《語言暨語言學》專刊外編之七

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鄭錦全先生七秩壽慶論文集

ON AND OFF WORK

FESTSCHRIFT IN HONOR OF PROFESSOR CHIN-CHUAN CHENG ON HIS 70TH BIRTHDAY

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編輯

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鄭錦全先生及夫人梁慕琴女士

（中央研究院・2004）

門內日與月——
鄭錦全院士的學術生涯

鍾榮富

在國科會的研究領域劃分裡，語言學是個獨立的學門。門內有日，是為「間」，鄭錦全老師獻身語言學其間，從一縷烏絲到滿頭皓髮，幾乎沒有一天停止對語言學問題的思考。門內有月是為「閒」，鄭老師即使是閒暇之時，心思也從未間斷語言學的探究。「門中日與月」主要表示鄭老師在語言學門中的日夜鑽研，也寓含鄭老師半生學術生涯的縮影。昔時，孔老夫子認為「君子無終食之間違仁，造次必於是，顛沛必於是」，而今鄭老師行語言學，也是「居間必於是，居閒必於是」。從語言學（文字學）的角度，中國古文之中，常用「閒」來表「間」，因此「間」就是「閒」，「閒」就是「間」，對於台大中文系出身的鄭老師而言，日夜浸醉在語言學之中，正好是以日常生活實踐了漢字形與義互動的體現。

鄭錦全老師 1955 年進入台灣大學中文系就讀，1959 年大學畢業，並於同年進入台大中文系碩士班，與丁邦新、鄭再發、嚴棉等受教於董同龢先生門下，奠定了深厚的聲韻、訓詁、考據之基礎。在這兩年之間，正好趙元任先生到台大做連續性的專題演講，於是這幾位研究生責無旁貸地做了逐字稿，後來出版成《語言問題》(商務，1959)，為台灣的語言學盡了「為往聖繼絕學」的任務。兩年之後，鄭老師獲碩士學位，隨後入伍服役，退伍後 (1963) 在台大的史丹福中心任中文講師。旋於次年負笈美國康乃爾大學 (Cornell University) 研讀語言學，一年之後轉至伊利諾大學香檳校區 University of Illinois at Urbana-Champaign，並於 1968 年獲語言學博士學位。鄭師在 1967-69 年受聘到哈佛大學任教，一年後轉任加州大學柏克萊校區任語言學講師。1970 後，回到伊利諾大學語言系任助理教授，並於 1985 年晉升教授。同年，也應伊大的 English as an International Language 之請，為該系之教授。由於傑出的表現，鄭老師於 1991 年榮獲伊大 Jubilee Professor of Liberal Arts and Sciences 的頭銜，這是文理學院極大的榮譽。從 1984 到 1999 鄭老師一直擔任伊大的語言中心主任 (Director of Language Learning Laboratory)，這其間由於研究經費的充裕，使很多前往伊利諾大學留學的台灣學

子有了獎學金的資助。1999 年卸任後，應香港理工大學電機資訊系之邀，到該系任訪問教授。2000 年受聘為香港理工大學語言學系主任，並於 2001 年膺選為中央研究院院士，且受聘為中央研究院的特聘研究員。2004 年 4 月份起，應聘擔任中央研究院語言學研究所所長，直到今年 (2006) 七月任滿。卸下所長職務之後，鄭老師仍然天天一早就到了研究室工作。

在鄭老師前往香港任教之前，我正好回香檳做訪問學人。有一天，鄭老師約我到伊大外語大樓（Foreign Languages Building，一般稱為 FLB）旁的 Trino 去喝咖啡。初秋午後的陽光，璀璨亮眼，把路旁的綠草都逼出了閃閃的光芒。窗內卻幽暗昏黃，播放著慵懶的爵士音樂歌手低吟的低低長長的樂音，很是悠閒。聽完我近期的生活報告之後，鄭老師突然拿起茶杯（老師不喝咖啡），悠悠地說：「每下愈況了。」我楞在那兒，不知如何接腔。「最早出道時，是在哈佛，後來單飛到加大柏克萊，然後回到伊大。明年起，要去香港任教了。」話是如此說，但是老師的表情卻不無喜悅，我想老師想要用中文親傳華人弟子的夢想，終於成真。

鄭師的博士論文《國語的共時音韻》(*A Synchronic Phonology of Mandarin Chinese*)，改寫後由 Mouton 出版社出版，並有韓文、日文、中文（繁體本及簡體字本）的翻譯本，迄今依然廣為徵引，無論在漢語學界或現代音韻理論的發展上，都有無比的影響力。鄭師早年一直教授語音學的課程，其著作如 English stresses and Chinese tones in Chinese sentences (*Phonetica* 18:77-88, 1968) 比較英語輕音節與國語三聲的本質，識見卓傑，方法新穎，為語音研究開闢了嶄新的途徑。鄭師後來加入「詞彙擴散理論」(lexical diffusion) 研發的陣容，留下了數十篇精闢的論文，如 Phonological change of Middle Chinese initials（與王士元先生合寫，見於《清華學報》9:219-270）。「詞彙擴散理論」是近代仍然廣為應用的語言學理論之中，唯一由中國學者所提倡者，以漢語的語料及傳統中國聲韻學的看法為基礎，進而推演而來的理論，在語言的進化及歷史語言的研究中，扮演舉足輕重的角色。著名的歷史語言學家 H. Hock 在其成名作 *Principles of Historical Linguistics* 中，就把「詞彙擴散理論」列為 20 世紀語言學理論中最有影響力的理論之一。

鄭老師在計算語言學上的研究與貢獻更為國際學者所共同肯定。他早在以卡打孔鑽洞的時期，即投入了漢語的中古音與現代音系的對比方面的研究。1974 年發表的 Computational linguistics on PLATO 再為計算語言學的應用開了新領域。

1985 年間他為伊利諾地區各大學所寫的圖書查詢系統，是為後來圖書查詢系統的鼻祖，更是把電腦程式應用在人文科學的先驅。電腦走入了視窗時代之後，他又把中古音與現代音系的對比重改成視窗版，方便了中古音系的研究。近年來，鄭師更利用電腦的程式，寫了漢語各方言之間的親疏關係方面的論文，如 Syllable based dialect classification and mutual intelligibility (*Chinese Languages and Linguistics*, Vol. 1: *Chinese Dialects*, 145-177. Taipei: Academia Sinica, 1992)。親疏關係的研究至少在兩方面有其不可磨滅的貢獻：(a) 開了一個全新的研究方向，使語言的研究與電腦程式結合，並使語言的研究有了量化的根據。(b) 應用文獻中的語料，從聲母、韻母、聲調、音節、構詞等層面，透過量化的研究，來印證昔日方言的劃分及歸類。再者，鄭老師也在華語文教學上極具影響，他對華語「一詞多意」的見解及教學上的應用，大大地拓展了華語教學的視野及內涵。

回台之後，鄭老師積極從事語言學的數位化研究，他所領導的研究團隊不但把《紅樓夢》等古典巨著數位化，更蒐集了閩南、客家等民歌童謠等台灣民間文學，建立了數位語料庫，上網供大家使用。其中對於未來語言學或數位典藏研究衝擊最大的還是語言地圖 (linguistic atlas) 的微觀研究。

歐陸及北美都有語言地圖的製作，尤其是 William Labov 的團隊所繪著的北美語言地圖最為學界所稱道。台灣的語言地圖研究，還在起步的階段，迄今還沒有完整的語言地圖產生。鄭老師最大的願望是透過台灣各個研究人員的合作，把過去已經做過或日後將要做的田野調查資料，重整匯合，把台灣每個村落的閩南語、客語乃至原住民語言之間的交錯分布，繪製成一份精緻細膩的語言地圖。為了這個目的，他身先士卒，首先想以閩南語的「厝」和客家話的「屋」為本，率領研究團隊到新豐鄉鳳坑村和上坑村做研究。整個研究的動機是因為新豐鄉鳳坑村和上坑村都是閩客混居的地方，而語言研究的文獻裡，有些人把新豐鄉看成客家地區，有些人則把新豐鄉看成閩南語區，更有趣的是，不同年代的地圖也可能把同一個地方，或標成「田屋」，或標成「田厝」，主因無非是閩南人會把田姓家族所居住的地區稱為「田厝」，而客家人會把田姓家族居住的地區稱為「田屋」。因此，「厝」和「屋」成為某些地區閩客方言分布的指標之一。地圖繪製者之所以會用不同的名稱稱呼同一個地方，純粹是因為他們在做調查時，問到的是閩南人或問到客家人而有了不同的結果。這個看似很小的問題，也可能會帶來很大的誤差，這就是語言地圖之所以重要的原因。

至於工作的程序，鄭老師的研究小組先調出農林航空測量所 (2002) 的航照圖，並家家戶戶去調查閩客語言分布的實際情況，而得到了非常準確的方言分區圖，這種微觀研究方法成了現在方言地圖研究的典範。

鄭老師除躬身埋首、伏案學術研究外，講學與指導學生更不遺餘力，而且指導的主題幾乎包含了語言學的各個領域，如音韻理論、歷史語言、方言的親疏關係、紅樓夢的言談分析、電腦輔助教學、漢語句法等等，無不反映了鄭老師的學養與灼見，也造就與培養了不少人才。基於此，鄭老師對聲韻學乃至於語言學的研究一直抱持樂觀的看法，他常常說：「我們是站在前人的肩膀上，是以我們要比前人看得更遠，心胸更大」。鄭老師指導學生常用循循善誘、日日濡染的方式，因此他最喜歡講的故事是：有個年輕人拜師學藝，但是師傅只是天天要求他挾豆子。每天，這個年輕人都必須把一大堆豆子挾到盤裡。幾年之後，年輕人再也忍不住，問師傅為什麼不教他武藝。師傅說「我不是天天都在教嗎？」年輕人頗不以為然。這時，但見老師傅隨手就向他甩出一把飛刀。年輕人毫不思索，用筷子一挾，把飛刀挾住。老師傅說：「這不就是功夫嗎？」鄭老師的教學，也是如此，首重啟發，然後從不斷關心之中形成對學生的壓力，讓學生自己去摸索、思索、探究、然後從不經意的言談之中，讓學子豁然開朗，使學子終身受用。

