出國報告 (出國類別：國際學術會議)

赴日本東京參加第六屆日本語言與語言學國家研究院語音暨音韻學國際學術研討會(6th NINJAL International Conference on Phonetics and Phonology)

服務機關：海軍軍官學校

姓名職稱：劉晉廷助理教授

派赴國家：日本

出國期間：**108**年**12**月**13**日**-12**月**15**日

報告日期：**109** 年 **1** 月 **8** 日

目錄

一、摘要

本次前往日本東京(Japan, Tokyo)參與日本語言與語言學國家研究院主辦的第六屆日本語言與語言學國家研究院語音暨音韻學國際學術研討會(6th NINJAL International Conference on Phonetics and Phonology)。會中討論聲學語音學及音韻學理倫相關之社會科學研究交流，並將其運用於本人所主持之科技部專題研究計畫。同時，會中本人張貼海報發表論文「Revisiting Tone Three Sandhi Acquisition: Insights From Acoustical Analysis」(再探三聲變調習：聲學分析的啟發)。本次會議吸引世界一流之語音學暨音韻學之知名學者，透過海報發表交流，本人獲取許多寶貴的研究相關建議，成果豐碩。

關鍵詞：三聲變調、語言習得、聲學分析、基頻

二、目的

本次出國的目的主要是透過海報發表論文「Revisiting Tone Three Sandhi Acquisition: Insights From Acoustical Analysis」(再探三聲變調習：聲學分析的啟發)，與世界專家學者交流，以提升本人之研究能量及品質。另外，藉由觀摩他人研究方法及成果，提供未來研究內容的啟發。

三、過程

本次出席第六屆日本語言與語言學國家研究院語音暨音韻學國際學術研討會(6th NINJAL International Conference on Phonetics and Phonology)過程概述如下：

民國 108 年 12 月 12 日前往桃園機場，搭乘本國中華航空桃園 (TPE) 直飛東京成田機場 (NRT)之航班。因成田機場離東京市中心及會議地點仍有一段時間，故搭巴士及電車轉往會議地點周圍之飯店。

民國 108 年 12 月 13 日到 15 日前往會議場所「日本語言與語言學國家研究院文學大樓」報到及參與會議。參與活動包含海報發論文一篇、聽取國際知名學者專題演講及聽取他人海報發表內容。大會共安排 3 場專題講座、13 場口頭論文發表及 2 個海報論文發表場次。

民國 108 年 12 月 16 日前往東京成田機場 (NRT) 搭乘中華航空直飛回桃園 (TPE)之航班，並自行搭車回本人台中住處。

四、心得及建議

本次會議發起的原因是因為日本語言與語言學國家研究院展開了一個大型專題計畫「Cross-linguistic Studies of Japanese Prosody and Grammar」。這個計畫下包含了四個子計畫，其中一個就是和本次會議相關的主題「Prosody」(韻律)。每個計畫有充足的經費，除了讓學者進行研究及國際交流外，也可以與辦國際研討會。因此，這個會議的十三個口頭論文發表皆是邀請和此計畫有合作的學者來發表相關成果。其他投稿的講者皆安排在海報發表。對於日本對語言學研究如此有策略、規模及執行力，台灣學界應該借鏡。

