8-3 | 13:50-14:00 | BREATHING PATTERNS IN CHILDREN WITH AND WITHOUT ASTHMA: A PRELIMINARY STUDY OF TASK AND READING DIFFICULTY EFFECTS | Emily Lin | |
| S8-4 | 14:00-14:10 | PROCESSING ACOUSTIC VARIABILITY IN MANDARIN TONE PERCEPTION BY NATIVE AND NON-NATIVE LISTENERS | Chao-Yang Lee | |
| S8-5 | 14:10-14:20 | ACOUSTIC ANALYSIS OF VOICE: IRANIAN TEACHERS | Ali Dehqan | |
| S8-6 | 14:20-14:30 | USING THE NEURAL NETWORK MODEL TO SIMULATE THE NEURAL RESPONSE OF THE VOWEL PERCEPTION. | Tao-Wei Wang | |
| S8-7 | 14:30-14:40 | THE INTERACTION BETWEEN ORAL PROFICIENCY AND PRONUNCIATION FEATURES ON CHINESE EFL LEARNERS' INTELLIGIBILITY | Feng-Lan Kuo | |
| S8-8 | 14:40-14:50 | THE DEVELOPMENT OF A NEW DISYLLABIC SPEECH PERCEPTION MATERIAL KNOW AS THE CANTONESE SPOKEN WORD RECOGNITION TEST (CANSWORT) | Kathy Y.-S Lee | |
| | 14:50-15:10 | Q&A | | |
| | 15:10-15:30 | Afternoon tea | | |
| S9-1 | 15:30-15:40 | UNRAVELLING THE LIDCOMBE PROGRAM: INVESTIGATING THE NEED TO ASK CHILDREN TO CORRECT THEIR STUTTERING | Michelle Donaghy | Sally Hewat Shu-Lan Yang |
| S9-2 | 15:40-15:50 | SHORT-TERM OUTCOMES OF THE VIDEO SELF-MODELING TREATMENT FOR ADULTS WHO STUTTER | Shin Ying Chu | |
| S9-3 | 15:50-16:00 | TREATMENT FOR VIETNAMESE ADULTS WHO STUTTER | Sally Hewat | |
| S9-4 | 16:00-16:10 | INHIBITORY CONTROL FUNCTION OF SCHOOL - AGED CHILDREN WHO DO AND DO NOT STUTTER | Kowsar Esfandeh | |
| | 16:10-16:30 | Q&A | | |

| Session code | Time | Title | Speaker | Moderator |
|---|---|---|---|---|
| S10 | 08:30-09:30 | Keynote Session: PRINCIPLES OF MOTOR LEARNING: APPLICATION TO AOS AND OTHER SPEECH PRODUCTION IMPAIRMENTS | Julie A.G. Stierwalt | Hyang Hee Kim |
| | 09:30-09:50 | Morning Tea | | |
| S11-1 | 09:50-10:00 | "ONWARDS AND UPWARDS" - PERSPECTIVES AND EXPERIENCES OF STROKE SURVIVORS WITH CHRONIC DYSPHAGIA | Claire Layfield | Elizabeth Ward Isamu Shibamoto |
| S11-2 | 10:00-10:10 | DYSPHAGIA MANAGEMENT OF ELDERLY IN NURSING HOME: SKILLS AND KNOWLEDGE OF FRONTLINE STAFF | Karen Chan | |
| S11-3 | 10:10-10:20 | EFFECTS OF HIGH-FREQUENCY REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION (RTMS) ON SWALLOWING FUNCTION OF POST-STROKE INDIVIDUALS WITH DYSPHAGIA: A PILOT STUDY | Karen Chan | |
| S11-4 | 10:20-10:30 | BIOMECHANIC CHANGES IN PHARYNX AND UPPER ESOPHAGEAL SPHINCTER AFTER BALLOON DILATATION IN BRAINSTEM STROKE PATIENTS WITH DYSPHAGIA: A INVESTIGATION USING HIGH-RESOLUTION SOLID-STATE MANOMETRY | Yue Lan | |
| S11-5 | 1030-10:40 | THE CORRESPONENCE OF PARAMETERS BETWEEN HIGH-RESOLUTION MANOMETRY AND VIDEO FLUOROSCOPIC SWALLOWING STUDY DURING THE PHARYNGEAL PHASE OF SWALLOWING | Zulin Dou | |
| S11-6 | 10:40-10:50 | EARLY DYSPHAGIA POST RADIOTHERAPY IN PATIENTS WITH NASOPHARYNGEAL CARCINOMA - A PRELIMINARY STUDY | Wai Ming Wong | |
| S11-7 | 10:50-11:00 | DYSPHAGIA BOOT CAMP FOR HEAD AND NECK CANCER PATIENTS | Laishyang Ouyoung | |
| S11-8 | 11:00-11:10 | CRUSHING MEDICATIONS FOR PEOPLE WITH DYSPHAGIA: SPEECH PATHOLOGY MEETS PHARMACY TOWARDS A POSITIVE OUTCOME FOR PATIENTS | Louise Brown | |
| | 11:10-11:20 | Q&A | | |
| | 11:30-12:00 | **Closing Remarks at Rm B**102 | | |

## Daily Program    Audiology

### Nov 1
### B1F, RM B102

| Session code | Time | Title | Speaker | Moderator |
|---|---|---|---|---|
| A1 | 09:30-10:30 | Keynote Session:<br>ADVANCES IN AUDITORY PROSTHESES | Fan-Gang Zeng | Hsiao-Chuan Chen |
| | 10:30-10:50 | Morning Tea | | |
| A2-1 | 10:50-11:05 | VALIDATION OF THE SCREENING CHECKLIST FOR AUDITORY PROCESSING IN ADULTS | Ramya Vaidyanath | Sumalai Maroonroge<br>Hung-Ching Lin |
| A2-2 | 11:05-11:20 | BEHAVIORAL AND ELECTROPHYSIOLOGICAL MASKING-LEVEL DIFFERENCES IN OLDER LISTENERS | Yi-Chi Lo | |
| A2-3 | 11:20-11:35 | SPEECH EVOKED AUDITORY BRAINSTEM RESPONSE FOR CHILDREN WITH (CENTRAL) AUDITORY PROCESSING DISORDERS | Prawin Kumar | |
| A2-4 | 11:35-11:50 | AUDIOLOGICAL MANAGEMENT OF AUDITORY NEUROPATHY SPECTRUM DISORDER IN CHILDREN WITH MILD TO MODERATE HEARING LOSS USING CORTICAL AUDITORY EVOKED POTENTIALS | Hsiuwen Chang | |
| | 11:50-12:00 | Q&A | | |
| | 12:00-13:30 | Lunch at B1F, Cafeteria | | |
| A3-1 | 13:30-13:45 | SPECIFICATIONS OF THE FIRST COMPUTER-BASED AUDITORY TRAINING PROGRAM-MALAY VERSION | Bahram Jalaei | Hsiu Wen Chang |
| A3-2 | 13:45-14:00 | COMPARISON OF ESRT BETWEEN ADULTS AND CHILDREN WITH MED-EL CI USERS | Mei Jui Huang | |
| A3-3 | 14:00-14:15 | TRACKING ASSESSMENT ON EFFECTS OF MONOSYLLABIC WORD RECOGNITION REHABILITATION FOR HEARING-IMPAIRED CHILDREN WITH COCHLEAR IMPLANTS | Jianju Liu | |
| | 14:15-14:30 | Q&A | | |
| | 15:00-15:40 | INTERVAL: next session is the special topic at Rm B101 | | |
| | 15:40-16:00 | Afternoon tea | | |

### B1F, RM B102

| Session code | Time | Title | Speaker | Moderator |
|---|---|---|---|---|
| A4 | 16:00-17:30 | Rehabilitation for the hearing-impaired children | Yi-Ping Chang<br>Min-Hua Hsing<br>Yu-Chih Huang<br>Yu-Shan Ku<br>Ying-Chuan Julie Ma | Hsiao-Chuan Chen<br>Sumalai Maroonroge |

## Nov 2
## B1F, RM B102

| Session code | Time | Title | Speaker | Moderator |
|---|---|---|---|---|
| A5 | 09:30-10:00 | Keynote Session: EVIDENCE-BASED PRACTICE (EBP) AND CLINICAL PRACTICE | Lena Wong | Edward Yih-Liang Yang |
| | 10:00-10:30 | Morning Tea | | |
| A6-1 | 10:30-10:45 | TAIWAN SIGN LANGUAGE/CHINESE BILINGUAL-BICULTURAL MODEL OF LITERACY EDUCATION FOR THE DEAF STUDENTS: COMPARISON OF THE EFFECTIVENESS OF PICTURE BOOKS READING PROGRAMS | Hsiu Tan Liu | Edward Yih-Liang Yang |
| A6-2 | 10:45-11:00 | COMPARISON OF SMARTPHONE-BASED AUDIOMETRY WITH SELF-PERCEPTION, QUESTIONNAIRE AND WHISPERED VOICE TEST FOR SCREENING FOR HEARING IMPAIRMENT | Cheng-Jung Wu | |
| A6-3 | 11:00-11:15 | THE PROMOTION OF NEWBORN HEARING SCREENING IN TAIWAN & ITS EFFICACY | Hung-Ching Lin | |
| A6-4 | 11:15-11:30 | PERCEPTION OF FREQUENCY-LOWERED MANDARIN MONOSYLLABLES AND SENTENCES IN NOISE | Pei-Chun Li | |
| A6-5 | 11:30-11:45 | IS THERE ANY RELATIONSHIP BETWEEN SPEECH EVOKED AUDITORY LATE LATENCY RESPONSE AND DICHOTIC TEST IN CHILDREN WITH DYSLEXIA | Prawin Kumar | |
| | 11:45-12:00 | Q&A | | |
| A7 | 12:00-13:30 | Lunch Symposium Sponsored by Bay Audio **BELTONE PROMISE ™ : TINNITUS MANAGEMENT: MODERN PRACTICES, PROTOCOLS AND PROCEDURES** | **Michael Piskosz** | |
| Lunch Break & Interval | | - SLP Session: B1F, Room B102<br>- Audiology Session: 3F, Rm 301&302<br>- AAC Master Class: 3F, Rm 312<br>- Taiwan Voice Society Symposium: B1F, Room B101 | | |

## 3F, RM
## 301&302

| Session code | Time | Title | Speaker | Moderator |
|---|---|---|---|---|
| A8 | 14:00-14:30 | Special Topic: TAIWAN SIGN LANGUAGE ABILITY ASSESSMENT AND RELATED STUDIES | Hsiu-Tan Liu | Chu-Hsiu Teng |
| | 14:30-15:00 | Afternoon tea | | |
| A9 | 15:00-16:00 | Round-table Discussion: Tinnitus Management | Hung-Ching Lin<br>Jiunn-Liang Wu<br>Tien-Chen Liu<br>Chii-Yuan Huang | Jen-Tsung Lai<br>Fan-Gang Zeng |

| Session code | Time | Title | Speaker | Moderator |
|---|---|---|---|---|
| A10 | 09:30-10:00 | Special topic: INSIGHT INTO CONNEXIN GENES IN NON-SYNDROMIC HEARING LOSS: FROM PHENOTYPE TO GENOTYPE TO MOLECULAR MECHANISM AND THE APPLICATION ON DIAGNOSIS | Jiann-Jou Yang | Henry Lew<br>Lena Wong |
| | 10:00-10:30 | Morning Tea | | |
| A11-1 | 10:30-10:45 | DIABETES AND HEARING LOSS: RESEARCH FINDINGS AND CLINICAL IMPLICATIONS | Sumalai Maroonroge | Henry Lew<br>Lena Wong |
| A11-2 | 10:45-11:00 | ASSOCIATION OF THE GRAINYHEAD LIKE 2 GENE (GRHL2) POLYMORPHISM AND AGE-RELATED HEARING IMPAIRMENT IN TAIWAN | Juen-Haur Hwang | |
| A11-3 | 11:00-11:15 | TESTING PROTOCOL FOR ACCESSING HEARING HEALTH CARE NEEDS OF STUDENTS WITH DISABILITIES IN TAIWAN | Pei-Yu Lin | |
| | 11:15-11:30 | Q&A | | |
| 11:30-12:00 | | **Closing Remarks at Rm B102** | | |

**Daily Program** | Augmentative and Alternative Communication (AAC)

Nov 2
B1F, RM B101

| Session code | Time | Title | Speaker | Moderator |
|---|---|---|---|---|
| C1 | 09:00-10:00 | Keynote Session:<br>AAC ASSESSMENT ISSUES FOR INDIVIDUALS WITH AUTISM SPECTRUM DISORDER | Pat Mirenda | Chih-Kang Yang |
| | 10:00-10:30 | Morning Tea | | |
| C2 | 10:30-11:00 | Special Topic:<br>WHAT WE LEARN FROM THE AAC RESEARCHES IN TAIWAN? | Ming-Chung Chen | Meng-Ju Tsai |
| C3 | 11:00-11:30 | Special Topic:<br>HARNESSING THE POWER OF THE EYE-MIND RELATIONSHIP: USING EYETRACKING FOR CLINICAL RESEARCH ON COGNITIVE AND LINGUISTIC PROCESSING | Brooke Hallowell | |
| | 12:00-13:30 | Lunch symposium at Rm B101 and Rm B102 | | |
| | 13:30-16:30 | AAC Master Class<br><br>Sponsored by Utechzone Co., Ltd.<br>By reservation only | Pat Mirenda | Ming-Chung Chen |

**Daily Program** | AAC Program

Nov 2
B1F, RM B101

| Session code | Time | Title | Speaker | Moderator |
|---|---|---|---|---|
| T1 | 12:00-12:45 | Lunch Symposium<br>MUSCLE TENSION DYSPHONIA & MUSCULAR ASSESSMENT OF THE LARYNX | Murray Morrison | Tzu-Yu Hsiao |
| | 12:45-13:30 | Taiwan Voice Society General Assembly | | |
| T2 | 13:30-14:00 | LEMG GUIDED HYALURONIC ACID VOCAL FOLD INJECTION  FOR UNILATERAL VOCAL FOLD PARALYSIS | Chen-Chi Wang | Ka-Wo Lee |
| T3 | 14:00-14:30 | IRRITABLE LARYNX SYNDROME AND CENTRAL SENSITIVITY DISORDERS | Murray Morrison | Pen-Yuan Chu |
| | 14:30-15:00 | Afternoon tea | | |
| T4 | 15:00-15:30 | MANAGEMENT OF CHRONIC UNEXPLAINED COUGH & LARYNGOPHARYNGEAL REFLUX | Murray Morrison | Tuan-Jen Fang |
| T5 | 15:30-16:00 | INTRALESIONAL STEROID INJECTION FOR BENIGN VOCAL FOLD DISORDERS | Chi-Te Wang | Tzer-Zen Huang |
| | 16:00-16:30 | 1600-1605 Closing Remarks<br>1605-1630 TVS Committee Meeting | | |

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# Keynote Summary & Abstracts

Oral Presentation

## S-1 Keynote   DOES THE CORTICOSTRIATAL SYSTEM CONTRIBUTE TO SLI?

James Bruce Tomblin

*Department of Communication Science and Disorders, University of Iowa (USA)*

Specific language impairment (SLI) is often characterized as unexplained poor language development.   Two principal accounts of the cause of SLI are those that that hypothesize deficits in language specific systems and particularly an innate grammatical system or alternatively accounts that hypothesize deficits in general purpose learning and processing systems.   This presentation will argue from the latter position.   Specifically, I will argue for the role of general-purpose reinforcement and procedural learning processes in language learning and that these processes can contribute to SLI.   Importantly, these learning systems are known to involve the corticostriatal system (basal ganglia and cortical circuits) contributes to a wide range of cognitive functions and may be important for aspects of language learning. In this talk, I will describe the nature of procedural and reinforcement learning and how they could contribute to language learning.   In particular, I will argue that this system provides a means for learning the temporal statistical structure important to language and is driven by feed forward prediction and feedback prediction error.   Data from nonverbal procedural and reinforcement learning tasks that show an association to individual differences in language will be reviewed.   Since these learning systems are based in the corticostriatal system we can hypothesize that the corticostriatal system is important to language learning.    To support this claim, I will present evidence from several sources.   The first source of evidence comes from genetic research on genes involved in the corticostriatal system (FOXP2 and DRD2).   FOXP2 is well known for its association to speech and language impairments and has been shown to affect basal ganglia structure.   DRD2 is a gene for the D2 dopamine receptor and variants of this gene have been associated with several neuropsychiatric disorders including ADHD.   In this regard, the high level of co-morbidity of ADHD and SLI serve as an additional source of evidence of corticostriatal involvement in SLI since ADHD is generally believed to be involved with the corticostriatal system.   Finally, I will present recent brain imaging studies showing abnormal basal ganglia structure that provides further support of this hypothesis.

## S2-1   "SEVERITY" OF THE APHASIC SUBJECTS

C. Lu[1], C. Wang[1], S. Lee[2], Y. Chung[2], N. Dronkers[3]

[1] *Nationla Hsinchu University of Education (Taiwan)*
[2] *The General Hospital of Veterans (Taiwan)*
[3] *VA Northern California Health Care System (United States)*

**Objective:** The aim of this study is to find out the underlying factor for the subjective rating of "severity" by the testers for the aphasic subjects.

**Methods:** 258 aphasic subjects were tested with Mandarin version of BDAE, which contained 31 objective subtests. Beside of the scores tested with the 31 objective subtests, each subject also obtained rated scores by the tester's subjective rating, concerning his/her oral production. After all, each subject got a rated score, indicating his/her degree of severity of aphasia.

**Results:** After conducting a factor analysis of the scores, the findings show that the score of "severity" was categorized together with the other subjective ratings for the subjects' oral production quality, not with any scores of the objective testing.

**Conclusion:** It suggests that the impressive severity of the aphasic subjects were more oral production-based, usually obscuring the aspects of comprehension. Consequently, the scores of subjective rating for "severity" should be used with caution.

## S2-2 OBJECTIVE MEASUREMENT ON KOREAN MICROGRAPHIA IN PARKINSON'S DISEASE

HyangHee Kim[1], Ji Hye Yoon[2], Kyeong Eun Park[1]

[1] Yonsei University (Republic of Korea)
[2] Hallym University (Republic of Korea)

**Objective:** Micrographia, small handwriting, is one of the common symptoms of Parkinson's disease (PD). The aim of the study was to characterize of handwriting size in PD by utilizing objective measurement.

**Methods:** We recruited 34 patients (Male : Female=14 : 20) diagnosed with various severity (i.e., H & Y stage) of PD at tertiary hospitals in Seoul, Korea. The PD patients fulfilled the criteria for probable idiopathic PD (post-onset time: 101.6     58.2 months). The Mini-Mental State Examination was administered to all PD participants. In order to compare the handwriting size, age- and education-matched 34 community-dwelling normal elderly (NE) (Male : Female = 7 : 27) were also included as a control group in the study. There was no significant difference in age (p= .261) and education (p= .122) between the two groups. The writing stimulus was a four-syllabic Korean word with one-to-one grapheme-to-phoneme correspondence. For the writing to dictation task, the subjects wrote the stimuli on an A4-sized sheet of paper. Size (i.e., area) of each syllable in the word was measured using the public domain software program, 'Image J' which is often used for various imaging applications.

**Results:** By comparing the size of each syllable between the two groups, it was found that the PD group showed significantly smaller writing size than the NE group in all four syllables (p < .001). Within the each group, multiple comparison analysis with LSD adjusted was performed to compare the performance according to the syllabic position of the target word. In PD group, there were significant differences between the second syllable and fourth syllable (p=.01). In NE group, there were significant differences between the first syllable and fourth syllable (p=.01), and between the third syllable and fourth syllable (p=.002).

**Conclusion:** The underlying mechanism for the impaired handwriting in PD may be explained by basal ganglia dysfunction. This study is noteworthy because this is the first attempt to provide information on micrographia of PD based on objective measurement.

## S2-3 INCREASING ALIGNMENT IN CONVERSATION DURING APHASIA COUPLES THERAPY

Larry Boles

University of the Pacific (United States)

**Objective:** Alignment refers to the (usually) unconscious use of similar words to accomplish linguistic and cognitive "common ground." This occurs in normal conversations, but has been used in computational modeling algorithms. Reflecting (repeating or paraphrasing) is a simple, overt method for accomplishing this.   Training spouses to reflect what they heard (whether an intended utterance or one with "errors") was hypothesized to positively impact the conversations of a couple.   Objective: To demonstrate improvement in conversation alignment, a more even balance in talking turns in a couple, and increased verbal production by the aphasic client.

**Methods:** E was a 75 year old right handed retired office manager prior to the study.   She was two years post stroke with moderate Wernicke's aphasia.   E's husband D was a semi-retired professor.   The couple was encouraged to talk about any topic throughout the study.   D was encouraged to reflect E's utterances frequently.   Ten-minute conversations were videorecorded for analysis, using Elan software.

A single subject multiple baseline design was applied, with the following dependent variables: relative talking turns; reflections by D; utterances by E; and words by E. Specific instructions were focused on helping D increase his linguistic alignment with his wife, and encouraging E to elaborate , despite frequent failures to convey the idea.

**Results:** This couple achieved a more balanced share of utterances, increased alignment, and more utterances and words by E.   The WAB AQ and QOL increased modestly.

Conclusion: Directly addressing alignment was successful in improving the communication and quality of life of this couple.

## S2-4 VALIDATION OF THE MANDARIN CHINESE VERSION OF THE EYE-TRACKING-BASED MULTIPLE-CHOICE TEST OF AUDITORY COMPREHENSION

Brooke Hallowell[1], Yu Zhang[1], Ying Xu[2], Song Luping[2]

[1] Ohio University (United States)
[2] China Rehabilitation and Research Center, Beijing Bo'ai Hospital (China)

**Objective:** Knowing what a person with a stroke or brain injury understands is vital to every aspect of interaction with that person as well as to rehabilitation and planning for education, living arrangements, and career and pastime options. A common challenge for aphasiologists is assessing accurately and with confidence the comprehension abilities of people with neurological disorders. Comprehension of test instructions and motoric and perceptual deficits are frequent confounding factors when comprehension test items require overt responses (speaking, gestures, pointing, button-pressing, writing, or drawing). Incorrect responding or failure to respond on traditional comprehension tests does not necessarily indicate poor comprehension. Comprehension deficits may be overestimated or unknown.

Eye-tracking methods offer an alternative response mode requiring no complex body, hand, limb, or oral movements and no verbal output. They also minimize reliance on understanding of task instructions and provide a continuous online record. Results to date (Hallowell, 1999; 2012; Hallowell, Wertz, & Kruse, 2002) support the feasibility of employing eye-tracking-based methods to index auditory comprehension in aphasia.

**Methods:** The validity of an eye-tracking-based Mandarin Chinese version of the Multiple-Choice Test of Auditory Comprehension (MCTAC; Hallowell, 2013) was evaluated. Twenty-four adult native speakers of Mandarin without neurological disorders and 16 adults with aphasia due to stroke participated.

**Results:** Results support the test's validity for capturing comprehension responses for adults with and without aphasia. Additionally, the pointing version holds promise as a separate useful clinical and research tool for use with Mandarin-speaking people who have aphasia.

**Conclusion:** Further validation and standardization of both versions is warranted.

## S2-5 THE ASSESSMENT OF FIDELITY IN A MOTOR SPEECH TREATMENT APPROACH

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**Objective:** To demonstrate the application of the constructs of treatment fidelity for research and clinical practice, using Prompts for Restructuring Oral Muscular Phonetic Targets as an example. Treatment fidelity refers to a set of procedures used to monitor and improve the validity and reliability of behavioural intervention. Whilst the concept of treatment fidelity has been emphasized in medical and allied health sciences, the documentation of procedures for the systematic evaluation of treatment fidelity in Speech-Language Pathology is sparse.

**Methods**: The Prompts for Restructuring Oral Muscular Phonetic Targets treatment fidelity measure is evaluated against recommended measurement strategies documented in the literature. This includes evaluating the appropriateness of goals and objectives; and the training of speech-language pathologists, using direct (video-taped) and indirect (self-reported checklists) procedures. A unique fidelity scoring system, that integrates treatment delivery and clinical skill as a single quantifiable metric, is presented.

**Results:** In addition to in-house data on reliability and validity, fidelity procedures from three studies will be discussed. In general, the fidelity scores across these data sets were 80% or better.

**Conclusion:** The development of fidelity measures for the training of service providers and treatment delivery is especially important in specialized treatment approaches where certain "active ingredients" (e.g., specific treatment targets, therapeutic techniques and dosage) must be present in order for treatment to be effective. The construction of the Prompts for Restructuring Oral Muscular Phonetic Targets treatment fidelity measure enables researchers and clinicians to objectively measure treatment outcomes; and reflects evidence based practice.

## S2-6 · A STUDY ON MYELINATION OF PRIMARY CORTICES AND LANGUAGE CENTERS IN BRAIN USING MRI

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**Objective:** To investigate the myelination progression course in language-correlated regions of children with normal brain development by quantitative magnetic resonance imaging (MRI) analysis compared with histological studies.

**Methods:** The subjects were 241 neurologically intact neonates, infants and young children (128 boys, 113 girls) who underwent MRI between 2001 and 2007 at the University of Tokyo Hospital, ranging in age from 0 to 429 weeks (8 yearS3 months) by corrected postnatal age. Axial T2-weighted images were obtained using spin-echo sequences at 1.5 T.These patients underwent MRI because a brain disorder was suspected, but they were judged to be normal: subjects with a history of prematurity, birth asphyxia, Iow Apgar score, seizures, active systemic disease, congenital anomaly, delayed development, infarcts, hemorrhages, brain lesions, or central nervous system malformation were excluded from analysis. Seven regions of interest in language-correlated areas, namely Broca's area, Wernicke's area, the arcuate fasciculus, and the angular gyrus, as well as their right hemisphere homologous regions, and the auditory cortex, the motor cortex, and the visual cortex were examined. Signal intensity obtained by a region-of-interest methodology progresses from hyper- to hypointensity during myelination. We chose the inferior cerebellar peduncle as the internal standard of maturation.

**Results:** Myelination in all these seven language-correlated regions examined in this study shared the same curve pattern: no myelination was observed at birth, it reached maturation at about 1.5 years of age, and it continued to progress slowly thereafter into adult life. On the basis of scatter plot results, we put these areas into three groups: Group A, which included the motor cortex, the auditory cortex, and the visual cortex, myelinated faster than Group B, which included Broca's area, Wernicke's area, and the angular gyrus before 1.5 years old; Group C, consisting of the arcuate fasciculus, has similar degree of myelination as Group B before 1.5 years but then myelinated more slowly after 3 years of age.

**Conclusion:** In this study, we determined the sequence of myelination of languagecorrelated regions in infants and children by quantitative MRI assessment. The higher cortical areas matured later than the primary cortical areas, and the arcuate fasciculus matured last. The observation that myelination reaches maturity after 18 months suggests that myelination may be a reason for the acceleration in vocabulary acquisition observed in children from that age. The slow pace of myelination also suggested the possibility of language development's continuation into early adult life. Myelination assessed by MRI was at least 1 month behind that assessed by histological staining. No gender or left-right hemisphere differences in myelination were noted.

## S3-1 EFFECTS OF SURFACE ELECTRICAL STIMULATION ON VOICE PRODUCTION IN NORMAL NON-DYSPHONIC ADULTS

Edwin Yiu, Jessi Chan, Dai Pui

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**Objective:** The study aimed to determine 1) changes in maximum phonation time (MPT) 2) highest attainable frequency, and 3) the fundamental frequency before and after surface electrical stimulation of the larynx.

**Methods:** The study involved a randomized single-blind control design. A gender-balanced group of 40 non-dysphonic healthy university students were recruited for the study. They were randomly assigned into either a genuine electrical stimulation or a sham control groups. Electrodes were placed over the laryngeal area. Subjects received 30 minutes of continuous electrical stimulation at their maximum tolerance level. Maximum phonation time and highest attainable pitch were obtained from each subject before and after the electrical stimulation. Difference in fundamental frequency with and without stimulation was measured during prolonged /a/.

**Results:** Mann-Whitney U tests were used to analyse mean measurements for voice parameters pre- and post-stimulation across control and stimulation groups and genders. No significant differences were found across the control group and stimulation group for either gender in the measurements of maximum phonation time, highest attainable frequency, and fundamental frequency.

**Conclusion:** The study did not support the hypothesis that surface electrical stimulation on the laryngeal regions results in increased maximum phonation time and highest attainable pitch in non-dysphonic subjects. Thus a negative finding was found in support of using electrical stimulation for improving voice production.

## S3-2 EFFECTS OF LOW CURRENT ELECTRICAL STIMULATION OF NECK MUSCLES ON VOICING

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**Objective:** This study investigated the effects of low current electrical stimulation of neck muscles on voice quality following induced vocal fatigue. It was hypothesized that low current electrical stimulation of muscles facilitates vocal recovery.

**Methods:** Thirty healthy non-dysphonic subjects were randomly assigned into either a genuine stimulation group or sham control group. Voice fatigue was first induced by asking subjects to read aloud a random selection of Cantonese passages using their maximum sustainable loudness. Electrical stimulation was administered via electrodes placed over the extrinsic laryngeal muscles, at intensity tolerable to each subject for 20 minutes. Subjects were assessed one hour before the vocal-fatigue inducing task, immediately following the task, and immediately after electrical stimulation. Voice production was monitored using the voice range profile, aerodynamic measures, surface electromyography (sEMG), and a self-reported questionnaire on vocal fatigue symptoms. Outcomes between the two groups were compared.

**Results:** Significant differences were found in some measurements between the three assessment time points, including maximum fundamental frequency, intensity and area; maximum phonation time; mean and peak air pressure; laryngeal muscle activity, and self reported signs of vocal fatigue. However there were no significant differences in general between the stimulation group and control group.

**Conclusion**: The outcome of this study did not support the hypothesis that the use of low current surface electrical stimulation facilitated increasing muscle strength and endurance and alleviating vocal fatigue symptoms. Therefore, the negative finding did not support the use of low current surface electrical stimulation to restore voice production following vocal fatigue.

## S3-3 THE MORE THE MERRIER: THE ROLE OF GROUP CLIMATE IN EFFECTIVE GROUP VOICE THERAPY

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**Objects:** Group therapy is a widely used service delivery model in speech pathology. Our pilot data suggested that an engaging group climate is associated with positive treatment outcome. This current study aimed to substantiate the role of group climate in successful group voice therapy by using a larger cohort of patients.

**Methods:** Thirty-five participants with hyperfunctional dysphonia attended six group-voice-therapy sessions. Treatment comprised of both direct and indirect voice therapy. Therapy techniques were introduced in a group format. Participants were required to practice in pairs and in small groups to allow for peer modeling and generalization. Voice-related quality-of-life and treatment completion rate were used as outcome measures. The Group Climate Questionnaire was used to measure the underlying process of group therapy.

**Results:** The participants' overall voice-related quality-of-life improved significantly following treatment ($p < 0.001$) with an effect size of 0.5. Eighty-nine percent of the participants completed the study and 86% attended more than half of the therapy sessions during the program. The group climate questionnaire indicated that the treatment cohort was classified as "engaging" rather than "avoiding" and "conflicting", which is known to be associated with positive treatment outcome.

**Conclusion:** Group therapy as a service delivery model possesses many advantages over individual-based therapy from the psychosocial, clinical, health resources allocation and motor learning perspective. This study further confirms the relationship between group climate and treatment outcome in group voice therapy.

## S3-4 ACOUSTIC CHARACTERISTICS OF BREATHINESS IN CONNECTED SPEECH

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**Objective:** This study aimed to determine whether an acoustic correlate of breathiness was sensitive in differentiating voices with and without glottal competence and how breathiness affected vowel intelligibility.

**Methods:** Participants were 30 adults, with five females and five males from each of three groups. The three groups were individuals with normal voice ("Normal"), voice patients diagnosed with vocal fold paralysis ("Paralysis"), and voice patients who were diagnosed with a functional voice disorder and found, under laryngostroboscopic examination, to show a complete glottal closure ("Functional"). Participants read a standard passage. One set of three vowels, /i/, /a/, and open /o/, was segmented from a breathy context, where the vowel immediately followed a voiceless consonant. The other set was taken from a non-breathy context, where the vowel did not immediately follow or precede a voiceless consonant. The amplitude difference between the first two harmonics (H1-H2) and the frequencies of the first two formants (F1 and F2) were derived from these vowels.

**Results:** Results of four-way (3 groups X 2 genders X 3 vowels X 2 phonetic contexts) Mixed Model Analysis of Variance tests revealed significant group effect on H1-H2 and four-way interaction effect on F2. The "Paralysis" group showed the highest mean H1-H2, followed in order by the "Normal" and "Functional" groups.

**Conclusion:** The H1-H2 measure was confirmed to be a sensitive acoustic measure in detecting breathiness associated with an incomplete glottal closure in voice patients. Breathiness was found to affect formant frequencies in ways that reduced vowel differentiation.