鄭老師的正字標記應該是他那一頭銀灰發亮的白髮及和藹可親的笑容。即令是陌生人或仰慕他的學生，只要和他請益，無不感染到他溫和的個性及慢條斯理的談話。有時，他會在沈思之中，忽然靈光一來，睿語與機智，齊迸而出，於是問者豁然開朗，萬端困惑於焉釋然。

在我們的心目之中，老師是永遠年輕的，指的是他的心。老師對任何事情，都不會有預設立場，對於任何新奇的東西，都懷以「好奇」(curious) 的態度，事事關心，事事觀察，很少看到他疲倦的樣子。沒想到，歲月倏忽，彈指之間，老師已然望七了。在人生的開始之際，他的朋友及學生約好編撰一冊論文集，恭祝鄭老師手中天天仍然有一大堆的工作。

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* 本文有部分內容見於「側寫鄭錦全」(《中國聲韻學會成立二十週年特刊》) 及「梅骨執著一白髮——獻給鄭錦全教授」(《語言研究與英語教學：挑戰及因應》) 的序言中。

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鄭老師永遠年輕的心。這是老師在伊利諾大學 FLB 把玩剛剛上市的錄影機。

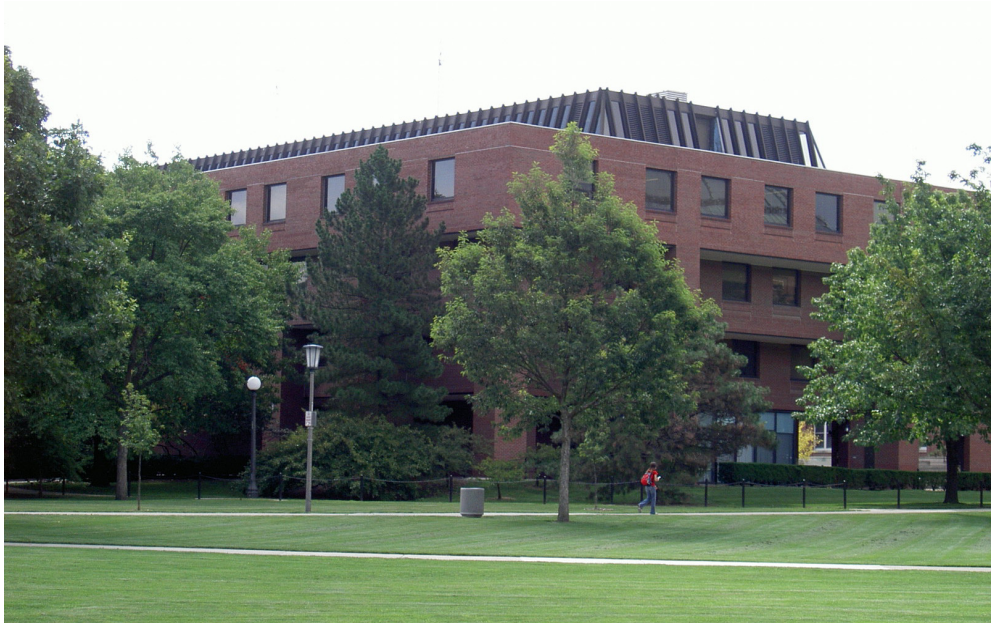
鄭老師臉上永遠帶著鼓勵的笑容（2005 年高師大）

鄭老師剪影（2005 年高師大）

2006 年鄭老師應邀至台南演講，會後參觀木雕展。

鄭老師 1997 年訪問三地門原住民文化園區

鄭老師 2006 年到彰師大演講，之後到八卦山和郭鳳蘭、黃美珍、游毓玲合照。



這是伊利諾大學有名的「外語樓」(Foreign Languages Building)。
語言學系就在四樓，鄭老師在此取得學位，在此工作。

鄭老師和師母在香港（2002 年）

1993 年鄭老師在新加坡大學參加第一次國際中國語言學學術研討會，
提問時的留影。

鄭老師在伊利諾 Urbana 的家，是留學生最溫暖的回憶。
鄭老師左手邊的是老師公子。（1988 年春節）

接任語言所所長 (2004)

鄭老師接受所長職位後，接受香檳校友的獻花。(2004)

接任中央研究院語言學研究所所長後，與在台的伊大同學合照。(2004)

《門內日與月：鄭錦全先生七秩壽慶論文集》1-8
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北京話文白異讀和方言移借*

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本文主要探討北京話文白異讀和方言移借之間的關係。關於北京話文白異讀的問題，李榮 (1982) 認爲：「文言音往往是本地的，白話音往往是從外地借來的。」最近，耿振生 (2003) 從不同的角度提出相反的看法，他的結論是：「北京話的白話音是本地固有的讀音層，讀書音是從外地借入的讀音層。」這是兩種截然不同的說法。檢討了李榮和耿振生立論的根據以後，我發現李榮是從實際的例子出發，而耿振生則是從理論或歷史的角度推論。如果理論或歷史有別的解釋的話，就可能影響推論的正確性，而且從理論或歷史的角度也要能解釋實際的例子。我認爲中古的 -k 尾字今讀 -i、-u 尾的白話音是別的方言裡不同的演變，跟北京本地固有的讀音層不一樣，在不同的時期移借到北京話裡來，人群遷徙和社會上不同語言層的混雜是主要原因，今天的北京音實在是一個方言混雜的語言，其中讀書音是本地固有的讀音層，白話音是從外地的方言移借而來，一字多音正是反映這種現象。

關鍵詞：文白異讀，方言移借，白話音，讀書音，一字多音

關於北京話[1] 文白異讀的問題，李榮 (1982) 認爲：「文言音往往是本地的，白話音往往是從外地借來的。」最近，耿振生 (2003) 從不同的角度提出相反的看法，他的結論是：「北京話的白話音是本地固有的讀音層，讀書音是從外地借入的讀音層。」這是兩種截然不同的說法，我想檢討他們的根據，並且探究一下什麼是「本地固有的讀音層」，然後再來判斷哪一種說法更接近事實。

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* 1973 年，鄭錦全發表 *A Synchronic Phonology of Mandarin Chinese* 一書，使北京話音韻的研究走上規律化的路。大學時代錦全跟我同窗，一起成長，一起奮鬥，有許多溫馨的記憶。不知不覺就到了七十之年，但心境卻還年輕。現在特別寫這一篇跟北京話有關的短文來爲老友祝壽。

[1] 現在我們說的國語是以北京話爲基礎的，在這篇文章裡對於這兩個名詞並不作嚴格的區分。

1. 兩種說法的根據

李榮 (1982:115) 總共舉了兩個例子才來證明「白話音是從外地借來的」，這兩個例子耿振生並未反駁。

一個例子是「搞」：

> 「搞」gǎo、「攪」jiǎo 這兩個字音不同，意思也不一樣，在北京音內部是兩個不同的詞，來源卻是一個，就是廣韻的「攪」字。「攪」是古見母二等開口字，今音讀 jiǎo 符合北京的音變規律，是本地固有的詞。很多南方方言，古見母二等開口字讀 g- 不讀 j-，「搞」gǎo 字大概是從長江中部一帶傳到北方的。長江中部地區「搞」讀 gǎo 上聲，符合當地的音變規律。就北京說，「搞」gǎo 字是外來的。

另一個例子是「尷尬」：

> 按古今音變的規律，北京應讀如「監介」。現在實際上讀 gān gà 不讀「監介」。那是因為這個詞是由吳語區傳到北方的。

我覺得從這兩個例子得到「白話音是從外地借來的」結論，似乎難以反駁。如果加上最近在北京流行的「打的」（坐出租車）、「買單」（結帳），[2] 明顯是從粵語區借來的，因此說有些白話的詞彙是從外地借來的，好像並沒有問題。

其次來看耿振生的根據，他的立論是從不同的角度來看文白的來源，這些角度包括：風格的差別，使用階層的差別，異讀層的地理分布，異讀字的韻類範圍，以及文獻記載。現在一一加以檢討。

耿振生指出：

> 讀書音的特點是文雅，白話音的特點是俗，只有一種讀音的字，如果讀的是白話音，總是日常生活中常用常見的詞，…如果讀的是讀書音，這類詞一般是日常生活中不會出現的，…日常使用的詞語只有白話音沒有讀書音，…這些所謂「高頻詞」百姓們經常要說，所以讀音穩定，不易受外來影響而改變。因此這類詞語所屬的讀音層應該是本地固有讀音。

[2] 粵語本來是「埋單」，到了北京話變成了「買單」。

如果以上面的四個例子「搞、尷尬、打的、買單」來說，都很通俗，至少有三個詞是很常用的，屬於百姓們經常要說的「高頻詞」。但他們都是從別的方言移借而來，並不是本地固有的讀音，所以風格的差別可能跟文白異讀的來源沒有一定的關係，並不能用風格來證明讀音的歸屬。再來看使用階層的差別，耿說：

> 「讀書音在文人中間使用較廣泛，而下層百姓則主要使用白話音。…合乎情理的說法，還是因為白話音是本地固有音，所以在下層百姓間通行。」這話的上一半當然正確，但下一半有問題。回到上面的四個例子，下層百姓可能也會使用其中的兩三個常用詞。換句話說，老百姓不一定不說外來語，北京話的白話音是不是本地固有的語音無法從階層上加以肯定。

至於異讀層的地理分布，耿振生做了一些細緻的分析。他把北京話跟共同語基礎方言中有重要地位的次方言比較，例如：

> 宕江攝入聲字，北京話的讀書音是ɤ、o、uo、ye，與果攝相同；通攝入聲字北京話的讀書音是 u、y，與遇攝相同。以上二類的讀書音都跟洛陽一帶的河南讀音一致。而北京話的白話音有宕江攝的 au、iau，和通攝的 ou、iou，韻母分別與效攝和流攝相同，這在洛陽一帶是沒有的，這一類白話音主要存在於河北、東北。…由此可知，北京話的讀書音都跟古代的強勢方言有一致性，屬於外來音；北京話的白話音跟那些強勢方言掛不上鉤，不會是外來音而是本地的固有讀音。