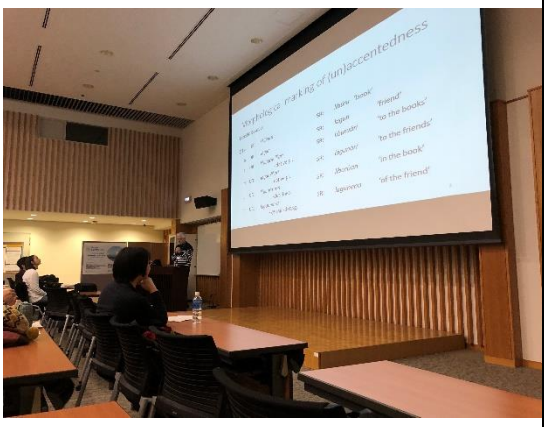
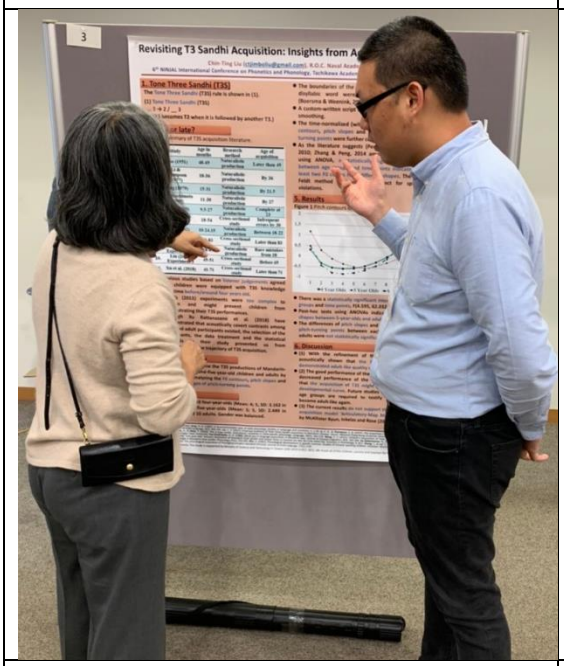
在發表過程中，各國學者給予本人的研究許多有建設性的點評，摘要如下：(1) 本人的研究將小孩及成人三聲變調的基頻曲線(fundamental frequency (f0) contour)標準化 (normalized)後進行比較。但文獻指出，比起二聲，三聲的基頻時長 (duration)較長，所以本人可以將標準化前的資料跨組別比較，如變小孩的變調習得未完成，那麼他們產出的基頻時長應該比成人的長。(2) 目前研究結果應將年齡組別延伸至六歲及七歲，以檢視實際習得的年齡。(3) 瞭解以使用頻率為本的語言習得理論 (usage-based approach to language acquisition)是否可以解釋本研究結果，及相關文獻的結果。和國際學者討論後，本人收獲良多。

本次會議舉辦的細節也有不少可以供本校未來舉辦會議時參考。(1) 議程時間的安排上，本次會議有失誤。特別是大會手冊中第二日在時間的安排上有失誤，讓一位講者的演講時間被壓縮。雖然大會臨時口頭宣佈延長議程，但仍有少數與會者因車程緣故，需依原訂時間離開。(2) 大會雖然提供了茶水與飲料，但大量使用一次性的紙杯/塑膠杯，不甚環保。(3) 大會會場指示不明，有參與者表示，第一次來會場花了一個小時以上才找到會議的發表禮堂。

最後，本人感謝科技部經費的支持，讓我有機會出席與本人研究領域相關的國際重要學術會議，得到許多啟發及反思的機會，成為本人未來研究的養份。同時要感謝海軍司令部及海軍官校的長官及同仁，同意本人申請因公出國並協助完成相關手續。

五、附錄

附錄 1：活動照片

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>照片 1：與中華大學余老師合照</td><td>照片 2：大會口頭論文法表</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>照片 3：向國立交通大學潘荷仙教授簡報研究內容</td><td>照片 4：向當地學者簡報研究內容</td></tr>
</table>

	
照片 5：向與會者簡報研究內容	**照片 6：**向國立交通大學顧可漢客座講座教授簡報研究內容

附錄 2：發表論文摘要

Revisiting Tone Three Sandhi Acquisition: Insights from Acoustical Analysis

Liu, Chin-Ting

R.O.C. Naval Academy

Background: Tone Three Sandhi (T3S) is a phenomenon where the first Tone 3 (T3, a falling-rising tone) syllable becomes a rising pitch when it is followed by another T3 syllable. Previous studies based on listener judgements agreed that children were equipped with T3S knowledge sometime before/around four years old (Li & Thompson, 1997 among many others). Although Xu Rattanasone et al. (2018) have demonstrated that acoustically covert contrasts among child (three, four, and five years old) and adult participants existed, the selection of the participants, the data treatment and the statistical methods in their study prevented us from understanding the trajectory of T3S acquisition. The purpose of the study is to examine the T3S productions of Mandarin-acquiring four-and-five-year-old children and adults by acoustically analyzing the F0 contours, pitch slopes and the percentages of pitch-turning points.