## S3-5    META-PERCEPTION OF ATTITUDE JUDGMENT IN INDIVIDUALS WITH VOICE PROBLEMS

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**Objective:** The aim of the present study was to examine the meta-perception of attitude judgment (personality, physical appearance, social characteristics) in individuals with voice problems.

**Methods:** Eleven vocally healthy and 11 voice-disordered individuals participated in the study. Each participant was asked to rate their self-perceived severity of voice quality. To evaluate their meta-perception, each participant was also asked to give attitude ratings in response to the question "How do you think other people rated their attitudes toward you?". The attitude judgments were made using a semantic differential scale with 22 bipolar adjective pairs. The 22 bipolar adjective pairs were intended to cover non-speech characteristics about the individual's personality, social characteristics, and physical appearance.

**Results & Conclusion:** Results showed that the dysphonic group gave significantly more negative rating (p < 0.01) in their self-perceived severity of voice quality. The dysphonic group also had significantly more negative meta-perception (p < 0.01) than that of the normal group. The findings suggest that individuals with voice problems have a negative attitude towards themselves than vocally healthy individuals.

## S3-6    ABCLOVE VOICE TRAINING FOR THE MANAGEMENT OF SPASMODIC DYSPHONIA

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**Objective**: Spasmodic dysphonia (SD) is a challenging voice disorder. Injection of botulinum toxin (Botox) has become the treatment of choice for controlling the symptoms. Currently, limited studies have documented the effectiveness of voice training in this population. ABCLOVE voice training is a combined voice training including the components of oral resonance, vocal function exercises, laryngeal manipulation, breathing and vocal care. This study is to investigate the effectiveness of ABCLOVE voice training in SD patients.

**Methods:** Twelve patients with adductor SD were seen in the hospital clinic. Three patients were excluded from the study due to lack of attendance. Six patients received Botox injections and ABCLOVE training. Three patients received ABCLOVE training. Voice outcome measures were taken pre and post treatment in their hoarseness (RAPS), Pitch Range (PR), Maximum Phonation Time (MPT) and stroboscopes. Voice handicap Index (VHI) also was administrated to measure the changes of their physical, functional and emotional aspect pre and post treatment.

**Results:** The paired sample t-test indicated a significant change pre- to post treatment in all nine patients. Three patients with onset of their voice problem within one year tend to improve more significantly and do not need Botox injection. Patients with repetitive Botox injections tend to gain less in VHI scores.

**Conclusion:** This present study should be viewed as a preliminary investigation into this topic. It represents the first attempt to provide an alternative management for spasmodic dysphonia. Early intervention to address the patient's voice disorders may avoid Botox injection and restore patient's voice.

## S3-7 SCREENING FOR DYSPHONIA IN SCHOOL-AGE CHILDREN USING A MULTI-PARAMETRIC APPROACH

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**Background:**    There is currently a lack of pediatric normative database on how Cantonese dysphonic children manifest differently from vocally healthy Cantonese children in terms of their vocal functions. Data reported in the literature on English-speaking children cannot be directly applied in Cantonese-speaking children because Cantonese is a tonal language and English is a non-tone language. Voice measures can manifest differently between tone and non-tone languages.

**Objective:**    The present study investigated the feasibility of using a multi-parametric approach to predict the presence of dysphonia in Cantonese school-age children.

**Methods:**    Twenty dysphonic children with laryngeal pathologies and 20 controls with normal voices participated in the study. All children were native Cantonese speakers and were aged from 6 to 12 years. Each child undertook several voice recordings for perceptual, acoustic perturbation, voice range profile (phonetogram) and aerodynamic evaluation. A minimal set of instrumental voice parameters was identified based on the predictive power of each parameter in discriminating dysphonic and normal voices.

**Results & Conclusion:**    Results showed that the two groups performed significantly differently in six parameters, including relative average perturbation, shimmer percent, maximum phonation time, mean airflow rate, intensity range and profile area in voice range profile.    Stepwise logistic regression revealed that the combined use of shimmer percent and maximum phonation time correctly predicted over 90% of the voice conditions. The results support the use of a multi-parametric approach in screening for dysphonia in children.

## S4 Special Topic — MATURATION OF MISMATCH NEGATIVITY TO CHANGES OF MANDARIN LEXICAL TONES IN INFANTS AND YOUNG CHILDREN AND ITS RELATIONSHIP TO LITERACY DEVELOPMENT

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The behavioral measurements for infant's speech perception often require participant's overt responses. Recently, researchers have shown an increased interest in using mismatch negativity (MMN) as an alternative to the behavioral measure. MMN is an auditory ERPs component to index auditory change detection based on a sound representation constructed to a repeated auditory input and to reveal whether listeners have formed sufficient and robust representations of automatic pre-attentive discrimination (Naatanen, Paavilainen, Rinne, & Alho, 2007; Winkler, 2007). MMN can be elicited even when the participant does not attend to the stimuli (for example, while they are reading a book or watching a silent movie). Thus, the MMN may serve as an excellent tool for assessing auditory discrimination, especially for infants and children with limited attention or motivation.

In this talk, I will present a series of studies to examine the maturation of mismatch responses (MMRs) to Mandarin lexical tones. A multi-deviant oddball paradigm with a low dipping tone (T3) as standard (80%) and high rising (T2) and high level tones (T1) as large and small deviants (10% for each) was applied in adults, infants (aged from birth and 6 months old), and children (aged from 4 to 13 years old). The data from adults revealed the typical mismatch negativities (MMN) for both T1/T3 and T2/T3 contrasts. The large deviant T1/T3 elicited P-MMR in sleeping newborns. The transition from P-MMR to adult-like MMN was evident in awaking infants at six months old and then the adult-like MMN remain stable in all age groups of normal developing children. As for the small deviant T2/T3, no significant MMR was seen in newborns. A P-MMR was found in infants of 6-month-old and remained in older groups. The adult-like MMN to T2/3 could only be found in children older than 10 years old or those with high reading ability. Most importantly, the MMRs to changes of lexical tones correlate with children's behavioral measures on phonological awareness (PA), rapid naming test (RAN), and Chinese character recognition test (CCRT). These findings suggest the MMN and P-MMR index different functional characteristics and provide information on when and how children's speech perception of lexical tones becomes automatic. The MMRs to lexical tones changes may serve as neurophysiological markers for the early identification of children with language or reading deficits.

## S5-1 CONTRIBUTIONS OF MORPHO-SYNTAX AND DISCOURSE SKILLS TO READING IN HONG KONG CHINESE-SPEAKING ADOLESCENTS WITH DYSLEXIA

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**Objective:** This study investigated the relative importance of morpho-syntax and discourse skills that might differentiate Chinese-speaking adolescent readers with developmental dyslexia from those without.

**Methods:** Fifty-two Chinese dyslexic readers (mean age 13;42) from Grade 7 to 9 in Hong Kong high schools were compared with 52 normally achieving readers of the same chronological age (mean age 13;30) in the measures of word reading, reading comprehension, morpheme discrimination, morpheme production, morphosyntax knowledge, sentence order knowledge, and sentence span.

**Results:** Results showed that the dyslexic readers performed significantly worse than the normal readers on all the cognitive-linguistic tasks. Analyses of individual performance also revealed that over half of the dyslexic readers exhibited deficits in morphological, syntactic, and discourse skills. With age and word reading statistically controlled, morphological, syntactic, and discourse skills were uniquely associated with reading comprehension.

**Conclusion:** Findings highlight the uniquely important correlates of morpho-syntax and discourse skills in Chinese reading.

## S5-2 THE EFFECTS OF THE EMERGENT LITERACY CURRICULUM ON THE LANGUAGE DELAYED YOUNG CHILDREN

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**Objective:** The purpose of this study was to assess the effects of the emergent literacy curriculum on the language delayed young children.The design of emergent literacy curriculum was based on the embedded-explicit model, and the core content included oral language, phonological awareness, and print awareness.

**Methods:** The study was the case study which conducted with the ABA design of single subject research to evaluate the effects of the curriculum. The participants were two 6-year-old girls who were diagnosed language delayed when they were 3-years old. They received emergent literacy curriculum for 50 minutes per week. The case A took 30 weeks to finish the curriculum, and the case B took 39 weeks. The data analysis used visual inspection, and utilized performance accuracy to analyze their learning efficacy and progressing in each case.

**Results:** In this research, the main findings were as follows：

1.The emergent literacy curriculum had immediate effects to two cases on oral language, phonological awareness, and print awareness, and the remaining effects still showed ninety percent proficiency.

2.Based on participants' performance on oral language, both cases achieved over 90% accuracy in comprehensive vocabulary and category concept after intervention. Although the case A achieved 90.0% accuracy in expressive vocabulary after intervention, the case B was only 86.7%.

3.Based on participants' performance on phonological awareness, the two cases demonstrated different learning results. The case A achieved 100% proficiency in all aspects of phonological awareness. However, the case B performed poor on tone discrimination, only achieved 66.7% proficiency. And the other aspects of phonological awareness achieved 85% proficiency averagely.

4.Based on participants' performance on print awareness, both cases achieved 100% accuracy in all aspects of print awareness after intervention, except character discrimination. However, they still showed great improvement in character discrimination; the case A's accuracy was increased form 27.8% to 83.3%, and the case B was increased from 19.4% to 80.6%.

**Conclusion:** In short, this research strong recommended using emergent literacy curriculum for language delayed young children.

## S5-3  NARRATIVE ABILITIES IN BILINGUAL CHILDREN WITH CLEFTS: THE INFLUENCE OF VOCABULARY AND COGNITION

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**Objective:** Children with nonsyndromic cleft lip and/or palate (CLP) are known to be at risk of expressive language impairment, but there is limited research on their oral narrative skills. Given the reported link between early narrative and later academic achievement and social communication in monolingual English-speaking children, it is especially important to separate the roles that vocabulary and cognition play in the personal narrative abilities of bilingual children with CLP.

**Methods:** Nineteen pairs of 4 to 8 year-old Singaporean English-dominant children with CLP and children with typical development (TD), were matched for age and socioeconomic status. Tests of hearing, speech, nonverbal cognition, forward and backward digit span, receptive vocabulary, and personal narrative skills were administered and 10 photographs of familiar scenarios (e.g., movies, swimming, toy shop) were used to elicit narrative samples.

**Results**: High-point analysis and SALT were used for macrostructural and microstructural analyses respectively. Mann-Whitney U test (one-tailed) showed significantly weaker receptive vocabulary skills and poorer verbal short-term memory (VSTM) in children with CLP. Spearman correlation analyses revealed nonverbal cognition and verbal working memory (VWM) to be significantly related to both receptive vocabulary and narrative macrostructure for the CLP group.

**Conclusion:** For CLP children, the results suggest that early assessment and intervention, targeting receptive vocabulary and verbal STM, might enhance weak language and narrative abilities, thereby reduce long-term difficulties in educational achievement and social communication. The present findings also revealed the supportive role of nonverbal cognition and verbal WM for language skills in bilingual children with CLP.

## S5-4  A RANDOMIZED CONTROLLED TRIAL OF SYNTAX INTERVENTION IN CANTONESE-SPEAKING SCHOOL AGE CHILDREN

Carol K. S. To, Ming Lui, Gary Y. H. Lam, Xin Xin Li

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**Purpose:** This study aimed to evaluate the efficacy of two procedures for syntax intervention, namely the Sentence-Combining (SC) and Narrative-Based (NAR) procedures using a randomized-controlled-trial (RCT) design. These two procedures have been indicated to be effective in previous case reports and expert opinions.

**Methods:** A total of 50 Cantonese-speaking school age children with language impairment participated in the study. Pre- and post-treatment scores on the outcomes measured by a standardized language assessment, was subject to mixed effect model ANOVAs.

**Results:** Children in both treatment approaches demonstrated significant growth after four months of intervention. Interaction effect was not significant suggesting that both treatment approaches showed similar effect.

**Conclusions:** Both treatment approaches were equally efficacious. By using the study design of RCT, this study provided stronger evidence to support language intervention in school years. Future research can examine which types of children are more likely to benefit more from one method or the other.

## S5-5 SEMANTICS AND SYNTAX OF MOTION VERBS IN VIDEO DESCRIPTIONS AND NARRATIVES BY ENGLISH- AND MANDARIN-SPEAKING CHILDREN

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**Objective:** We aimed to examine how verb semantics interacts with syntax developmentally and cross-linguistically. We examined the amount and quality of information included in the description of motion events elicited from videos and narratives in 2 typologically diverse languages. Unlike English, Mandarin is a serial verb language, enabling us to examine how available syntactic structures interact with content to influence information content.

**Methods:** Fifty-five typically-developing 4- and 6-year-old monolingual speakers of English or Mandarin described 24 motion event videos (The deer hopped from the bike over the fence to the pool) and completed two narrative retells following SALT protocols. The information content (e.g., manner, path) and the syntactic structure (e.g., verb, preposition) used to describe motion events were coded.

**Results:** Developmental increases in motion element types were observed in both languages and the structures used were consistent with language-specific patterns. In video descriptions, English-speaking 6-year-olds, but not 4-year-olds, showed a tradeoff between amount of information and verb specificity. Conversely, Mandarin-speaking children described path information encoded by low-frequency verbs less often than expected. In narratives, informativeness differed, with Mandarin-speaking 6-year-olds communicating about manner and path more redundantly than English-speaking 6-year-olds, perhaps due to language-specific patterns.

**Conclusion:** Our findings suggest that developmental changes of motion verb use may vary according to task demands and the ways syntactic forms combine in a language. High frequency word combinations influence the amount and type of information included by children at both 4 and 6 years of age.

## S5-6 VERBAL LEARNING IN CHILDREN WITH SPECIFIC LANGUAGE IMPAIRMENT

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**Objective:** rammatical limitations are one of the most salient features of specific language impairment (SLI) in children. Previous studies on typically-developing individuals have shown that variability is key to the learning of grammatical constructions. However, little is known about whether or not variability also facilitates grammatical learning in individuals with SLI. In the current study, we trained children to interpret constructions where word order determines meaning.

**Methods:** Twenty-eight English-speaking children with SLI (mean age= 8; 8), 28 younger typically-developing children matched for grammatical comprehension ability (mean age= 5;8) and 20 typically-developing children matched for chronological age (mean age= 8; 9) participated in the study. Each child received 4 language training sessions, in which they heard some repeated sentences (i.e., high token frequency) and some non-repeated sentences (i.e., high variability).

**Results:** We found that the two control groups did not respond differently to repeated or non-repeated sentences, whereas different patterns of performance in the repeated and non-repeated sentences were seen in children with SLI.

**Conclusion:** The current findings suggest a dynamic relationship between input statistics and grammatical learning. The observed performance in the children with SLI suggests a possible way of facilitating grammatical learning by structuring the language input when providing language intervention to these children.

Key words: SLI, grammatical learning, input statistics

## S5-7 SPEECH PERCEPTION DEFICITS IN CHILDREN WITH READING DIFFICULTIES

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**Objective:** The purpose of this study is to investigate whether Mandarin-speaking children with reading impairment exhibit speech perception deficit and its predictive power to their overall language and reading abilities.

**Methods:** Thirty-one school-aged children with reading impairment and 31 age matched typical children participated in this study. All participants were assessed by nonverbal intelligience, language and reading comprehension, word recognition, and computerized lexical tone and consonant discrimination and identification tasks.

**Results:** Children with reading difficulties performed significantly poorer on the lexical tone and consonant discrimination tasks compared to the matched group. The slopes of consonant identification curves show that children with reading difficulties exhibit shallower curve compared to typical children. The results of consonant discrimination curves show that children with reading difficulties made a lower proportion of discrimination than the control group on the between–category pair, but higher proportion of discrimination on the within-category pairs. The results indicate that Mandarin-speaking children with reading difficulties exhibit inferior speech perception abilities relative to controls. In general, speech perception abilities are associated with oral language comprehension, word recognition, and reading comprehension. The regression analysis revealed that in addition to the word recognition and language comprehension, the performance of lexical tone discrimination was an important predictor of reading comprehension.

**Conclusion:** Children with reading difficulties demonstrated inferior speech perception than their IQ/age matched peers. Speech perception abilities is associated with oral language and reading comprehension during school ages. Speech perception may be one of the potent predictors in language and reading development (or disorders).

## S6 Keynote DYSPHAGIA MANAGEMENT FOR HEAD AND NECK CANCER: CLINICAL CHALLENGES AND FACTORS INFLUENCING FUTURE SERVICE DELIVERY

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Dysphagia and subsequent nutritional impairment occur to a severe extent in 30-50% of Head and Neck Cancer (HNC) patients treated with curative radiotherapy (RT) with or without chemotherapy [(chemo)RT]. It is currently estimated that the incidence of treatment-related dysphagia is between 10,000 – 20,000 new cases per year internationally. Furthermore, with continued improvements in (chemo)RT treatment protocols and the influx of young patients with favourable human papilloma virus (HPV)-associated HNC, the numbers of patients living long-term with the negative impacts of cancer treatment is predicted to increase over the next decade. Improving swallowing outcomes for this population is therefore a significant global health care issue.

The management of dysphagia following HNC management is not a singular event and is required pre-treatment, during treatment and long term post treatment. The early acute toxicities of (chemo)RT treatment for HNC patients, including oedema, mucositis, pain, loss of taste, and nausea contribute to dysphagia and can result in RT treatment delays in half of all patients. Treatment delay in HNC is a well recognised adverse feature. Hence reducing or minimising the severity of early treatment induced toxicities, such as severe dysphagia, is a key factor in avoiding unplanned treatment delays. Preventing dysphagia from occurring also serves to minimise a number of long term negative impacts for patients. Chronic dysphagia can persist long term post treatment, as a result of tissue fibrosis, atrophy and neural degeneration, and may continue to worsen in the months/years following treatment. These deficits, in the presence of xerostomia and trismus ultimately have significant detrimental impacts on the oropharyngeal musculature and their movement during swallowing. Long standing dysphagia is recognized to have significant negative impacts for the patient. As greater understanding of the survivorship burden of living with dysphagia is realized, it is recognised that patients with dysphagia and their carers experience detrimental changes to health, relationships, and socialization.

Unfortunately, internationally it is recognised that optimal clinical management of the patient with dysphagia following HNC is currently hindered by an absence of rigorous evidence and the challenges of insufficient availability of specialist speech pathology services. This invited presentation will discuss current research regarding the management of patients with dysphagia following HNC, explore how this evidence will impact clinical services internationally and propose new directions for services in the future. The presentation will involve a synthesis of current key research conducted regarding HNC management practices within Australia, the United Kingdom and the United States of America and discuss the emerging evidence supporting (a) the need for changes to practice and clinical care, and (b) discuss potential new models of service delivery. Key issues in current HNC management will be highlighted and new research developing in these areas will be presented to propose areas of future practice change, including (a) enhanced pre-treatment services though emerging evidence for early predictors of deficits (b) early peri-treatment dysphagia intervention and alternate models of care to enable this, and, (c) new services to address both patient and carer needs in the post treatment and survivorship phase.

As our understanding of the issues and the impact of dysphagia following HNC grows, there needs to be translation of this evidence into new, best practice models of care. The growing evidence base supports there is the need for enhanced early intervention services and better long term supports for patients with dysphagia post HNC. The further challenge is finding clinical feasible, cost efficient and patient supported models to provide such services.

## S7-1 ADVOCATING FOR FIJI ISLANDERS WITH COMMUNICATION DISABILITY

Suzanne C. Hopf, Sharynne McLeod

*Charles Sturt University (Australia)*

**Objective:** To overview resources in Fiji for people with communication disability, including the role of speech-language pathologists (SLPs), in order to develop a plan for future advocacy.

**Methods:** Barriers and facilitators of change for Fiji Islanders with communication disability were reviewed using the World Report on Disability (2011) and the framework provided by Wylie et al. (2013).

**Results:** There is little recognition of the unique needs of Fiji Islanders with communication disability despite a growing awareness of the rights of people with disability. Facilitators for change to the provision of services for people with communication disability in Fiji are present. For example, the adoption of disability inclusive government policy and ratification of international disability treaties; well organised and resourced organisations of people with disabilities; calls for specialist services from Ministries of Health and Education; and community recognition of specialist help required through utilisation of untrained alternative service providers. However, barriers to change are significant, including: financial, geographical, linguistic, and cultural elements in addition to a general lack of specialist speech-language knowledge.

**Conclusion:** In Fiji, the needs of people with communication disability are "under-served". Internal and external driving forces for positive change at all levels of society are facilitating a call for increased support of people with disability. A coordinated approach from all stakeholders and research into best practice models for the Fijian context is recommended to overcome identified service development barriers.

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## S7-2 CLINICAL LEARNING AND PRACTICE: THE HOPES AND CONCERNS OF SPEECH PATHOLOGY STUDENTS

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**Objective:** Although there is a significant literature detailing speech pathology students' development of competency during clinical placements, there is limited understanding of the expectations these students have of the learning they will gain from clinical education experiences. The aim of this study was to investigate the hopes and concerns students have about a clinical placement. Methods: Participants were 62 third year undergraduate speech pathology students undertaking a simulated clinical program aimed to provide experience for students in managing clients with voice disorders. As part of this program, students participated in two interviews with standardised patients, actors trained to portray clinical roles to support student learning. Students undertook a voice case history and assessment session, and an intervention session. In addition, students completed a form detailing their hopes for and concerns about the session immediately prior to these clinical experiences. The written responses were analysed using an inductive approach to qualitative content analysis. Results: Analysis of the data revealed 16 categories of 'hopes', of which the development of confidence was the most common. Hopes also related to competency development in relation to voice disorders. Nineteen categories of 'concerns' were identified, the most common of which was concerns about interactions with clients. Modelling voice techniques, and dealing with clients' questions were also concerns. Conclusions: Identifying how students view their upcoming clinical experiences can inform curriculum planning for clinical education placements. In particular, addressing students' hopes and concerns has the potential to maximise learning opportunities, and decrease the anxiety often associated with clinical experiences.

## S7-3 SIMULATED LEARNING ENVIRONMENTS VIA VIDEOTELECONFERENCING TECHNOLOGY FOR SPEECH PATHOLOGY STUDENTS IN AUSTRALIA: BARRIERS AND FACILITATORS TO IMPLEMENTATION

Simone Howells, Elizabeth Cardell, Andrea Bialocerkowski, Neil Tuttle

*Griffith University (Australia)*

**Objective:** Increasing numbers of speech pathology students is placing a strain on current and future clinical placement opportunities. Simulated learning is recognised as offering similar educational opportunities to traditional clinical placements. This pilot study investigated barriers and facilitators to delivering simulated learning experiences via videoteleconferencing technology to speech pathology students.

**Methods:** Master of Speech Pathology students (n = 27) participated in five simulation sessions. Students were based in one of nine health or education facilities located in the community. They accessed the simulated learning environment via videoteleconferencing platform, WebEx®, which required a computer, microphone, camera and internet access. Simulated patients and clinical educators were located on campus. Data was collected using technology usability questionnaires, student satisfaction scales and structured interviews, to identify key themes pertaining to implementation and operation.

**Results:** All students were able to connect to WebEx® and participate in the simulated learning experience. The reliability of internet connections was variable, impacting on the students' ability to participate in the simulated learning activities. Preliminary data analysis has shown that facilitators to implementation include having well-developed cases and resources, trained clinical educators and simulated clients, and a robust videoconferencing platform with networked internet connection. Identified barriers were predominantly technology-based, such as acquisition of licensing software and quality of internet connection.

**Conclusion:** Simulated learning environments via videoteleconferencing technology are a new concept in clinical education that can offer similar opportunities to traditional clinical placements. Early data suggests that internet connectivity challenges were best overcome by strong working relationships between the University and the placement sites.

## S7-4 SPEECH-LANGUAGE PATHOLOGY IN MALAYSIA- CHALLENGES IN DEVELOPMENT AND SUSTENANCE

Kartini Ahmad

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The paper describes Malaysia's initiatives in the early 1990s, in developing its local professional capacity to provide   service for people with communicative disorders (PWCD), as part of a myriad of different level services within the country. It charts the history of development of a local undergraduate entry-level degree program for speech-language pathology (SLP) from the point of conceptualization to full execution and highlights relevant issues faced by newly introduced professions in a country where resources and practice traditions were previously unavailable.   Ensuring sustainable growth and maturity is a constant balancing act in the face of challenges within and outside the profession. The article provides glimpses to the processes and challenges faced by Universiti Kebangsaan Malaysia as the pioneer university in the South East Asia region to undertake the training and education of the SLP profession.   The on-going process underscores the important role played by government institutions and international professional network in supporting and driving growth in new professions such as speech-language pathology.

## S7-5 RESEARCH STATUS ON SPEECH AND LANGUAGE PATHOLOGY IN LAST TWENTY YEARS IN MAINLAND OF CHINA

Xing Jin

*School of Rehabilitation Medicine, Shanghai University of Traditional Chinese Medicine (China)*

**Objective:** Review researches on speech and language pathology in last twenty years in mainland of China.

**Methods:** Search articles about speech and language pathology from three main Chinese databases (Cnki, Weipu and Wanfang) from 1993 to 2013. Eight thousands and eleven articles were found. Almost one thousand articles were finally selected according to the inclusion and exclusion criteria. Descriptive statistics was used to analyze these articles according to four aspects include participants, research questions, institutions of first authors, published time.

**Results:** Researches on aphasia were far more than that on the other kinds of clients. The kinds of participants were limited. Research questions were mainly focus on the treatments of disordered individuals. Most of first authors were from medical institutions. The number of articles about different disorders increased with time.

**Conclusion:** In general, research on speech and language pathology in mainland of China was developing gradually, though there were a lot of disadvantages. Researchers need to improve their research methods and concern some questions more further.

## S7-6 LANGUAGE DIVERSITY, USE, MAINTENANCE, AND LOSS IN YOUNG AUSTRALIAN CHILDREN

Sarah Verdon[1], Sharynne McLeod[1], Adam Winsler[2]

[1] *Charles Sturt University (Australia)*
[2] *George Mason University (United States)*

**Objective:** Information about children's cultural and linguistic diversity and language acquisition patterns is important in order to provide services that work towards optimal outcomes for all children regardless of the languages they speak.

**Methods:** The first three waves of data pertaining to children from the Longitudinal Study of Australian Children (LSAC), containing 5,107 young children were analyzed to consider language diversity, use, maintenance, and loss.

**Results:** When children were aged 0 to 1 years, 10.8% had a language other than English as the main language spoken at home. When children were 2- to 3-years-old, 16.7% spoke a main language other than English, with 15.3% doing so at 4- to 5-years-old. The most common languages spoken after English were Arabic, Italian, Greek, Spanish, and Vietnamese. Children's patterns of language acquisition and loss over the first 5 years of life varied within and between language groups. Overall, 91.5% of children maintained speaking a language other than English at wave 2, yet only 86.6% did so at wave 3. There were differences in language use according to the language spoken. For example, Arabic-speaking multilingual children tended to maintain Arabic throughout early childhood, whereas Italian-speaking children's use of Italian decreased considerably over the first 5 years of life while use of English steadily increased. Environmental and personal factors such as parental language use, and first- and second-generation immigrant status were related to language maintenance among non-English speaking children.

**Conclusion:** Environmental factors play important roles in facilitating language maintenance in young Australian children.

## S7-7   MULTILINGUAL SERVICES IN AUSTRALIAN SPEECH-LANGUAGE PATHOLOGY

Sarah Verdon, Sharynne McLeod, Simon McDonald

*Charles Sturt University (Australia)*

**Objective:** It is necessary for the speech-language pathology workforce to provide equitable, quality services to the entire clinical population; this includes multilingual clients from culturally and linguistically diverse backgrounds. This paper describes the availability of multilingual speech-language pathology services in Australia.

**Methods:** The participants of this study were 2,949 speech-language pathologists (SLPs) registered with Speech Pathology Australia. Analyses were undertaken to identify the number of SLPs in Australia who provided services in a language other than English and the most common languages in which services were provided. Subsequently, the locations of these services were then mapped using ArcMap spatial analysis software to show their location in Australia.

**Results:** 599 (20.3%) SLPs offered services in a language other than English. The most commonly spoken languages by SLPs in Australia were Auslan (n=127), French (n=95), Italian (n=67) Greek (n=46) and Cantonese (n=44). The maps produced from these data show that SLPs who offer services in languages other than English can be found across Australia, but mostly cluster in the location of capital cities.

**Conclusion:** The findings of this paper show that one fifth (20.3%) of speech-language pathologists in Australia provide SLPs services in a language other than English. Despite this relatively high number, the most common languages spoken by SLPs do not match the most common languages spoken by the Australian population. Therefore there is a need for all SLPs, both multilingual and monolingual, to be culturally competent in providing equitable services to all clients regardless of the languages they speak.

## S7-8   CORE VOCABULARY SELECTION FOR CHILDREN WITH COMPLEX COMMUNICATION NEEDS IN THAILAND

Nitha Ungsuprasert

*Clue Ei Centre (Thailand)*

**Objective:** Core vocabulary of Thai children aged from 3-6 year old will be collected and collated in order to group a core vocabulary necessary to determine an appropriate AAC system to implement with children with complex communication needs. To date, there is limited evidence and data collection on children's vocabulary used hence it is often difficult to determine appropriate language to include in AAC system.

**Methods:** Preschool and kindergarten children's language sample will be collected and collated. The words will then be categorised according to its linguistic category and use and assigned to a group of core or fringe vocabulary. These chosen vocabulary will be used with the children to determine the frequency of use to ensure that they are the best representation of the first 100 core vocabulary for AAC.

**Results:** First 100 AAC core vocabulary will be used in AAC systems for children with complex communication needs. The AAC systems will be present during the conference.

**Conclusion:** As there are no core vocabulary for AAC users in Thailand at present, this research will be one of the first research to explore on this topic. The results of this study will be shared during this conference. The screen capture and the success and evaluation of the first Thai AAC application will be shared during the conference.

## S7-9 STORY STRUCTURE IN THE ORAL NARRATIVES TOLD BY STUDENTS WITH INTELLECTUAL DISABILITIES

Pao-Hsiang Chi[1], Shu-Ching Hung[2], Huei-Chiau Guo[3]

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**Introduction:** Narrative as mind (Sutton-Smith, Botvin, & Mahony, 1976) 。 Therefore, to investigate the oral narrative skills of children with mental retardation might reflect the way how they organize information, and process language. Accordingly, the purpose of this study was to analyze the story structure in the stories told by children with mild mental retardation.

**Method:** Using the discourse context of story telling after watching cartoon films, the current study obtained language samples from 25 mentally retarded children and 25 peers of the same grade. All the language samples were transcribed and analyzed by using story structure organization, narrative stage, and narrative content characteristics.

**Results:** Overall, the results showed that (1) Children with mental retardation used significantly less story structures of 'setting', 'initiating event', 'internal response', 'attempt', 'result' , 'reaction', and 'complete episode' in their oral narratives than normal peers. (2) Most mentally retarded children's oral narrative stage was lower than the expected stage development as defined by age. And their language development stage was in 7 or 8 years old. Generally, they can't reach the level achieved by their same age peers. (3) The narrative characteristics of children with mental retardation could be summarized as: (a) narrative content was insipid and limited. (b) misuse and lack of diversity in words and phrases. (c), lack of description of the affections between the roles. (d) nonfluent and filled with mazes. (e) unclear in episode information and without causal statement.

Implication: The findings are interpreted from the point of view of language processing deficits. Also, these findings could enhance the understanding of oral narrative skills in Mandarin Chinese-speaking children with mild mental retardation.

## S7-10 LANGUAGE IMPAIRMENTS (SLI/LI) IN MONOLINGUAL AND MULTILINGUAL CHILDREN SPEAKING TURKISH

Seyhun Topbas, Selcuk Guven, Ayse Aydın, Deniz Kazanoglu, Dilber Kacar, Ozlem Cangokce-Yasar, Elcın Tadıhan

Anadolu University (Turkey)

**Objective:** Until today, detailed language profiles of monolingual and bilingual Turkish children with SLI living outside Turkey were limited due to several reasons such as lack of standardized tests, misdiagnoses, staff and lack of awareness about SLI. In the light of these, a national project had been conducted to examine several language measures of SLI children derived from psychometric tests and spontaneous language samples by quantitative and qualitative methods. The purpose of this talk is to present the final results of this research   as follows:

1)     Comparative data on tasks that are adapted and standardized in Turkish (TELD-3 & TOLD-P:4) and newly developed Multi-Sentence Repetition Test-TR, Non Word Repetition Test will be presented.

2)     The results will be discussed to answer the question of "how children with MO-SLI would differ from their typically developing peers in grammatical development?" with evidence from a non-Indo-European agglutinating language.

**Methods:**   The participants were 15 monolingual-typically developing, 15 -typically developing-SLI & 15 Turkish-German bilingual-typically developing children. Comparative and correlational statistics was used to analyze the data.

**Results:** The results will highlight some key aspects of grammatical limitations that might be central and/or potential clinical markers for identifying children with specific language impairments in Turkish.