他的分析基本上沒有問題，但推論很難說。我只是懷疑，跟強勢方言一致的讀書音何以不會是本地音？存在於河北、東北的白話音何以不會是從這些方言移借而來的？

北京的文白異讀字大多數屬於中古 -k 尾的入聲韻，形成成套的異讀音。對於異讀字的韻類範圍，耿文作了一些分析。說明爲什麼只有收 -k 尾的字存在文白異讀，而收 -p、-t 尾的卻沒有。我覺得這跟文白異讀何者屬於外來音的關係不太大。他說：

> 北京音的白話音存在於周邊地區的弱勢方言中，如果說白話音是外來音，就只能說是從周邊這些弱勢方言引進的，…我們無法解釋引進這種讀音的動力是什麼。

那麼，引進「搞、埋單」的動力是什麼呢？我想方言之間的移借可能有許多原因，人群的遷徙，語言階層的混雜，都有可能，恐怕不能單從推理上否決引進的動力。同時，中古 -k 尾以外的入聲韻也可能有文白異讀，收 -p 尾的「法」字，有好幾個讀音，如果認爲 fa3[3]（法律）是文讀，fa2（沒法兒）是白讀；收 -t 尾的「結」字，tɕie2（結髮）是文讀，tɕie1（結巴）是白讀。雖然意義不大相同，如此認定，大概也沒有問題。

耿文提出來的最後一項根據是文獻記載。他認爲邵雍《聲音唱和圖》中宕、江、通、曾攝入聲字配陰聲的情形「完全符合北京話的韻母系統」，我覺得「配」可能代表入聲韻和陰聲韻的元音相同或音近，那時候入聲還存在，而且邵雍的方言能不能說是現代北京話的直接祖先也不敢說定，要下一個「完全符合北京話的韻母系統」的結論，可能很難說。耿文又說「邵氏圖中收 -k 尾的入聲字只出現了白話音無讀書音」，這一點也很難說，可能邵雍的方言是現在某些方言的祖語，其中收 -k 尾的入聲字演變到現在成爲收 -i、-u 尾的字，就從這些方言借入了北京的白話音。

耿文又認爲《中原音韻》只限於宕、江、通攝的入聲字有文白異讀，到了明代徐孝的《合併字學集韻》異讀字就增加了許多，「最顯著的差別就是梗攝曾攝入聲字產生了讀書音，而且是讀書音多而白話音少」。如何認定上述邵雍的《聲音唱和圖》代表白話音，而明代的《合併字學集韻》增加的字是讀書音，似乎缺乏論斷的根據。這些增加的字會不會是本地的語音呢？如果《合併字學集韻》顯示的是當時一種方言的實際情形，那麼，「讀書音多而白話音少」就可能表示讀書音是本地音，而白話音是外來音。

檢討了李榮和耿振生立論的根據以後，我發現李榮是從實際的例子出發，而耿振生則是從理論或歷史的角度推論。如果理論或歷史有別的解釋的話，就可能影響推論的正確性，而且從理論或歷史的角度也要能解釋實際的例子。

2. 如何斷定「本地固有的讀音層」

李榮提到「北京的音變規律」，耿振生屢屢說到「本地固有的讀音層」這一個概念。我想他們的意思是一樣的，都是指基本的北京音及中古音演變到今音的規律。現在我們來一一檢看中古收 -k 尾各韻的入聲字到今音的演變大勢，希望能找到「本地固有的讀音層」。我的方法是羅列入聲韻有文白兩讀的字，再看大部

[3] 本文用 1、2、3、4 表示北京話的陰平、陽平、上聲、去聲。

分只有一讀的字究竟跟哪一種讀音接近，然後加以判斷。例字並沒有完全列舉，盡可能找普通的字，相信並沒有遺漏任何音變的規律。

廣韻	漢字	白讀	文讀	同韻無文白異讀字舉例
屋三	熟	ʂou2	ʂu2	u: 塾淑 ʂu2；叔 ʂu1；福 fu2；伏 fu2；目 mu4；竹 tʂu2；畜 tʂhu4
	縮	suo1	su1	ou: 粥 tʂou1；肉 ʐou4　iou: 六 liou4
				y: 菊 tɕy2；麴 tɕhy3；蓄 ɕy4；郁 y4；育 y4（見影系）

屋韻三等的字除見影系讀 -y 韻母以外，大部分字讀 -u 韻母，跟「熟縮」兩字的文讀音一樣。廣韻裡跟「熟」同音的字「塾淑」也讀 ʂu2。這一類字裡有很常用的「叔福竹畜」等字。

「熟」字的白讀韻母 -ou 只見於「粥肉」兩字。「縮」字的白讀韻母 -uo 不見於任何其他的字。如果說屋韻三等的字在北京基本上讀 -u 韻母，相信是合於事實的，「熟縮」兩字的讀書音跟基本音一樣。而且「熟縮」兩字的白話音不同，無法說哪一種白讀是北京的基本音。如果說「縮」字的白讀韻母 -uo 是基本音的話，那就只剩下這一個字了！

廣韻	漢字	白讀	文讀	同韻無文白異讀字舉例
覺	剝	pau1	po1	u: 邈 mo4
				uo: 啄 tʂuo2；捉 tʂuo1；濁 tʂuo2；朔 ʂuo4；握 uo4
	學	ɕiau2	ɕye2	ye: 確 tɕhye4；岳 ye4（見系）
	覺	tɕiau3	tɕye2	au: 雹 pau2　u:樸璞 pu2
	角	tɕiau3	tɕye2	

「剝」字是唇音字，文讀韻母跟大部分讀 -o 或 -uo 的字一樣，這些字裡有常用的「捉握」等字。覺韻見系字的韻母讀 -ye，其中有常用的「確」字，「學覺角」都是見影系字，文讀韻母也讀 -ye，是有條件的音變。請參考上述屋韻的見影系字。

如果說讀 -uo 或 -ye 韻母的字是覺韻字在北京的基本音，應該沒有問題，這跟「剝學覺角」四字的文讀音是一致的。只有一個「雹」字韻母讀 -au，恐怕不能認爲 -au 韻母才是基本音。

廣韻	漢字	白讀	文讀	同韻無文白異讀字舉例
鐸	薄	pau2	po2	o: 博po2；泊pho4；莫膜mo4
	落	lau4	luo4	uo: 鐸tuo2；託托thuo1；諾nuo4；作tsuo4；錯tshuo4；昨tsuo2；索suo3；郭kuo1；穫xuo4；霍xuo4；廓khuo4
	鶴	hau2	hɤ4	ɤ: 各kɤ2；恪khɤ4；涸hɤ4；愕萼ɤ4；惡ɤ4（見影系）
	郝	hau3	hɤ4	

除見影系字讀 -ɤ 韻母屬於有條件的音變以外，所有的字都讀 -o 或 -uo。-ɤ 跟 -uo 兩種讀音都可說是基本音，跟「薄落鶴郝」的讀書音一樣。「薄落鶴郝」的白讀韻母 -au 完全不見於其他的字，不能說這些字的白話音代表北京的基本音。

廣韻	漢字	白讀	文讀	同韻無文白異讀字舉例
藥開	削	ɕiau1	ɕye1	ye: 爵 tɕye2；卻 tɕhye4；略 lye4；虐 nye4；噱 ɕye4
	躍	iau4	ye4	au: 杓芍 ʂau2；藥 iau4
	鵲	tɕhiau3	tɕhye4	uo: 灼 tʂuo2；若弱 ʐuo4；綽 tʂhuo4；著 tʂuo2（知章系）
	雀	tɕhiau3	tɕhye4	
	約	iau1	ye1	
	嚼	tɕiau2	tɕye2	
	腳	tɕiau3	tɕye2	

藥韻開口知章系的字，大體上讀 -uo，其他的字讀 -ye，可能這兩種讀音代表北京的基本音，跟所有兩讀字的文讀音一樣。兩讀字的白話音沒有變撮口，讀書音都讀 -ye，顯然是不同方言的演變。讀 -au、-iau 韻母的只有兩三個字，要認爲 -au、-iau 才是基本音，似乎理由太薄弱。

廣韻	漢字	白讀	文讀	同韻無文白異讀字舉例
陌	擇	tʂai2	tsɤ2	ɤ: 澤 tsɤ2；嘖 tsɤ2；格 kɤ2；客 khɤ4；赫 hɤ4；額 ɤ2
	宅	tʂai2	tʂɤ4	
	白	pai2	po2	o: 伯 po2；帛 po2；魄 pho4；陌 mo4　uo: 虢 kuo2
				ai: 拍 phai1
				i: 戟 tɕi3；屐 tɕi1；隙 ɕi4；逆 ni4（見系）
				y: 劇 tɕy4

陌韻的唇音字跟合口字韻母是 -o 或-uo，見系字是 -i。其他的字大致是 -ɤ，都有很常用的字。「白」的文讀韻母正是 -o，而「擇宅」的文讀韻母正是 -ɤ，這

兩個韻母大概是基本音。跟「擇宅白」的白讀韻母相同的只有一個「拍」字。「擇」的同音字「澤」只讀 tsɤ2，相信 -ai 的讀法不會是基本音。

「劇」跟「屐」在廣韻是同音字，「劇 tɕy4」的讀法是例外。

廣韻	漢字	白讀	文讀	同韻無文白異讀字舉例
麥開	摘	tʂai1	tʂɤ2	ɤ: 責 tsɤ2；策 tshɤ4；賾 tsɤ2；革 kɤ2；覈核 xɤ2；厄 ɤ4
	冊	tshai3	tshɤ4	
	隔	tɕie4	kɤ2	
麥合	脈	mai4	mo4	o: 檗 po4　uo: 摑幗 kuo2；獲 xuo4
	擘	pai1	po4	ai: 麥 mai4

麥韻開口字韻母都讀 -ɤ，沒有任何字讀 -ai。「隔」字有一個白話音是 tɕie4，是見系二等字顎化的問題，當然不能認爲 -ie 是基本音。麥韻唇音字及合口字韻母都讀 -o 或 -uo，只有一個「麥」字讀 -ai。可見 -ɤ 和 -uo 是基本音，-ai 大概不會是基本音。