Methods: Data from 10 four-year-olds (Mean: 5; 5, SD: 3.162 in months), 10 five-year-olds (Mean: 5; 5, SD: 2.449 in months) and 10 adults were collected and analyzed. The two genders were balanced in each age group. The boundaries of the vowel in the first T3 of a T3-T3 disyllabic word were manually tagged in PRAAT (Boersma & Weenink, 2019). A custom-written script was used for F0 extraction and smoothing. The time-normalized (with 11 time points) z-scored F0 contours, pitch slopes and the percentages of pitch-turning points were further computed. As the literature suggests (Zhang & Lai, 2010 among others), a statistically significant interaction between age groups and time points indicate that at least two F0 curves have different shapes. The Hyunh-Feldt method was used to correct for sphericity violations.

Results: *Figure 1* displays the F0 contours produced by the child and adult groups. Results from a mixed ANOVA (group X time points) with repeated measures indicated that there was a statistically significant interaction between groups and time points, $F(4.595, 62.032) = 5.836$, $p = .000$. Two additional mixed ANOVAs were performed as post-hoc tests to investigate the source of differences. The results indicated that the F0 shapes between 5-year-olds and adults were different. The differences of pitch slopes and the percentages of pitch-turning points between each child group and adults were not statistically significant.

Discussion: (1) With the refinement of the methods, it was acoustically shown that the four-year-old children demonstrated adult-like quality of T3S productions. (2) The good performance of the four-year-olds and the decreased performance of the five-year-olds suggest that the acquisition of T3S might involve a U-shaped developmental curve. Future studies focusing on older age groups are required to testify when children become adult-like again. (3) The current results do not support the phonological acquisition model 'Articulatory-Map Model' proposed by McAllister Byun, Inkelas and Rose (2016).

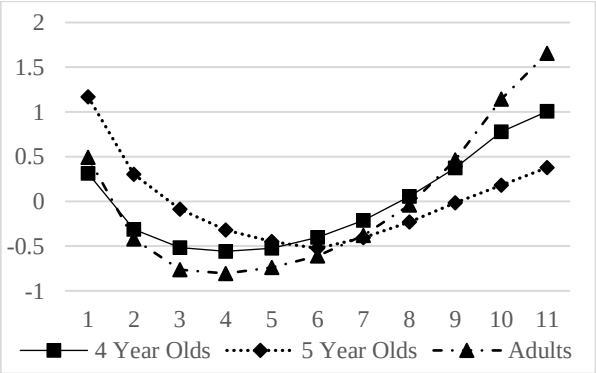


Figure 1. Time-normalized F0 contours of the three age groups (Y axis: Z-scores; X axis: Time points)

References:

Boersma, P., and **Weenink**, D. (2019). *Praat: Doing Phonetics by Computer [Computer program] (Version 6)*. Available online at: http://www.praat.org/

Li, C. N., & **Thompson**, S. A. (1977). The acquisition of tone in Mandarin-speaking children. *Journal of Child Language*, *4*(2), 185-199.

McAllister Byun, T., **Inkelas**, S., & **Rose**, Y. (2016). The A-map model: Articulatory reliability in child-specific phonology. *Language*, *92*(1), 141-178.

Xu Rattanasone, N., **Tang**, P., **Yuen**, I., **Gao**, L., & **Demuth**, K. (2018). Five-year-olds' Acoustic Realization of Mandarin Tone Sandhi and Lexical Tones in Context are Not Yet Fully Adult-like. *Frontiers in Psychology*, *9*, 817.

Zhang, J., & **Lai**, Y. (2010). Testing the role of phonetic knowledge in Mandarin tone sandhi. *Phonology*, *27*(1), 153-201.