Finally, the error patterns of MO-SLI Turkish children will be compared with a small sample of bilingual typically developing Turkish children and then discussed with implications for Turkish BI-SLI children (alongside with studies conducted in COST Action).

## S8-1    PHONOLOGICAL TREATMENT OF ARABIC-SPEAKING CHILDREN

Manal Alsaad, Patricia McCabe, Alison Purcell

University of Sydney (Australia)

Arabic is widely spoken around the world with about 24 countries in the Middle East using it as an official language. Surprisingly, to date there is no research dedicated to intervention for Arabic speaking children with speech disorders, which leaves speech language therapists working with Arabic speaking communities without evidence proving whether their speech intervention is effective and valid or not.

**Objective:** This Pilot Study investigated the efficacy and the ability to apply the phonological contrast therapy approach in Arabic, and to evaluate the effect of the phonological contrast therapy approach on speech accuracy and consistency of word production for children with consistent speech-sound disorder in Arabic.

**Methods:** The participants were two Arabic-speaking children (1 male and 1female) aged (4:2-4:4). A single-case, multiple-baseline design across-participants was used. The children attended were treated by an Arabic-speaking speech pathologist over three blocks for baseline collection sessions, 2 treatment sessions for 3 weeks, and once per week for 2 follow up sessions. Outcome measures of phonological ability (percentage of consonants correct (PCC), percentage occurrence of different phonological processes and phonetic inventory) is taken for before and after treatment comparison.

**Results**: Participant 1: At baseline the participant has scored below 50% correct production of fricatives. Following intervention, the child's production significantly improved from 10% to >70% correct with generalization to untreated sounds. Participant 2: At baseline the participant has scored 10% correct production of the nasal /m/. Following intervention, the child's production has gradually improved.

**Conclusions:** The preliminary results suggest that phonological contrast therapy is effective in Arabic.


## S8-2    EFFECT OF PRENATAL MATERNAL DEPRESSION ON EARLY SPEECH SOUND ACQUISITION

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**Objective:** Speech sound disorders (SSD) are the most prevalent childhood communication disorders. Many cases of SSD have unknown origin. The study investigated prospectively the effect of prenatal maternal depression on the offspring's speech sound acquisition.

**Methods:** A total of 26 mother-child dyads were recruited. Prenatal maternal depression was assessed by a validated questionnaire during late pregnancy in the third trimester. Speech sound production ability was assessed in terms of the number of atypical speech errors produced in a standardized speech assessment when the children were at 2 years old.

**Results:** Hierarchical multiple regression analyses illustrated that prenatal depression uniquely accounted for 30.8% of the variance in speech sound acquisition after controlling for the child's sex and postnatal maternal depression level.

**Conclusion:** Maternal prenatal depression was significantly associated with more atypical speech errors in the offspring at 2 years old. The current findings contribute to the understanding of the etiology of SSD with unknown origin. At the clinical level, prenatal depression could be taken as a risk factor for SSD.

## S8-3 — BREATHING PATTERNS IN CHILDREN WITH AND WITHOUT ASTHMA:   A PRELIMINARY STUDY OF TASK AND READING DIFFICULTY EFFECTS

Emily Lin[1],Beth Wiechern[1], Kathleen Liberty[1], Philip Pattemore[2,3]

[1] *University of Canterbury (New Zealand)*
[2] *Christchurch Hospital (New Zealand)*
[3] *University of Otago (New Zealand)*

**Objective:**   This study investigated the relationship between breathing patterns and difficulty reading aloud in children with asthma.

**Methods:**   Participants were 11 children diagnosed with moderate to severe asthma and 11 gender- and age-matched controls. Acoustic recordings were obtained during three non-reading tasks (i.e., breathing, talking, and alphabet recital) and reading aloud at three difficulty levels, namely, independent (easy), instructional, and difficult (hard). Measurements included inspiration time (or pause time in speech), time ratio between inspiration and expiration (I-E ratio), and total time taken for five inspirations. Pauses during reading were subsequently classified as occurring at a grammatical junction in the text or a non-grammatical point.

**Results:**   The asthma group, compared to the control group, exhibited a significantly longer [$F(1, 16) = 5.454$, $p = 0.033$] and more variable pause time [$F(1, 16) = 6.996$, $p = 0.018$] during talking and significantly greater

variability in the measure of I-E ratio during easy [$F(1, 16) = 9.071$, $p = 0.008$] and hard reading tasks [$F(1, 16) = 8.457$, $p = 0.01$]. As children with asthma read progressively more difficult texts, they showed fewer breaths as compared with breathing while talking and greater variability in pause time, as well as pausing at points where a typical reader would not normally pause.

**Conclusion:**   The general finding that children with asthma, compared to those without asthma, showed greater variability in breathing patterns across reading levels suggests the possibility that breathing patterns may be associated with difficulty in oral acquisition of reading.

## S8-4 — PROCESSING ACOUSTIC VARIABILITY IN MANDARIN TONE PERCEPTION BY NATIVE AND NON-NATIVE LISTENERS

Chao-Yang Lee

*Ohio University (United States)*

**Objective:** This paper reviews a series of studies on the effects of acoustic variability on Mandarin tone perception by native and non-native listeners. These studies examined whether non-native tone perception is affected disproportionately by various sources of acoustic variability including fragmented acoustic input, context, noise, and speaker variability.

**Methods:** Perception experiments were conducted in which the stimuli included acoustically degraded Mandarin syllables. Participants with a range of Mandarin proficiency were asked to identify the tones. Behavioral measures including accuracy and reaction time were analyzed.

**Results:** Fragmented acoustic input, contextual variations, and noise affected non-native tone perception disproportionately. By contrast, speaker variability affected native and non-native tone perception similarly.

**Conclusion:** Not all sources of acoustic variability affects native and non-native tone perception equally. Non-native tone perception is compromised only when syllable-internal tonal information is reduced or altered.

## S8-5 ACOUSTIC ANALYSIS OF VOICE: IRANIAN TEACHERS

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**Introduction:** In Iran, the total number of elementary schoolteachers is estimated to be nearly 300 000 people and this population is at risk for developing voice disorders. Acoustical characteristics of voice for schoolteachers in Iran are unknown but are relevant to the quantitative description, diagnosis, intervention, reassessment, and outcomes of their voices.

**Methods:** Fifteen female and 15 male Iranian primary schoolteachers in the age range of 35-40 years with 15 years teaching experience volunteered to participate in the study. The control group consisted of 30 Iranian adults aged 35-40 years (15 men and 15 women). Recordings and audio signal analyses were carried out using Praat software. Each subject was asked to sustain the vowel /â/ using habitual and constant vocal pitch, loudness, and quality for at least 5 seconds. Five tokens from each subject were obtained.

**Results:** For the male subjects, the results indicated no significant difference (at the 0.05 level) for each variable between the two groups. However, for the female subjects, t tests showed significant differences between the teachers and the nonteacher controls in all parameters at the 0.01 level. The Iranian female teachers had significantly lower F0 (190.27Hz) than the control group (236.32Hz). Also, for the perturbation acoustic parameters (jitter% and shimmer%), the female teacher group had significantly higher values than their corresponding control group. Similarly, the harmonics-to-noise ratio (HNR) measures for the Iranian female teacher population were significantly lower than for their corresponding control group.

**Discussion and Conclusion:** The results indicate that female Iranian teachers appear to be more susceptible to voice stability change than the male Iranian teachers. Also, acoustic analysis of voice for teachers may significantly contribute to the objective voice examination of this group. Further investigations of factors that promote individual susceptibility to vocal stability are necessary.

## S8-6 USING THE NEURAL NETWORK MODEL TO SIMULATE THE NEURAL RESPONSE OF THE VOWEL PERCEPTION

Tao-Wei Wang ,Chao-Min Wu

National Central University (Taiwan)

**Objective:** This study provides an approach with the neural network model to simulate the vowel perception and its corresponding brain activities.

**Methods:** A neural-network- based directions into velocities of articulators (DIVA) model was developed to simulate neural correlates of speech production (Guenther, 1994; Guenther et al., 2005; Wu and Wang, 2013). To simulate the neural responses of auditory perception, the original DIVA model was modified and added a similarity index that was determined by the Euler distances between the auditory inputs and the weights of the trained model. This index was used to determine the neural activity levels with Gaussian function. These activity levels were convolved with an idealized hemodynamic response function defined in the SPM2 (statistical parametric mapping second version) toolbox. Finally, the simulated results were displayed in Montreal Neurological Institute (MNI) normalized spatial coordinates.

**Results:** The modified model was used to simulate the brain activities in vowels perception. Simulated results were compared with findings from previous (Kuhl, 1991; Guenther and Bohland, 2002) studies to indicate the model's capability to produce vowel perceptual responses.

**Conclusion:** The model could be used to simulate the auditory perception that would unify observations from auditory psychophysics, cortical neurophysiology, and neural modeling.

## S8-7 THE INTERACTION BETWEEN ORAL PROFICIENCY AND PRONUNCIATION FEATURES ON CHINESE EFL LEARNERS' INTELLIGIBILITY

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National Changhua University of Education (Taiwan)

**Objective:** Prosodic features in spoken English have been identified as factors affecting ESL learners' intelligibility (Warren, Elgort, & Crabbe, 2009). For EFL learners whose L1s are syllable-timed languages, the over-emphasis on syllables tends to create a "staccato rhythm," which directly causes problems in comprehensibility. For English majors and prospective teachers, prosodic expression of English is an indicator of higher proficiency, as native speakers regard prosodic features as strong indicators of comprehensibility.

**Methods:** To verify the correlation between oral proficiency levels and comprehensibility ratings, the research team recruited an intact class of 50 sophomore English majors in a central Taiwan university. Intermediate GEPT, launched by Language Learning and Testing Center, Taiwan, was tested to determine the subjects' oral proficiency levels. And the intelligibility was tested by students' reading of a self-developed text with a high reliability coefficient of .926. The top 27% students and the bottom 27% students were respectively grouped as the higher-proficiency level (HP group) and the lower-proficiency level (LP group).

**Results:** Investigated as a whole group, the difficult areas for the 50 subjects take the ranking order of rhythm, sentence stress, vowels and rate. For the HP group, rhythm was found to be the only area which requires improvement, whereas for the LP group, all the areas except word stress require improvement.

**Conclusion:** The results show that the oral proficiency level interacts with pronunciation features to affect perceived comprehensibility. The finding can serve as a strong pedagogical implication to strengthen the oral speaking ability by training suprasegmentals like rhythm and sentence stress.

## S8-8 THE DEVELOPMENT OF A NEW DISYLLABIC SPEECH PERCEPTION MATERIAL KNOW AS THE CANTONESE SPOKEN WORD RECOGNITION TEST (CANSWORT)

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**Objects:** To develop and validate a new Cantonese word recognition test for paediatric hearing-impaired population known as the Cantonese Spoken Word Recognition Test (CanSWORT).

**Methods:** 255 participants, aged 3;00 to 6;11, with normal hearing, and 120 participants, aged 3;06 to 19;05, with hearing impairment from mild to profound degrees were recruited.   Test items were presented by a loudspeaker calibrated to 65 dB(A).   Participants with hearing impairment were firstly tested under unaided condition, then under aided condition for those with hearing devices.   Two scores, namely repetition and recognition, were recorded for each item under each condition.

**Results:** Performances were close to 100% among those with normal hearing across the age groups from 3 to 6 years. Performances of participants with hearing impairment deteriorates with their level of hearing, as expected, from over 95% accuracy among children with mild impairment, to less than 5% on those with moderately-severe impairment or above.   All 120 items can be completed in 25 minutes on average.

**Conclusion:** Further analyses, including psychometric characteristics, on the data collected will be conducted for item refinement. The ultimate product will be a shorter test with equivalent lists, which is clinically applicable for population as young aS3 years old and with hearing status ranges from mild to profound impairment.   The validated test is expected to be a sensitive clinical tool for candidacy assessment and rehabilitation monitoring.

## S9-1 UNRAVELLING THE LIDCOMBE PROGRAM: INVESTIGATING THE NEED TO ASK CHILDREN TO CORRECT THEIR STUTTERING

Michelle Donaghy[1], Susan O'brian[1], Elisabeth Harrison[2], Mark Onslow[1], Ann Packman[1], Ross Menzies[1], Mark Jones[3]

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[3] *The University of Queensland (Australia)*

**Objective:** The Lidcombe Program is an efficacious treatment for early stuttering with an odds ratio of 7.5 established with meta-analysis. Parents deliver the treatment during everyday conversations with their child, using verbal contingencies for stuttering and for stutter-free speech. One of the contingencies for stuttered speech is 'request for self-correction.' Without empirical reason to support the utility of this contingency, we questioned whether it is essential.

**Method:** We recruited 33 stuttering children aged between 2 and 6 years from a treatment waiting list. We randomly assigned them to one of two groups: standard Lidcombe Program and Lidcombe Program without 'request for self-correction.' We treated the children until they attained a 50% stuttering severity reduction sustained for 3 weeks. Primary outcomes were number of weeks and clinic visits to reach thiS50% reduction. Secondary outcomes were percentage of syllables stuttered and parent-reported severity ratings.

**Results:** There were no significant differences between the two groups for weeks or clinic visits to attain 50% stuttering reduction. Nor were there any significant differences for secondary outcomes.

**Conclusion:** Results suggest that the verbal contingency 'request for self-correction' may not contribute to the Lidcombe Program treatment effect. Before removing this contingency from the program, however, research is needed to show that its removal from the entire treatment process does not affect long-term outcomes.

## S9-2 SHORT-TERM OUTCOMES OF THE VIDEO SELF-MODELING TREATMENT FOR ADULTS WHO STUTTER

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**Objective:** The video self-modeling (VSM) involves people watching video images of themselves free of problem target behavior. This study investigated the short-term clinical outcomes of the VSM in adults who stutter.

**Methods:** Participants were 10 adults who stutter. They were video recorded on the following 3 tasks: reading a passage, telephone conversation (with a script), and free conversation (topics: hobby, travel, etc.). The videos were then edited to remove all observable stuttering behaviors. Participants then viewed the resulting stutter-free video of themselves every day for 1 month.

**Results:** Majority of the participants showed improvement in their percentage of stuttering after 1-month VSM treatment. Secondary outcome results showed a significant reduction in their self-rated stuttering severity scale post-treatment. A self-rated questionnaire about the attitude towards stuttering, situational avoidance, and the anxiety level demonstrated a significant change in their overall attitude towards stuttering to a more positive manner.

**Conclusion:** The VSM intervention was associated with improvements in the percentage of stuttering and self-reported outcomes. The VSM provides an opportunity for adults who stutter to recognize their ability to perform stutter-free speech; hereby, reduces their fears associated with anticipation of stutter and helps them to integrate the resultant enhanced confidence in their speech.

## S9-3   TREATMENT FOR VIETNAMESE ADULTS WHO STUTTER

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This paper presents the development of a treatment program and clinical data for three Vietnamese adults who stutter. The treatment program was developed as part of a course in stuttering delivered to students enrolled in the first ever speech therapy training course at Pham Ngoc Thach University of Medicine in collaboration with the Trinh Foundation Australia (Atherton, Nguyen & Vo, 2013). Development of the program utilised Dollaghan's (2007) model for the application of evidence based practice and occurred in three distinct stages, including (1) a systematic review of the evidence for treatment of stuttering in adults, (2) identification of key components of treatments that were considered essential for inclusion in a new treatment program for Vietnamese adults, and (3) consideration of the Vietnamese culture, facilities and resources available in the health service as well as patients preferences and access to services.

Three members of the ECHO Group Vietnam, a self-help group for people who stutter in Vietnam, consented to participate in the first treatment program. The program involved participants learning prolonged speech to control their stuttering during one individual treatment session, two consecutive days of group therapy and follow-up support sessions. Clinic data was collected throughout the program in a variety of speaking tasks within and beyond the clinic. Speech measures included, percentage of syllables stuttered, severity ratings and naturalness ratings. Participants also reported on the impact of the stuttering and the treatment on various aspects of their life.

All three participants achieved near-zero levels of stuttering at the end of the 2-day group intensive.   During the follow-up support sessions the continued to control their stuttering using prolonged speech at various naturalness levels. All participants attended a booster session 12 months after the group intensive and all reported decreased levels of stuttering, improved communicative competency and greater confidence. All reported continued and more regular practice was required to maintain desired fluency levels.

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## S9-4   INHIBITORY CONTROL FUNCTION OF SCHOOL - AGED CHILDREN WHO DO AND DO NOT STUTTER

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**Objective:** The aim of this study was to investigate differences in inhibitory control performance between children who stutter(CWS) and children who not stutter(CWNS). From previous findings, in which the CWS scored lower on the inhibitory control scale, We hypothesized that inhibitory control function would be less efficient in CWS.

**Methods:** Participants consisted of 30 children diagnosed with developmental stuttering and 30 typically developing nonstuttering children, were matched by age and gender to the children who stutter. The mean age waS9;5 years (SD = 1;61 years; range = 7;02 – 13;00) for the CWS and 9;8 years (SD = 1;69 years; range = 7;01–13;00) for the CWNS. Auditory Go/No Go task, was used that assess the inhibitory control in CWS and CWNS. The following variables were examined in this study:Commision errors, Ommision errors and reaction time.

**Results:** Between group analysis showed significant difference in   error percentages of Auditory Go/No Go task variables.The percentages   of Commision errors and Ommission errors were higher in stuttering group than in the nonstuttering group.But the mean reaction time   for CWS and CWNS was not significantly different

**Conclusion:** Our results, based on Auditory Go/No Go task, provide further support for the hypothesis that CWS and CWNS differ in inhibitory control. CWS, as a group, were lower in inhibitory control, which suggests a lowered ability to inhibit prepotent response tendencies. The findings were linked to previous inhibitory control-related studies and to emerging theoretical frameworks of stuttering development

## S10 Keynote — PRINCIPLES OF MOTOR LEARNING: APPLICATION TO AOS AND OTHER SPEECH PRODUCTION IMPAIRMENTS

Julie A.G. Stierwalt

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The execution of speech is a complex motor task, and although primary skills are acquired and mastered at an early age, speech production abilities continue to evolve throughout the lifespan as novel segments, words, and languages are encountered.   Speaking requires an interaction of intact neural networks and pathways of the central and peripheral nervous systems including both sensory and motor components.   These systems act, along with muscles and structures, to execute the final outcome of intelligible patterns. At the basis of the speech task is the motor program.   The motor program provides the elements of execution, from the neural bases to the end result which requires careful orchestration of the speech mechanism, namely the respiratory, phonatory, resonance and articulatory systems.

Apraxia of speech (AOS) is an acquired neurological impairment which is thought to affect the motor program (Duffy, 2012).   AOS manifests as an inability to plan and sequence the muscle movements required for speech execution. Speech characteristics include difficulty with the volitional production of phonemes and phoneme sequences. Consequently, individuals with AOS often demonstrate error patterns which include articulatory substitutions, omissions, distortions, revisions, and/or additions. Generally the rate of speech is slow, and as the propositionality and length of an utterance increases, difficulty in production also increases.

Traditionally treatments for AOS have included (1) biofeedback and instrumental treatments, (2) visual reorganization and gestural treatments, (3) temporal or prosodic treatments and (4) placement and modeling treatments (Ballard, 2001).   It is the final treatment category that will be the focus of this presentation.   Placement and modeling treatments facilitate motor learning through establishing generalized motor programs, in this case, for speech sequences.   Schmidt & Bjork (1992) and Schmidt & Wrisberg (2004) have described a variety of factors that influence motor learning, many of which represent a departure from traditional treatment approaches for AOS. Specifically, they review characteristics of practice and feedback which are important parameters to consider in designing practice to facilitate motor learning.   Traditional approaches to motor learning have stressed practice procedures which ensured rapid and accurate acquisition of speech segments (e.g., massed practice, blocked practice, high frequency feedback).   However, Schmidt and colleagues have documented that randomized and varying practice in the face of reduced feedback improves motor learning while reducing the accuracy of productions measured during acquisition.   These researchers stress the importance of distinguishing between acquisition and learning because those parameters which improve learning often decrease the rate of acquisition.

The Motor Learning Guided (MLG) approach, introduced by Hageman and colleagues (2002) is a method which manipulates principles of feedback and practice to reflect these theories of motor learning.   MLG is a hierarchical approach in which external support/models from the clinician are faded throughout the treatment session.   The protocol elicits speech motor targets to serve as an index of motor learning at the onset of each therapeutic interaction, prior to any influence of practice.   MLG also utilizes randomized practice and reduced feedback which allows multiple opportunities for the client to retrieve the motor program, execute it and through that process develop self-evaluation and/or monitoring skills.

The purpose of this presentation is to review the principles of motor learning as they relate to skill acquisition and learning, conditions of practice, stimulus selection, and type of feedback.   Once outlined, the MLG approach will be reviewed as an application of these principles.   Data from a number of case studies using the MLG approach will be provided.   Primarily, the cases will represent individuals who present with AOS.   However, the principles are suited for any treatment where skilled motor acquisition and learning is targeted.   Therefore, modification of the MLG technique and subsequent application to other speech production impairments will also be discussed.

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## S11-1 "ONWARDS AND UPWARDS" - PERSPECTIVES AND EXPERIENCES OF STROKE SURVIVORS WITH CHRONIC DYSPHAGIA

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**Background:** Dysphagia, or disordered swallowing occurs frequently following stroke and in some cases is a lifelong condition. Health related consequences of dysphagia are well documented. While the psychosocial consequences of dysphagia can be serious, little attention has been dedicated to investigating them. Dysphagia has been linked with reduced mealtime enjoyment and social participation (Ekberg et al 2002) and impacting relationships with family, friends and carers (Kaatzke-McDonald 2003). Changes in perspective over time have been explored in individuals with acute and chronic dysphagia (Martino et al 2010); and in individuals with progressive dysphagia (Balandin et al, 2009). This study aims to explore the experiences of individuals with chronic post stroke dysphagia participating in a swallowing rehabilitation program, and their supporting family members.

**Method:** Participants in the training program were 5 individuals who had sustained strokes 13-42months earlier and as a result become dependent on enteral tube feeding. Four of the five treatment participants, and family members of all five participants, were able to participate in a semi-structured interview about their experiences. As part of their rehabilitation program participants also completed the dysphagia handicap index and personal well-being index. Interview data were analysed thematically using a modified grounded-theory approach.

**Discussion:** In this presentation we will share these families' experiences of living with chronic post-stroke dysphagia. Themes arising from interview data included changes to lifestyle, family routines and social networks as a consequence of a non-oral diet. Impact on body image and self-esteem were also elucidated. Participants also spoke about the issues of patient autonomy and disempowerment within healthcare settings, and advocated for patient/family goals and priorities to be recognized within the clinical decision making process. The importance of ongoing reviews and longer-term rehabilitation was also stressed by some participants. Clinical implications and service delivery planning for dysphagia rehabilitation will be discussed.

## S11-2 DYSPHAGIA MANAGEMENT OF ELDERLY IN NURSING HOME: SKILLS AND KNOWLEDGE OF FRONTLINE STAFF

Karen Chan[1], Hiu Ki Chan[1], Bernard MH Kong[2], Thomas Murry[3], May CM Wong[1], Edwin Yiu[1]

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[2] Pamela Youde Nethersole Eastern Hospital (Hong Kong)

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**Objective:** The current study investigated the knowledge and skills on dysphagia management of frontline staff in Hong Kong nursing homes.

**Methods:** A total of 243 frontline nursing home staff were recruited from 12 government-supported residential care homes. All participants completed a questionnaire on dysphagia management to assess their knowledge. The feeding skills of 109 participants were assessed through observation.

**Results:** Results showed that the participants had inadequate knowledge on dysphagia management and unsafe feeding behaviors. One of the weakest areas was in identifying causes and signs of silent aspiration. The participants were also unaware of the need to maintain a positive attitude and communication while they were feeding the elderly residents.

**Conclusion:** There is a strong need to improve the knowledge and skills in dysphagia management for nursing home staff. This is essential to ensure safe swallowing in nursing home residents.

## S11-3 EFFECTS OF HIGH-FREQUENCY REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION (RTMS) ON SWALLOWING FUNCTION OF POST-STROKE INDIVIDUALS WITH DYSPHAGIA: A PILOT STUDY

Karen Chan, Ka Yu Cheng

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**Objective:** This pilot study investigated the short-term effects of high-frequency repetitive Transcranial Magnetic Stimulation (rTMS) on improving swallowing functions in post-stroke individuals.

**Methods:** Two male and two female participants were assigned randomly to active and sham groups. The two sham group participants received active stimulation upon completion of all follow up sessions. The active group received 10 sessions of rTMS and the sham group received 10 sessions of sham rTMS. The tongue motor cortex was stimulated in the active rTMS sessions. All participants were assessed 1 week before stimulation, 1 week after stimulation and 1 month after stimulation.

**Results:** Videofluroscopic examination showed that higher oropharyngeal swallow efficiency was observed for the active group after stimulation. Improvement in the Swallowing Activity and Participation Profile was also observed in the active group but not in the sham group.

**Conclusion:** The results suggested that rTMS improved swallow efficiency and quality of life in the short-term.

The study was supported by the Seed Funding Programme for Basic Research, The University of Hong Kong.

## S11-4 BIOMECHANIC CHANGES IN PHARYNX AND UPPER ESOPHAGEAL SPHINCTER AFTER BALLOON DILATATION IN BRAINSTEM STROKE PATIENTS WITH DYSPHAGIA: A INVESTIGATION USING HIGH-RESOLUTION SOLID-STATE MANOMETRY

Yue Lan, Zulin Dou, Guifang Wan, Fan Yu, Tuo Lin

*The Third affiliated hospital of Sun Yat-sen University (China)*

**Objective**: Using high-resolution solid-state manometry, we examined biomechanic changes of physiologic swallowing events in patients with dysphagia after brainstem stroke.

**Method**: Thirty brainstem stroke patients with pharyngeal stage dysphagia were involved in this study. 15 of them as dilatation treatment group completed 3 weeks of modified balloon dilatation treatment and traditional swallowing therapy. Another 15 patients as control group only completed 3 weeks of traditional swallowing therapy. Before, and following the dilatation we measured FOIS(Functional Oral Intake Scale), pharyngeal manometric pressures peak and duration, the nadir of UES and its duration during swallows of thin liquid, thick liquid, and pasty material in 3 ml volumes. We compared these results to identical measures obtained from control group.

**Results**: Brainstem stroke patients with dysphagia always manifest failed UES relaxation and poor pharyngeal propulsion, with decreased UES resting pressure. Following dilatation treatment, 12 of 15 patients were removed feeding tube in dilatation group. Post-dilatation the relaxation of UES and propulsion of pharynx were both significantly better than Pre-dilatation in the group of dilatation treatment for three materials ($p < 0.05$). UES resting pressure approximated to normal. Only 2 of 15 patients were removed feeding tube in control group following traditional swallowing therapy. Post-treatment the relaxation of UES in control group was not shown any significantly difference from pre-treatment ($p > 0.05$) for all three materials.

**Conclusion:** Dysphagia therapy with dilatation improves relaxation of UES and propulsion of pharynx during swallowing. Moreover, it is helpful for restoring UES resting pressure.

## S11-5 THE CORRESPONENCE OF PARAMETERS BETWEEN HIGH-RESOLUTION MANOMETRY AND VIDEO FLUOROSCOPIC SWALLOWING STUDY DURING THE PHARYNGEAL PHASE OF SWALLOWING

Zulin Dou, Yue Lan, Guifang Wan, Fan Yu

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**Objective:** The objective of the current study was to evaluate the correlation between the pharyngeal constriction ratio (PCR) and pharyngeal maximum pressure, upper esophageal sphincter (UES) opening size and UES Nadir pressure.

**Methods:** Swallowing function was examined using videofluoroscopy (VFSS) and high-resolution manometry in 24 stroke patients with dysphagia. PCR is the pharyngeal area (including residual bolus material) visible in the lateral radiographic view at the point of maximum pharyngeal constriction during swallow divided by the area with blous held in the oral cavity. UES opening size is the widest portion of the bolus flow at the level of C4-C6 by drawing a horizontal line across it. Pharyngeal maximum pressure and UES Nadir pressure were measured by manometry. Spearman's analyses were used to evaluate the correlation between manometric and fluoroscopic variables.

**Results:** Increases in pressure wave amplitude were significantly correlated with decreased PCR (r=-0.849, P＜0.0001). Increase in UES opening size were significantly correlated with decreased UES nadir pressure (r=-0.609, P＜0.0001). Certain VFSS measures were significantly correlated with measures of pressure assessed with manometry. Measures from VFSS may be deemed sufficient for determining pressure-generation difficulties during the swallow in patients who are unable or unwilling to submit to manometric testing.

**Conclusion:** The utility of an objective fluoroscopic measure in assessing pharyngeal strength and UES relaxation function when manometry may not be available or possible. Pharyngeal manometry complements the modified barium swallow with videofluoroscopy (VFSS) in diagnosing pressure-related causes of dysphagia.

## S11-6 EARLY DYSPHAGIA POST RADIOTHERAPY IN PATIENTS WITH NASOPHARYNGEAL CARCINOMA - A PRELIMINARY STUDY

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[3] *Department of Clinical Oncology, Prince of Wales Hospital (Hong Kong)*

**Objects**: To study the incidence and the degree of swallowing dysfunction in patients with NPC who underwent radiation therapy.

**Methods:** A total of 78 participants were recruited at the Prince of Wales Hospital and the Queen Elizabeth Hospital of Hong Kong. All of them underwent Flexible Endsoscopic Examination of Swallowing (FEES) by an ENT surgeon and speech therapist. All the video clips were rated by one speech therapist.

**Results:** Forty-nine males and 29 female were recruited from January 2011 to May, 2012.The mean age waS52 years. The average numbers of days after RT to FEES assessment waS94 days. Thirty-two participants (41%) had early disease (stage I, II) and 45 participants (57.7%) had advanced disease (stage III, IV). Eleven participants underwent RT (14.1%), 52 (66.7%) received concurrent chemo-radiation therapy, 7 (8.9%) performed IMRT and 5 (6.4%) had chemotherapy with IMRT. Thirty-five of them (44.9%) has naso-regurgitation of food and/or liquid.   Forty participants (51%) have premature spillage of food. Forty-five patients (57.7%) have silent penetration and/or silent aspiration on food and/or liquid swallow.

**Conclusion:** This study showed that 57.7% NPC patients have penetration and/or aspiration after (as above) swallow. It is suggested that more education concerning the possible risk of deterioration of swallowing functions needs to be addressed to the NPC patients after radiation therapy.

## S11-7 DYSPHAGIA BOOT CAMP FOR HEAD AND NECK CANCER PATIENTS

Laishyang Ouyoung

*Keck Medical Center of USC (United States)*

**Objective:** Dysphagia due to head and neck cancer presents both challenges and rewards for the clinicians. This study is to investigate the effectiveness of intensive dysphagia training to improve patients swallowing functions and quality of life.

**Methods:** 63 patients were referred to the speech pathology program at Keck Medical Center of USC. 40 patients were enrolled in dysphagia therapy. 29 out of 40 patients were non-oral eating and G-tube dependent. A radiographic swallow study and the Functional Oral Intake Scale (FOIS) was administered prior to and at the completion of treatment. Dysphagia treatment was given 3 times per week for one hour with a licensed speech pathologist. Patients with esophageal narrowing (identified during MBS) were referred to the head and neck surgeon for the home esophageal dilatation program

**Results:** All patients demonstrated a minimum of 2 levels of improvement as measured by the Functional Oral Intake Scale (FOIS). Twenty-five (25/29, 86%) were tolerating an oral diet with multiple consistencies (FOIS LevelS5 and 6) and had their G-tube removed. Four patients (4/29, 14%) who began dysphagia treatment more than one year after chemoradiation remained G-tube dependent . They were able to consistently tolerate some liquid and food (FOIS Level 3).

**Conclusion:** Early intervention to provide dysphagia treatment before, during and after XRT or chemoradiation is the key to restore patient's swallowing functions. For severe dysphagia patients, a home dilation in conjunction of dysphagia treatment may increase the chance to restore oral diet and G-tube removal.

## S11-8 CRUSHING MEDICATIONS FOR PEOPLE WITH DYSPHAGIA: SPEECH PATHOLOGY MEETS PHARMACY TOWARDS A POSITIVE OUTCOME FOR PATIENTS

Louise Brown[1], Morgan Groves[2], Sherryl Robertson[1], Beverley Glass[1]

[1] *James Cook University (Australia)*
[2] *Cairns Base Hospital (Australia)*

**Objective:** Medication management of patients with dysphagia commonly involves crushing solid dosage forms, such as tablets for administration in various media. The aim of this study was to determine, using paracetamol as the model drug, whether this process affects the viscosity of the media and the subsequent drug dissolution.

**Methods:** Methodology involved the determination of the viscosity of commercial pre-thickened fluids prior to and after the addition of crushed paracetamol tablets, in addition to determining the effects of temperature, time and stirring on viscosity, using a viscometer and the line-spread test. Dissolution of paracetamol from the crushed tablet-media mixture was undertaken according to the United States Pharmacopoeia (USP) for paracetamol tablets.