廣韻	漢字	白讀	文讀	同韻無文白異讀字舉例
德	勒	lei1	lɤ4	ɤ: 德 tɤ2；忒 thɤ4；特 thɤ4；則 tsɤ2；刻克 khɤ4；劾 hɤ2
	得	tei3	tɤ2	ei: 北 pei3；黑 hei1；賊 tsei2
	塞	sei1	sɤ4	o: 墨 mo4；國 kuo2；或 xuo4（唇音及合口）

德韻的情形比較特別，文白兩種韻母各有相當的支持，也各有很常用的字，不容易判斷何者是基本音，不過讀 -ɤ 韻母的字多一點。

廣韻	漢字	白讀	文讀	同韻無文白異讀字舉例
職開	色	ʂai3	sɤ4	ɤ: 嗇 sɤ4；測 tshɤ4；仄 tsɤ4（莊系）
				i: 逼 pi1；匿 ni4；即 tɕi2；息 ɕi2；棘 tɕi2；極 tɕi2；弋 i4
				ʅ: 職 tʂʅ2；直 tʂʅ2；陟 tʂʅ4；食 ʂʅ2；識 ʂʅ4（知章系）

「色」是莊系生母字，同音字「嗇」讀 sɤ4，其他莊系字的韻母也都是 -ɤ，沒有任何別的字讀 -ai 韻母，我們不可能說 -ai 是本地的基本音。

以上是中古收 -k 尾的各韻入聲字文白兩讀的分析，包括了通、江、宕、梗、曾各攝的入聲韻。整體說來，除德韻以外，各攝文讀音跟其他沒有兩讀的入聲字

的讀法是一致的，尤其鐸韻職韻的白讀韻母完全不見於其他的字，直接否決了白讀韻母作爲基本音的可能，因此德韻的選擇也就很顯然了。同時，同一韻的白話音有時候有兩種韻母，如屋韻的熟 ʂou2、縮 suo1，麥韻的摘 tʂai1、隔 tɕie4，根本不大可能把哪一種白讀韻母認定爲基本音。從種種現象判斷，只能說文讀是本地的基本音，也就是「本地固有的讀音層」。

3. 結語

Stimson (1962) 早已指出，北京音裡這些中古的 -k 尾字在變成今音的過程裡，至少有三個方言層混合在一起。不過他利用當時 Swadesh 二百個基本詞彙的觀念，認爲收 -i、-u 尾的讀音是本地音，跟耿振生的說法相同。用基本詞彙的觀念來討論，本身就有問題，現在語言學界已經很少有人相信這個方法。我認爲收 -i、-u 尾的白話音是中古的 -k 尾字在別的方言裡不同的演變，跟北京本地固有的讀音層不一樣，在不同的時期移借到北京話裡來，人群遷徙和社會上不同語言層的混雜是主要原因，今天的北京音實在是一個方言混雜的語言，其中讀書音是本地固有的讀音層，白話音是從外地的方言移借而來，一字多音正是反映這種現象。[4]

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[4] 潘家懿在〈海豐話文白異讀研究〉（《山西師大學報》第十八卷第三期）裡指出：「海豐話有文白兩讀的字共約 550 個，占字表總數的 15%，其餘 85% 的字只有一種讀音，而且多數屬文讀系統。」這個現象跟北京話的情形一樣，但是我們不能說海豐的白話音是外來音。我想閩語的情形有一點不同，經過多年的融合，讀書音早已受到白話音的調整，系統很難決定。一讀音「多數屬文讀系統」這句話也不知道詳情如何，現在只能存疑。這個資料承嚴立模見告，在此致謝。

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語言演化的探索*

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自古以來，思想家們一直在努力思考著這樣的一些問題：人類語言到底來自哪裡（神造的還是人造的）？最初產生的是哪種語言（希伯來語，荷蘭語，梵語都有人建議過）？語言的變化是進步的標誌還是衰落的象徵等等。多少年來，無數人在尋找這些問題的答案，包括在哲學、神學和科學領域中一些最有才智的學者。然而，儘管他們做了很大努力，卻沒有取得什麼進展。其實，要回答語言是什麼時候產生的這個問題，關鍵之處當然在於我們願意接受把什麼作爲語言，因爲平常我們使用語言這個詞的含意是相當模糊的。認爲語言是組合的觀念是有用的，我們可以在這個觀念中，完善我們對語言演化的理解，畢竟，語言是最包羅萬象和組織得最好的智慧形式。無論如何，因爲語言確實既帶有文化的成分，同時也具有明顯的生物成分，所以把語言的演化和器官的變化進行嘗試性的對比，是很有益的。尤其是，我們可以對器官進化中的選擇和變異這兩個方面，跟語言演化的對應現象進行思考，就像我們從最近的語言歷史研究中得到的那樣。鑒於在一些語言中有語音 x 變成語音 y 的現象，自然會產生這樣的問題：這種變化到底是怎樣出現的？對這個問題有三種答案，每一種答案都有部分的正確性。要把這些答案整合爲一種一致的綜合音變理論，還需要做更多的研究。爲了方便起見，我們可以把這三種答案分別簡稱爲：(1) 新語法學派的機制；(2) 變項規則的機制；(3) 詞彙擴散的機制。語言演化的研究，儘管有內在的吸引力並且具有重要性，然而它基本上還屬於一個未劃定的領域，還有大量的研究工作等著我們去做。我們可以充分利用有關交叉學科的優勢進行探索，其中尤其是人類學、語言學、神經生物學及心理學等學科。僅僅根據我們在這裡所評述的各種間接的人體結構和基因及考古的證據，一個合理的猜想就是語言出現在約 10 萬年前，即最近現代人遷出非洲的時候。

關鍵詞：語言演化，綜合音變理論，新語法學派，變項規則，詞彙擴散

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1. 前言

1978 年我應 Bh. Krishnamurti 教授之邀，到印度 Osmania 大學作了一系列講演。一部分講稿出版於該校的學報上，後來也重印於我的論文集 *Explorations in Language*（台北金字塔出版社，1991）。這幾十年來語言演化一直是我最感興趣的問題，因爲語言是人類跟其他動物間最基本的區別，也是所有文明必有的基礎。而研究這個大問題時，我們可以跟很多其他有意思的學科交流，共享彼此的一些研究成果。

原有的英文講稿，承南開大學的石鋒教授及貝先明先生和向檸先生譯成中文。我在修改時，刪去了一些篇幅，也增加了一些較新的材料。做這工作時，又有蔡雅菁小姐的大力幫助，我向他們幾位表達由衷的謝意。

中國語言學[1] 是一門源遠流長的學問，可是這兩千多年的文獻，絕大部分是論述漢語的文字、音韻及語法，很少著眼於境內其他語言。而探索人類語言的起源與演化，除了荀子的幾句名言之外，幾乎沒有任何系統性的研究。

國外近幾十年來，研究這方面的學術論著越來越多，有不少出色的貢獻。雖然目前還不能給演化這個大問題下個全盤定論，但無疑的，我們對它已有更深入的了解，研究的態度及理論已經適時地摻入演化論的觀點。就如 T. Dobzhansky 所說：「在生物學裡，一切的道理都需要用演化論去了解。」這句話套用在語言學上也完全恰當。

國外的作品都是用外語書寫，況且又雜亂分散在諸多不同的理工或醫學學報裡，不容易讀到。希望這篇拙作，[2] 能夠起一點穿針引線的作用，讓中國語言學界擴大視野，在語言演化這個大問題上發揮些許功效，並在理論語言學的範圍裡作一些基礎貢獻。

2. 宇宙中的三個系統

變化是宇宙的一個基本特徵，這是自古以來一直被人們所論及的。古希臘哲學家 Heraclitus 用了一個非常形象的說法：人不能兩次踏進同一條河——流動的河水是隨著時間而改變的。中國經典的著作《易經》，也就是《變化之書》。宇宙

[1] 我在這裡用的「中國語言學」，是指中國人對人類語言的研究。這個詞的另一個意義，是對中國境內的語言之研究。

[2] 因爲時間的限制，除了引了手邊幾篇文章，沒能在本文中附加很多參考文獻。大部分的資料都列在我 1991 年論文集的書末目錄裡。

是一個整體，其中某一部分的變化不可避免地要影響到其他的部分。儘管如此，我們還是可以從中分辨出三個相對獨立的系統：物理系統，生物系統，跟文化系統。

三者之中，物理系統有最宏大的時間跨度。直到現代，我們才逐步確實認識到這個跨度範圍是多麼宏大。一種關於世界起源的早期判斷是 Ussher 主教在 17 世紀初作出的。如果說現今把科學當作宗教信仰是一個普遍的錯誤，那麼主教犯的是相反的錯誤，他把宗教信仰當作科學了。通過對《聖經》所敍述的一些家族系譜進行艱苦的研究，他得出一個結論：世界產生於西元前 4004 年！

對世界起源的各種判斷在 18 世紀和 19 世紀不斷增加。Kant 作出幾億年的判斷已經在向一個龐大的數字接近。現在，人們普遍認爲地球已經有近 50 億年的歷史了。認識地球久遠的歷史，對於理解各種生物和文化系統的產生當然是一個非常重要的因素。顯然，我們在這裡所推斷的關於早期語言是何種狀況以及它們如何演化爲今天的各種語言，主要取決於我們假設這個變化過程是有數千年還是有數百萬年。只有在真正遙遠的時間跨度裡，我們才能想像出造化設計的可能的演化是何等複雜。

最初出現的物理系統沒有自由的氧氣，也就沒有臭氧層的防護。因此太陽的紫外線輻射就有可能給有機化合物的合成提供必需的能量。隨著植物生命體的發展，由光合作用產生的氧氣可以提供給生命體，使它們向更複雜、更高級的形式發展，從沒有細胞核的單細胞體發展到有細胞核的單細胞體，再發展到多細胞的有機體。細胞核導致有性繁殖，這就大大增加了有機體的基因多樣性。這種多樣性是生物進化演變得以發生的一個基本要素。從較小的時間跨度範圍中，我們可以更直接地看到物理系統對生物的影響。氣候變冷又變熱，冰川消退又增長。隨著大陸板塊漂移分離或者相互碰撞，山峰突起又下降，改變了河流的走向和降雨的模式。所有這些大自然的力量，就像善變的神的念頭，改變並塑造著生物種類群體的命運。隨著新的自然環境的產生，原有的各種生物或者留下來努力解決新出現的問題，或者遷移去尋找更適宜的棲息地。這種遷移往往是不能成功的，遷徙出去的生物種群就會消亡。據估計，世上現存動物約有兩百萬種，而這只是曾經存在的物種數量中一個很小的比例。在這些倖存下來的生物中，有很多都曾數次改變牠們的棲息地。

在人類自己的歷史中，我們現在很大程度上得益於我們繼承下來的大約幾千萬年前，我們的遠古祖先還在樹上生活的時期就開始積累下來的遺產。其中特別重要的就是它們粗笨的前肢由於在樹上攀爬和騰躍而得以發展，進化成爲今天我們所擁有的靈巧的雙手和直立行走的能力。在森林古猿從樹上生活過渡到陸地生

活的最初階段，利用手來完成搬運東西和進行搏鬥這些原本是靠嘴來做的事情，這對於語言的產生和演化是一個基本的因素。人類語言之所以豐富多彩，部分地要歸功於它使用了一個特別有效的通道，即有聲言語，因此樹上生活的中間過渡階段在決定我們進化的道路上是至關重要的。

跟物理系統相比，生物系統的時間跨度範圍就小得多。但是人們還是在很大程度上低估了它，即使錯誤程度不是很大，沒有像 Ussher 主教犯的錯誤那麼大。在達爾文時代，人們通過研究化石，發現生物系統的時間要追溯到五億年前。然而，到了 20 世紀 50 年代，隨著微型化石的發現，生命起源的時間被擴展爲距今約三十五億年。爲了更好地理解如此巨大的數字，最好是把它轉換成更爲人們所熟悉的一套演算法。我們設想把三十五億年濃縮爲一年的時間，並假定生命開始於 1 月 1 日。在這假設的一年中大部分時間裡，世界上不存在任何已知的生物體。恐龍的出現是在這一年的最後一個月裡：12 月 1 日，或者說是在三億年前。最早的靈長目動物進化的時間約在耶誕節前後（六千萬年前）。人類是直到這一年的最後幾個小時才出現。

文化系統的開始已是接近於生物系統時間跨度範圍的末尾。在北京附近，人類實際使用火的時間要到 12 月 31 日的晚上 11 點（五十萬年前）。實際上，在這最後的一個小時裡產生了今天被我們認爲是文化的一切事物——洞穴壁畫，葬禮儀式，複雜工具的製造等等。一旦隨著在大腦神經環路中產生對於文化的生物能量而出現了真正的人類，世界就開始極爲迅速地並且是不斷加速地發生著變化。人類大規模的改變環境，以使環境來適應自己的身體，而不再是使身體去適應環境。

爲了理解不同的時間跨度範圍有多大差別，我們來看看相同的問題在生物上和文化上分別是怎樣解決的。就拿飛行問題爲例。在爬行動物向鳥類的進化中，需要做大量的改變：胸骨加深，骨骼變輕；鱗片要變成羽毛，前肢要變爲翅膀。在生物方面解決飛行這個問題，經歷了幾百萬年的軀體適應。形成明顯對比的是，在文化方面解決飛行問題，從達芬奇開始思考發明飛行器到渦輪噴氣式飛機出現，前後不過幾百年。只要稍加考慮就可以清楚地認識到，有可能使文化上的變化成爲現實的根本催化劑是語言的能力。近年來，兩位著名的理論生物學家，英國的 John Maynard Smith 與匈牙利的 Eors Szathmary 合寫了一本宏觀的科學著作，把地球上有生命以來的演化史作了個總結。他們這部史書裡，一共只有七種不同的主要轉變，從最早的生物細胞一直到目前的人類社會。這些轉變的關鍵機制，在於如何傳達與累積信息。他們認爲最後的轉變是人類語言的產生，我們覺得這樣對語言的評價是一點都不過分的。

3. 語言演化的本質

那麼，現在可以就這一點提出問題了：語言演化的本質是什麼？它是像鱗片變成羽毛一樣屬於生物的，還是像雙翼飛機變成噴氣式飛機一樣屬於文化的？考慮到近些年來語言學是在人文科學和社會科學的背景下發展起來的，語言的生物學背景相對地沒有引起多少注意。然而，這樣的背景對於語言研究來說，既是相關的也是重要的。

自古以來，思想家們一直在努力思考著這樣的一些問題：人類語言到底來自哪裡（神造的還是人造的）？最初產生的是哪種語言（希伯來語，荷蘭語，梵語都有人建議過）？語言的變化是進步的標誌還是衰落的象徵等等。多少年來，無數人在尋找這些問題的答案，包括在哲學、神學和科學領域中一些最有才智的學者。然而，儘管他們做了很大努力，卻沒有取得什麼進展。爲了減少時間和紙張的浪費，在一個多世紀以前，先是巴黎的語言學會，然後是倫敦的語言學會，提出了關於停止臆測語言起源問題的著名禁令。

現在看來，我們可以認識到，按照當時科學發展的狀況，確實是沒有希望在這些問題上取得任何實質性的結論的。一方面是由於對不同的物理系統和生物系統的真實年齡沒有正確的判斷，就像我們上文提到的，相關的估計都存在很大程度的偏差。另一方面是由於人們普遍都堅守物種不變的信條——每一個動物最初都是按照特定的狀態產生的，並且一直保持原狀基本不變。當時的人們還沒有關於世界上各種語言的系統性的知識。對於其他物種的交際行爲和認知能力，幾乎是一無所知。對於人類自身的種系發生史和個體發生史，也都沒有達成一致的共識。總而言之，對於這些無法檢驗的（並且有時是幻想的）而又不斷增長的猜測進行限制，這從有益於學術發展來看，不失爲聰明的舉措。

在過去的約一個世紀裡，情況發生了戲劇性的變化。Charles Lyell 的地質學著作和達爾文的進化論著作完全改變了我們關於時間、空間和生命的觀念。語言學在人類學的框架中研究探索，依循著 Joseph Greenberg 語言共同性的研究道路，現在已經能夠向我們提供世界上大多數語言結構的合理輪廓。更爲重要的是，從各種不同學科領域中獲得的成果正在合爲一體。這些進展總括起來，使我們能夠再一次提出那些由來已久的問題，並且有較大的希望把對這些問題的認識推進一步，即使我們不可能在不久的將來就會找到這些問題的最終答案。

語言的演化必須從兩個互補的方面來考慮：語言的使用者方面和語言的結構方面。一方面，早期類人猿的大腦容量不到我們大腦的一半，經歷了幾百萬年無數次的人體結構上的逐漸變化，直到有了學習當今世界上幾千種語言裡的任何一

種語言的能力。相應地，另一方面，語言本身也在發展，從身體姿勢、面部表情、與各種活動和情感相聯繫的聲音，直到人類所有語言中的各種複雜的、抽象的、精密的符號設置。

語言使用者和語言結構分離產生了一些深遠的影響。嬰兒並不是生來就在大腦之中存有任何語言，所以他就面臨必須學習語言這樣一個巨大的任務。這就意味著他要長時期依賴一個支援他的語言環境。如果一個兒童在習得語言的關鍵時期被剝奪了適當的語言環境，不管是由於偶然的事故還是患有疾病，那麼他在以後的一生中都不可能完整地掌握語言。

通過這種使用者及語言本身的分離，我們得到了一個至關重要的好處，相比之下產生的習得不便則是微不足道的。如果語言在人出生之前就被固定下來而不能改變的話，那麼就只有通過身體的適應性這種生物過程才能改變它。這樣的過程比文化上的變化要緩慢得多。比如說，由陸棲的爬行動物改變形體進化成鳥類需要非常漫長的時間，相比之下，在文化上只用了幾百年就以飛機的形式解決了飛行的問題。語言能力無疑是建立在生物基礎之上的，然而，事實上正是文化的傳播使語言在精密性和適應性上具有了巨大的潛力。

在行爲方式的演化中，語言的演化顯然是最複雜最強大的，並且也跟一般的有機體適應方式有所不同。如果飛蛾的顏色保護性不強，牠就很可能會被經過的鳥兒吃掉。如果長頸鹿的脖子不夠長，牠就吃不到樹枝高處的葉子。這裡選擇的單元是動物個體，即使優勢基因在群體中只是出現一次，牠們也能夠遺傳下去。

語言的演化和選擇要複雜得多，它至少要涉及兩個個體：發送者和接收者。如果一個原始人用一種靈巧的方式說出「水邊的洞穴裡有一隻獅子」，但是他的群體中沒有一個能聽懂他的話，那麼語言的演化就不會有進展。只有同時存在一個敢於創造的發送者和至少一個有見識的接收者，語言的演化才能前進一步。

就此看來，語言的演化和其他行爲的演化有一些共同之處。這種必須同時有幾個個體參與的選擇類型，它的成功概率比那種基於單一個體進行的選擇類型的概率當然要低一些，這裡給定的其他變數都應該具有可比性。當這種革新的選擇成功後，就會使語言的表達方式更豐富，使得這個群體的成員們在他們的活動中變得更加協調，因此，支援語言革新的基因庫也會獲得一個生存的優勢。

回答語言是什麼時候產生的這個問題，關鍵之處當然在於我們願意接受把什麼作爲語言，因爲平常我們使用語言這個詞的含意是相當模糊的。假如有一個滿頭黑髮的人，我們每次扯去他一綹頭髮。那麼人們對於到何時可稱他爲「禿頭」，也會有不同的意見。當前關於類人猿能否學會語言的爭論在很大程度上就是基於怎樣對語言進行定義。一方面有人認爲，有幾隻黑猩猩已經掌握了語言的