**Results:** Results from viscosity tests indicated that the addition of crushed tablets altered the viscosity of the medium the patient would be required to swallow. Refrigeration was also found to have a significant effect on viscosity. Results for all the thickened fluid media, with the exception of apple puree, showed that the dissolution of paracetamol, ranging from 22.1% to 64.7% no longer met the USP requirements of 85% paracetamol dissolved within 30 minutes.

**Conclusion:** These results indicate that the viscosity of crushed tablet-media may not meet individual requirements for patients with dysphagia. Additionally, the combination of thickened fluids with crushed paracetamol does impair paracetamol dissolution and this should be taken in account when considering this practice. Apple puree does however present a cost effective, readily available medium, which optimises the dissolution of paracetamol.

## A1 Keynote — ADVANCES IN AUDITORY PROSTHESES

Fan-Gang Zeng

*University of California, Irvine (USA)*

Hearing involves multiple delicate processes from the ear to the brain. As a result, hearing impairment can occur at any level and may have different perceptual consequences. Significant advances have been made in understanding physiological mechanisms underlying the auditory process, as well as diagnosing and classifying hearing impairment from mechanical damage in the periphery to neural injury in the brain. Traditionally, hearing impairment is classified into conductive and sensorineural categories. At present, the sensorineural category can be further classified into (1) cochlear impairment including outer hair cell loss and inner hair cell loss, (2) neural impairment including synaptic transmission disorders, auditory nerve demyelination and axonal loss, (3) feedback impairment that may be responsible for speech recognition difficulty in noise, tinnitus and stuttering, (4) central impairment that may be responsible for general auditory processing disorders, language and learning disabilities or even autism. State-of-the-art and emerging technologies will be presented to include smart hearing aids, middle ear implants, cochlear implants, and brainstem implants as well as nanotech and stemcell based therapies. A highlight will be the use of combined acoustic and electric hearing to improve speech perception in noise and language development, particularly tonal and prosodic aspects, in children with severe to profound hearing loss. Pros and cons of these technologies will be compared. Examples will be given to illustrate the short-term and long-term solutions to different hearing impairments. The industrial trends will be discussed to identify convergence between medical devices and consumer electronics, as well as the changing landscape from vertical integration to horizontal integration, as reflected by recent acquisition of middle and cochlear implant companies by hearing aid companies. The future of hearing health industry is bright because we have been able to use different types of stimulation at different places to not only compensate for different hearing impairments but even restore or enhance normal hearing.

## A2-1 — VALIDATION OF THE SCREENING CHECKLIST FOR AUDITORY PROCESSING IN ADULTS

Ramya Vaidyanath, Asha Yathiraj

*All India Institute Of Speech And Hearing (India)*

**Objective:** The study aimed to validate a screening checklist designed to detect auditory processing in adults.

**Methods:** The study was carried out on 20 older adults aged 55 to 75 years having near normal hearing thresholds (pure tone thresholds < 20 dB HL binaurally between the frequencies of 250 to 2000 Hz). A checklist titled, 'Screening Checklist for Auditory Processing in Adults' was administered on the participants. Additionally, the participants were evaluated on five diagnostic auditory processing/cognition tests that tapped binaural auditory integration, auditory separation/closure, temporal resolution, temporal ordering and auditory memory. These auditory processes were evaluated using the 'Dichotic consonant-vowel test', 'Speech-perception-in-noise test in Kannada', 'Gap detection test', 'Duration Pattern Test' and the 'Kannada auditory memory and sequencing test'.

**Results:** The correlation / association between the scores obtained on the diagnostic auditory processing tests and the screening checklist for auditory processing in adults was determined using Pearson's product moment correlation as well as Bland-Altman test of association and difference. The results indicated the correlation between the screening checklist and the different auditory processing/cognitive tests varied from tests to test. The correlation was the least with the binaural auditory integration test.

**Conclusion:** The study revealed that the screening checklist for auditory processing in adults was able to identify older adults with auditory processing deficits. The correlation between the checklist and the different diagnostic auditory processing/cognition tests were not similar.

## A2-2 BEHAVIORAL AND ELECTROPHYSIOLOGICAL MASKING-LEVEL DIFFERENCES IN OLDER LISTENERS

Yi-Chi Lo

*National Kaohsiung Normal University (Taiwan)*

**Objective:** The purpose of this study was to investigate the ability of auditory temporal processing by comparing behavioral and auditory late latency P2 (ALLR P2) masking-level differences (MLDs) in older listeners. Both behavioral and ALLR P2 thresholds in SoNo and SπNo€ No conditions were tested.

**Methods:** Participants were 22 older adults with near-normal hearing or with age-related hearing loss. The stimuli for the MLD were 500 Hz tone bursts presented in narrowband noise with the center frequency of 500 Hz and a 50 Hz bandwidth. The MLDs were recorded by late latency evoked potential and behavioral methods. Behavioral thresholds of SoNo and SπNo € No were obtained with the same stimuli as in the AEP tests and presented by the same instrument.

**Results** and Conclusion: The results suggested that older adults had smaller MLDs that were caused by more elevated thresholds in SπNo € No condition. The significant finding on the interaction between age and recording methods showed stronger effects of age on diminishing ALLR P2 MLDs than on the behavioral MLDs. The discrepancy between the behavioral and ALLR P2 MLDs in the older adults suggested that deficits in processing temporal information occurred in the aging auditory system and brain. However, the origin of the neural generators and any cognitive ability involved in MLDs processing will need to be identified in future studies.

## A2-3 SPEECH EVOKED AUDITORY BRAINSTEM RESPONSE FOR CHILDREN WITH (CENTRAL) AUDITORY PROCESSING DISORDERS

Prawin kumar, Niraj Singh, Vipin Ghosh

*All India Institute of Speech and Hearing (India)*

**Objective:** The present study aimed to understand the spectral and temporal measures of speech evoked ABR in children with processing disorders without associated reading disability.

**Methods:** Three hundred and thirty-six school going children in the age range of 8-14 years were screened for auditory processing. Out of 336 participants, fifteen participants were identified as at risk for auditory processing disorders and served as experimental group. Fifteen typically developing children were considered for control group. Participants in both groups were ruled out for any difficulty in reading ability using early reading skills tests which was followed by detailed audiological testing and auditory brainstem response testing using click and speech stimuli.

**Results:** MANOVA was carried out for the comparison between groups and the results revealed that the latencies of waves V and A were significantly prolonged ($p < 0.05$) for experimental group. There was a marginal significant reduction in the V/A slope in the experimental group (p=.065), whereas the first formant and higher formants were not significantly different across the groups (p>0.05).

**Conclusion:** The results suggests that the speech evoked ABR responses are affected in children who are at risk of (C)APD without reading disorder. Hence it is concluded that children with processing disorder have abnormal encoding of speech signal at brainstem level.

## A2-4 AUDIOLOGICAL MANAGEMENT OF AUDITORY NEUROPATHY SPECTRUM DISORDER IN CHILDREN WITH MILD TO MODERATE HEARING LOSS USING CORTICAL AUDITORY EVOKED POTENTIALS

Hsiu-Wen Chang

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**Objective:** With the advent of newborn hearing screening program, an increasing number of infants with auditory neuropathy spectrum disorder (ANSD) are identified at very young ages.   Among the clinical characteristics of ANSD, the lack of normal brainstem function poses a challenge to the audiological management in the pediatric population as behavioral hearing thresholds cannot be estimated from auditory brainstem responses to tonal stimuli.   Cortical auditory evoked potentials (CAEP) were proposed in previous studies to manage children with ANSD.   The potential use of these higher order electrophysiological responses has been shown in determining hearing aid benefit mostly in children with severe to profound ANSD-type hearing loss.   However, ANSD can also exhibit lesser degrees of hearing loss.   The present study reports case studies of hearing aid evaluation of ANSD children with mild to moderate hearing loss using CAEP. The clinical implications will be discussed.

**Methods:** Assessment of speech-evoked CAEP were performed in unaided and/or aided conditions.   The morphology and latency were examined at stimulus presentation level of 55 dB SPL.

**Results:** CAEP responses were evident at soft conversational level in unaided and/or aided conditions.

**Conclusion:** CAEP testing may provide valuable information in counseling families about the need of hearing aid fitting in ANSD children with mild to moderate hearing loss.

## A3-1 SPECIFICATIONS OF THE FIRST COMPUTER-BASED AUDITORY TRAINING PROGRAM-MALAY VERSION

Jalaei Bahram

*University Sains Malaysia (Malaysia)*

**Objective:** Over the past decade, we have seen considerable advances in the field of rehabilitation and auditory training. One example of these developments is manufacture and application of auditory training software which is called computer-based auditory training (CBAT) program. Despite financial benefits of using these programs, it sounds that it can be useful for improving auditory skills in hearing impaired children. In Malaysia, at present, traditional auditory training is the most popular method which is implemented by speech therapists after hearing aid/ Cochlear Implant device fitting. There is not specific protocol for using traditional auditory training program. Thus, like other advanced countries it sounds that having an advanced program for auditory training with specific protocol is very necessary.

**Methods:** For making an auditory training program we need to use all the auditory stimulations like background noise, phonemes, words and sentences. An important factor in making a successful auditory training program is considering the changes in main parameters of a sound like frequency, intensity and time. So in producing this training program we considered three aspects:

• Redundancy variation

• Frequency variation

• Time variation

**Results:** The content of this program has been prepared and we are currently in the process of manufacture of the software. More details of how to make this program will be presented during the lecture.

Conclusion: We believe that this Auditory training program can be success in improving the auditory skills of hearing impaired children.

## A3-2　COMPARISON OF ESRT BETWEEN ADULTS AND CHILDREN WITH MED-EL CI USERS

Mei Jui Huang, Chi Ching Lin, Hsing Yi Chen, Meng Ju Lien

*Auditory Medical Center at Cheng-Hsin General Hospital (Taiwan)*

**Objective:** The aims of this study were to collect data on electrically evoked stapedius reflex threshold (eSRT) in Med-El adults and children cochlear implant users, and to compare their relationship between these two groups.

**Methods:** A retrospective study was performed. 52 subjects implanted Med-El cochlear implants at Auditory Medical Center at Cheng-Hsin General Hospital between 2009 to 2013 were recruited in this study. Among these subjects, 7 were adults CI users and others were children CI users. ESRT data was measured 1 day post the surgery across 12 electrodes. The data of implanted age and eSRT was analyzed by applying two-way Mixed Design ANOVA.

**Results:** The result from ANOVA analysis showed there is no significant correlation between age and eSRT. In adult group, mean eSRT ranges from 16.6 to 24.4 current units. In children group, mean eSRT ranges from 17.0 to 23.3 current units. In terms of comparison between 2 groups, there is no significant difference of ESRT data between adult and children group across all 12 electrodes.

**Conclusion:** The analysis of retrospective data showed that there is no significant difference of eSRT between adult and children Med-El cochlear implant users at all 12 electrodes.

## A3-3　TRACKING ASSESSMENT ON EFFECTS OF MONOSYLLABIC WORD RECOGNITION REHABILITATION FOR HEARING-IMPAIRED CHILDREN WITH COCHLEAR IMPLANTS

Jianju Liu[1], Xibin Sun[2]

[1] *Shanghai Univercity Of T.C.M (China)*
[2] *China Rehabilitation Research Center For Deaf Children (China)*

**Objective:** To analyze influence of cochlear implant age , gender, rehabilitation time and education programs to monosyllabic word rehabilitation effects and to discuss the regularity of monosyllabic word development of hearing-impaired children by evaluating 2-6 years of 316 hearing-impaired children with cochlear implants.

**Methods:** To utilize hearing evaluation criteria and methods of hearing impaired children widely used in china rehabilitation system for deaf children.  The research is based on gender, age and intervention time by three mixed design, the dependent variable is the CI children's assessment results of monosyllabic word rehabilitation and independent variable is the CI children's age, gender and the evaluation time. Software spss16.0 is applied to analyze the statistical data.

**Results:** The CI children's monosyllabic word significantly increased with prolonged rehabilitation time . The interactions of CI children's hearing assessment time and age were significant, the children age are smaller, the larger progress range will be obtained. The CI children's gender on the main effect of hearing was not significant

**Conclusion:** After Cochlear implants, monosyllabic word ability gets rapid development with the rehabilitation time, the age are smaller and the larger increase are obtained, the monosyllabic word was relatively stable when the hearing training time are at least 12 months, but for yonger-age group, the hearing training time are exceed 1 year.

## A5 Keynote — EVIDENCE-BASED PRACTICE (EBP) AND CLINICAL PRACTICE

Lena L N Wong

*Division of Speech and Hearing Sciences and Clinical Hearing Sciences (CHearS) Laboratory, University of Hong Kong (China)*

Evidence Based Practice (EBP) is a buzz phrase in modern day healthcare, and there is a rising interest on EBP in audiology as well. Many researchers and clinicians stress the importance of this approach but it is often difficult for a clinician to apply EBP in clinical settings, particularly when limited evidence is available for a device or when a clinician is busily engaged with the day to day clinical routine. This talk will cover the basic concepts of EBP and examples will be used to illustrate how EBP could be implemented in clinical settings.

Evidence Based Practice (EBP) refers to the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients (Sackett, Rosenberg, Gray, Haynes, and Richardson,1996)". However, there are misunderstandings that it is a cookbook approach to the application of literature in a clinical setting and is too difficult for an average clinician to incorporate. In reality, the EBP approach stresses the importance of understanding a client's preferences, priorities and values, as well as a clinician's expertise in the assessment of the relevant research findings, and takes into account the clinical context in which the client and clinician interact.

As an introduction to EBP, the first four steps of the process: (1) ask a question, (2) access the information, (3) appraise the articles, and (4) apply the information will be illustrated with an example. The presenter will then walk through with the audience examples of research with varying levels of evidence, with the purpose of illustrating how they could be applied in clinical situations. EBP principles will be used to identify the gaps in research about these particular intervention approaches. Finally, based on these findings, clinicians could help their clients make a clinical decision that addresses an individual's needs.

## A6-1 — TAIWAN SIGN LANGUAGE/CHINESE BILINGUAL-BICULTURAL MODEL OF LITERACY EDUCATION FOR THE DEAF STUDENTS: COMPARISON OF THE EFFECTIVENESS OF PICTURE BOOKS READING PROGRAMS

Hsiu Tan Liu, Chun Jung Liu

*Chung Shan Medical University (Taiwan)*

Reading achievements among deaf students typically lags significantly behind those of their hearing peers. While the efforts of oral approach or total communication method, deaf students still struggle to master reading skills. Bilingual-Biculture （BiBi）is new paradigm in Deaf education. BiBi paradigm emphasize using sign language to be the teaching language. The purpose of this study is to develop a Taiwanese Sign Language/ Chinese Bilingual storybook reading program for deaf children to improve their reading performance.

This study adopted parallel treatment design of single-subject research to compare two kinds of picture reading program, one is called 123 picture book reading program and the other is called Dialogic program. Both 123 and Dialogic picture book reading program use Taiwan Sign Language to teach deaf children Chinese reading and the teachers of the two programs are deaf. The participants are 3 deaf students of deaf school. They all participated two programs. During the 12 weeks intervention, the word recognition, reading comprehension, book reading in Taiwan Sign Language will be measured every week. After the intervention, we will compare the outcomes of these two picture book reading programs based on visual analysis and effect size analysis. In addition, this study investigates whether these interventions make clinically significant remediation or normalization of the reading skills of deaf students or not.

**Key words:** deaf children, picture book, Bilingual Taiwan Sign Language, reading

## A6-2 COMPARISON OF SMARTPHONE-BASED AUDIOMETRY WITH SELF-PERCEPTION, QUESTIONNAIRE AND WHISPERED VOICE TEST FOR SCREENING FOR HEARING IMPAIRMENT

Cheng-Jung Wu[1], Te-Fang Wu[1,2] ,Yaoh-Shiang Lin[1]

[1] *Department of Otolaryngology – Head and Neck surgery/ Kaohsiung Veterans General Hospital (Taiwan)*
[2] *Kaohsiung City Audiologist Association (Taiwan)*

**Objective:** We want to evaluate the smartphone-based audiometry as a test for screening hearing impairment. This study also sets out to compare the usefulness of self-perception, questionnaire and whispered voice test to screen for hearing impairment.

**Methods:** All participants were recruited through a single otology practice. Patients with otorrhea and cognitive impairment were excluded. All patients completed five hearing evaluations, including the smartphone-based audiometry test, self-perception test, questionnaire test and whispered voice test and a standard audiogram by the same audiologist. We compared the results of these tests to the standard audiogram.

**Results:** The smartphone-based audiometry was able to correctly diagnose the presence of hearing loss with a high sensitivity and high specificity. Compared to self-perception test, questionnaire test and whispered voice test, the smartphone-based audiometry has higher positive likelihood ratio.

**Conclusion:** The smartphone-based audiometry is a reasonable screening test to rule out moderate hearing loss and is valid at quantifying the degree of hearing loss in patients known to have abnormal hearing.

## A6-3 THE PROMOTION OF NEWBORN HEARING SCREENING IN TAIWAN & ITS EFFICACY

Hung-Ching Lin[1,2]

[1] *Deparment of Audiology & speech language pathology, Mackay medical college (Taiwan)*
[2] *Department of Otolaryngology, Mackay Memorial Hospital (Taiwan)*

The purpose of this study: The newborn hearing screening in Taiwan has begun since 1998 and was promoted by government yearly. The aim of this paper is to assess the result of newborn hearing screening affecting the age of identification and intervention of congenital hearing impaired children in Taiwan.

**Materials** and Methods: There were 263 hearing impaired children from Children's Hearing Foundation, with their start of auditory habilitation from 2006, to 2010. Among these, there are 114 hearing impaired children with newborn hearing screening but 149 without it. Independent samples & t-test were used to compare the age of confirmed diagnosis, hearing aid fitting and auditory intervention between these two groups.

**Results:** For hearing impaired children with newborn hearing screening, their average age of identification iS8.7 months; hearing aid fitting is 12.4 months and auditory intervention is 18.8 months. For those without newborn hearing screening, their average age of identification iS27.5 months; hearing aid fitting iS31.3 months and auditory intervention iS40.5 months. There were significant differences in the age of identification, hearing aid fitting and auditory intervention between congenital hearing impaired children with and without hearing screening.

**Conclusion:** This research indicates newborn hearing screening facilitates early identification, diagnosis and intervention of congenital hearing loss. The age of these three key aspects related to management of congenital hearing impaired children among different years has dramatically reduced after promotion of newborn hearing screening program in Taiwan.

## A6-4    PERCEPTION OF FREQUENCY-LOWERED MANDARIN MONOSYLLABLES AND SENTENCES IN NOISE

Pei-Chun Li, Ching-Ju Liu

*Department of Audiology and Speech-Language Pathology, Mackay Medical College (Taiwan)*

**Objective:** Frequency lowering processing tries to compensate for the high frequency hearing loss by translating high frequency cues into lower frequency signals. This technique reduces the bandwidth of speech signals and inherently introduces distortions on phase and magnitude information of frequencies in the compression region and may degrade perceptual features from acoustic phonetic perspective. Recent systematic review on the efficacy of this processing strategy indicates the heterogeneity of outcomes across different studies, and little is known about its benefit for understanding speech in noise, especially for Mandarin users. The purpose of this study is to evaluate the effect of frequency lowering on the performances of Mandarin Monosyllable Recognition Test (MMRT) in noise and Mandarin Hearing in Noise Test (MHINT).

**Methods:** The MMRT in 3 different signal-to-noise ratios and the MHINT in quiet and noise front conditions were conducted to investigate the impact of a nonlinear frequency compression (NFC) algorithm on the speech recognition performance in noise. The cutoff frequency, frequency range and compression ratio parameters of the NFC algorithm were varied, and their effect was measured with 30 normal hearing listeners and 6 hearing impaired listeners. The HI listeners were fitted with individual targets using the NAL-NL1 method. Hearing aid verification was completed before test and no feedback was generated during experiment.

**Results:** The relative influence of NFC parameters were analyzed. The comparison of MMRT and MHINT performances may help to estimate the intertwined effect of frequency lowering and noise on different types of materials. It is expected the HI group is more sensitive to the effects of NFC. And words with retroflex consonants and dental sibilant sounds are expected to be distorted most by frequency lowering.

**Conclusion:** The frequency lowering processing led to poorer performance for normal hearing listeners under all test conditions. Vowel and consonant confusion analyses showed place of articulation errors to be the most frequent. There was no systematic relationship between the effect of noise and the test materials.

## A6-5    IS THERE ANY RELATIONSHIP BETWEEN SPEECH EVOKED AUDITORY LATE LATENCY RESPONSE AND DICHOTIC TEST IN CHILDREN WITH DYSLEXIA

Prawin Kumar, Rohit Gupta

*All India Institute of Speech and Hearing (India)*

**Objective:** The present study evaluated the performance of children with dyslexia in comparison to typically developing children on speech evoked long latency response and Dichotic CV test. It was also aimed to see if any correlation exists between speech evoked long latency response and in Dichotic CV test in children with dyslexia.

**Methods:** A total number of 20 children in the age range of 10-12 years were taken for the study. Out of 20 children, there were 10 typically developing children and 10 children with dyslexia.

**Results:** The results revealed that overall latencies were significantly prolonged and amplitude was reduced in dyslexic children as compared to typically developing children ($p < 0.05$) for long latency response. Similarly, Dichotic CV scores were also significantly reduced in dyslexic children ($p < 0.05$). Further, it was observed that there were positive correlation between double corrected score and speech evoked auditory long latency response but statistically non-significant ($p > 0.05$).

**Conclusion:** Hence, it is concluded that children with dyslexia performed poorly in dichotic listening test. It is also concluded that there is abnormal encoding of speech signal at cortical level in these children.

## A7 Lunch Symposium

**Beltone Promise™: Tinnitus Management: Modern Practices, Protocols and Procedures**

Michael Piskosz

*Global Audiology team for GN ReSound (New Zealand)*

Beltone Promise™:    Tinnitus Management: Modern Practices, Protocols and Procedures

- *General tinnitus knowledge*
  - What causes tinnitus?
  - How is tinnitus diagnosed?

- *Treatments/Management & Methodologies*
  - Sound Therapy
  - Tinnitus Retraining Therapy (TRT)
  - Progressive Tinnitus Management (PTM)
  - Combined approach
  - Unconventional methods

- *MyPal: Direct transmission for Pediatrics*
  - Benefits of improved SNR
  - MyPal & research

*Beltone*

## A8 Special Topic

### TAIWAN SIGN LANGUAGE ABILITY ASSESSMENT AND RELATED STUDIES

Hsiu Tan Liu

*School of Speech Language Pathology & Audiology,Chung Shan Medical University, Taichung (Taiwan)*

Taiwan Sign Language (TSL) is an important tool for the deaf in Taiwan to transmit information, express emotions, and establish deaf cultures. It is the main language for the deaf students to communicate and acquire their knowledge.

The purpose of this study was to develop an assessment tool, Computer-based Test for TSL (CTTSL) in Taiwan. The CTTSL can be used to assess the sign language ability of deaf students, adults and interpreters. It can be used to assess the effectiveness of intervention programs or to understand the relationship between sign language ability and other ability (ex. Reading ability).

This article will explain how the CTTSL has been developed. It consists of background investigation and three receptive tests including vocabulary comprehension, syntax comprehension and story comprehension.

The CTTSL has provided psychometric indicators, such as Cronbach's Alpha consistency reliability, Test –retest reliability and validity according to the pretest of 30 deaf participants. It has been used with 183 signers and in the development--- of the Norms for deaf students (age 12-18), deaf adults and interpreters.

We have found six background variables which had significant association with sign language ability. Then we used the Standardized regression model to find that the most important variables for sign language ability were the onset time, the years of staying at the dorm, and the age of beginning to learn sign language.

According to CTTSL, we found that the correlation between sign ability and reading ability are quite high.

## A10 Special Topic

### INSIGHT INTO CONNEXIN GENES IN NON-SYNDROMIC HEARING LOSS: FROM PHENOTYPE TO GENOTYPE TO MOLECULAR MECHANISM AND THE APPLICATION ON DIAGNOSIS

Jiann-Jou Yang

*Department of Biomedical Sciences, Chung Shan Medical University, Taichung (Taiwan)*

The crucial role of gap junctions, which are composed of connexin (CX) protein, in auditory functions has been confirmed by numerous studies. In this study, we investigate the prevalence and phenotype/genotype correlation of connexin (CX) gene family variants in a cohort of children with nonsyndromic hearing loss (HL). A total of 513 unrelated children with nonsyndromic HL were screened for the presence of variants in 6 genes of the CX gene family. The prevalence of CX gene variants in 513 patients was 19.88% (102/513). We found the frequency of a sloping audiometric configuration was significantly higher for children with GJB2 and GJB3 variants than for those with GJB4 and GJC3 variants (Adjusted OR = 4.89, $p < 0.001$). In addition, our results suggest the variants of GJC3, GJB4, and GJB3 may be the common genetic risk factor, after variants of GJB2, for the development of nonsyndromic HL in Taiwan. These data can be effectively applied to direct the clinical evaluation of children with CX gene variants. Further, we compared the intracellular distribution and assembly of mutant Cxs with that of the wild-type (WT) Cxs in HeLa or tet-on HeLa cells and the effect that the mutant protein had on those cells. Our results indicated that Cx26R184Q and CX30A40V have a dominant negative effect on the function of wild types Cx26 and Cx30. We found that Cx29E269D has a dominant negative effect on the formation and function of the gap junction. In addition, we found that mutations in Cx43 genes resulted in loss of function of Cx43 protein might be the causes for hearing loss. These results provide information for understanding the importance of genetic factors in nonsyndromic deafness of Taiwanese and that may be of use in the improvement of genetic diagnosis of hearing loss.

## A11-1 DIABETES AND HEARING LOSS: RESEARCH FINDINGS AND CLINICAL IMPLICATIONS

Sumalai Maroonroge[1], Hsiao-Chuan Chen[2], Chun-Jung Liu[3], Connie Barragan[4]

[1] Texas A&M International University (United States)
[2] National Kaohsiung University (Taiwan)
[3] Chung Shan Medical University (Taiwan)
[4] Lyndon B. Johnson General hospital (United States)

**Objective:** Diabetes and hearing loss are two of the most common health concerns. The number of people with diabetes worldwide was estimated at 171 million in 2000 and is predicted to rise to 366 million in 2030. As the prevalence of diabetes continues to rise, it will strain health-care resources. Diabetes is often associated with high blood pressure and high cholesterol that lead to vascular disorders and mortality. Studies from NIH and others indicate that hearing loss is twice as common in people with diabetes. Various physiological studies showed high glucose levels damage blood vessels and auditory nerves which lead to hearing loss. However, the associated disorders of diabetes and their effect on hearing sensitivity remain unclear. Further research is needed in order to provide effective prevention and intervention. The purpose of this research was to examine hearing loss in hypertension, dizziness, and tinnitus and ear infection in patients with and without diabetes.

**Methods:** Data from 1128 patients from the Audiology Clinic at Lyndon B. Johnson (LBJ) General Hospital in Houston, TX were used in the statistical analysis.

**Results:** 1. High prevalence of hearing loss found in patients with diabetes, hypertension, dizziness, and ear infection.

2. Diabetic patients mostly revealed high frequency sensorineural hearing loss.

3. Good correlation among types of hearing loss and tympanogram.

**Conclusion:** Hearing loss was a common but under-diagnosed complication in patients with diabetes. This study indicates an urgent need for audiology assessment and intervention in diabetes and other associated disorders.

## A11-2 ASSOCIATION OF THE GRAINYHEAD LIKE 2 GENE (GRHL2) POLYMORPHISM AND AGE-RELATED HEARING IMPAIRMENT IN TAIWAN

Juen-Haur Hwang[1], Chen-Chi Wu[2], Tien-Chen Liu[2]

[1] Buddhist Dalin Tzu-Chi General Hospital, and the School of Medicine, Tzu Chi University (Taiwan)
[2] National Taiwan University Hospital (Taiwan)

**Objective:** The grainyhead like 2 gene (GRHL2) was found to be associated with age-related hearing impairment in European. This study aimed to investigate whether the same association exists in Taiwan population.

**Methods:** A total of 1175 Han Taiwanese volunteers were divided into cases (the 26 % subjects with worse hearing, n= 310) or controls (the 26% subjects with better hearing, n= 308) by the Zhigh scores converted from the original frequency-specific hearing thresholds. The GRHL2 single nucleotide polymorphism (SNP) locus (rs10955255: A/G) in intron 1 (coordinate: 102605581) shown in the HapMap was genotyped with correlation to the audiological phenotypes.

**Results:** The genotype distributions of the GRHL2 (AA/AG/GG) were not significantly different between the controls and the cases classified (P= 0.349). Compared to genotype AA, the odds ratios (ORs) of the genotypes AG and GG of GRHL2 for ARHI did not show significant differences after adjusting other environmental risk factors by logistic regression analyses (0.78 ±0.139, 95 % C.I.= 0.55~1.10 , P= 0.160 for AG; 0.85 ± 0.283 95 % C.I.= 0.44~1.63, P= 0.625 for GG). The AA was the most common genotype in each audiogram pattern. But, compared to genotype AA, the adjusted ORs of the genotypes AG and GG of GRHL2 for ARHI still did not show significant differences in each audiogram pattern.

**Conclusion:** Our results did not show a positive association between GRHL2 polymorphism and ARHI in Taiwanese. Population differences might be a key factor leading to non-replication.

## A11-3 TESTING PROTOCOL FOR ACCESSING HEARING HEALTH CARE NEEDS OF STUDENTS WITH DISABILITIES IN TAIWAN

Pei-Yu Lin[1], Hsiao Chuan Chen[1], Nan-Mai Wang[2], Shu-Yu Liu[2], King Chung[3]

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[2] School of Speech Language Pathology and Audiology, Chung Shan Medical University (Taiwan)
[3] Department of Allied Health and Communicative Disorders (United States)

**Objectives:** Individuals with special needs are often reported to have high prevalence of undetected hearing disorders/loss, and there is no standard hearing screening protocol for testing this population. The purposes of this study were 1) to examine the hearing status among students with special needs in Taiwan, and 2) to investigate desirable hearing test protocol for adequately detecting hearing problems in this population and reducing necessary referrals for follow-up services.

**Methods:** A total of 238 students participated in the study. They were enrolled in two schools of special education and one learning center for individuals with special needs located in the northern, central, and southern regions of Taiwan. Most students had intellectual disabilities and some also had additional syndromes or disorders. A hearing screening protocol including otoscopy, tympanometry, and distortion product otoacoustic emissions was administered to examine students' outer, middle, and inner ear functions, respectively. Pure tone tests were also administered to those who failed or could not be tested using the screening protocol.

**Results:** Overall, 32.4% of students passed, 52.1% needed follow-up services, 11.8% could not be tested, 2.5% had documented hearing loss and 1.3% needed to be monitored because of the presence of negative middle ear pressure. The inclusion of pure tone audiometry was found to increase the passing rate for 9.9% and provided more hearing sensitivity information for another 8.6% of students.

**Conclusion:** The results of this study highlight the necessity of providing regular and quality hearing services for students with special needs. A screening protocol examining the outer, middle, and inner ear functions are needed because of high occurrences of excessive cerumen, middle ear dysfunction and sensorineural hearing loss. The inclusion of pure tone audiometry could reduce the number of unnecessary referrals and provide more hearing sensitivity information. Training of the care-givers and teachers of students with special needs are also encouraged so that they can help identify hearing problems and reduce the negative impact of hearing disorders/loss.

## .C1 Keynote — AAC ASSESSMENT ISSUES FOR INDIVIDUALS WITH AUTISM SPECTRUM DISORDER

Pat Mirenda

*University of British Columbia, Vancouver BC (Canada)*

Augmentative and alternative communication (AAC) assessment is a dynamic and ongoing process that is based on a transactional model of communication interaction. Assessment should extend beyond formal testing of skills to include information about the individual's functioning in terms of communication and related areas across environments or social contexts. This presentation will introduce the Participation Model (Beukelman & Mirenda, 2013), a strategy for conducting an AAC assessment for individuals with autism spectrum disorder (ASD). According to the Model, two types of barriers may result in a failure to participate in communication interactions—barriers related to opportunity and barriers related to access. Opportunity barriers refer to limitations that are imposed by people other than the individual with ASD that cannot be eliminated simply by providing an AAC system or intervention. For example, an individual may be unable to participate at the desired level because of the attitudes of those around him or her, even though an appropriate AAC system has been provided. Access barriers are present primarily because of limitations in the current capabilities of the individual or his or her current communication system. For example, an access barrier might occur because an individual's AAC system does not have sufficient memory for the vocabulary needed for specific activities. Resolution of access barriers for individuals with ASD requires specific attention to assessment of symbol understanding, language comprehension, and literacy skills. Strategies for assessment of these areas will be the focus of the presentation, with videotaped examples as illustrations.