基礎，因爲牠們已經學會了語言的一整套特徵。持批評意見的人則提出反對，並指出牠還沒學會語言的其他一些必要特徵。

對原始人的研究還沒有面臨這個問題。當代的語言都有相當豐富的結構——即使它們在不同的系統成分上表現的複雜性各有不同。無論是書面的文獻還是語言的構擬，都不能讓我們得知六、七千年以前的情況，也不能提供足夠的時間跨度範圍讓我們推知語言長期逐步豐富發展的進程。

因此，只能做最粗略的猜想。在人體結構方面，有了一些里程碑式的建樹已經使我們能夠探索更進一步的問題。其中的第一個基本點，就是原始人從類人猿分離出來時用兩足行走的問題。最近在東非發現的化石遺跡和原始人的足跡，促使我們再次考慮兩足行走的完成時間。似乎早在大約三百五十萬年前，南方古猿在很大程度上就具有了像我們今天這樣直立行走的姿勢和步法。伴隨著這種發展，雙手就能夠承擔先前由嘴所完成的很多任務，比如搬運和搏鬥，這就使得語音的發展成爲可能。

我們也有理由相信，作爲直立姿勢產生的結果，迫使不同的身體部位作出大量的機械式反應，其中包括了喉部位置的下降。這種獨特的生理適應性變化結果對有聲語言產生了一定的影響，這一點我們將在下文論述。語言的出現可能要比兩足行走的出現晚得多。一種權威的意見認爲語言的萌芽可能在兩百萬年前。在兩足行走實現之前是根本不可能產生語言的。

第二個人體結構上的里程碑是直立姿勢所產生的部分影響，確切地說，是日益迅速地變得靈巧而熟練的雙手，對神經系統產生了影響。一百五十萬年前，原始直立人 (*Homo erectus*) 的腦容量估計在 850 立方釐米到 1100 立方釐米的範圍內。類似現代人的智人 (*Homo sapiens*)，比如出現在十萬年前的尼安德特人，就有著現代人的大腦容量，平均大約爲 1400 立方釐米，其中當然會存在很多個體的差異。

因此，大腦容量的發展要遠遠晚於兩足行走的出現，但是它是以驚人的速度進行的。我們很難知道隨著增加大約 400 立方釐米的腦容量，大腦活動的複雜性會增加到多大的程度。其中特別重要的是大腦皮層聯繫區域的擴大，通過這種擴大，不同的情感和知覺的各種形態，如聽覺、視覺、觸覺、嗅覺等等，能夠跟各種表達方式，如聲音和手勢，相互交叉地聯繫起來。資訊的交叉傳遞模式是人腦的特殊能力之一。從殘留在顱骨化石中的軟組織痕跡裡，我們可以看到大腦額葉皮層的相對尺寸稍微發生了改變。然而，這僅僅是對於在幾百萬年中，發生在原始人類大腦裡的神經系統大規模地精密化和重組進化，給出了一個最模糊的暗示。

顯然，某些新的大腦組織發展成爲大腦皮層，是與語言行爲有關的。一種對大腦進行電極刺激反應的實驗提供了這方面的證據。用電極刺激猴子的大腦皮層並不能使猴子發出聲音，只有把電極深深地插入大腦皮層下，才能引起猴子發出聲音。另一方面，對人類大腦的電極刺激，正如有必要時，可以在神經外科手術之前進行那樣，常會干擾對於說話或者稱名的情況。

這些事實暗示著，伴隨著在靈長目動物中，只有人類獨有的新的語言行爲之演進，新的腦組織也在大腦中一個完全不同的區域裡發展起來了。遺憾的是，早期原始人大腦的軟組織，對我們來說已經永遠丟失了。所以，目前看來，我們對神經學上這種至關重要的發展，似乎不可能瞭解更多進化細節。當然，這並不意味著這些新的組織以專有的方式只是對語言才起作用，我們將在下文看到這一點。

除了兩足行走和大腦容量之外，還有另外一些可能相關的人體結構證據，迄今爲止還沒有得到系統的研究，很大程度上是由於缺乏資料。但是，隨著化石被陸續發現的頻度加快，我們不久會有足夠的來自大量個體的化石遺骨，來完成這項任務，而且可能從尼安德特人開始進行研究。這裡不得不涉及所有人類群體都有的右手優勢問題。這僅僅是因爲右手是由大腦左半球控制，而語言控制也主要是在大腦左半球。左腦的專化發展，很可能是由右手優勢和語言活動雙重刺激的結果。在大腦的重組中，與功能對側式有關的神經組織專化發展，可能是很重要的一步，它促進了語言的產生。無論如何，關於右手優勢如何發展的知識，在這個問題上給了我們某種間接的啓示。

右手優勢的問題已經在不同場合引起了討論。有些學者認爲南方古猿在大約二三百萬年前，主要使用右手來擊打狒狒頭骨以獲取食物。也有學者考察了距今五十萬年的北京人洞穴中的石器，認爲這些石器是適合右手使用的。然而，儘管這些研究有著誘人的時間跨度，卻還不爲史前史學家所廣泛接受。

迄今爲止，關於右手優勢如何發展的最早的定量證據，是來自「顯微物」研究，在這種研究中，舊石器時代的打火石工具，被放大幾百倍之後再進行檢測。長期使用右手的證據，是在英國找到的約 20 萬年前的鑽孔工具。另一類有關的證據，是約 3500 年前刻有銘文的甲骨製品，這是漢字最早的例證。在過去的半個世紀裡，古文字學家已經辨認出這些甲骨文中的幾千個漢字。其中有上百個漢字含有一個代表「手」的象形偏旁，這個偏旁只是簡單地畫了一隻手，而且大多數漢字偏旁畫的是右手。

考慮到上述主要基於人體結構領域的證據，上限可以作爲語言產生的一個「必要」條件，即：在原始人身體的進化發展中具備這種條件之前，語言是不會

產生的。近年來有兩個發現與上限有關，一是在東非一個叫作 Herto 的地點，發覺出幾套大約十六萬年前的古代人化石。這些古人的人體結構，大致上跟現代人已沒有多大的差異。另一個發現是在人體中的基因組裡一個叫做 FoxP2 的基因，顯然跟語言有關，而這個基因的形成，也大約是在十六萬年以前。

相應地，下限可以作爲一個「充分」條件，即：語言在那個時候必定已經出現。關於語言的出現之下限的討論，通常認爲是在大約四五萬年前，那時隨著智人的出現，爆發了大規模的創造革新。這些創新的內容包括：新工具和武器的製造，棲居處的建造，洞穴牆壁上的畫作，遠達美洲和澳洲的遷徙。我們認爲，無論是幫助個體內部的思考還是提升群體的力量，如果沒有語言的使用，這一切創新都是不可能發生的。特別是，這些事實告訴我們，由於這些長途跋涉的群體顯然一路上都要使用語言，所以語言必定在這些長途遠遷之前就已經出現。如果那個時候還沒有出現語言，我們就需要假定，語言是後來在幾個不同的地點獨立產生的——這是多源發生的，而不是單源發生的。

曾經有人贊同單源發生說，認爲所有的人類語言肯定是從一個單一的祖先衍生出來的，因爲它們有太多的共同點，即所謂的語言共性。儘管這種觀點有一定的說服力，但它顯然還不是確定無疑的。人類語言中相似的結構也可以有另外的兩種解釋。一種解釋是，這些相似性很可能是由於，人類各個種族都有著基本上相同的神經生理機制，對外部世界進行轉譯和編碼。而且，各種語言所據以編碼表達的物件，在本質上是同一個外部世界。

另一種解釋和語言的接觸有關。現在經過廣泛的考察發現，當不同的語言社團相互交往的時候，不同的語言也在來回往復地傳遞它們的特徵。儘管某些特徵的傳遞比其他的特徵更爲容易，並且在傳遞過程中有不同層級的制約，可是人們普遍相信，如果給定一段時間，比如說幾千年，那麼所有特徵都可以在任何兩種語言之間傳遞。數千年來，人類各種規模的群體、部落和社區之間相互融合，必然會在語言中產生大量的共同特徵。因此，儘管有些實驗性的證據，傾向於把語言的出現追溯到下限的時間，我們也還不能斷定語言是單源發生還是多源發生，更不能斷定語言出現的地理中心或者源頭。

4. 跟語言演化相關的動物研究

從語言演化的觀點出發，有幾個研究動物的領域具有特別的意義。對鯨魚的歌聲進行的研究，跟語言演化密切相關，因爲這些哺乳動物的大腦容量很大，牠們表現出來的智商，明顯地達到較高的等級。此外，跟人類一樣，鯨魚是社會型

的、並能發出聲音的動物。有些種類的鯨魚歌聲具有複雜的聲學特徵，可以不重複地持續 30 分鐘。這些歌聲可以向四周傳播到幾百英哩的範圍，因此，每頭鯨魚都可以跟散佈在廣大的三度空間裡面的若干其他鯨魚同時進行交流。只是由於人們最近才開始對鯨魚的歌聲做系統的研究，至今對它的內容還瞭解得很少。

對靈長目動物之間的交際進行觀察，有兩種不同的方法：一種方法是觀察牠們之間自發的交流活動；另一種方法是教會牠們用人類設計的交際系統。在野外和實驗室條件下進行的觀察都表明：靈長目動物有大量的交際活動，而具體的交際程度，則隨著特定種類以及同一種類中不同群體的社會性不同，而有所差別。

靈長目動物有很多交際活動，是通過肢體語言或面部表情這些非語言的方式來進行。黑猩猩是跟人類最相近的動物，現在由於人類跟黑猩猩的基因串都已全部分析出來，我們得以知道牠們跟我們大約是在六百萬年前分開的，見 *Nature*（2006 年 6 月 29 日）。牠們語音種類的數目很小，能發出的叫聲還不到幾十種。而且這些叫聲，不能像人類的話語一樣分解成更小的語音片段。儘管有些聲音的區別，顯示出共振峰頻率的不同，但是比起人類元音，這種以共振峰頻率區別聲音的方式要粗糙許多。毋庸置疑，靈長目動物發出的聲音跟人類的語音之間，存在著巨大的進化差距。

另一種研究靈長目動物的方法，是教給類人猿某種由人類設計的交際方式。考慮到這些類人猿自身還沒有創造語言，牠們對現成的語言是否有進行學習和使用的能力呢？二十世紀初的前幾十年裡，人們開始嘗試教黑猩猩說話，卻遭到明顯失敗。這表明大型類人猿中（如黑猩猩，大猩猩和紅毛猩猩），沒有哪一種具有學習有聲語言的能力。我們還不清楚造成牠們學習困難的原因，是由於大腦不夠發達，還是嘴巴不夠靈巧。

多年以來，人們難以斷定，猿類不能學習語言的現象，有多少是由於語言符號本身的特性，又有多少可以歸因於跟人類語言相關的專門的發聲——聽覺通道。20 世紀 60 年代末，美國心理學家 Gardners 夫婦成功地教會黑猩猩 Washoe 大量的美式手語動作時，我們開始在這個問題上取得突破。

在 Washoe 之後，又出現了一系列有名的猩猩，牠們在各種環境裡，接受幾種完全不同的訓練方法來學習語言。長期以來，人們對類人猿是否已經掌握語言有爭議，部分原因是來自「語言」這一術語本身的模糊性。毫無疑問的是，訓練較成功的猿猴已經學會了一些詞：這些詞可以用不同的符號來表示，這些符號包括身體的姿勢、木板上彩色的卡片、電腦終端的鍵盤等等。

有幾隻猩猩已經掌握了 100 多個詞彙符號。據說舊金山的大猩猩 KoKo 已經掌握了 400 多個！另外還有一些記錄的情況：有一隻猩猩可以主動對一個符號，

從一個已學過的意義中引出一系列沒學過的相關語義來。利用開門的動作給黑猩猩 Washoe 示意了「打開」的符號之後，牠可以成功地把這個符號推廣使用於抽屜、行李袋、罐子以及電燈的開關上（儘管英語中開關電燈所用的動詞，與打開其他物品所用的動詞不是同一個，可是很多其他語言是可以那麼用的。這表明這隻黑猩猩能獨立掌握所有這些動作中，所包含的認知相同性）。

還有一些著名的例子，就是把不同的符號標記用新的方式組合起來，指示還不知名稱的對象。如 Washoe 用「水—鳥」來指稱鴨子，用「硬—糖」來指稱堅果等等。這種語義概括和新的組合的意義在於：它們第一次指明語言符號是以一種創造性的能產方式被使用。這種創造性行爲，以及在野外和實驗室對猿類進行的其他觀察結果表明，猿類有很強的認知能力，使牠們有可能獲得比目前所表現出來的更爲複雜的語言學習能力。

從某種意義上說，目前對猿猴是否具有掌握語言的能力的爭論，就如同在「盒子是半空的」、「盒子是半滿的」這兩種說法中作出選擇。這種差別在涵義上的不同，大於它們在名稱上的不同。看起來，猿類這種萌芽狀態的語言能力，跟幾百萬年前早期原始人處於萌芽期的語言能力是一樣的。然而，在對 Washoe 進行第一次報導後的幾十年裡，我們還是沒有取得令人信服的證據，來證明猿類能夠學會那些 5 歲或者 6 歲兒童不費力氣就能掌握的複雜句法。

從對猿類的研究中，我們終於對在進化道路上距今至少一千萬年前發生的人猿分化情況，有了一些瞭解。顯然，猿類並不具有人類在進化過程中發展得到的一種最基本能力——對有聲語言的學習能力。於是我們必須跨越動物的不同譜系達到相當的距離，去找到那些具有類似能力的物種。

5. 湧現論和連續論

我們可以預想到，一個如語言演化這樣巨大而困難的問題，人們對它的一些基本論點一定眾說紛紜。在這裡，我們將考察兩個論題：一個是語言的湧現論，一個是語言的組合論。

湧現論的觀點用一種極端的形式來闡述，以爲語言是相當突然地出現的。由於人類的語言行爲跟動物交際的所有其他形式之間的分離，好像是一種不可逾越的鴻溝，因此，研究動物的其他交際形式，並不能幫助我們理解人類語言是如何出現的這個問題。這種關於語言湧現的觀念，使人聯想起羅馬神話中，聰明絕倫的智慧女神密涅瓦，全副武裝地從主神朱庇特頭中跳出的故事。爲了論述的方便，我們不妨把語言湧現的觀點稱爲密涅瓦理論。

另一方面，連續論的觀點認爲，認真思考我們跟其他靈長目動物的同源關係，和鳥類發音學習的模仿式發展，以及鯨魚的歌聲，可以用圖表的形式在語言的進化序列中，把這些不同的進展表示出來。語言不是以完美的形式突然跳出來的，而是由在不同時間產生的語義、音系、詞法和句法各自按照不同的順序，以組合的方式逐漸發展出來。於是，相應地，我們把這後一種理論稱爲組合理論。

對於密涅瓦理論的支持者來說，可能更容易把大規模變化的產物看成是自動出現的。人類的語言能力被稱爲一種「器官」，並且可以跟人的心臟、眼睛、生殖器官相提並論。爲了再一次有力地表達這種觀點，這種器官包含著被認爲是具有全部語言功能，並且是僅對語言有用的功能的神經組織。

跟密涅瓦理論不同的看法是：人類的語言，被看成是人類各種更爲基礎性的能力之間的一種「介面」。這些基本能力也包括了非語言的處理程式，並涉及到在頻率和時間域中的模式感知，在不同記憶層面上對事物的編碼和儲存，以及對各種不同層級的心理結構的運作控制。

在其他動物裡，這些能力很多都有不同程度的表現，如黑猩猩製造工具和解決問題的例證。人類進化的過程中，其中多數的能力可能比語言能力出現得更早。這些能力一項一項地逐漸增強，用於促進語言的精密化，就像在一件鑲嵌作品中添加一個個元件。這個觀念基本的想法是「結構早於功能」，這些加強的能力，也同樣促進了人類掌握的其他幾種複雜能力，最值得注意的如數學能力和音樂能力。這兩種能力如同語言能力，也是所有人類都有的。

在討論人類智力的演化時，我們可以假設，智力是用各種次程式作爲組成成分，以層級方式被組織起來的。按照順序，這些次程式又是由「解決人類生存中，諸如獵物的偵察這種處理具體問題的各種具體程式」所組織起來的。這些次程式「可以是一些簡單的程式或環路，或者是一連串的次程式和環路，並且可能含有各種可塑的和預存的元素。」認爲語言是組合的觀念是有用的，我們可以在這個觀念中，完善我們對語言演化的理解，畢竟，語言是最包羅萬象和組織得最好的智慧形式。這個觀念就如上文所提 T. Dobzhansky 的名言，是把語言演化的問題放在演化論的輪廓裡研究，目前已經逐步獲得良好成果。

6. 人體對語言的適應變化

有關語言演化問題的大量工作內容，是探尋人體內專門針對語言的適應變化或運作機制。這些工作基本上分爲三類：喉部的下降是對語言發音的一種適應變化；神經構造上的不對稱性是語言特有的神經組織的標誌；感知不對稱性是語言

特有的處理機制的標誌。

多年來，人們已從比較解剖學研究中得知，人類的喉部位置明顯低於其他靈長目動物。喉部的下降，使我們有了一個從唇到喉之間的彎曲聲道，而其他靈長目動物的聲道相比之下要直一些。此外，由於喉部從軟齶降低，當舌身在口腔中向前向上移動時，在咽部就產生了一個較大的空腔。在正常的說話發音過程中，通過改變口腔和咽腔的形狀和大小，就會得到種類豐富的共振頻率。我們把這種口腔與咽腔相通的聲學構造稱爲「雙管系統」。

最近，認爲喉部下降是對有聲語言的特殊生理適應變化的這種假設，得到進一步發展。有些學者爲了支持這一假設，通過對遠古的化石骸骨進行復原，他們認爲在智人之前的遠古人類，尤其是尼安德特人，由於喉部位置太高，還不能發出足夠數目的聲音。他們進一步提出，在喉位下降以前，語言是不會出現的，因爲這時人類能發出的語音太少。

這種喉位下降的假設還沒有被人們廣泛地接受，有幾個原因：這裡一個相關的調查結果表明，世界上各種語言中使用的語音數量差別非常大，波利尼西亞語只有十多個語音，而高加索語有六十到七十個語音。考慮到這種 1 比 6 的差異，我們無法確定「足夠」的語音數量到底是多少。一般來說，人類語言很少把所有的語音資源都拿來利用。

第二個保留的原因，是跟喉部復原這項任務的巨大難度和不確定性有關。人類的喉部是藉由韌帶、軟組織和肌肉懸在人顱骨的骨質結構上構成的。而這些韌帶、軟組織和肌肉，經過幾千年的時間早已不復存在。因此，很明顯地，即使我們的喉部位置跟現代猿類相比要相對低一些，我們也很難在這些古人類化石上認定喉部的準確位置。我們可以根據這些殘留的化石骨骼結構作出某種推測，但是這些推論，應該跟我們這裡考慮到的其他更爲實質性的因素相符合。

第三個保留的意見，來自於對有著聲道病理構造的患者的話語進行研究的結果。根據一位體質人類學家的見解，「顱骨和下頜骨跟尼安德特人具有相同特徵的現代人……由於具有這些骨骼特徵的現代人確實能說出正常的話語……」這項研究並不支持喉位下降導致語言產生的假說。

顯然，由於在神經指令的控制平面上可能有大量的補償動作，因此這個外部機制的準確量度並不是很重要。這些研究結果，沒有否定由於喉位下降促成語言的湧現這一理論。然而，它們確實證明了，喉位的下降並不是語言湧現的必然條件。任何人可以毫不費力地自己證實這一點，只要在說話的同時，在牙齒中間放上一支鉛筆，使下齶保持一個固定的位置，這並不難做到。發音中的這類補償動作是非常清晰的，而那些專業的口技表演者對它的掌握運用更爲熟練。