## C2 Special Topic — WHAT WE LEARN FROM THE AAC RESEARCHES IN TAIWAN?

Ming-Chung Chen

*Department of Special Education, National Chiayi University (Taiwan)*

With the efforts of advocacy and promotion, AAC interventions have being one of the options for individuals with complex communication needs in Taiwan. Meanwhile there are many studies explored the effectiveness of AAC interventions for individuals with various disabilities. In order to explore the external evidence of AAC intervention, a systematical review was conducted. This presentation will show the results of reviewing AAC researches in Taiwan, and will give some reflections and suggestions for the future research.

## C3 Special Topic

**HARNESSING THE POWER OF THE EYE-MIND RELATIONSHIP: USING EYETRACKING FOR CLINICAL RESEARCH ON COGNITIVE AND LINGUISTIC PROCESSING**

Brooke Hallowell

*Communication Sciences and Disorders, Ohio University (USA)*

Monitoring where people look as they engage in cognitive and linguistic tasks enables clinical researchers to explore an exciting and vast array of clinical research questions.    There are two primary clinically relevant uses of eyetracking: a) computer or device control or input (as for gaze-based alternative and augmentative communication (AAC) systems) and b) means of studying cognitive and linguistic processes through spontaneous fixation patterns. In this session our emphasis will be on the latter. Spontaneous (natural, unintentional or unprogrammed) eye fixations are unlike those used purposefully in AAC and environmental control, although the latter uses have tremendous benefits for many people with motor speech difficulties. The distinction between two types of use is important in that one of the key strengths of methods for eyetracking in cognitive and linguistic research is that people are not required to use their eyes intentionally to communicate; this helps control for potential ocular motor programming confounds that may affect an individual's intentional use of the eyes to convey propositional (intentional, meaningful) content.

Although eyetracking research methods have been in use for over 100 years, eyetracking studies are rapidly growing in popularity because of growing awareness of their value in studying cognitive activities, enhanced accuracy, improved ease of use, and decreasing costs. Eyetracking enables us to monitor where people fixate as they take in visual information.  When applied to research with individuals with disabilities, eyetracking indices have particular appeal in that they offer an alternative response mode and may reduce reliance on memory and comprehension abilities.  Eyetracking methods also have the advantage of allowing online measures, i.e., tracking of responsiveness during the actual task under study. They do not have the drawbacks associated with successive measures (e.g., recall, recognition, question answering) that require inferences about individuals' cognitive processes and allow for testing responses only after a studied task, leaving obscure the locus of the effect of manipulated variables.  Additionally, individuals with neurological disorders, for example, those with stroke and brain injury, including motor problems in the head, neck, trunk, and limbs, often retain eye movement control.

The technology used most commonly now entails video-based pupil-center corneal reflection systems, which come in myriad forms with diverse levels of accuracy, varied configurations (e.g., head-mounted, remote, and goggle-based, and entailing diverse ways of controlling or accounting for head movement), and a wide range of costs. After a brief introduction to how eyetracking technology works, we will review examples of research incorporating eyetracking to study cognitive and linguistic processes (outside of AAC), including language comprehension, stimulus design for multiple-choice image displays, attention, working memory, and sematic priming. We will also briefly discuss eyetracking applications in AAC design and user interfaces. Strategies for selecting an eyetracking system and for ensuring quality and effectiveness of eyetracking research methods will be shared.   Potential for interdisciplinary and cross-linguistic research collaboration will be discussed.

# Faculty of Taiwan Voice Society Symposium

## Prof. Shyue-Yih Chang, MD.

Prof. Chang was born in Taiwan 1948. He graduated from Kaohsiung Medical University of Taiwan and spent his fellowship at the University of California-San Francisco. Prof. Chang had served as a president of Taiwan Otolaryngological Society, and a chairman of Department of Otolaryngology-Head & Neck Surgery in Taipei Veterans General Hospital. Prof. Chang has been a president of Taiwan Voice Society, and an advisor of Laryngology in Cheng Hsin General Hospital, and a professor of National Yang Ming University in Taipei. Prof. Chang's major interest is in Laryngology and Head Neck Surgery. He also has a passion for voice care.

## Pen-Yuan Chu

Dr. Chu is a fully trained head and neck surgeon. He was graduated from National Defense Medical Center, Taipei, Taiwan in 1989 and completed his residencies and fellowships at Taipei Veterans General Hospital in 1995. He spent one year as the international research fellow at Memorial Sloan-Kettering Cancer Center and worked with Prof. Jatin P. Shah in 2001. Now, he is Professor and Director of the division of Laryngology-Head and Neck Surgery, Department of Otolaryngology, Taipei Veterans General Hospital, National Yang-Ming University, Taipei, Taiwan.

Prof. Chu has been actively involved in national Otolaryngological and Head and Neck Societies. He is the Standing Director of Taiwan Head and Neck Society and Director of Taiwan Otolaryngological Society. Dr. Chu has been academically active at national and international meetings, his research interests includes transoral laser microsurgery for head and neck cancers/tumors, organ preservation therapy in head and neck cancers, head and neck reconstruction, and diagnosis and treatment of second primary maligancies.

## Ka-Wo Lee

- Standing Director, Taiwan Voice Society
- Director, Voice Center, Department of Otolaryngology Head and Neck Surgery, Kaohsiung Medical University
- Visiting Staff, Department of Otolaryngology Head and Neck Surgery, Kaohsiung Medical University Hoapital
- Associate Prof., School of Medicine, Kaohsiung Medical University

**Tzu-Yu Hsiao**

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  -Medical school: College of Medicine, National Taiwan University, Taipei, Taiwan. (1973-80)

  -Internship: National Taiwan University Hospital, Taipei, Taiwan. (1979-80)

  -Residency: Dept. of Otolaryngology, National Taiwan University Hospital, Taipei, Taiwan. (1982-86)

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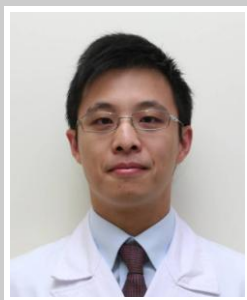
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  - Academic visits: Mount Sinai Hospital, NYC, US. & Mayo Clinic, Arizona, US.
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  - Taiwan Otolaryngological Society
  - Taiwan Head and Neck Society
  - Taiwan Voice Society
  - American Academy of Otolaryngology-Head and Neck Surgery
- Major Interest
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  - Office-based laryngeal procedures
  - Vocal fold augmentation and steroid injection
  - Laryngeal laser operation
  - Clinical epidemiology and health economics

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<u>Overseas Training</u>:
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 2. Visiting Fellow, Eye & Ear Institute, University of Pittsburgh Medical Center, 2003 Oct. -2004 Sep.
 3. Visiting Fellow, Voice Disorders Center, Massachusetts Eye & Ear Infirmary, Harvard University, May 2004
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 1. Da-Vinci robotic surgery for head and neck tumor
 2. Management of laryngopharyngeal cancers
 3. Laryngeal electromyography
 4. Acid reflux disorders

**MUSCLE TENSION DYSPHONIA & MUSCULAR ASSESSMENT OF THE LARYNX**

MORRISON Murray Douglas

*University of British Columbia (Canada)*

The term "Muscle Misuse Disorder" refers to the broad spectrum of dysfunctional patterns that contribute to or cause voice problems, chronic cough, paradoxical vocal fold movements, and other symptoms that can be associated with muscle hypertonicity and/or asynchrony of movement patterns affecting laryngeal function.

We find it helpful to evaluate muscle misuse disorders of the larynx within a framework that encompasses four basic realities of human function and behaviour that can influence muscle use at different levels of the vocal tract: The ALERT model.

1.    Anatomical factors – structural; lesions or neurological conditions can affect muscle usage.

2.    Lifestyle/Environment

An individual's occupational, domestic and recreational activities and the environments in which vocal demands are met may contribute to or cause muscle misuse patterns. Lifestyle factors that affect laryngeal health, such as smoking, excessive caffeine or alcohol intake, hydration, and fitness should all be explored to gain a full appreciation of the potential influences on laryngeal muscle use.

3.    Emotions

Emotional reactions can and frequently do contribute to muscle misuse patterns through mechanisms of voluntary and involuntary muscle systems and through the sympathetic nervous system. In screening for psychological contributors to voice disturbances it is important to look at variables that influence an individual's level of emotional awareness.

4.    Reflux

GERD is a common cause of both chronic laryngitis and muscle misuse in the larynx. The mechanism through which gastro-esophageal reflux can cause muscle misuse in the larynx has been described both theoretically and through study of a porcine model, and reflects with the primary life-preserving role of the larynx to protect the airway.3   GERD seems to increase laryngeal, pharyngeal, and esophageal muscle tone; accompanying symptoms include postnasal drip, globus, and the feeling of a need to clear the throat.   Habitual throat clearing contributes to vocal abuse and hoarseness.   An irritated esophagus reflexly affects the muscles of the pharynx and larynx, causing them to be hypertonic; the resulting muscle misuse can contribute to phonotrauma.

5.    Technique and Vocal Skill

Technique involves more than just the motor activity of speaking or vocal performance. Body alignment, linguistic competence and comfort, communication strategies and pragmatics are among many factors influencing the neuromuscular commands that orchestrate complex muscle patterns for vocal communication.

Laryngoscopic classification

Signs of organic change secondary to misuse may complicate the clinician's diagnostic task. Symmetrical bilateral vocal nodules are mucosal changes known to be secondary to vocal overuse and muscle misuse. Nodules often can be identified with a laryngeal mirror and, if assignment of a diagnosis is based solely on this readily identified clinical sign, it seems logical to label the disease process "vocal nodules". Such an approach to classification focuses on organic pathology, often out of context with an individual's habitual voice use patterns and may bias a clinician to focus on the organic change when planning treatment for patients. If instead, the primary etiology (misuse of muscles) is implied in the diagnostic classification, as in the descriptive term muscle misuse dysphonia with secondary vocal nodules, then management will more likely be directed appropriately toward reducing chronic dysfunctional muscle use.

A classification of laryngeal muscle misuse patterns has been proposed.27   It includes six common postures, observable during phonation, and often seen in combination:

1.    The laryngeal isometric pattern

2.    Glottal and supraglottal lateral compression

3.    Anteroposterior compression

4.    Incomplete adduction in conversion reaction dysphonias

5.    Psychogenic bowing

6.    Falsetto register in adolescent transitional voice disorders.

Muscular assessment by palpation

Palpation of extrinsic laryngeal muscles can yield important information about internal laryngeal postures and diagnosis of muscle misuse voice disorders, particularly MMD type 3 (anteroposterior supraglottic compression). Integration of this technique into routine laryngeal examination can be a significant aid to diagnostic accuracy.

| Figure 3. | Criteria for extra-laryngeal muscular tension grading system |
|---|---|

**Supra-hyoid muscles (S):**

0 = soft at rest, may slightly contract on phonation

1 = soft at rest, mild low pitch & moderate high pitch contraction

2 = some tension at rest, tense with jaw protrusion on phonation

3 = tense all the time, maximally tight on phonation

**Thyrohyoid muscles (T):**
0 = no muscular contraction at rest, mild on phonation
1 = soft thyrohyoid space at rest, some contraction on phonation
2 = tense, narrow thyrohyoid space at rest, moderate contraction on phonation
3 = very tense with closed thyrohyoid space all the time

**Cricothyroid muscles (C):**
0 = normal cricothyroid space and phonatory movement
1 = narrowing of cricothyroid space at rest, some movement on phonation
2 = anterior displacement of cricoid cartilage with narrowing of cricothyroid space at rest, closing of the space on phonation
3 = closed cricothyroid space all the time

**Pharyngo-laryngeal muscles (inferior constrictor) (P):**
0 = soft, easy to rotate the larynx for 90degree and palpate posterior cricoarytenoid (PCA) muscle and arytenoid movement on sniffing
1 = slightly tense, cannot palpate PCA muscle movement on sniffing
2 = moderately tense, difficult to rotate the larynx but still can palpate the posterior edge of thyroid cartilage
3 = very tense, cannot rotate the larynx at all

| Figure 2. | Technique of Palpation |
|---|---|

*Supra-hyoid muscles (S):*

➢ Midline upwards palpation in submental space with middle finger

Observe : 1) tension at rest

2) contraction during low-pitched /a/ follow by high-pitch /u/ phonation

*Thyrohyoid muscles (T):*

➢ Palpate both thyrohyoid spaces with the thumb and forefinger

observe : 1) tension at rest

2) contraction during connected speech (count one to five), and with an easy hum

*Cricothyroid muscles (C):*

➢ Feel the cricothyroid space in midline with tip of the index finger

Observe : 1) position of the cricoid arch relative to the thyroid cartilage

2) size of the space at rest

3) closing and opening of the space during high and low pitched phonation

*Pharyngo-laryngeal muscles (inferior constrictor) (P):*

➢ Rotate the larynx, hook posterior edge of thyroid cartilage with index finger and draw forward, feel the posterior aspect of the cricoid cartilage with middle and ring finger

Observe : 1) tension in pharyngeal muscles

2) associated arytenoid movement and posterior cricoarytenoid (PCA) muscle contraction during sniffing

| **T2** | **LARYNGEAL ELECTROMYOGRAPHY-GUIDED HYALURONIC ACID VOCAL FOLD INJECTION FOR UNILATERAL VOCAL FOLD PARALYSIS** |

Chen-Chi Wang[1,3,4], Ming-Hong Chang[2]

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Incomplete vocal fold adduction in unilateral vocal fold paralysis (UVFP) is a common disorder that may cause glottal closure insufficiency (GCI) with hoarseness of voice and aspiration during swallowing. Since Bruening started using vocal fold injection (VFI) to treat GCI of UVFP in 1911, it has becomes a popular treatment with various injectable materials including hyaluronic acid (HA). In the past, VFI was always guided by laryngoscopy with different techniques. Especially office-based awake VFI under local anesthesia was rapidly adopted in recent years. However, it's difficult to monitor VFI under laryngoscopic guidance if patient had strong gap reflex, compensatory contracted supraglottic structures, or profuse saliva secretion overwhelming the larynx under local anestheasia etc.

Laryngeal electromyography (LEMG) was introduced in 1944 by Weddel et al., and it is the only test that can provide otolaryngologists with the neuromuscular status of UVFP patients and prognosis information. In 1988, Ludlow et al. reported using LEMG to guide botulinum toxin injection into the thyroarytenoid (TA) muscle to relieve vocal fold spasm in adductor spasmodic dysphonia. Because the TA muscle is the target of both LEMG and VFI, we have prospectively investigated the therapeutic application of LEMG guidance HA injection in patients with UVFP since 2010. In our preliminary reports, we have proved that LEMG-guided HA VFI is a feasible office-based technique with satisfactory short-term results. So far we have done this procedure for more than 66 patients and more than half of our patients could have long term effect after singe injection.

LEMG-guided HA VFI is a treatment option for UVFP. In this report, the rationale, procedure, long term results, advantages and disadvantages of this surgical procedure will be introduced and discussed.

| **T3** | **IRRITABLE LARYNX SYNDROME (ILS) AND CENTRAL SENSITIVITY DISORDERS (CSD)** |

MORRISON Murray Douglas

*University of British Columbia    (Canada)*

The irritable larynx syndrome (ILS) is a clinical picture in which a person develops laryngeal hypertonicity and/or spasm when triggered by a sensory stimulus. The laryngospasm might produce airway obstruction, more often inspiratory than expiratory, and this is often called "vocal cord dysfunction" or "paradoxical vocal cord motion". The patient's description of obstruction during inspiration rather than expiration is a helpful cue in differential diagnosis, as this does not fit the typical profile for asthma. Laryngeal spasm can cause episodes of cough when a cause is not evident, or a sense of a lump in the throat, called globus. It may lead to voice difficulties, manifest as episodes of tight, strained, spasmodic voice. The irritable larynx syndrome (ILS) was initially defined in 1999 as "hyperkinetic laryngeal dysfunction resulting from an assorted collection of causes in response to a definitive triggering stimulus."   We hypothesized that some or several processes had altered brain stem control of laryngeal sensory-motor processes so that abnormal muscle tension or spasm occurred in response to what would otherwise be a normal sensory stimulus.   ILS symptoms include episodic laryngospasm, chronic cough, dysphonia and/or globus, with visible and/or palpable evidence of tension or tenderness in laryngeal muscles.   Specific symptom-triggering stimuli are also identified.   The presence of significant gastroesophageal reflux seems to play a role in development of throat (ILS) symptoms in patients with CSD, and can also act as a symptom trigger.

The central sensitivity may be post viral, or related to neuroplastic changes in the central nervous system subsequent to repetitive noxious stimuli impacting muscle reactivity in the larynx and associated structures of the embryologically-related neuromuscular systems of respiration and swallowing.

ILS often co-exists with symptoms associated with other central sensitivity syndromes (CSS), including irritable bowel, fibromyalgia, chronic fatigue syndrome, migraine headache. A theoretical model for CCS implies an underlying neuro-endocrine-immune (NEI) pathology, evidenced by testing neurotransmitters/modulators with nociceptive spinal flexion reflex, functional MRI and cerebral evoked

potential by EEG. There is increasing evidence that negative affective states (depression, anxiety) activate pain-facilitating pathways that are linked to the amygdala. This interaction may be a critical neuro-anatomical link in central sensitivity syndrome processes.

Treatment for ILS in CSS involves 1. Minimizing exposure to offending stimuli (mostly reflux), 2. Providing exercises, stretches to aid in re-programming the central response (voice therapy), and 3. Addressing the central issues with counseling and appropriate neuromodulator medications.

## T4 MANAGEMENT OF CHRONIC UNEXPLAINED COUGH & LARYNGOPHARYNGEAL REFLUX

MORRISON Murray Douglas

*University of British Columbia (Canada)*

Chronic Cough is the number one complaint of patients seeking medical care in ambulatory clinics. In most cases the contributing causes can be identified and successfully treated.

Chronic Cough, defined as lasting more than three weeks, is typically caused by upper airway cough syndrome (if it exists), asthma, GE Reflux, bronchiectasis, eosinophilic bronchitis, medications (ACE inhibitors), smoking.

GE Reflux and Cough: GER causes cough by stimulation of an esophageal-bronchial reflex. When GERD causes cough, there may be no GI symptoms up to 75% of the time. Accurately diagnosing and successfully treating chronic cough due to GERD can be a major challenge.

Upper Airway Cough Syndrome or Postnasal Drip Syndrome are Pulmonary medicine terms. The syndrome or pseudo-syndrome of post-nasal drip (PNDS) represents a diagnostic label which is unhelpful in the understanding of chronic cough. There is no accepted definition of PNDS and no accepted method of measurement. Otolaryngologists believe that postnasal drip, globus, throat clearing and the associated cough are due to laryngopharyngeal reflux.

The etiological hypotheses for unexplained cough includes up-regulation of brainstem nuclei that control laryngeal function, including the cough center. The hypersensitive CNS responds inappropriately to a "normal" sensory stimulus. The altered CNS coding may be caused by, sudden severe upper airway sensory trauma (inhalation?), chronically repeating milder irritant (reflux?), severe psychological trauma (a variant of PTSD?), chronically repeating psychological stressor, or a viral illness where DNA alters central coding.

Post-viral laryngeal neuropathy is compatible with ILS, as discussed in the previous talk.

Central Sensitivity Syndromes comprise an overlapping and similar group of syndromes without structural pathology, bound by the common mechanism of central sensitization (CS) that involves hyper excitement of the central neurons through various synaptic and neurotransmitter/neurochemical activities.

The 3 level treatment strategy:
1. Minimize sensory stimuli (reflux, odors)
2. Re-program habituated central response
1. Cognitive behavioral therapy
2. Voice therapy (eg, pursed lips breathing)
3. Manual therapy (tongue and larynx stretches)
4. Neuro-psychotropic medication: amitriptylene, SSRIs and combined S+NA (venlaxitine), baclofen, gabapentin etc.

Three scenarios to "explain" chronic unexplained cough:

1. Altered CNS "laryngeal" neuronal irritability, post viral or post severe stimulus (like PTSD)

2. Esophageal disorders. The otolaryngologist's role in treating patients with chronic cough is usually through the effective management of GE reflux.

3. Full Irritable Larynx Syndrome with a cluster of other Central Sensitivity disorders such as fibromyalgia, IBS, CFS, headaches, etc. Adopting a broader perspective, that of a Central Sensitivity Syndrome, allows the ORL practitioner to help the patient live with a troublesome cough that otherwise remains unexplained.

## T5   INTRALESIONAL STEROID INJECTION FOR BENIGN VOCAL FOLD DISORDERS

Chi-Te Wang

*Assistant Professor, Department of Otolaryngology Head and Neck Surgery, Far Eastern Memorial Hospital, Taipei (Taiwan)*

Treatments for benign vocal fold disorders include a list of conservative and interventional modalities. In most circumstances, behavioral modification remains the first-line management, followed by phonomicrosurgery. However, when the compliance of conservative managements is poor, when the risk of general anesthesia is high, when the patients' willingness to receive operation is low, or in case of recurrence after preceding surgery, very little option is left for the patients.

Intralesional steroid injection has long been advocated for various inflammatory laryngeal diseases, such as sarcoidosis, systemic lupus erythematosus, and Wegener's granulomatosis. With the advance of rigid and flexible endoscopy, various studies had applied direct steroid injection to treat benign vocal fold lesions. In our recent systematic review and meta-analysis, 6 articles were identified from electronic database, and the proposed indications of vocal fold steroid injection (VFSI) include vocal nodules, polyp, cyst, Reinke's edema and scar. Quantitative meta-analysis had demonstrated significant improvements of maximal phonation time (1.82 seconds increase) and voice handicap index (27.61 points decrease) after VFSI. Adverse effects of VFSI include local hematoma, whitish deposition of triamcinolone and mild vocal fold atrophy, which resolve spontaneously within 1 to 2 months.

Despite the documented evidence from the literature, clinical application of VFSI is frequently limited by the high technical demands for adequate anesthesia and precise needle placement into the superficial lamina propria (Reinke's space). Therefore, we developed a modified injection technique via the operating channel of a transnasal flexible laryngoscope, and the results showed comparable outcome and better tolerability for patients with sensitive larynges. In order to provide more convincing evidence of the treatment effectiveness, we also compared the lesion reduction rates between VFSI and vocal hygiene education (VHE), which revealed a higher overall lesion reduction rate of VFSI than VHE (46% vs. 24%, p < 0.05). Specifically, for vocal nodules and patients with regular occupational vocal demands, VFSI resulted in earlier lesion reduction than VHE at 1 month, but both modalities achieved similar lesion reduction rateS2 month later (p>0.05). In contrast, for vocal polyps and patients with high occupational vocal dependence, VFSI was more effective than VHE alone (p < 0.01).

In summary, after almost 50 years from the original work by Dr. Yanagihara in 1964, intralesional steroid injection is now available for modern laryngologists as a useful alternative management option for benign vocal fold disorders. Hopefully, our recent researches may bring detailed understanding of existing literature, improve the clinical practicability and patients' tolerability, and provide more convincing evidence regarding the clinical effectiveness of VFSI. Future works are undergoing to investigate the long term outcome, prognostic factors, and safety profile of VFSI.

**Abstracts**

Poster Presentation

| No. | Title | First name | Surname |
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| PPA-001 | DETECTING SENTENCE TYPE IN TONAL AND NON-TONAL LANGUAGES WITH AND WITHOUT SIMULATED HEARING LOSS | Emily | Lin |
| PPA-002 | THE EFFECTS OF CONSONANT ENHANCEMENT AND SYLLABLE COMPRESSION UPON THE CONSONANT IDENTIFICATION AND INTELLIGIBILITY | Chi-Yuan | Yin |
| PPA-003 | A RESEARCH ON THE DECISION MAKING OF ADULT COCHLEAR IMPLANT CANDIDATES IN TAIWAN | Min-Chi | Kao |
| PPA-004 | THE SIX-SOUND TEST REVISITED: A CHINESE-ORIENTED APPROACH | Yu-Chen | Hung |
| PPA-005 | EXPRESSIVE VOCABULARY OUTCOMES OF TODDLERS WITH HEARING LOSS IN AN AUDITORY-VERBAL THERAPY (AVT) PROGRAM | Yi-Ping | Chang |
| PPS-001 | A RESOURCE PACKAGE ON VOCABULARY ENHANCEMENT FOR SECONDARY SCHOOL STUDENTS (「詞彙策略輕鬆學 閱讀寫作添歡樂」資源套): APPLYING THE VOCABULARY ENHANCEMENT STRATEGIES IN DAILY TEACHING AND LEARNING FOR IMPROVING SPEECH AND LANGUAGE IMPAIRED STUDENTS' LEARNING EFFECTIVENESS IN SECONDARY SCHOOLS | Joanna Sum Chi | Cheung |
| PPS-002 | AN INVESTIGATION OF STORY RETELLING ABILITIES OF BILINGUAL CHILDREN WITH CLEFTS | Selena | Young |
| PPS-003 | LANGUAGE PERFORMANCE IN SPOKEN NARRATIVES OF STUDENTS WITH INTELLECTUAL DISABILITIES | Pao-Hsiang | Chi |
| PPS-004 | THE EFFECTS OF THE STORY STRUCTURE INSTRUCTION ON THE READING COMPREHENSION FOR HIGH SCHOOL STUDENTS WITH INTELLECTUAL DISABILITIES | Pao-Hsiang | Chi |
| PPS-005 | A STUDY ON THE NARRATIVE ABILITIES AND EXECUTIVE FUNCTIONS BETWEEN THE ADHD CHILDREN AND NORMAL CHILDREN | Shu-Shiuan | Huang |
| PPS-006 | THE USE OF HIGHLY-SATURATED PICTURE BOOKS IN FACILITATING VOCABULARY LEARNING IN STUDENTS WITH SEVERE MENTAL RETARDATION | Hsin-Yin | Liu |
| PPS-008 | CASE REPORT: BACKING ARTICULATION DISORDER OF ADULT'S TREATMENT EFFICACY | Pei-Ju | Hsieh |
| PPS-009 | ARTICULATORY-ACOUSTIC RELATIONSHIP OF CANTONESE CORNER VOWELS - AN ELECTROMAGNETIC ARTICULOGRAPHIC (EMA) STUDY | Manwa L. | Ng |
| PPS-010 | PHONOLOGICAL DEVELOPMENT OF MANDARIN-ENGLISH BILINGUAL CHILDREN IN NEW ZEALAND | Taiying | Lee |
| PPS-011 | DEMONSTRATING CLINICAL COMPETENCY THROUGH AN EPORTFOLIO: STAFF AND STUDENT RESPONSES | Abigail | Lewis |
| PPS-012 | ANALYSIS OF FACTORS ON OUTCOMES OF PRESCHOOLERS WITH HEARING LOSS IN AUDITORY-VERBAL THERAPY | Pei-Hua | Chen |
| PPS-014 | TREATMENT EFFECTIVENESS OF MELODIC INTONATION THERAPY AND RESPONSE ELABORATION TRAINING FOR APHASIC PATIENTS IN TAIWAN | Nai-Wen | Chang |
| PPS-015 | LANGUAGE STYLE MATCHING IN CHINESE-ENGLISH BILINGUALS | Angela | Tzeng |
| PPS-016 | THE VIEWS OF PARENTS ON MANDARIN-SPEAKING CLUTTERING CHILDREN | Shu-Lan | Yang |
| PPS-017 | THE EFFICACY OF AN INTEGRATED-APPROACH TREATMENT ON A STUTTERING ADULT WITH SEVERE ANXIETY | Chi-Nung | Lin |
| PPS-018 | THE EFFECTIVENESS OF THE INTERVENTION OF FLUENCY SHAPING METHOD COMBINED WITH COGNITIVE BEHAVIOR THERAPY FOR ADULTS WITH MILD STUTTTERING | Weichi | Wu |
| FPS-015 | THE SCOPE OF SPEECH LANGUAGE AND HEARING THERAPY IN JAPAN | Masae | Shiroma |

## PPA-001

### DETECTING SENTENCE TYPE IN TONAL AND NON-TONAL LANGUAGES WITH AND WITHOUT SIMULATED HEARING LOSS

Emily Lin, Donal Sinex, Paul Daniell, Salma Al Busaidi

*University of Canterbury (New Zealand)*

**Objective:**    This study investigated the effects of simulated hearing loss on the perception of sentence type.

**Methods:**    Declarative statements and questions produced in two non-tonal languages, Arabic and English, and two tonal languages, Mandarin and Taiwanese, were processed with simulated hearing loss. The six simulation conditions included three levels of temporal jittering simulating a loss of neural synchrony in the auditory pathway, a high level of temporal jittering combined with filters simulating both a falling and a rising audiometric hearing loss configuration, and a vocoder processing procedure simulating cochlear implant processing. Five female and five male adult native speakers of each of the four languages listened to the processed signals and indicated whether the utterance was a "statement" or "question".

**Results:**    Results from a three-way Mixed Model Analysis of Variance conducted on the percent correct scores revealed significant signal condition effect, language effect, and signal condition by language interaction effect ($p < 0.05$) but no significant listener gender effect or other interaction effects.   For English, Mandarin, and Taiwanese, the "Vocoder" condition resulted in the worst performance in identifying sentence type. Temporal jitter superimposed on filtered signals was found to adversely affect the performance. Tonal languages, especially the language with more tonemes (i.e., Taiwanese compared to Mandarin), were more susceptible than non-tonal languages to the adverse effect of simulated hearing loss on the identification of sentence type.

**Conclusion:**    The effects of simulated hearing loss on the perception of statement/question intonation varied by language and the tone type of the sentence-final syllable.

## PPA-002

### THE EFFECTS OF CONSONANT ENHANCEMENT AND SYLLABLE COMPRESSION UPON THE CONSONANT IDENTIFICATION AND INTELLIGIBILITY

Chi-Yuan Yin, Hsiao-Chuan Chen, Chih-Hao Tsai

*National Kaohsiung Normal University (Taiwan)*

**Objective:** This study explores the effects of consonant enhancement (prolonging the duration or increasing the intensity) and syllable compression upon the identification and intelligibility-rating of consonants, as well as whether the effect is influenced by the manner, voicing feature, and the vowel-context.

**Methods:** The stimuli of the study are 80 items, 20 syllables repeated for 4 times. The 20 syllables are stops (the [p], [pʰ], [t], [tʰ], [k], and [kʰ]) and affricates (the [tɕ], [tɕʰ], [ts], and [tsʰ]), combined with two different vowels (the [a] and [u]). These stimuli will be edited with CSL4500 and Cool Edit Pro. The edition involves two steps: (a) consonant enhancement: prolonging the consonant-duration (from 90 to 50%, 10%/step) or increasing the consonant-intensity (4 steps: 3dB, 5dB, 8dB, 10dB), and (b) syllable compression (from 120 to 220%, 20%/step). Ten normal hearing subjects will be tested in the soundproof room. The edited stimuli will be played randomly. After subjects listen to the stimuli, they will select an answer from four options, and rate the speech intelligibility.

**Results and Conclusion:** This study is still proceeding. The results and discussion will be reported in the conference.

**Clinical Application:** Temporal processing disordered people have difficulty in identifying certain consonants which have rather short acoustic features. The results of the study will provide inspiration in developing auditory training materials as well as designing auditory processing tests.

## PPA-003    A RESEARCH ON THE DECISION MAKING OF ADULT COCHLEAR IMPLANT CANDIDATES IN TAIWAN

Min-Chi Kao[1], Li-Jung Lin[2]

[1] *National Taichung University of Education (Taiwan)*
[2] *National Taiwan University Hospital (Taiwan)*

**Objective:** Very few studies focus on decision making of adult cochlear implant candidates with not bad oral communication skills. The objectives of this study are to find adult cochlear implant candidates's experience, to explore issues and challenges facing cochlear implantation, and factors affecting choice of decision making by cochlear implant candidates in Taiwan.

**Methods:** Besides literature review, this study uses qualitative research method to collect data through semi-structured in-depth interviews. The narrative analysis framework is adopted to analyze the research observations.

**Results:** The results of this study are as follows. The advices given by cochlear implant club and advisory associations in Taiwan are only one part of what candidates will consider in their decision making. Many candidates experience distress because of inadequate channels of related information on cochlear implantation. The critical factors, including cognitive biases on communication ability, interaction between surgeons/hearing specialists/speech therapists and candidates for cochlear implants, informed consent, and professional differences, influence what decision candidates make. Some points of view that surround these factors are discussed. The inner push-pull struggle may explain how cochlear implant candidates decide to make their decision.

**Conclusion:** It is necessary to establish a nationwide cochlear implant database in Taiwan to provide performance and outcome data and information on selected conditions in hearing and speech to cochlear implant candidates. Far more work on the development and use of expert decision system will go towards to support cochlear implant candidates make their decision.

## PPA-004    THE SIX-SOUND TEST REVISITED: A CHINESE-ORIENTED APPROACH

Yu-Chen Hung, Yi-Cheng Tsai, Chun-Yi Lin

*Children's Hearing Foundation (Taiwan)*

**Objective:** The Ling six-sound test encompasses six phonemes - /u/, /m/, /a/, /i/, /ʃ/, and /s/ - spanning from low to high frequency across the entire speech spectrum in English (Ling, 1976, 2002). However, its clinical reliability may be affected when it is applied to other language users, since different languages, or even accents vary considerably in their phonemic inventory (Agung, Purdy, & Kitamura, 2005). The present investigation attempted to provide an efficiently adapted test for the Chinese population by means of an overall acoustic analysis of Chinese phonemes.

**Method:** The auditory material consisted of 28 phonemes, with each spoken three times by 20 female speakers (mean age = 28.3 years). Formants and spectral moments were computed for each vowel and consonant, respectively. Apart from the fundamental acoustic characteristics, three additional factors have also been considered: the inter-speaker and intra-speaker variations in articulation, and the vowel space boundaries.

**Results:** Endeavoring to provide a hearing test that can verify the effectiveness of hearing aids and cochlear implants, six phonemes were chosen based on the results of the analysis: /u/, /a/, /i/, /ə/, /tsʰ/, and /s/. The data revealed that all sounds have not only a highly compartmentalized frequency-specificity, but also relatively low inter- and intra-speaker variations. In comparison to the Ling six-sound test, our procedure includes two language-dependent adaptations. First, the mid-central vowel /ə/ was selected; since its main two formants are both in the mid-frequency range, but distinct from /a/. While in English /ə/ is almost irrelevant, in Chinese it is central in language acquisition, since it often functions as a nucleus when a consonant has to be pronounced alone, such as /bə/ for /b/. Furthermore, this /Cə/ combination is commonly used in the education programs in Taiwan, increasing the necessity of the audibility of /ə/ to ensure a normal language development. Second, instead of /ʃ/ - a non-existing Chinese phoneme, the affricate /tsʰ/ was chosen based on its spectral central of gravity (Moment 1: mean = 5570.68Hz; SD = 1043.5Hz) to complement the frequency range between 4000 and 7000 Hz.

**Conclusion:** We were able to fine tune the six-sound test in order to propose a hearing screening that is more adequate for Chinese users. Most importantly, our modifications enable the therapist and the caregiver to quickly assess the child's ability in detecting or identifying sounds across the whole speech frequency range in Chinese.

## PPA-005

### EXPRESSIVE VOCABULARY OUTCOMES OF TODDLERS WITH HEARING LOSS IN AN AUDITORY-VERBAL THERAPY (AVT) PROGRAM

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*Children's Hearing Foundation (Taiwan)*

**Objective:** This study examines the expressive vocabulary development in toddlers with hearing loss and its relationship with age at fitting of amplification.

**Method:** We recruited 43 subjects (ages ranged from 18 to 36 months) who have been receiving AVT at Children's Hearing Foundation. For all subjects hearing aids were fitted at the age of two or before (the median is six months). The median duration between fitting of amplification and enrollment of AVT is three months. Mandarin-Chinese Communicative Development Inventory (MCDI), a survey designed to be filled out by the primary caregiver, was administered to assess the expressive vocabulary. A total of 696 words are included in MCDI and words that the subject can spontaneously express are to be marked.

**Results:** The results showed that only 19% of the subjects have an equal or larger expressive vocabulary than normative data. If a comparison is done based on the hearing age (the duration between fitting of amplification and testing), 66% of the subjects have an equal or larger expressive vocabulary. In addition, regression analysis showed that the size of the expressive vocabulary can be predicted by age at fitting of amplification ($F = 15.614$; $p < 0.001$).

**Conclusion:** When comparison is based on hearing experience, despite the possible influence from cognitive development, toddlers with hearing loss in AVT program can develop a comparable expressive vocabulary by age three as compared with typical-hearing peers. In addition, toddlers fitted with amplification at a younger age have a larger expressive vocabulary relative to norm.

## PPS-001

### A RESOURCE PACKAGE ON VOCABULARY ENHANCEMENT FOR SECONDARY SCHOOL STUDENTS (「詞彙策略輕鬆學 閱讀寫作添歡樂」資源套): APPLYING THE VOCABULARY ENHANCEMENT STRATEGIES IN DAILY TEACHING AND LEARNING FOR IMPROVING SPEECH AND LANGUAGE IMPAIRED STUDENTS' LEARNING EFFECTIVENESS IN SECONDARY SCHOOLS

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In view of the increasing number of speech and language impaired (SLI) students in secondary schools, the Speech and Hearing Services Section of the Education Bureau of the Government of the Hong Kong Special Administrative Region has identified and developed a set of vocabulary enhancement strategies to improve secondary school students' vocabulary learning for better access to curriculum.

The vocabulary enhancement strategies are evidence-based practices which enhance students' ability to develop underlying rules among phonology, morphology and semantics in words, broaden their semantic knowledge and strengthen their word retrieval ability. These strategies include: 形旁策略 (Radical strategy), 字根配詞策略 (Root word strategy), 上文下理策略 (Context clues strategy), 類別聯想策略 (Categorization strategy), 詞義聯想策略 (Antonyms vs synonyms strategy), 情境聯想策略 (Attribute-cueing strategy) and 多感官聯想策略 (Multi-sensory strategy).

Since 2008, these strategies have been tried out with junior secondary SLI students in small group pull-out training. The feedback from students and parents was positive. The strategies were also tried out in Chinese Language, Liberal Studies, Mathematics and Personal, Social and Humanities Education subjects in junior secondary levels at schools with the participation of teachers. The effectiveness of the strategies was evaluated by pre- and post-tests performance of students, questionnaires for teachers and students, as well as online recording of students' mastery of strategies. Results indicated that, by applying vocabulary enhancement strategies in teaching and learning, the motivation and participation of both SLI and normal students increased. Their attitude towards learning became more positive. In addition, all students' academic vocabulary learning ability was enhanced.

In 2012, the Section produced a resource package on vocabulary enhancement strategies (「詞彙策略輕鬆學 閱讀寫作添歡樂」資源套) for secondary school students based on the literature review and tryouts in different settings. The package includes video clips, interactive games and school-based resources. Students can use different means to practise the strategies at their own pace. Teachers can apply the strategies in their daily teaching with the resources provided. Parents might also help students transfer the skills to their daily life.

The tryouts revealed that language support strategies could be embedded in teaching of non-language subjects. This can facilitate, not only SLI students, but also all students to better learn the subject content to improve learning effectiveness. The production of vocabulary enhancement package encouraged the use of these strategies by teachers, speech therapists and other professionals. It is believed that speech therapist-teacher collaboration could be further enhanced to promote curriculum-based language support to students in secondary schools.

## PPS-002 — AN INVESTIGATION OF STORY RETELLING ABILITIES OF BILINGUAL CHILDREN WITH CLEFTS

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**Objective:** The purpose of this study was to examine the story retelling abilities of bilingual children with nonsyndromic cleft lip and/or palate; and to ascertain if associations between language, cognition, and story retelling measures were different when compared with typically-developing peers.

**Method:** Twenty-five English-dominant bilingual Singaporean children with CLP and 25 children with typical development aged 4;7 to 8;5 were matched on age and socioeconomic status. The test battery included: story retelling, narrative comprehension, English receptive vocabulary, verbal short-term memory, verbal working memory and nonverbal cognition. Macrostructural elements of introduction, theme, main character, supporting characters, conflict, coherence, resolution and conclusion were analyzed with the Story Quality Rubric. The microstructural elements of verbal productivity, grammatical competence, expressive vocabulary and semantic diversity were coded analyzed using the Systematic Analysis of Language Transcripts.

**Results:** The CLP group scored significantly poorer on inferential narrative comprehension, receptive vocabulary, and verbal short term memory. Correlational analyses of story retelling and linguistic-cognitive measures showed differences in correlational patterns between the CLP and the TD group.

**Conclusion:** This pattern of results suggests different underlying linguistic-cognitive processes in children with CLP and may have implications for school intervention programs to optimize development and subsequent academic success in the classroom.

## PPS-003 — LANGUAGE PERFORMANCE IN SPOKEN NARRATIVES OF STUDENTS WITH INTELLECTUAL DISABILITIES

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**Introduction:** The purpose of this study was to investigate the oral narrative performance of children with mild mental retardation in Taiwan. In addition, the present study also aimed to to determine which narrative indices were the best predictors to differentiate the narrative performance between children with mild mental retardation and peers.

**Method:** Using the discourse context of story telling after watching cartoon films, the current study obtained language samples from 25 mentally retarded children and 25 peers in 5th and 6th grade in elementary schools.   A t-test and discriminant Analysis were used to analyze the transcribed narrative language sample.

**Results:** Overall, the results of this study were concluded as follows: (1) Children with mild mental retardation produced more proportion of simple utterances, proportion of word error, proportion of context error utterances, proportion of multiple error utterances, proportion of grammatical error utterances, proportion of total mazes than their peers. (2) Children with mild mental retardation performed worse than their peers in number of total words, number of different words, corrected type token ratio, total utterances, different types of complex utterances, proportion of conjunction sentence, proportion of complex utterances, mean length of utterances, proportion of redundant

vocabulary utterances. (3) The indices which can distinguish children with mild mental retardation from their peers included: proportion of conjunction sentence, proportion of complex sentences, proportion of simple utterances, proportion of grammatical error utterances, proportion of word error, mean length of utterances, number of total words, proportion of context error utterances, number of different words, proportion of total mazes, corrected type token ratio, proportion of multiple error utterances, total utterances, proportion of quantifier error utterances, proportion of redundant vocabulary utterances.

**Implication:** The findings are interpreted from the point of view of language processing deficits. Also, these findings could enhance the understanding of oral narrative skills in Mandarin Chinese-speaking children with mild mental retardation.

## PPS-004 — THE EFFECTS OF THE STORY STRUCTURE INSTRUCTION ON THE READING COMPREHENSION FOR HIGH SCHOOL STUDENTS WITH INTELLECTUAL DISABILITIES

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**Introduction:** The purpose of this study was to investigate the effects of using the Story Structure to improve the reading comprehension and oral narrative abilities of students with mild mental retardation.

**Method:** Three high school students with mild mental retardation participated in this study. Direct instruction of a story map procedure and a story face procedure were used as story-structure analysis strategies to improve these three students' reading comprehension performance. The effects of the strategies were assessed through a multiple-baseline-across-subjects design.

**Results:** Results indicated an increase in reading comprehension performance by all three students from baseline to the independent phase condition of the intervention. In addition, generalization to a novel passage and maintenance of strategy effects were observed for all students. On story retell measures, results demonstrated an increase in the number of story elements recalled. Finally, the social validity measure revealed positive results for all students.

**Implications:** Overall, the current study validates the effectiveness of using story structure to improve the reading comprehension and oral narrative for students with mild mental retardation.

## PPS-005 — A STUDY ON THE NARRATIVE ABILITIES AND EXECUTIVE FUNCTIONS BETWEEN THE ADHD CHILDREN AND NORMAL CHILDREN

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**Objective:** This study was aimed at: (1) examining whether ADHD children demonstrate deficits in narrative abilities and in executive functions, respectively; (2) studying the associations between narrative abilities and executive functions of ADHD children.

**Methods:** The study was conducted with 50 children (25 ADHD and 25 normal controls), aged 6-9, on 4 tasks employing story-telling and -retelling assignments and 2 executive function assessments: The Attention Test of Synthetic Cognition Assessment (SCA-A) and The computerized Wisconsin Card Sorting Test (WCST).

**Results:** The results indicate that the two groups did not differ in the narrative abilities. However, for both the groups, their differences did exist in Number of Total Word (NTW), Number of Different Word (NDW), Corrected Typed-token Ratio (CTR), Number of Total Mazes (NTM), Story Grammar Components (SGC), and Story Contents (SC) between the two story-telling conditions. The above six measures in the story-retelling after listening were significantly higher than those in the story-telling without listening. In addition, in SCA-A, ADHD children showed poorer performances on the Interference Test, the Distraction Test, and the Detection Test, but in the subtests of WCST, the performances of the ADHD children were equivalent to those of the normal controls. Finally, the time taking on the Interference Test in SCA-A could significantly predict SGC, SC and CTR in SCA-A, respectively.

**Conclusion:** The results seem to support the assumption that ADHD children demonstrate deficits in executive functions, and there are correlations between executive functions and narrative abilities of ADHD children. In addition, the two groups both improved their narrative performances on story-retelling after listening.

## PPS-006 THE USE OF HIGHLY-SATURATED PICTURE BOOKS IN FACILITATING VOCABULARY LEARNING IN STUDENTS WITH SEVERE MENTAL RETARDATION

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**Objective:** The purpose of the study is to examine whether or not picture books with relatively higher color saturation provide better teaching materials in teaching language skills (i.e., vocabulary) to students with severe mental retardation.

**Methods:** A group of students who are enrolled in a special school for children with mental retardation will participate in this study. All the participants will have normal vision and hearing, and none of them meet the criteria for autism. The participants will be randomly assigned to a low- or a high-saturation learning condition. Each participant will receive several training sessions in which picture books with low- or high-color saturation will be used to teach a set of novel words.

**Results:** Comparisons of performance before and after training will be conducted.

**Conclusion:** We predict that picture books with higher saturation of colors would facilitate word learning as a result of better maintenance of attention.

## PPS-008 CASE REPORT: BACKING ARTICULATION DISORDER OF ADULT'S TREATMENT EFFICACY

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**Objective:** To know the less capable of self-awareness and has long-wrong-established habit of articulation errors of adult's treatment efficacy. In conjunction with the action-oriented teaching and proprioceptive intervention strategies .

**Methods:**

*Subject: As a 23-year-old hearing and normal intelligence, but there is articulation disorder of women. Because of job demands, she comes for help. The case, in addition to consonant articulation errors, with the vowel sound and complex vowel articulation is also an error.

*Procedure: Six weeks, once a week for 60 minutes individual therapy.

*Goal: 1. Correctly target sound up to 100%.     2. Generalize to day's communication.

*Strategy:1. With "traditional articulation therapy" mainly combined "sensory feedback" as intervention principle, the establishment of the correct phonological knowledge and articulation movements.

2.Strategy include: phonetic placement,facilitating context,and use a spatula to push case's tongue do a block action to provide [d] and [t$^h$] force required,when the tongue perception and use a spatula under the cross on the tongue and teeth, fixing the position of the tongue, to increase the /s /location consciousness.

*Intervention: 1. Fixed cases articulation method and location, emphasizing the correct tongue placement and articulation method.   2. Use a spatula to push the case for the resistance movement of the tongue exercises strengthen its tongue firmly perception.

**Results:** Finally, after the six target sound[d]and [t$^h$]intervention, the case can say with /d/, /th/ vocabulary, correct rate of 90%; after two goals , [s] intervention tell /s/vocabulary correctly, the correct rate of 45%.

**Conclusion:** After six courses of treatment, the case comes to targeted words and sentences. Sound obvious progress, but still   require continuous treatment, in order to be able to enhance the overall speech intelligibility, to achieve effective communication. Only because of time constraints, did not carry out more in-depth observation and goal setting, but the results can still be used as reference for clinical short-term intervention.

## PPS-009 ARTICULATORY-ACOUSTIC RELATIONSHIP OF CANTONESE CORNER VOWELS - AN ELECTROMAGNETIC ARTICULOGRAPHIC (EMA) STUDY

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**Objective:** Results from previous studies appear to support a non-linear relationship between acoustics and articulation. Location of articulators may not be directly translated into change in vowel formants. The present study further examined the articulatory-acoustic relationship of corner vowels of Cantonese. Relationship between formant frequencies and articulatory movements was quantified among the three corner vowels in Cantonese /i, a, u/.

**Methods:** Ten adult native Cantonese speakers were instructed to produce three actual Cantonese words of syllables/pin/, /pan/, and /pun/, which were embedded in a carrier phrase to ensure naturalness of production. Kinematic information associated with different vowels was obtained by using 3-D electromagnetic articulography (EMA) (AG500, Carstens Medizinelektronik GmbH). In addition to reference sensors on the nose bridge, the gum above the upper central incisors, and the mastoid process, three more sensors were attached to participant's tongue at 1 cm, 2 cm, and 3 cm from tongue tip. Acoustic signals were recorded by using a unidirectional dynamic microphone and were digitized at 10 kHz. The first two formant frequencies were measured by using Praat.

**Results:** Results indicated a weak correlation between articulation and acoustics between vowels in males, but a moderately strong correlation in females. Comparing the acoustic and physiological vowel spaces of Cantonese, the acoustic distance between /u/ and /a/ was relatively shorter than articulatory distance.

**Conclusion:** The present findings support the non-linear relationship between articulation and acoustics. They also suggest that lip and laryngeal gestures are also determining factors of acoustic outcomes.

## PPS-010 PHONOLOGICAL DEVELOPMENT OF MANDARIN-ENGLISH BILINGUAL CHILDREN IN NEW ZEALAND

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**Introduction:** Current research into the phonological development of successive bilingual children indicates that they differ from monolinguals in both the rate and the 'route' of their development (Zhu Hua and Dodd, 2006). However, little is known about the specific developmental trajectory or about the effect of possible interactions of their languages on speech development (Dodd et al., 1996; Genesee et al., 2004).

**Objective:** Our aim is to investigate typical phonological development in a pair of languages not previously considered.

**Method:** Our study is cross sectional and focuses on Mandarin-English speakers aged 5-8 years. The children's phonological skills were assessed using the Diagnostic Evaluation of Articulation and Phonology (Dodd et. al., 2002) and a Mandarin word test (Zhu Hua, 2002). Following previous research (Dodd et al., 2002; Smit et al., 1990) the data was analysed for size of phonetic inventory, phonological accuracy and error patterns

**Results:** Results show that bilinguals differ to monolinguals with regards to phoneme accuracy and error patterns. While phonetic inventories are similar to that found for monolinguals in both languages there are both quantitative and qualitative differences between the children's development in Mandarin and English. Some errors, typical in monolingual development are found in greater frequency (e.g. gliding, cluster reduction in English) while others are unique to this population and would be characterised as atypical compared with monolinguals (e.g. insertion in English)

**Conclusion:** We conclude with comments on how Chinese dialect background, impacts on phonological development and what our results say about differentiating speech difference from disorder.

## PPS-011 — DEMONSTRATING CLINICAL COMPETENCY THROUGH AN EPORTFOLIO: STAFF AND STUDENT RESPONSES

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**Introduction:** In Australia, Speech Pathology (SP) students are required to develop a portfolio of clinical work samples in order to demonstrate their clinical competencies at the end of their course. In the SP course at Edith Cowan University an ePortfolio has been embedded across the four years as both a formative and summative assessment. The ePortfolio aims to use the process of reflective practice to facilitate the development of professional clinical competencies, demonstrate their development of these competencies and support students to link their practicum with their academic curriculum.

**Objective:** To investigate the students' response to, and understanding of, ePortfolios and how these responses compared to academic staff. The research questions were:

How are students actively engaged in learning about their competency development using the ePortfolio?

How does the technology help or hinder their learning about and their collection of evidence for competency?

Do students see it leading into lifelong learning in their future career?

Do students see its use for capturing growing depth of reflection?

How similar or different are staff and student views about the ePortfolio?

**Method:** In July 2012, second (n = 14), third (n = 24) and fourth year (n = 15) SP students were asked to complete questionnaires on their experience of using the ePortfolio. They used a 5 point Likert agreement scale to rate statements about: their level of engagement with the ePortfolio; their use of technology; the educational value of the ePortfolio; the usefulness of it for reflections and development of competency; and finally their future use of the ePortfolio. There were also free text questions which were thematically analysed using NVivo software. Students were then invited to participate in focus groups. The audio recordings were transcribed and thematically analysed using NVivo. SP academic staff were invited to participate in individual interviews and audio recordings were also transcribed and analysed using NVivo.

**Results:** Of the 53 students invited to participate in questionnaires the response rate was 47% and in the 3rd and 4th year focus groups participation was 51%. Five academic staff completed interviews (100%). Generally students were positive about the educational value of the ePortfolio and were engaged in the process. However they had key issues with the Platform used and did not see the link with their future career. Students' responses to the ePortfolio differed across the cohorts of the course and differed to staff understanding about the ePortfolio. Staff were more aware of the educational value of collecting evidence and reflecting on their clinical experiences and of promoting the ePortfolio's value for their future career as a SP.

**Conclusion:** Implications for the use of ePortfolios with students include the importance of choosing a Platform that is flexible and straightforward to use; providing technological support and training for students and staff; giving consideration to how the ePortfolio is developed across a course, in terms of the complexity of tasks to be completed and workload needed to complete these tasks; and developing clear links between the ePortfolio and their future career.

## PPS-012 — ANALYSIS OF FACTORS ON OUTCOMES OF PRESCHOOLERS WITH HEARING LOSS IN AUDITORY-VERBAL THERAPY

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**Objective:** Auditory-Verbal Therapy is one of the most influential interventions for children with hearing loss. Recently, there have been a large number of studies focusing on the evaluation of communication and academic outcomes of this intervention. The majority of studies have investigated one to several factors, while only a few studies have included all possible factors within one analysis. Thus, the aim of this research was to investigate whether the following factors would influence children's expressive and receptive language: (1) the degree of hearing loss, (2) the frequency of therapy, (3) the paternal education, (4) the type of hearing devices (hearing aid and/or cochlear implant), (5) the duration of daily language input, and (6) the participation of Newborn Hearing Screening.

**Methods:** A total of 127 children (36-72 months / bilateral permanent hearing loss), who had participated in Auditory-Verbal Therapy in

the Children's Hearing Foundation (CHF), were recruited in 2012. The outcomes of the intervention were assessed by Revised Preschool Language Assessment (Lin, Huang, Huang & Shyan, 2008) on the basis of (1) language comprehension, (2) oral expression, and (3) language development. Data was analyzed by Multivariate analysis of variance (MANOVA).

**Results:** The present analysis showed that (1) the paternal education level (F = 1.870, p = .037, η2 = .079), (2) the frequency of therapy (F = 3.303, p = .004, η2 = .085), and (3) the Newborn Hearing Screening (F = 3.008, p = .034, η2= .065) significantly impact the degree of intervention outcomes. Higher paternal education level yielded better intervention outcomes. Low frequency of therapy (once a month) in CHF was associated with better intervention outcomes. Finally, children who had participated in Newborn Hearing Screening showed lower scores on measure.

In CHF, the frequency of the therapy is reduced when children have no further communication issues and can successfully finish their school tasks. In addition, robust family functions (parental support and techniques in input language of main caregiver) are encouraged. In this case, it is thus reasonable that children with lower frequency of therapy showed higher scores of measure, since they generally had better language ability than those with intensive therapy sessions. Furthermore, the level of paternal education is also an important element that can affect the outcomes of intervention.

Due to the fact that the Universal Newborn Hearing Screening has only been administered for one year in Taiwan, most of the children who had been screened were less than one-year old at the time, and had just started the intervention program. It is thus perhaps too early to clearly discriminate whether the early screening is advantageous or not. The effects of intervention for these children remain to this point unclear.

**Conclusion:** Nevertheless, the overall results demonstrated that the paternal education level, the frequency of therapy, and the participation of Newborn Hearing Screening were significantly related to children's intervention outcomes.

## PPS-014 TREATMENT EFFECTIVENESS OF MELODIC INTONATION THERAPY AND RESPONSE ELABORATION TRAINING FOR APHASIC PATIENTS IN TAIWAN

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**Objective:** The purpose of the study is to compare the effectiveness of Melodic Intonation Therapy-Chinese version (MIT-C) and Response Elaboration Training (RET) approaches for Mandarin speakers with aphasia.

**Methods:** The study was approved by the Institutional Review Board of two hospitals. Two treatment programs were designed. The MIT-C program based on revision of Sparks' (2008) recommendation conducted by a music therapist, and the RET one followed Kearns (1985)'s six-step procedures led by a speech therapist. Sixteen participants (4F and 12M, M age 51.13) with no evidence of hearing and cognitive impairments were included. Each participant was assigned to one program based on his/her convenience and took a 20-week one to one session (50-60 minutes per session, one session per week) in either MIT-C or RET program. Outcome measures included the Concise Chinese Aphasia Test and Boston Diagnosis Aphasia Examination-Chinese (BDAE-C).

**Results:** The results showed no significant difference in each group in CCAT overall scores (Z = -.155, p = .877), but significant difference in BDAE-C overall score (Z = -2.327, p < .05) which only occurred with the MIT group (Z = -2.521, p < .05). Closely, RET group performed better on sentence repetition of CCAT subtest IV (Z = -2.197, p < .05) and MIT-C group demonstrated better performance on verbal agility of BDAE-C oral expression subtest (Z = -2.834, p < .01).

**Conclusion:** Non-fluent aphasic participants could benefit from certain aspects of speech either in MIT-C or RET treatment. Providing suprasegment/music training and adding non-verbal measures are suggested.

## PPS-015   LANGUAGE STYLE MATCHING IN CHINESE-ENGLISH BILINGUALS

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**Objective:** In Expressive Writings (EW), Pennebaker and his colleagues proposed (1993, 2001, 2007, 2010) "how people talk" may be more important than "what people talk" in the process of communication. Linguistic Inquiry and Word Count (LIWC) is a text analysis software program designed to analyze Expressive Writing. One of the major arguments in Expressive Writing is that functional words convey more meaning than content words socially. According to Pennebaker (2013), functional words make up almost 60% of the words we use; however, they only account for much less than 1% of our vocabulary. Expressive Writing has been successfully used in traumatic therapy. Significant differences in Expressive Writing were also found in gender, age, social status, personality, and thinking styles. One application of thinking style is Language Style Matching (LSM). LSM refers to the degree of similarity on usage of functional words between two persons in communication. Ireland et al. (2010) suggested LSM predicted the stability of the relationship between two persons. The purpose of current study was employing LSM paradigm to investigate the usage of functional words of Chinese-English bilinguals. We hypothesized LSM in L2 would be slower than L1 since LSM required implicit understanding of the language.

**Methods:** Two experiments were conducted. Thirty college students participated in the study voluntarily. In study 1, each participant was to read ten articles on "a traveler's journal", and another ten articles on "why ocean is important" in Chinese. The first ten articles were written by narrative style, and the other ten were in analytical style. The participants were to "correspond to the writer" by composing a 500-word article right after reading each article. The independent variable was writing style (analytic vs. narrative) and the dependent variable was LIWC analysis of seven categories of functional words (pronouns, articles, propositions, negations, conjunctions, quantifiers, common adverbs) of participants' writing.

**Results:** The results showed the participants matched the writing style as quickly as the fourth article. In study two, the same paradigm was introduced. Another twenty articles on two topics were chosen. The results suggested much slower matching on the usage of functional words. We therefore concluded LSM in L1 is much easier than in L2.

**Conclusion:** This suggested LSM is not only an indicator for stability of a relationship, but also an indicator for how the language users implicitly master the language.

## PPS-16   THE VIEWS OF PARENTS ON MANDARIN-SPEAKING CLUTTERING CHILDREN

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This study was to explore parents' views on their school-age cluttering children in terms of speech-language developments, speech-language difficulties, personalities, and other related issues.

Four parents with 3 Mandarin–speaking cluttering children (W, H and CH) had an interview with the researcher, separately, and answered 11 questions regarding his/her child's cluttering. Content analysis of the parents' verbatim was employed. The major findings are as follows:

The time of all the cluttering children saying the first word is slower than that of the normal children. Their slight delay is about 3-6 months. However, all of them spoke the first sentence (S+V or S+V+O) before the age of 3. This is similar to that of the most normal children. All the parents found that their children had speech difficulties before the age of 4. They all claimed that their children spoke too fast to understand, and after asking repeatedly, they got angry. CH also had stuttering.

From the views of the parents, fast speaking of the family members and the father's impaired articulation for W, lack of talking opportunities for H, and a bad temper, less talking, and the unqualified preschool for CH caused their cluttering, respectively. All the parents suggested that their cluttering children are impatient. W is stubborn and H is extreme, too. CH is also cowardly, timid, and crying. Both W and H are picky eaters. They all considered that the cluttering children's personalities are negative.

The above results offer valuable information to deeply understand the cluttering children' speech-language features and their related behaviors, and help us design appropriate treatments for them.

## PPS-017

# THE EFFICACY OF AN INTEGRATED-APPROACH TREATMENT ON A STUTTERING ADULT WITH SEVERE ANXIETY

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**Objective:** This study was to determine the efficacy of an integrated-approach treatment on a stuttering adult who had severe communication anxieties and poor self-concept.

**Methods:** The patient was a 25-year-old unemployed male. He complained of severe stuttering which affected his daily life. An integrated-approach treatment, including stuttering modification, fluency shaping, systematic desensitization, and some strategies proposed by Perkins (1997) and Silverman (1996) were employed. The Stuttering Severity Instrument-Forth Edition (SSI-4) in Mandarin (Yang and Chung, 2011), and a seven-point scale were used to assess the patient's stuttering before and after treatment. Treatment lasted 4 weeks and there were 3 one-hour sessions per week.

**Results:** The results showed that for SSI-4, the patient's percentage of stuttered syllable (SS), stuttering duration (SD), physical concomitants (PC), and the stuttering severity all decreased. SS reduced from 5.45 to 1.42%; SD reduced from 0.94 to 0.49 seconds; PC reduced from 7 to 4 points, respectively. His stuttering percentile rank also reduced from 58 to 14. The severity of stuttering assessed by SSI-4 and the self-reported scale lowered from moderate to mild level and from 5 to 2 points, respectively. In addition, most of the negative items in The Communication Anxiety Inventory for Adults changed from "sometimes or usually" to "never or sometimes". After treatment, the speech naturalness rated by the patient was 1(very natural), and he satisfied this treatment.

**Conclusion:** In sum, the patient's stuttering severity decreased in both the standardized assessment and the self-reported measures. The integrated-approach treatment is effective for the stuttering adult with severe anxiety.

## PPS-018

# THE EFFECTIVENESS OF THE INTERVENTION OF FLUENCY SHAPING METHOD COMBINED WITH COGNITIVE BEHAVIOR THERAPY FOR ADULTS WITH MILD STUTTTERING

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**Objective:** Manning（2001）claimed that speech impediment is the combination of perspective , comportment , cognition and anxiety or fear to some degree. The purpose of this research that select an adult woman who has mild stuttering as the object of the study is to probe into the outcomes uniting fluency shaping therapy and cognitive behavior modification.

**Methods:**  Start from the fluency strategies of shaping therapy to make normal oral communication as ideal as possible and then combine Cognitive-behavior therapy with Modification of automatic thoughts、Breathing retraining and Exposure therapy for nearly one month, including six courses, one hour for one course. Language samples were collected by recording before as well as after all the strategies. In addition to language samples, the comparison of the score data between SSI-3 and SLD was also held to evaluate the outcomes.

**Results:**  (1) The objects feel much stranger about the slow speaking speed of Fluency shaping therapy than the original speech difficulties. Therefore, improvements can only be noticed from the decrease of first word repeats while the object lacked of self practice at home.   (2) During taking SSI-3, there were not much differences in the impediment. However, it helps reduce speaking anxiety and the occurrence og second syndrome.   (3) Instead of evading, the new communicative experiences obtain from the process promote the object tends to positively deal with her negative perspectives from stuttering.

**Conclusion:** (1) Because of the confirmed stutter, adult patients generally have to make more efforts to establish new behavior pattern to have notable improvement though new speech act has been learned. (2) The attitude related to courses of treatment toward Adult patients often affects their motivation and the cooperation between them and SLP.

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## FPA-001

### CORRELATIONS BETWEEN F0-HEIGHT-PITCH RECOGNITION AND MANDARIN TONE RECOGNITION IN COCHLEAR-IMPLANT USERS AND NORMAL LISTENERS

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**Objective:** The major acoustic attribute of auditory pitch perception in recognizing Mandarin lexical tone is the fundamental frequency (F0) contour concentrated in low frequency region. The previous research showed that the frequency height pattern is one of critical features on F0 contour recognition. The purposes of this study were to investigate correlations between frequency height pattern of pitch recognition in F0 region and Mandarin tone recognition for cochlear-implanted and normal listeners, as well as to compare the differences between these two groups.

**Methods:** Two groups of subjects, cochlear implant (CI) users (male=20, female=19; mean age=12.97±3.80 years) and age-matched normal hearing (NH) listeners (male=20, female=19; mean age=13.02±3.67 years), participated in this study. All subjects (N=78) were tested individually through standard procedures held in a sound-treated booth. Two closed-set computerized tests, F0 Height Recognition (F0HR) Test and Mandarin Lexical Tone Recognition (MLTR) Test, were developed for this study. F0HR test included 50 stimuli with 6 frequency-height-patterns, i.e., three types of paired pitch pattern (H-L, H-H/L-L, L-H) varied in two sets of low/high F0 region. MLTR test included 132 stimuli with 4 tones, i.e., Tone1 to Tone4 in 132 randomized monosyllabic words. The auditory perception performance of CI group was compared with that of NH group. The t test, two-way repeated-measures ANOVA and Pearson correlation were adopted in statistical analyses.

**Results:** The study found that the scores for F0HR test and MLTR test for CI group were 52.36% (SD=13.75) and 65.85% (SD=15.39), respectively. For NH group, the scores were 88.00% (SD=12.37) and 97.46% (SD=3.21), respectively. Significant statistically differences were observed between these two groups both in F0HR and MLTR test-scores (F0HR: t=-12.03, p＜.001; MLTR: t=-12.56, p＜.001). A statistically significant correlation between these two tests was revealed both in CI group (r=.663, p＜.001) and in NH group (r=.568, p＜.001). Moreover, the correlations within 6 frequency-height-patterns (H-L, H-H/L-L, L-H in low sets and H-L, H-H/L-L, L-H in high sets) in each subject group were analyzed. Significant correlations were observed in 3 items only (r=.351-.775, p＜.05) for the CI group, comparing to 6 items (r=.547-.668, p＜.001) in NH group.

**Conclusion:** Comparing to normal listeners, cochlear implant users have lower auditory perception performance in both tests. However, a higher correlation between F0-height-pitch recognition and Mandarin tone recognition was indicated in cochlear implant users' performance. Besides, cochlear implant users have shown lower scores of performance in recognizing contrast-paired pitch patterns rather than same-paired ones. Cochlear implant users also demonstrated inconsistent perception ability in identifying these two types of contrast-paired pitch across low and high fundamental frequency regions. The results of this study suggest that the poor frequency-height-pattern-pitch recognition, as one factor, may partly lead to the poor tone recognition in cochlear implant users.

## PPA-006

### TAUTOSYLLABIC VOWELS AS AN INDICATOR OF LIQUID ACQUISITION: A CASE STUDY IN JAPANESE

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**Objective:** The liquid /r/ in Japanese is acquired rather late and is often a source of functional articulation disorders (Sakauchi 1967 and Murata 1970). In addition to the fact that the target liquid is most likely replaced by, or alternated with, voiced alveolar plosive [d] (Funayama 1998), it has long been recognized and widely accepted by clinicians that the target liquid first appears in combination with high vowels [i] and [u], then with other vowels, and possibly the latest with the low vowel [a] (Ishikawa 1930). In spite of the common, traditional recognition, few, if any, case studies have been conducted to see how the liquid emerges. This study presents a description of liquid acquisition of a child with functional misarticulation.

**Methods:** Data elicited from one child (5 years and 9 months) showing a problem with the liquid were analyzed in terms of the quality of the tautosyllabic vowel.

**Results:** (1) The target /r/ exhibited replacement by [d] where combined with [e] and [o] rather than with [a], with which the subject did a good job. (2) Even combined with [i] and [u], the target was replaced in some words, which means that the development is unpredictable with respect to adjacent vowels.

**Conclusion:** The height of the tautosyllabic vowel is not necessarily a proper indicator to predict the emergence of the target /r/. This suggests that each child can have his/her own phonological system and should be treated as such.

## PPA-007 SPEECH INTELLIGIBILITY OF LIFE-VOICE VERSUS STANDARD-RECORDED MANDARIN CHINESE

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**Objective:** The current study is to examine the outcome difference of speech recognition between life-voice and standard-recorded Mandarin Chinese.

**Methods:** Two groups of young adults, ages 18-30 years, will be tested. Listeners in group 1 have normal hearing (NH) whereas those in group 2 have mild to moderate hearing loss (HL). Speech intelligibility is examined with Mandarin Word Recognition Test (MWRT) and Mandarin Sentence Recognition Test (MSRT). The speech recognition threshold (SRT) is obtained prior to the intelligibility tests.

**Results:** The preliminary results demonstrate a decreased SRT (better threshold) as well as increased MWRT and MSRT scores (better speech intelligibility) using standard-recorded Mandarin Chinese. The effect is greater in HL than in NH listeners.

**Conclusion:** In Taiwan, for practice convenience and time efficiency, the SRT and speech recognition tests are usually done with life voice presented by the clinic audiologists. Results of this study show a significant effect of speaker variability in Mandarin Chinese speech intelligibility. The speech recognition scores are impaired, especially in hearing impaired listeners, when speech tests are presented with life voice. This may cause a false result of a patient's speech intelligibility. Consequently, it may lead to misdiagnosis of the patient's hearing assessment and, even worse, wasting medical resource utilization in assessing hearing instruments and plan aural rehabilitation programs.

## PPA-009 COMMUNICATION APPREHENSION AND L2 LEARNING ANXIETY IN JAPANESE, KOREAN, AND TAIWANESE UNIVERSITY STUDENTS

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**Objective:** This study investigated the relationship between communication apprehension and anxiety in second-language (L2) learning. Effects of gender, language culture (Japanese, Korean, and Taiwanese), and study major (English, Education, Engineering, Science, and Non-English Liberal Arts) were also exploded.

**Methods:** Students taking a first-year university course in learning English as a second language   were recruited. Participants consisted of 302 Japanese (125 females and 177 males), 84 Korean (60 females and 24 males), and 242 Taiwanese (198 females and 44 males). Participants completed two structured closed-ended questionnaires, including a Foreign-Language Classroom Anxiety Scale (FLCAS) and an Erickson Communication Attitude Scale (ESCAS).

**Results:** The FLCAS and ESCAS scores were significantly and positively correlated (n=626, Pearson's r=0.4, p < 0.001). Results of a two-way (language culture by gender) multivariate analysis of variance (ANOVA) conducted on the two experimental measures revealed a significant language cuture effect (p < 0.001). Japanese students showed a significantly lower mean ESCAS score than both Korean and Taiwanese students. Korean students showed a significantly lower mean FLCAS score than Taiwanese students. Neither gender nor study major appeared to affect the two experimental measures.

**Conclusion:** Individuals who reportedly had   a higher level of communication apprehension were associated with more anxiety in L2 learning. On average, Japanese students reported a higher level of communication apprehension than both Korean and Taiwanese students. Korean students reported a higher level of L2 learning anxiety than Taiwanese students. Further studies on the effect of study major are needed.

## PPA-010

**QUASI-EXPERIMENTAL STUDY OF LOW-MOLECULAR WEIGHT DEXTRAN AND ORAL CORTICOSTEROID THERAPIES ON IDIOPATHIC SUDDEN SENSORINEURAL HEARING LOSS**

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**Objects:** This study aimed to investigate whether adding low-molecular-weight dextran to oral steroids in patients of idiopathic sudden sensorineural hearing loss demonstrated better hearing outcomes than patients receiving oral corticosteroids alone.

**Methods:** We reviewed the clinical records of 166 patients with idiopathic sudden sensorineural hearing loss. Therapeutic effectiveness was measured by 1) the gain of pure-tone averages, and 2) four categories of hearing outcome, i.e. complete recovery, marked recovery, mild improvement, or no improvement. To manage potential confounding factors associated with treatment allocation, we matched the subjects from each group according to the propensity score (i.e., the predicted probability that they would receive a specific treatment).

**Results:** We identified 50 pairs of propensity score-matched subjects (N=100) without significant difference of all clinical factors (p>0.05). Subsequent analyses demonstrated that the average hearing gain in subjects receiving additional dextran to oral steroid was 31.7± 21.5 dB, which did not differ from 33.0±21.8 dB in subjects receiving steroids alone (p=0.76). Difference of hearing outcomes between the two groups was also non-significant (p=0.92).

**Conclusion:** Matching propensity scores successfully balanced the heterogeneity between the dextran and steroid groups. Analytical results demonstrated that adding low-molecular-weight dextran to oral corticosteroids was not associated with greater hearing gain or better hearing outcome in idiopathic sudden sensorineural hearing loss.

## PPA-011

**THE TELEPHONY SATISFACTORY OF THE IN-EAR BLUETOOTH ASSISTED LISTENING DEVICE FOR PEOPLE WITH MILD TO MODERATE HEARING LOSS**

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**Objective:** This study is aimed at accessing the telephony satisfactory of the in-ear Bluetooth assisted listening device (ALD) with linear amplification scheme. The ALD's target groups are people with mild to moderate sensorineural hearing loss (SNHL).

**Methods:** A sample group of thirty-one adults, with mild to moderate hearing loss,attended a hearing examination. The sample group received Mandarin monosyllable recognition tests (MMRT) via the Bluetooth device in both noisy and quiet environments. After simulating telephony experiences, the satisfactory ratings of the Bluetooth ALD were determined using self-developed questionnaires.

**Results:** The MMRT, Mandarin monosyllable recognition tests, results show significant difference between those with mild SNHL and those with moderate SNHL (F(1,50)=6.299, p < 0.05*). However, the data did not reveal significant difference between quiet and noisy environments. The satisfactory ratings show significant difference between people with mild SNHL and those with moderate SNHL (F(1,62)=8.318, p < 0.01**). However, the data did not differ significantly between quiet and noisy environments. Both objective MMRT and subjective satisfactory data show the Bluetooth ALD satisfied people with moderate SNHL more than people with mild SNHL in both quiet and noisy environments.

**Conclusion:** The MMRT and satisfactory results show that the ALD combined with Bluetooth technology could provide the benefit of mobile telephony for people with mild to moderate SNHL. Results show that people with moderate SNHL were more satisfied with the Bluetooth ALD than people with mild SNHL.

## PPS-019 MANDARIN RECEPTIVE GRAMMAR TEST FOR CHILDREN: AN ANALYSIS OF NEGATIVES, TEMPORAL AND SPATIAL MARKERS

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**Objective:** Ethnic Chinese form 74.1% of the population in Singapore but thus far no language assessment tools have been developed for Mandarin-dominant children. The purpose of this study is to develop a linguistically and culturally relevant Mandarin sentence-picture matching test to assess Singaporean preschool children's comprehension in Mandarin grammar and to gather normative data for this population.

**Methods:** The Mandarin Receptive Grammar Test (MRGT) was developed with reference to the grammar acquisition patterns of children from Mainland China and Taiwan. It contained 60 sentences over six grammatical constructs. The MRGT was administered to two groups of typically developing bilingual Singaporean preschoolers with Mandarin as their first language (N = 23 for ages 4;0-4;11 and N = 29 for ages 5;0-5;11). To test validity, participants were also tested on the Mandarin Bilingual Language Assessment Battery (MBLAB) for receptive vocabulary. This paper focused on the Negatives, Temporal and Spatial constructs.

**Results & Conclusion:** The MRGT was found to have adequate validity and reliability. Age effects were found for all three constructs and the overall MRGT suggesting that Singaporean children experience a development spurt in acquisition of Mandarin grammatical markers when they are 5 years old. 不 (bu) and 正在 (right now) were identified as possible clinical markers for language impairment.

## PPS-020 A STUDY OF COMMUNICATION AND SOCIAL INTERACTION BETWEEN NEW-INHABITANT PARENTS AND THEIR HEARING-IMPAIRED PRESCHOOL CHILDREN IN TAIWAN

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**Objective:** The purpose of this study was to understand the current situation of the communication and social interaction between new-inhabitant parents and their hearing-impaired preschool children and its influencing factors.

**Methods:** The measure used including in half-structureal formula of the interview, observation and qualitative analysis.

**Results:** The results were: (a) new-inhabitant parents tend to use verbal means the most to elder hearing-impaired preschool children; however, they often use verbal and gestural means together to younger ones; (b) hearing-impaired preschool children with less verbal acts tend to use social-affective signaling to respond to their parents; children with more verbal acts tend to use verbal means to react; (c) fathers in new-inhabitant families often use some communication and interaction strategies, including talk to their children or punish them; mothers' strategies include: use children's interests, establish trust with their children, or talk to them; (d) the factors that influence the communication and social interaction between new-inhabitant parents and their hearing-impaired preschool children are parents' age, education background, the accompany time of learning, age of hearing loss discovery, relatives' recognition, parents' attitudes toward nurturing and toward children's impairment.

## FACILITATING VALID ASSESSMENT OF THE SPEECH AND LANGUAGE SKILLS OF MULTILINGUAL CHILDREN: CONSIDERATIONS FOR SINGAPORE

Chris Brebner

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For multilingual children, diagnosing Specific Language Impairment (SLI) can be particularly complex. SLI is an impairment in language not attributable to any other identifiable cause (i.e. hearing impairment/intellectual disability) (Leonard, 1995; Paradis, 2007). Features of SLI in bilingual children have been identified as including slower lexical growth, difficulties with word retrieval, reduced utterance length, restricted verb knowledge, and particular difficulty with inflections or forms with less phonetic salience (O'Toole & Hickey 2012).

In Singapore, the lack of information on the acquisition of local languages has a significant impact on assessment of children's speech and language skills (Brebner, 2010; Teoh, Brebner & McCormack, 2012; Gn, Brebner & McCormack, in progress). There is clearly a need to obtain normative data on the acquisition of speech and language for all of the languages spoken.

With an overwhelming lack of information on typical development, research needs to be targeted and areas prioritised. This could include studies on acquisition of vocabulary and morphosyntax, as these are areas that are known to be particularly difficult for multilingual children with SLI. Tasks devised to elicit this information need to be culturally sensitive, utilising culturally and linguistically appropriate tools and formats. Language dominance and the socio-linguistic environment in which the child is learning languages must also be considered.

In this paper I will synthesise the findings of my research in Singapore with current literature. I will propose an approach to obtaining information that will support clinicians in making appropriate diagnoses of speech and language impairment in multilingual contexts.

## SLIPS OF THE TONGUE IN FIRST AND SECOND LANGUAGE

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**Objective:** Word selection errors in the slips of the tongue refers to the phenomenon in which a speaker accidentally substitutes an intended-to-say word to an unintended-to-say word. This type of speech errors happens in our daily life and tells us a great idea about the structure and organization of mental lexicon. For instance, a husband who is decorating his house for Christmas may tell his wife "Honey, maybe we should buy a bouquet." However, in fact, what he really wants to buy is the"garland". The point of this example is not about why he makes a mistake, but is about why he makes that mistake. The husband does not make a random mistake; he substitutes the correct word "garland" with another word that is related in meaning. However, there is also a possibility that he may misuse the word (e.g. garden) that is more phonologically related with correct word. The aim of the present study is to extend this question into bilingual contexts. We want to investigate what types of word selection errors bilinguals are more likely to make when they use the first language in comparison with the second language.

**Methods:** The present study consists of two experiments in which Chinese-English bilinguals are recruited as participants. Both experiments are conducted based on the Deese–Roediger–McDermott (DRM) paradigm. In first experiment, participants are asked to name nouns in the study phase and recognize them in the test phase in the midst of distractors which are the new nouns semantically related with old nouns, the new nouns phonologically related with the old nouns and the non-related new nouns. In the second experiment, the procedure is the same as the first experiment. The only difference is that the word naming task is replaced by picture naming task.

**Results:** Our participants showed less correct recognition in Chinese than in English. More importantly, more semantically related new nouns are misrecognized in Chinese than in English. On contrary, more phonologically related new noun are misrecognized in English than in Chinese.

**Conclusion:** The results will be discussed with the current bilingual lexical models (Kroll and Stewart, 1994).

## PPS-023 LISTENER PERCEPTIONS OF NON-NATIVE SPEAKERS OF ENGLISH

Sally Hewat, Helen Blake ,Hae In Park,

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Non-native speakers of English (NNSE) are required to make themselves understood to a wide range of communication partners or listeners in varying communication situations (Derwing & Munro, 2005). Listeners bring their own values, experience, abilities, and biases to communication with NNSE and these personal factors can not only influence listener judgments of intelligibility, but also affect the success of the entire communication interaction. Studies have demonstrated that NNSE with strongly accents are perceived as being less competent, intelligent, educated, successful, more inferior and of lower status (Carlson & McHenry, 2006; Fuertes, Potere & Ramirez, 2002; Southwood & Flege, 1999). Much of the research has targeted speakers and how to improve their communication however, literature concerning listeners' contribution to the communication interaction or the perceptual aspects of intelligibility can be further explored.

**Objective:** The current study had two main research aims: (1) to Investigate the difference in the way various groups of listeners perceive the intelligibility, comprehensibility and accentedness of non-native English speech and (2) to Identify if the methodology used in the study is feasible in judging listener perceptions of NNSE speech.

**Methods:.** Eleven speakers (NNSE students enrolled in an English language learning centre) and 15 listeners were recruited from The University of Newcastle as participants. The listeners were categorised into three groups according to their expected familiarity with the speech of NNSE: 'unfamiliar' (first year speech pathology students), 'familiar' (English as a Second Language teachers) and 'trained' (fourth year speech pathology students). All listeners assessed recorded speech samples made by the NNSE by transcribing the utterances and providing a perceptual rating of intelligibility, comprehensibility and accentedness.

**Results:** The key finding of this study supported the hypothesis that listeners who had the most exposure to the speech of NNSE, understood more of their utterances. The results also indicated that trained listeners rated the speakers differently to the other two listener groups. The NNSE were found to be the least intelligible to the trained listeners.

**Conclusion:** The results suggest that familiarity positively impacts on the intelligibility of NNSE verbal communication. The methodology used proved feasible in objectively and perceptually measuring listener perceptions. Methodological limitations, implications of the result for a variety of settings and the need for further research in this area were highlighted. Directions for further clinical development and research were discussed.

## PPS-024 A COMPARATIVE STUDY ON THE ACQUISITION OF PERSONAL PRONOUNS BY CHILDREN WITH AUTISIM

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**Objective:** To examine whether the children with autisim master the visual perspective-taking skill and knowledge of speech roles through comparing with the mentally retarded children and typically developing children. To examine which factor play a more important role in pronoun acquisition.

**Methods:** The experimental tasks included (1) visual perspective-taking task and (2) taking the speech role task. Task 1 examined the comprehension and production of personal pronouns . However, Task 2 was designed to examine whether the subjects can take the speech roles( speaker, addressee and non-addressee ) according to the situation.

**Results:** The results showed that the autistic children almost performed as well as the mentally retarded children in task 1, although they were more likely to use proper names rather than personal pronouns. There were 50% of autistic group can pass Task 2, however, nearly 83% of mentally retarded group completed the task. For the autistic group, it was much harder to switch speech roles between addressee and speaker. As an addressee, when the autistic child heard "I" from the speaker, he can't comprehend it in the perspective of speaker. Instead, he still was in his own perspective and took "I" as himself.

**Conclusion:** The autistic group has a higher pronoun reversal rate (4.9%) than the control groups. The autistic children had more difficulties with speech roles. so, taking the speech roles played a more important part for the autistic children in the acquisition of personal pronouns.

## PPS-025 THE EFFECT OF VOLITIONAL CONTROL ON SWALLOWING-GENERATED SOUNDS IN HEALTHY ADULTS

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**Objective:** Cervical auscultation (CA) is a noninvasive technique for detecting the swallowing sounds and is used as a screening tool in the clinical evaluation. The aim of this study was to confirm the hypothesis that swallowing sounds in healthy adults can be affected by volitional control.

**Methods:** Twenty-three males and fourteen females (age range, 18-28) participated in the study. A stethoscope was placed on the skin of the right lateral border of the trachea to detect the swallowing sounds. Subjects swallowed to bolus volumes (3ml, 10ml) to command and not to command. For each swallowing sound, sound duration, the mean spectral frequency and the average amplitude were measured by Multi-speech model 3700 of the computerized sound lab. All the data were calculated and statistics analyzed by a multi-factorial ANOVA with repeated measured in SPSS 18.0.

**Results:** The results showed that sound duration, the mean spectral frequency and the average amplitude of the swallowing sound on both bolus volumes was changed   during the two swallowing conditions.

**Conclusion:** Normal swallowing sound frequency and durations are different when subjects are asked to swallow to command and when they swallow without a command. We infer that CA as a screening tool in detecting swallow abnormality may be affected by how the patient is asked to swallow a bolus.

## PPS-026 EFFECT OF ATTENTION AND BOLUS TEMPERATURE ON SWALLOWING REFLEX

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**Objective:** In this study, we examined the effects of attention and bolus temperature on swallowing performance parameter by using the "swallowing kinematic measurement system" to measure the duration of activated suprahyoid muscles from larynx movement of swallowing reflex.

**Methods:** Ten healthy volunteers were participated. Subjects were asked to swallow water with 2 different temperatures and 2 different attentional conditions. Bolus temperatures were 5 ℃ and 25 ℃. The conditions of attention were the conditions which perform an auditory detection task (called ADT conditions), and conditions which cannot be listening at all (called silent conditions). Bolus was 1ml of water. "Swallowing kinematic measurement system" consisted of a surface electromyograph which measures of activated suprahyoid muscles, and a pressure sensor which measures larynx elevation. Statistical analysis was done using two-way analysis of variance.

**Results:** In 5 ℃ water swallowing, ADT condition was 784.3±286.9msec, and silent condition   was 854.1±250.1msec. In 25 ℃ water swallowing , ADT condition was 815.3±199.7msec, and silent condition was 836.5±180.9msec. There were no statistically significant differences of two temperatures and two attentional conditions. Although, there were no significant differences of two conditions, the duration times were short in ADT conditions than silent conditions.

**Conclusion:** This study showed that vigilance may have increased because ADT conditions performed an auditory detection task compared with silent conditions. Since vigilance of this improved, it suggested a possibility of having given change to activate of the suprahyoid muscles at the time of a swallowing reflex.

## PPS-027

### EFFECT OF BALLOON DILATATION ON HYOID BONE AND UPPER ESOPHAGEAL SPHINCTER IN BRAINSTEM STROKE PATIENTS WITH DYSPHAGIA

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**Objectives** We examined effect of balloon dilation intervention on opening of upper esophageal sphincter(UES) and excursion of hyoid bone in brainstem stroke patients with dysphagia before and following treatment by using digital analysis of videofluoroscopy.

**Methods:** Thirty brainstem stroke patients with pharyngeal dysphagia were recruited in this study. 15 of them as dilatation treatment group completed 3 weeks of modified balloon dilatation treatment and traditional swallowing therapy. Another 15 of them as control group only completed 3 weeks of traditional swallowing therapy. Before, and following the dilatation we measured opening of upper esophageal sphincter(UES) and excursion of hyoid bone during swallows of thin liquid, thick liquid, and pasty material in 3 ml volumes. We compared these results to identical measures obtained from control group.

**Results:** Following dilatation treatment, 12 of 15 patients were removed feeding tube in dilatation group. Post-dilatation the opening of UES and excursion of hyoid bone were both significantly better than Pre-dilatation in the group of dilatation treatment for three materials ($p < 0.05$). Only 2 of 15 patients were removed feeding tube in control group following traditional swallowing therapy. However, Post-treatment the relaxation of UES in control group was not shown any significantly difference from pre-treatment ($p > 0.05$) for all three materials.

**Conclusion:** Dysphagia therapy with dilatation improves opening of UES and excursion of hyoid bone during swallowing. Traditional swallowing therapies have certain effect but do not have positive effect on opening of UES and excursion of hyoid bones.

## PPS-028

### EFFECTIVENESS OF TRANSDISCIPLINARY APPROACH IN THE MANAGEMENT OF CHILDREN WITH FEEDING AND/OR SWALLOWING DISORDERS - A PILOT STUDY

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Children with feeding disorders often present with complex multifactorial symptoms and usually require a team approach in the management of feeding and swallowing difficulties. The current study will focus on the Transdisciplinary model comprising of Speech Language Pathologist (SLP), Occupational Therapist (OT), parents/care-givers, teachers and Psychologist depending on the nature of the child`s clinical manifestations.

**Objective:** This study is aimed to evaluate the

1) effectiveness of Transdisciplinary approach in the intervention of children with feeding and swallowing issues

2) outcome of caregivers/parents and teachers training in handling the children with feeding and/or swallowing issues

**Method:** Five children with feeding and/or swallowing issues from Early Intervention Program will undergo baseline assessment using a rating scale by a SLP and an OT with experience in dealing with children with feeding and swallowing difficulties. Following the assessment, the caregivers/parents and teachers will be provided hands-on training on techniques and strategies to be followed at home and classroom for these children. The children`s progress will be evaluated 8-10 weeks after the first consultation. A pre and post training questionnaire will be used with parents/caregivers and teachers to assess their knowledge and skills in handling such children. Inter rater reliability will also be established during and 8-10 weeks after the first consultation respectively.

**Results and Conclusion:** The baseline assessment for feeding and swallowing skills in five children will be statistically compared with the assessment after 8-10 weeks. Similarly, the pre and post training results will also be compared for significance.

Key words: Transdisciplinary model, Parents/Care-givers training

## PPS-029

**THE INFLUENCE OF BOLUS VOLIMES AND CONSISTENCY ON OROPHARYGEAL SWALLOWING: A STUDY OF HEALTH SUBJECTS USING HIGH-RESOLUTION SOLID-STATE MANOMETRY**

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**Objective:** To determine the effect of bolus volume and consistency on pharyngeal and upper esophageal sphincter pressures, durations using high-resolution manometry (HRM).

**Methods:** Twenty-four health subjects swallowed three bolus volumes (3mL; 5mL; 10mL) and three bolus consistencies (water; thick; pasty) in the neutral head position. Pressure and durations measurements were acquired using a high-resolution solid-state manometer, with emphasis placed on the hypopharynx and upper esophageal sphincter (UES). Variables include UES nadir pressure, UES relaxtation duration, maximum hypopharygeal pressure and hypopharyngeal duration were analyzed across bolus volumes and consistencies using threeway repeated measures analysis of variance (ANOVA) investigating the effect of bolus volume and consistencies.

**Results:** UES nadir pressure, UES relaxtation duration, maximum hypopharygeal pressure and hypopharyngeal duration varied significantly across bolus volume and consistencies. UES relaxtation duration, UES nadir pressure and maximum hypopharyngeal pressure, had a direct positive relationship with bolus volume, whereas all of these four parameters had an positive relationship with bolus consistency.

**Conclusion:** Differences in hypopharyngeal pressure and duration, UES nadir pressure and duration were detected across varying bolus volumes and consistencies. Consideration of these variables is paramount in understanding normal and pathological swallowing.

## PPS-030

**DETECTING TEMPORARY UNILATERAL VOCAL PALSY AFTER THYROIDECTOMY: IS COMPUTERIZED SPEECH ANALYSIS PROGRAM DEPENDABLE?**

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**Objective:** Many patients complained of subjective voice changes after thyroid surgeries, some due to recurrent laryngeal nerve injuries, either temporarily or permanently, some due to unknown causes.　The objective of this study is to survey whether computerized speech analysis program (Vocal Assessment, Dr. Speech) can detect temporary unilateral vocal palsy in patients after surgery.

**Methods:** Voice samples of thyroidectomy patients were recorded (1-day pre-surgery, 3-day post-surgery, and 13-day post-surgery). Jitter%, shimmer%, harmonic-to-noise ratio (HNR), and normalized noise energy (NNE) were analyzed.　The study group was the four reported cases of temporary unilateral vocal cord palsy among over 400 surgeries from November 2009 till February 2013, average recovery time was 35 days.　The control group was another four patients, without vocal palsy, receiving thyroidectomy and voice analyses during the same period.　All eight patients were adults, mean ages were 45.25 (study) and 46.25 (control), with a diagnosis of goiter, female-to-male ratio was 1:1.　Voice changes of the two groups were measured and compared..

**Results:** Paired t-tests were used to compare the differences of voice changes between groups: t (Jitter3-day-JitterPre) = 0.623; t (Jitter13-day-JitterPre) = 0.265; t (Shimmer3-day-ShimmerPre) = 0.688; t (Shimmer13-day-ShimmerPre) = 0.321; t (HNR3-day-HNRPre) = 0.985; t (HNR13-day-HNRPre) = 0.298; t (NNE3-day-NNEPre) = 0.127; t (NNE13-day-NNEPre) = 0.405, while Pearson r analyses demonstrated there were statistically significant voice changes over the 2-week period (jitter% and shimmer%) in each group.

**Conclusion:** Computerized speech analysis program is not a dependable tool in detecting temporary unilateral vocal palsy after thyroidectomy.

**PPS-031**

**USING DIGITAL VOICE PROGRAM TO EVALUATE SHORT-TERM VOICE DATA OF LIPOINJECTION OF VOCAL CORD PARALYSIS PATIENTS AND COMPARED SOCIAL MENTAL FUNCTION BEFORE AND AFTER OPERATION**

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**Objective:** The vocal cord paralysis which often issue in the imperfect closure of the vocal cord is the common problem of vocal disease. One of the ideal solution of vocal cord paralysis is vocal fold augmentation by injection of various substances. Fat auto-grafting in the vocal folds has the advantage of good histo-compatibility in vocal cord. However, post injection unstable voice often bothers patients and larygologists.   Patients social performance and mental healthiness are often affected after autologous fat injection thyroplasty.

**Methods:** 60 unilateral vocal cord paralysis patients are recorded their voice data before and after the fat auto-grafting by MDVP program. A social and mental questionnaire with SNOT20 also are used for evaluating pre-and post operation social mental function.

**Results:** After fat auto-grafting to vocal cord, the parameter of F0, jitter and shimmer would slightly decrease within 1 month and improved after 3 months after autologous fat injection thyroplasty . The social and mental function is also significant better after operation 3 months.

**Conclusion:** The fat auto-grafting in the vocal folds could help vocal cord paralysis patients speak better after surgery in average 3 months after operation.   Educate patients with patience after autologous fat injection thyroplasty is warrant and help patient to reduce social anxiety.

**PPS-032**

**TREATMENT OUTCOME OF VOCAL FOLD STEROID INJECTION AND VOCAL HYGIENE EDUCATION: A COMPARATIVE STUDY**

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**Objects:** This study intends to objectively quantify and compare the regression rates of vocal lesions in patients receiving either vocal fold steroid injection (VFSI) or vocal hygiene education (VHE). Potential influence of occupational vocal demands on the treatment outcome was also investigated.

**Methods:** This study retrospectively enrolled 176 patients of vocal nodules and vocal polyps from 2009 to 2011. Ninety-two patients received VFSI, while 84 patients received VHE. We measured the lesion area with correction by the length of vocal fold, according to videolaryngoscopic examinations before, 1, and 2 months after treatments.

**Results:** VFSI was associated with a higher lesion reduction rate than VHE at 1 and 2 months ($p < 0.05$). In vocal nodules and patients with regular occupational vocal demands, VFSI achieved a higher lesion regression rate than VHE at 1 month ($p < 0.05$), while both modalities resulted in similar lesion reduction rates at 2 month ($p > 0.05$). In vocal polyps, the lesion reduction rate after VFSI was higher than that following VHE at 1 and 2 months ($p < 0.01$). In patients with high occupational vocal dependence, the lesion sizes decreased significantly at 1 and 2 months following VFSI
($p < 0.01$), but not for those receiving VHE ($p > 0.05$).

**Conclusion:** VHE remains the fundamental strategy for all dysphonic patients, while VFSI represents an alternative management. Both VFSI and VHE are effective for vocal nodules and patients with regular occupational vocal demand, but VFSI achieves lesion regression earlier than VHE. VFSI is preferred over VHE for vocal polyps and patients with high occupational vocal demands.

## PPS-033 — ACOUSTIC INVERSE SCATTERING OF SUSTAINED VOWEL PRODUCED BY PATIENTS WITH UNILATERAL VOCAL CORD PARALYSIS (UVCP) TREATED BY LIPOINJECTION THYROPLASTY: PRE- AND POST-OPERATION COMPARISONS

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**Objective:** The patient with UVCP is frequently noted in laryngologists clinic, and could be corrected by autologus fat injection thyroplasty. However, the prognosis of voice outcome is often hard to predict after operation. However, some evaluation tools before and after operation could give the laryngologists hints to arrange further salvage or early informs to patients. Therefore, we performed this study and hope to offer some useful markers by speech spectrogram and programming methods for prognosis of autologus injection thyroplasty.

**Methods:** Sustained vowels /a/ and /i/ were recorded from patients of UVCP before autologus injection thyroplasty, and 1, 3, and 6 months afterwards. The sounds were sampled digitally at 50 kHz sampling rate and 16 bit resolution. The digital samples were analyzed in a block-wise manner, and the glottal source signal was inferred via a linear prediction-based algorithm. The algorithm essentially estimates the glottal source and the vocal-tract filtering coefficients simultaneously. Then, physiologically meaningful features pertaining the function of vocal fold are ready to be extracted from the glottal-source signal, while the filtering parameters encode constriction of the vocal tract, which is not directly relevant for this study.

**Results:** Pilot studies indicate that, in several patients, the post-operation glottal-source waveforms have more prominent periodicity than the pre-operation waveforms. For all patients, we listened to the glottal source waveforms as estimated by the linear-prediction method, and the vowel quality is consistently removed. This indicates that the method allows us to focus on the vocal-fold properties while ignoring the filtering effects due to individual articulatory variations.

**Conclusion:** Acoustic inverse scattering can indeed be achieved via linear prediction. The technique generally yield an estimate of glottal source waveforms while patients attempt to produce sustained vowels. The technique thus can provide useful and novel features that help predict the effectiveness of autologus fat injection thyroplasty. As clinical data continue to be collected, more rigorous statistical analysis is warranted in the near future in search for the desired features derived from glottal-source waveforms.

## PPS-034 — TIMING OF THERAPY FOR VOCAL CORD PARALYSIS AFTER THYROIDECTOMY: A SYSTEMATIC REVIEW AND META-ANALYSIS

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[3] East China Normal University (China)

**Purpose:** We undertook a systematic review of the literature to identify the timing of every treating strategy for vocal cord paralysis after thyroidectomy, and established the primary decision-making model of therapy.

**Method:** We searched 4 databases, 1 journals, and terms for Thyroidectomy、Vocal Cord Paralysis、Therapy. We evaluated study quality using the Cochrane Collaboration's risk of bias tool, mainly extracted the datas of the therapy timing and types from the selected 37 articles. We calculated Odd Ratio, Relative Risks and 95%CI、heterogenicity , and did Regression analysis for the timing on log OR/RR.

**Result:** Of 11 articles of unilateral vocal paralysis, there are 5 articles focused on early therapy(0-6m), which significant clinic heterogenicity test revealed the OR of neurolysis is evidently higher than that of injection laryngoplasty and voice training (Q=17.002，P=0.000 < 0.1). The RR of injection laryngoplasty after 1 year is significantly higher than that of injection laryngoplasty before 1 year (Q=9.984，p=0.002 < 0.1); Of 26 articles of bilateral vocal paralysis, OR of bilateral posterior cordectomy is markedly higher than that of endolaryngeal cord laterofixation (Q=3.510, p=0.061 < 0.1) and combined laser arytenoidectomy with posterior cordectomy (Q=2.90,p=0.088 < 0.1).

**Conclusion**: For unilateral vocal paralysis after thyroidectomy within 12 months, suggesting the therapy of absorbable mass injection laryngoplasty、voice training, and neurolysis for which paralysis is clearly diagnosised as soon as possible; For which over 12 months, suggesting thyroplasty technique; For bilateral vocal paralysis after thyroidectomy within 12 months, suggesting cord laterofixation as early as possible, for which over 12 months, suggesting combined laser arytenoidectomy with posterior cordectomy.

## PPS-007 — IS THERE ANY DEFICIT ON THE ABILITY OF SPEECH DISCRIMINATION, RHYTHM JUDGMENT AND PHONOLOGICAL AWARENESS FOR CHILDREN WITH LOW ACADEMIC ACHIEVEMENT?

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Children with low academic achievement, who have a large gap between their learning potential and their academic achievement, cannot successfully develop normal reading ability through regular teaching. The purpose of this study is to investigate their ability of speech discrimination, rhythm judgment and phonological awareness, and compare to these ability of normal children. There were eighty students recruited. Forty of them had low achievement in the Chinese subject, and the other forty children were their classmates, served as a control group. The children in the control group were matched with age and gender. Three tests were conducted to assess their auditory speech processing and phonological ability. The first was speech discrimination task, which consisted of 50 pairs of phoneme contrasts imbedded in the monosyllabic words. The stimuli included 10 types of consonant contrasts, two types of rime contrasts, and one types of tonal contrasts. The task of auditory phonological awareness also had three divisions: consonant, rime and tone. The task of rhythm judgment was to choose the more irregular one within two stimuli, which included six DDK sequences and six sentences. The results show that there were significant differences between the low achievement group and the control group in all three tests, and these scores were moderately correlated with the amount of Chinese character recognition of the children. The scores of phonological awareness and the rhythm judgment test had the highest correlation coefficients ( r = .63, .60, respectively) correlated with the amount of Chinese character recognition of children. Furthermore, the results of multiple regression analyses show that the strongest predictors of the amount of Chinese character recognition were the scores of tone awareness and rhythmic judgment. The results suggest that children with low academic achievement may have defects in the ability of speech rhythmic segregation, auditory speech discrimination and phonological processing.

KEYWORDS: low academic achievement, speech discrimination, rhythm judgment, phonological processing

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## FPA-015 — THE CORRELATION OF HEARING LOSS BETWEEN THE THRESHOLDS OF MANDARIN HEARING IN NOISE TEST AND PURE TONE THRESHOLDS AVERAGE

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**Introduction:** Mandarin hearing in noise test (MHINT) has been utilized as an auditory assessment tool. It also could be verified the outcome of the hearing devices. Before it was developed, pure tone audiometry (PTA) is a majority test for hearing sensitivity in clinic. But, there are some limits to look out the speech recognition function. Traditionally, speech audiometry was performed with a few monosyllabic or spondee words in Mandarin. The study is aimed to the correlation between hearing loss in pure tone averaging and threshold of MHINT.

**Method:** Thirty two subjects with bilateral sensorineural hearing loss, ranging in extent from mild to moderate. Twenty subjects were within mild hearing loss, and twelve were within moderate hearing loss. All subjects had to test basic audiometry including PTA, uncomfortable level, tympanogram, speech recognition threshold, word discrimination score, before testing MHINT. When testing MHINT, the quiet situation was adjusting speech level in sound field, fixing speech noise level at 65 dBA and adjusting speech level in sound field when testing noise situation.

**Results:** Correlation coefficient between MHINT and PTA average in 500 Hz to 4000 Hz was 0.86 in MHINT quiet situation and 0.637 in MHINT noise situation. The correlation coefficient between MHINT and PTA average in 500 Hz to 2000 Hz was 0.846 in MHINT quiet situation and 0.531 in MHINT noise situation.

**Conclusion:** There was a strong correlation between MHINT in quiet situation and PTA average in 500 Hz, 1000 Hz, 2000 Hz, and 4000 Hz. Using MHINT to estimate PTA threshold can be an explored topic.

## FPA-016 — SELF-REPORTED SOCIAL RESTRICTIONS AND EMOTIONAL DISTURBANCES OF ADULTS WITH VARIOUS HEARING LEVELS IN TAIWAN

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The population of hearing disability has increased year by year in Taiwan. There were over one hundred and twenty thousand people with hearing disability up to the second quarter of 2012. Ninety-seven point twenty-two % of the hearing disabled are over 18 years old and adults.1 People who lose their hearing find it difficult to process messages. Even more, it can affect such as communication, learning, cognition, emotion, social adaptation,etc.2

Most of the current studies focused on elderly hearing impaired subjects.3-5 None of those studies investigated the relationship between social restrictions, emotional distress, and both in comparison to degree of hearing loss in adults. Therefore, ninety-eight adults with hearing impairment were recruited in this study. The Hearing Handicap Inventory for Adults (HHIA) was used as a survey tool to investigate the participants' social and emotional effects, and their relationship to hearing impairment. The original HHIA is a Likert three scales. A few disadvantages often showed, such as narrow spread of scores, etc.. Therefore, this study used a five-scale survey tool to counter those shortages, a Crobach alpha to verify the reliability level, and a structure equation model as a confirmatory factor analysis. Finally, this study will show the social and emotional consequences encountered by adults with hearing impairment, and their relationship to degree of hearing loss.

## FPS-035 OUTCOMES OF VOCAL HYGIENE PROGRAM AND RESONANT VOICE THERAPY FOR HYPERFUNCTIONAL VOICE DISORDERED PATIENTS

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**Objective:** About 40% of voice disordered populations are hyperfunctional dysphonia.Resonant voice therapy and vocal hygiene education have beam reported to be effective to a variety of voice disordered patients. However, no research has been done on the long term effects of the 2 methods on hyperfunctional dysphonic patients. The purpose of the study is to investigate long-term outcomes in vocal function, communication function, and life quality of vocal hygiene program and resonant voice therapy for hyperfunctional voice disordered patients.

**Methods:** The research subjects were 86 hyperfunctional voice disordered patients. The subjects were randomly assigned into 2 groups: 1) vocal hygiene group (VH group); and 2) resonant voice therapy group (RVT group). Subjects in VH group received vocal hygiene education; and subjects in RVT group received resonant voice therapy. A set of measurements were conducted on all subjects pre, post 2 weeks, 1 year, and 2 years' treatment. The measurements included: 1) auditory perceptual judgment of vocal pitch, vocal loudness and voice quality in reading and conversational speech; 2) acoustic analysis of perturbation in jitter, shimmer and harmonic to noise ratio for sustained vowel /a/; 3) aerodynamic analysis of laryngeal valving efficiency and phonation effort in airflow rate, maximum phonation time, and phonation threshold pressure; 4)self-report of voice severity; 5) Voice Handicap Index (VHI) for communication function; and 6) WHOQOL-BREF Taiwan Version for life quality. Test-retest, intra- and inter subject reliability were conducted on all examiners. All data were collected and analyzed quantitatively. Statistical analysis of test reliability, test consistency and significance of voice therapy post 2 weeks, 1 year, and 2 years' treatment of the 2 groups was performed with two-way ANOVA repeated measurement, Post Hoc Scheffe; and paired-t test.

**Results:** In auditory perceptual judgment, overall voice severity and the severity of pitch, roughness, strain, monotone, resonance, and glottal fry for RVT group were significantly reduced post 2 weeks and 1 year's treatment. The severity of monotone for VH group was significantly reduced post 1 year's treatment. In acoustic measurements, jitter (%) for RVT group was significantly reduced post 2 weeks, 1 year, and 2 years' treatment; and for VH group was significantly reduced post 2 years' treatment. Self-reported voice severity for both RVT and VH groups was significantly reduced post 2 weeks and 1 year's treatment. In Voice Handicap Index (VHI), the score of physical scale for both RVT and VH was significantly reduced post 2 weeks and 1 year's treatment. The score of emotion scale and total scale for RVT group were significantly reduced post 2 weeks and 1 year's treatment; and for VH group were significantly reduced post 1 year's treatment. In aerodynamic and WHOQOL-BREF Taiwan Version measurements, no significant difference was found for both RVT and VH groups at any time interval.

**Conclusion:** The results indicate that both resonant voice therapy and vocal hygiene education have short-term, mid-term, and long-term outcomes for hyperfunctional dysphonic patients. However, resonant voice therapy show more short-term, mid-term, and long-term effects in voice characteristics, vocal function, and communication function than vocal hygiene education.

## PPS-035

## ENHANCING AAC CONNECTIONS WITH THE WORLD: AAC SERVICES PROVISION IN CENTER-BASED LEARNING CENTER IN TAIWAN

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**Objective:** According to National Joint Committee for the Communication Needs of Persons with Severe Disabilities (1992), in spite of individuals with varied disabilities, these individuals have a basic right to communicate in their environments. This study was to describe a three-year project, Enhancing AAC Connections with the World, administered by Maria Social Welfare Foundation. This project was funded by YongLin Healthcare Foundation.

**Methods:** Five goals were targeted, including: (1) Providing financial aid to individuals with complex communication needs to have their own AAC devices; (2) Holding different AAC-related seminars to increase AAC practical knowledge of practitioners and caregivers; (3) Cooperating with academic programs (e.g, Chung Shan Medical University) in providing service learning experiences; (4) Promoting AAC-related publications (e.g., videos and handbooks); and (5) Establishing an experiencing AAC devices to public and individuals who needs AAC.

**Results:** Until the year of 2013, there are 184 AAC devices were purchased, and have been on trials for 6695 times. 63 individuals were reserved financial aid for their AAC devices, and AAC services provided by SLPs at clinical practice for 4632 times. Seven AAC-related seminars have been held. In addition, 1069 times of service learning by students from Chung Shan Medical University, and 4431 individuals visited the experiencing AAC area.

**Conclusion:** Through this founded project, practitioners and caregivers have clear understandings of the applications of AAC and its related services.

## PPS-036

## FREQUENCY OF WORD USAGE BY PEERS IN CENTER-BASED LEARNING CENTER IN TAIWAN

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**Objective:**

Maria Social Welfare Foundation provides center-based education and vocation training to individuals with severe to profound physical or mental disabilities. Most of them have different complex communication needs and might require an augmented and alternative communication (AAC) support. Therefore, the identification of suitable words when devising age and setting- appropriate AAC is important for speech and language pathologists (SLPs) and other specialties. The purpose of this study was to identify a core list of vocabulary used by preschoolers and adults in a center-based learning center.

**Methods:**

Naturally occurring words was collected from five preschoolers with age-appropriated verbal expression and five active verbal adults. Two different activities, including one student-directed activity and one trainer-directed activity, were observed. Speech sample used in these two activities were transcribed and analyzed to determine frequency of word usage, and kinds of syntactic, pragmatic, and semantic functions used by the 10 participants for each activity at each center.

**Results:**

The results indicated that all participants used 12 common vocabularies across both activities and centers. These vocabularies were found to serve different syntactic, semantic, and pragmatic functions.

**Conclusion:**

A careful description of the frequency words used in a center-based learning center might provide guidelines for SLPs and other specialties in selecting words in AAC used by individuals with complex communication needs. Also, the similarities and differences with other studies were discussed in this study.

## PPS-037 APPLICATIONS OF NARRATIVE THERAPY IN INDIVIDUALS WHO REJECT TO USE AAC

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**Objective:** The purpose of paper is going to present an approach of narrative therapy that may be used by speech-language pathologists in counseling individuals who might potentially use augmentative and alternative communication (AAC). Specifically, this paper will discuss reasons why an AAC user might have rejected his/her AAC devices or systems and steps to help this AAC user in terms of narrative therapy. In addition, the integration of narrative therapy into traditional treatment and measuring effect of counseling are addressed as well.

**Methods & Results:** A review of the literature includes research on the use of counseling in the context of communication disorders and on the application of a narrative therapy counseling approach with individuals who potentially need AAC. The key components and steps of narrative therapy are described, and applications for use with individuals who have rejected to use AAC. Sample vignettes of a counseling component of a 43-year-old adult with a left CVA are used to illustrate some of the key points of a narrative therapy counseling approach.

**Conclusion:** A narrative therapy counseling approach that is integrated into AAC intervention may be an effective way of addressing concomitant factors such as dominant narratives and loss of social identity. Readers of this article are challenged to seek additional counseling training and to begin to conduct research to determine the effectiveness and efficacy of integrating a counseling component into AAC intervention.

## PPS-038 TESTING HIGH-FREQUENCY WORDS AMONG TAIWANESE ADOLESCENTS AND ADULTS

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**Objective:** Little has known about using high-frequency words in evaluating speech intelligibility for disordered population although it is principally recommended. This study was to preliminarily examine a computer-based testing material of high-frequency words to identify word unidimension and familiarity using Taiwanese population.

**Methods:** A descriptive/prospective study design. The whole high-frequency lexicon with 50 out of 600 two-syllable Chinese words was adapted from multi-media resources (e.g. newspapers, magazines, and other web media). Both word familiarity and frequency were online openly surveyed by a 1-10 rating scale for one year. The word-frequency ratio was determined by the word-frequency statistic reports (Ministry of Education, Taiwan, 1997-1998). Demographic difference (age, gender, education, occupation, and resident location) and word familiarity were compared using one-sample t-test and one-way ANOVA.

**Results:** A total of 520 (out of 791) web surveys was obtained and valid for analysis during the study year. Majority of the respondents were female (63.3%) with mean age of 29.3 ± (*SD*) 11.3 years (range=16-60), high school education and above, and living in northern Taiwan. High familiarity of the 50-words was rated (91.1%; score 9.1±1.1) while three words, "cyst, cyanosis, cripple", were recognized as the lowest familiarity (score 7.68-7.86). And, levels of the word familiarity were significantly differentiated by the demographic parameters ($p < .01$).

**Conclusion:** The preliminary results demonstrate the high-frequent performance in the 600-word lexicon has potential as an appropriate testing material for use in Taiwanese. Clinical implication of testing speech intelligibility with the high-frequency words warrants for further research investigation.

## PPS-039 THE CHARACTERISTICS OF TARGET SOUND DURING LARYNGEAL TELESCOPY

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**Objective:** The purpose of the present study is to investigate the acoustic characteristics of target sounds /i/ and /ɛ/ phonated during laryngeal tellescopy. The results should make considerations in the selection of the target sound.

**Methods:** Thirty-four male subjects aged 20-39 years with normal voice   were included. The target sounds were /i/ and /ɛ/. Rrecording of voice smaples was under normal phonation and during the laryngeal telescopy. The acoustic analysis included the fundamental frequency, jitter %, shimmer in dB and N/H ratio.

**Results:** The target sound /ɛ/ was perceived more actually ($p < 0.001$) than the target sound /i/ ($p > 0.05$) during the telescopy. All the four acoustic characteristics of both sounds showed a much higher average and standard deviation (SD) during the telescopy. They showed significant difference ($p < 0.05$) when compared with those under normal phonation. There was no significant difference   between /i/ and /ɛ/ ($p>0.05$) during the telescopy. However, during telescopy the sound /ɛ/ had a better mean value and smaller SD than those of sound /i/.

**Conclusion:** To observe well the vocal activity with telescope, the examiner should encourage the patient to produce as natural a sound as possible. However, instrumentation would impact the normal phonation mechanism and vocal activity.. From the present study, sound /ɛ/ showed better mean value and smaller SD. To minimize instability in the phonation during laryngeal telescopy, examiner should consider a target sound appropriately with which the patient was more comfortable and easy to phonate.

## PPS-040 A WORD LIST SUGGESTED FOR SCORING THE NARRATIONS OF DESCRIBING COOKIE-THEFT

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**Objective:** The aim of this study is to create an easy-to-apply and effective word list for analyzing the narrations with language deficits.
Methods: We analyzed the narrations of 50 Chinese subject, including 21 normal subjects, 4 subjects of mild dementia, and 25 subjects with severe dementia, as they were asked to describe the picture of Cookie-Theft. Their narrations were transcribed, segmented and tagged with parts of speech.

**Results:** The verbs frequently used were abstracted from the narrations of the normal subjects, based on the theoretical framework of main idea concept. Then the allocations of the high-frequency verbs and the other words were abstracted from the speech corpus of the normal subjects. Thus we obtained a suggested list for oral expression in describing the picture of Cookie-Theft.

**Conclusion:** The list was found to be effective in discriminating between the mild group and the severe group of dementia, as we applied the list for scoring the speech corpus of the mild group and severe group of dementia.

## PPS-042

# AGE-ASSOCIATED VULNERABILITY IN SPEECH-LANGUAGE FUNCTIONS OF COMMUNITY-DWELLING KOREAN ELDERLY

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**Objective**: To investigate if there are certain aspects of speech and/or language functions which deteriorate with aging in the Korean elderly.

**Methods:** A total of 526(male= 125, age= 73.69±6.81 years old) community-dwelling elderly with normal cognitive function participated as subjects. They completed five language tasks: 1) 30-second Controlled Oral Word Association Test(COWAT-30); 2) 10-item of the Korean version of the Boston Naming Test(K-BNT-10); 3) verb naming test; 4) auditory sentence comprehension task; and 5) word definition task. In addition, among the 526 elderly, 260(male= 59, age= 72.34±7.02 years old) performed the diadochokinetic(DDK) task(i.e. alternate motion rate(AMR), sequential motion rate (SMR)). Other speech measures included fundamental frequency(F0), intensity, maximum phonation time(MPT), and GRBAS rating scale. ANOVA and ANCOVA were used for statistical analysis.

**Results:** Expressive language functions measured by COWAT-30($F$= 115.035, $p < 0.001$), K-BNT-10($F$=88.923, $p < 0.001$), verb naming test($F$=3.681, $p < 0.01$), and word definition task($F$=79.897, $p < 0.001$) were significantly reduced with aging. Also, numbers of correct response on auditory sentence comprehension test showed significantly reduced receptive language function with aging. Deterioration of speech production with aging was mainly characterized by significantly decreased

MPT($F$=3.010, $p < 0.05$), AMR [/pʌ/($F$= 3.859, $p < 0.05$), /tʌ/($F$=3.752, $p < 0.05$),/kʌ/($f$= 3.794, $p < 0.05$), and SMR (/pʌtʌkʌ/ ($F$=3.084, $p < 0.05$) performance. In addition, significant aging effect on GRBAS rating scale($F$=3.505, $p < 0.05$) was found only on women.

**Conclusion:** This large sample study on evaluation of the elderly manifests aging effects on both language and speech functions and the results imply the needs of regular check-up of communication functions in the elderly.

## PPS-043

# THE EFFECT OF VERB PRODUCTION TRAINING IN CHRONIC APHASIA: COMPARISON OF AGRAMMATIC AND NON-AGRAMMATIC APHASIA

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**Objective:** Noun-retrieval treatment studies in aphasia have reported influences on picture naming for trained words, but it remains unclear whether verbs can be treated in a similar way to nouns. We examined whether verb-production training promoted verb retrieval in picture naming and in a sentence context in 2 individuals with chronic non-fluent aphasia. The goal of treatment was to improve verb production in verb naming and a sentence context.

**Methods:** The participants were 2 right-handed men with chronic non-fluent aphasia. Case 1 (C1) involved a 70-year-old man with agrammatic aphasia. The subject's lesion was located in the left frontal and parietal lobes. Case 2 (C2) involved a 65-year-old man with Broca aphasia, apraxia of speech, and non-agrammatic speech. This patient's lesion was located in the left frontal, temporal, and parietal lobes. We used a single-subject research design. Verb production in a picture description test and 4 cartoon description tests was assessed before and after treatment.

**Results:** Both participants exhibited improvement in trained verb naming. However, 5 weeks later, it was difficult for them to produce trained verbs. Single verb production upon picture description was generated in C1 after training, and the number of verbs produced in a sentence context was increased when compared with that before training. Verb production was barely generated in C2.

**Conclusion:** These results indicate that there are cases of chronic agrammatic aphasia where language function can be improved and that verb-production training is effective for maintenance of language function.

**FILLERS IN ORAL SPEECH: A STUDY WITH ADULT NORMAL SPEAKERS**

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**Objective:** The purpose of this study was to identify and compare the type of fillers in normal adult speech elicited from two aphasia test pictures.

**Methods:** Eight adults without oral communication problems served as the participants of this study. Pictures in BDAE and CCAT served as the stimuli in the picture description task. Speech data was transcribed into verbatim scripts. Three types of fillers were calculated and compared between the two pictures.

**Results:** The results showed that sound filler, error word and word filler were all identified in both picture conditions. The proportion of sound fillers was about equal in the two pictures, however, the proportion of error words and word fillers were different. In compared with word fillers, more than twice of error words were observed in the BDAE pictures, however, in the CCAT picture, the proportion of error words and word fillers were reversed.

**Conclusion:**   According to this study, sound filler in oral speech was more independent from the content of pictures, while in word level, the content of pictures may had a relationship with the occurrence rate of error word and word filler in normal adult's oral performance. More researches are needed to verify the results in relation to this study.

**PPS-045** **THE APPLICATION OF CLUSTER ANALYSIS ON SUBJECT MATCHING AND CLASSIFICATION**

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**Objective:** The current study explored the feasibility of classifying and matching subjects by their oral performances on six expressive measures.

**Methods:** Two picture description tasks were administered to six participants with chronic aphasia. Verbatim translation was conducted to document their oral performances. Number of words, correct information units, percentage of correct information units, words per minute, correct information units per minute and mean length of utterance were calculated. Cluster analysis was computed to estimate the distance of similarity between the participants.

**Results:** The similarity between each participant was shown in a dendrogram. A cutting line could be set at any similarity distance depending on the number of desired group for classification. According to the results, if two groups are preferred, four participants with mild-to-moderate to near normal severity level will be classified into   one group; while the other two participants with moderate severity level will belong to another in terms of their similarity on six expressive measures.

**Conclusion:** Cluster analysis could provide us a clearer path to unveil the similarity between participants when more than one measure was considered for subject-matching or classification in clinical application.

## PPS-046   INTENSIVE LANGUAGE THERAPY IN THE REHABILITATION OF CHRONIC APHASIA-CASES STUDY

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**Objective:** Intensive language therapy has been proved more efficient in the rehabilitation of chronic aphasia in many countries! However, in Taiwan limited the health insurance and trained SLP, the lower intensive therapy is the very most approach!

**Methods:** The present study was 2 young, chronic aphasia who accepted 1.5 hr/day, 3-5 times/ week, total 30 sessions.Those 2 cases taken the computer-based language therapy and hierarchical choral reading,focused on situation-specific communication and societal participation.

**Results:** the language functions improved significantly following intensive treatment relative to the pre-treatment.Beside enhance the quality of life and improvement of self-report!

**Conclusion:** we concluded that intensive language therapy-based on the principles of brain plasticity, can lead to improve in language function in chronic aphasia.The people affected by chronic aphasia need the intervention that promotes meaningful and positive life changes and highlight his unique context and management with holistic perspective!

## PPS-047   DIFFERENT ACTIVATION OF SEMANTIC FEATURES BY THE APHASIC SUBJECTS: FINDINGS IN AN ERP STUDY

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**Objective:** The aim of this study is to scrutinize the different activation of the semantic features, when the aphasic subjects were participating comprehension task.

**Methods:** 30 objects were chosen as target names in this event-related potential study. Three semantic features were tested for each object: its upper semantic category, its motor feature, and its visual feature. There were 34 aphasic subjects recruited, screened by Mandarin version of BDAE. The subjects with different lesion sites were compared with their patterns of semantic activation. Post-hoc analyses in comparing the patterns among the different type of aphasia (Broca's, Wernicke's, and Anomic) were also conducted.

**Results:** The subjects with different lesion sites have different patterns of activation of semantic features for the same object.

**Conclusion:** Different patterns of activation of the semantic features of the same object are associated with different lesion sites of the patients.

## PPS-048   THE EFFECT OF FAMILIARITY OF CONVERSATION PARTNERS ON CONVERSATION TURNS IN TYPICAL DYADIC CONVERSATIONS- PRELIMINARY DATA

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**Objective:** The purpose of this preliminary study was to determine the effect of gender of conversation partners on contributed conversation turns in typical dyadic conversations. Two specific questions asked were: (1) If a significant asymmetry of contributed conversation turns exists in both familiar and unfamiliar dyadic conversations by typically speaking adults? (2) Do the contributed conversation turns significantly differ between familiar and unfamiliar dyadic conversations by typically speaking adults?

**Methods:** 36 typical adults, including 24 familiar adults and 12 unfamiliar adults, participated in the study. 12 adults were recruited first, and each was asked to recommend a familiar same-gender conversation partner. 12 additional adults (i.e., unfamiliar partners) who are unfamiliar with 12 originally recruited adults were recruited. Each familiar dyad converses one time in a week for six weeks. 12 unfamiliar partners were randomly selected to converse with 12 adults one time in a week for six weeks. Each conversation dyad was video-taped individually, and was allowed but not limited to, about 20 minutes (Light, et al., 1985), after which time the first author signaled the dyad to

conclude the conversation. In order to make the conversation as natural as possible, no structured scripts were used (Gallagher, 1991). Conversational topics were chosen by the participants. The dyads were encouraged to engage in spontaneous and unstructured conversation (Prutting & Kirchner, 1987).

**Results & Conclusion:** The findings of the current study showed that the asymmetries of contributed conversation turns exist in both familiar and unfamiliar dyadic conversation between typically speaking conversation partners. In addition, the asymmetry in the familiar dyadic conversation did not differ from that in the unfamiliar dyadic conversation.

## PPS-049 THE ROLE OF SPONTANEOUS SPEECH, AUDITORY COMPREHENSION, REPETITION AND NAMING IN CLASSIFYING TURKISH PATIENTS WITH APHASIA

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**Objective:** In the assessment of aphasic patients, the four subtests of aphasia batteries are especially important in classifying the characteristics of patients; namely, spontaneous speech, auditory comprehension, repetition and naming. Spontaneous speech and auditory comprehension results clearly distinguish aphasics into fluent and nonfluent types whereas repetition determines transcortical aphasia and conduction types. In Turkey, SLPs have been examining aphasic patients with a standardized Language Assessment Battery (ADD; Maviş &Toğram, 2009).The typology of the language, individual differences among aphasic patients and other variables like gender, age and post on set certainly make the assessments procedures getting more and more difficult every day. The purpose of the presentation is therefore to consider the currently available test of aphasia with regard to four-assessment field including the influential factors and to discuss whether ADD provide adequate samplings of the aforementioned communicative behaviors to meet the recovery purposes.

**Methods:** This presentation depends on the retrospective data, collected almost in 5 years; therefore, 205 aphasic patients participated in the study. 112 of them were in between 0-59 years and 93 were above 60. Their educational background was studied in three groups (24 illiterate, 149 educated up to 11 years, and 32 with more than 12 year- education). According to the classification by ADD test, 110 were non fluent, 40 of them was fluent and 55 of them were global aphasics.

Results: According to the data, it seems that spontaneous speech differs significantly among three types of aphasics. Interestingly, fluent and non-fluent aphasics speaking Turkish do not differ in auditory comprehension. All three types differ in naming and repetition. No significant difference was found between genders and age groups; however, education matters.

**Conclusion:** Turkish SLPs will get implications of the results mentioned and be aware of the characteristics of their patients with aphasia so that they will decide on the appropriate therapy techniques.

## PPS-050 THE USE OF KINESIO TAPING METHOD TO FACILITATE LIP SEAL FUNCTION FOR REDUCING DROOLING IN ADULTS WITH SPASTIC-QUADRIPLEGIC CEREBRAL PALSY - A PILOT STUDY

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**Objective:** To evaluate the effectiveness of using Kinesio Taping for facilitating of motor function of orbicularis oris in reducing drooling in adults with spastic-quadriplegic cerebral palsy.

**Methods:** A pilot study was carried out on 2 adults (age 42 and 51) with spastic-quadriplegic cerebral palsy and severe drooling problem. The subjects were found to have poor lip seal and had undergone weekly oral motor training for more than 6 months with no significant improvement noted.

Kinesio taping was applied to the clients' orbicular oris muscle for 3 hours a day and 3 sessions a week for 4 weeks. During this period, the clients' regular oral motor training were maintained.

Three parameters, including lip strength, saliva overflow condition evaluated by standardized Saliva Assessment Instrument (Allaire & Marshall, 2000) and lip seal ability during spoon feeding, were employed to evaluate the treatment effectiveness. Prior to the commencement of the taping, clients' oral functions were assessed in three pre-treatment baseline sessions conducted every week on a

fixed day. Assessments were repeated at the first, seventh and twelfth treatment sessions as well as one month after all the treatment sessions.

**Results:** Taping was shown to improve lip strength by 1.7 to 5 times in terms of the weight bearing ability in comparison with the tape-off condition for both clients. When the tapes were applied, there was an improvement in saliva overflow condition in both clients with the profuse amount of saliva possession reduced to mild or moderate drooling on the lips and chin. However, no significant improvement was found in the lip seal ability and the effects could not be sustained when the tapes were removed.

**Conclusion:** This study demonstrated the potential orthotic effect of Kinesio Taping for improving oral motor function and reducing drooling in adults with spastic cerebral palsy. However, no apparent therapeutic effect was observed so far. Further study with a larger sample size is warranted.

## PPS-051 CORTICAL SPEECH EVOKED POTENTIALS IN PARKINSON'S DISEASE

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Cortical auditory evoked potentials of self-produced and pre-recorded speech were compared in individuals with speech deficits due to Parkinson's disease and age-matched controls. On-line altered feedback of speech intensity was also applied to a subset of subjects' vocalizations to assess the effect of production-feedback mismatch on the evoked responses. Speech-induced suppression of the N1 evoked response was observed in both groups. Altered feedback reduced the extent of suppression among control subjects, but did not similarly affect response amplitude or latency among subjects with Parkinson's disease. The P2 evoked response, which was also characterized by speech-induced suppression in the control group, was either strongly depressed or completely absent in the Parkinson's group. Based on current theory regarding event-related potential source and function, these findings point to early involvement of auditory association areas, frontal motor areas and cingulate cortex in speech sensorimotor control deficits associated with Parkinson's disease. This suggests that not only sensory, but also preparatory ("feedfoward") and comparative ("error identification") functions are affected in this disorder.

## PPS-052 ACOUSTIC ANALYSIS OF MANDARIN-SPEAKING PATIENTS WITH PARKINSON'S DISEASE

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**Objective:** Nowadays, with aging population all over the world, Parkinsonism has become a noticeable health problem. Parkinson's disease (PD), a progressive neurological disease, associates with the loss of dopamine in the brain (Goberman & Elmer, 2005). PD individuals with dysarthria are termed "hypokinetic dysarthria", which have problems in prosody, phonation, articulation, and speech rate (Darley, Aronson, & Brown, 1969; Goberman & Coelho, 2002; Goberman & Elmer, 2005; Li, Li, & Wang, 2009). The goal of this present study aims at investigation on the speech performance of patients with Parkinson's disease as a Mandarin Chinese speaker by three measures: voice quality, and intelligibility.

**Methods:** There are two PD participants with Hoehn & Yahr Stage 3 recruited from National Cheng Kung University Hospital. They are both recorded before and after taking medication with three tasks—Maximum Performance Tasks (Rvachew, Megan, & Ohberg, 2005), reading out aloud two short passages, and elicitation.

Results:The finding shows both participants improve their intelligibility after taking medication. Besides, analysis from voice quality reports that jitter, RAP (relative average perturbation), and PPQ (pitch perturbation quotient) are higher both before and after medication than the norm, suggesting that PD patients have difficulty sustaining the voice quality even after medication.

**Conclusion:** Although few voice quality differences with medication are found, matched by Goberman, Coelho, and Robb (2002), patients improve on intelligibility after medication. It seems that fluctuations reported with the medication cycle still have certain influence on communication intelligibility in PD patients.