目前，在我看來，一個更好的觀點是認爲喉部的下降，主要是隨著人體直立行走姿勢而出現的生理機制反應。直接來自骨骼結構的化石遺跡表明，至少在三百五十萬年以前，人類已經可以完全直立行走了。於是，很可能喉部下降的實現，要比能夠操控發音動作的神經系統的發展早得多。如果這種猜測正確，那麼我們就有了另一個結構早於功能的例證，這種情況在進化過程中是很常見的。

另一個研究語言特有機制的方向，是對大量的神經解剖學資料進行的研究。20 世紀中，人們發現人的左腦中，被認爲對語言有特別重要作用的區域，比右腦的相應區域明顯要大得多。這個發現提出後不久，又有報導說：神經構造上兩個半腦區域不對稱的現象，甚至也出現在新生嬰兒的大腦中。

考慮到這些研究結果，人們試圖把這種大腦半球不對稱現象，解釋爲「言語器官」中存在一部分特殊的神經環路的標誌。但是，這樣的說法很難解釋在隨後進行的研究中，發現猿類也具有相似的大腦半球不對稱現象的事實，儘管猿類大腦半球不對稱的程度不如人類那麼顯著。因此無論猿類跟我們共同擁有多少來自神經構造不對稱性提供的功能，它們都不能是只爲語言所獨有的。

諸如此類的研究結果，很容易被主張語言是以組合形式出現的組合論者所採納。人類和靈長目共有很多相同的基本認知能力，儘管這些能力還沒有被別的動物結合起來用於語言的發明。最近在 *Nature Neuroscience*（2006 年 8 月）已經有人發表，在猴子的大腦裡找到了與 Broca 區跟 Wernicke 區相對的神經系統。而這兩個區正是跟我們運用語言有關的重要部分。

二十多年來，研究者充分利用了人類的雙耳，去探索大腦半球對於語言的專化作用問題。在很多實驗室中都發現，當對立的音節同時通過耳機傳遞給雙耳時，右耳在報告的正確度上比左耳略勝一籌。這被解釋爲左腦在處理語言方面具有優勢的例證，因爲人們相信，右耳的神經通路跟左半腦聯繫的有效度，高於它跟右半腦的聯繫。

然而另一種觀點卻認爲，語音具有很多聲學性質，大腦的側化方式可能依賴於其中的某些特定性質。要注意到在這種觀念中，將不再區分語音（語言）中的聲音和非語音的聲音，而是僅僅依據聲音的普遍物理特徵作出解釋。聲音的一個普遍特徵是時間性，另一個普遍特徵是頻率特徵或者頻譜特徵。

除了大腦側化優勢的研究之外，還有一些重要的文章報導了對範疇感知和選擇性適應的研究。這個有趣的結論是：在一個包含著語音的多度聲學空間裡，可能存在一些感知的邊界，在這些邊界附近，我們的辨別能力非常敏銳。由於這些感知邊界符合各種語音範疇，即使嬰兒也會有這些邊界感知的現象。於是這些現象，可能歸因於人類有一種專門控制語言的神經環路。

然而，最近的實驗顯示，獼猴和絨鼠也存在類似的範疇感知，這表明，範疇感知很可能是哺乳動物聽覺系統中的一個普遍特點，而不是專門針對語音本身的感知。因此，這裡的研究進展，跟前文講到的神經構造的不對稱性研究非常相似。研究對象是從成人開始，進而是不會說話的嬰兒，最後是研究沒有語言的動物。

雖然有很多文章探討這些問題，可是至今還沒有確鑿的證據表明，人體的任何一個部分是專門只爲語言或言語而設的。儘管我們在這裡並沒有對因器官異常，而導致語言紊亂的那些大量資料進行評述，但是在那些資料中，我們找不到跟上述結論相矛盾的證據。對這種專門化的尋求，是使我們加深理解語言生物學的建設性的研究策略。它爲實驗研究提供了焦點問題，從而使很多觀點進入到更爲確切的研究階段。然而，如果我們把語言的演化看作是組合的方式，當一個整合了很多已有能力的「介面」出現時，我們將不會發現內部裝有語言的任何獨立器官。隨著這個領域的進展，我們會認識到，組合理論比密涅瓦理論更符合這些實驗結果。

7. 手勢、韻律、音段系統

人們經常會有這樣的認識：語言演化中關鍵的一步，是語音取代了原始的手勢，即由一種模式轉換爲另一種模式。這種理論用這樣的形式表述出來，顯然是過於簡單了。每個地方的人在講話時，都使用了各具特色的手勢和面部表情。相反，猿類則是在使用手勢和動作之外，還發出許多不同類型的聲音。所有的高等靈長目動物，都保留著這兩種交際模式的功能，更確切地說，變化只在於二者之間的相對效用不同。

更爲關鍵的一步，是從一個基本的韻律系統向一個完整的音段系統過渡，即：元音和輔音的出現。儘管其他靈長目動物在發聲中個別利用了共振，其中重要的參量是音高、響度和時長的韻律特徵。這些韻律特徵適於長距離的廣泛傳遞。毫無疑問，喉部的下降擴展了人類發音的聲學範圍，尤其是在音高方面。通過觀察唱歌時喉頭的運動狀況，就很容易證實這一點。但是這些韻律特徵存在一個最大的缺陷，那就是它們傳遞的資訊率非常低。

韻律特徵表現爲不同的語調模式和各種超音段系統，它不同程度地保留在所有語言中。但是人類語言最大的表現力，來自於元音和輔音交替的鏈條。元音除了具有各種音質以外，還負載有效的聲學強度，而輔音負載的強度較小。另一方面，輔音因爲有不同的發音方法，而大大豐富了語音符號單位的數量。這樣就有

可能在保持聲學區別性的情況下，建立越來越龐大的詞彙表。

因此，這兩類語音以一種重要的方式互相支援：在需要跨越峽谷大聲呼喊的時候，元音提供聲學動力；輔音則提供大量的區別特性，以獲取更高的信息量。這兩類語音之間的快速交替，提供了語言中的一種節律模式，對於說話人和聽話人都非常有利。由於發輔音時要把嘴巴閉上，而發元音要把嘴巴張開，這種一開一闔的循環，使得說話人在說話過程中，可以利用一種鐘擺式運動的優點。而這樣循環的過程，恰是建立在我們咀嚼食物的開闔動作上。

對於聽話人而言，這種節律模式的優點，在於它可以使具有一定聽覺方式的時間框架重複出現。此外，相鄰的元音和輔音相互影響（協同發音），有時候會產生一種輔助聲學信息，來幫助識別不同的音段。考慮節律的這些優點，難怪兒童最早掌握的就是輔音–元音的音節類型，並且這種現象毫無例外地發生在世界上所有的語言中。嘴巴每秒能發出十幾個音段，這個速度對於我們極爲敏銳的聽覺系統來說，並不算快，可是，我們卻很難想像用身勢表達的其他交際方式，能以同樣有效的方式運作。

這些音段式的語音，在早期人類發音中作爲偶發的伴隨噪音，可能已經出現了無數次。當這些噪音能成系統地結合到人類發音中，用來擴充交際符號總量時，語言的演化取得了突破性的進展。隨著從粗糙的韻律特徵向成音段發音系統的過渡，語言的演化和精細程度，一定是以比先前更快的速度進展。從現實的情形來看，元音和輔音交替鏈的出現，引領著語言演化進入了一個新時代。

8. 語言演化的湧現和穩定

在語言演化進程中區分湧現和穩定這兩個階段是很有用處的。在原始人類發展的最初階段，人口稀少，因此可以推測每個群體的規模也相應很小。如果用現代過著狩獵和採集生活的部落，作爲原始人類的某種徵象，那時可能存在一個有等級制的社會結構，若干家庭組成幾十個成員一起外出的群體，若干群體鬆散地聯繫在一起，成爲有數百個成員的部落。只要原始人類的總數不多，即使棲居處所越來越複雜，而且棲居時間越來越久，部落之間的交往也可能並不頻繁，同時部落之間的互動就更少了。

基於這種假設，我們可以想到：由於每一個語言社群都會各自改進自己尚不完全的語言系統，而不是跟其他的語言社群相互參照，因此人類最早期的語言社群之間的差異是相當大的。但是，隨著原始人類的總數不斷增長，不同社群之間的接觸也相應增多，結果就產生更爲緊密的文化擴散模式，共同分享包括語言在

內的各種發明創造。同時，隨著種群規模的擴大，同一群體內的社會複雜性日益增長，包括更細緻的勞動分工以及食物和居所的分配，親屬關係和婚姻關係的複雜化。於是，這些語言社群內部的發展，同樣也增強了對於語言表達能力的要求。

近年來，關於語言接觸的研究已經表明，語言接觸造成的典型結果，是語法的簡化。這就是說，如果一種具有性別區分的語言跟一種沒有性別區分的語言相互接觸，二者很有可能混合成爲一種沒有性別區分的克里奧爾語。當然這是在語言穩定階段中觀察到的現象。

然而，如果我們設想的情景正確，在語言突變階段，事情可能有不同的變化。在學會製造工具的新方法或準備新食物的同時，人們會採用一些來自其他部落的語言上的新說法，作爲全部文化發展進程的一部分。這種擴散就如同歷史上不同時期採用不同書寫系統的情形，比如說，一千多年前日語中首次採用漢字的情況。那麼，從原始人類初步的交際系統演化成爲今天的語言，其中一個最基本的發展就是複雜化。

目前我們無法知道，在語言演化進程中的產生階段和現在的穩定階段之間的過渡期是在什麼時間。在過去的兩個世紀裡，語言學家創造了歷史構擬的方法。但是一般認爲，這些方法無法使我們回溯到六、七千年之前。造成這種侷限的最主要原因是：語言的傳遞既是垂直式的，同時也是水平式的。因此，我們選取的語言資料越是遠離當代，就越難排除這些因素的相互影響。

文字的歷史也只能追溯到幾千年前。這個問題最近在 *Science*（2001 年 6 月 29 日）又有了一個簡短的總結。最早記載的文字，比當代的文字更爲簡單或更具表意性。但是，這種早期文字的特徵，很可能是來自於把文字印在陶器上或刻在獸骨上所遇到的巨大困難，而不是那時的語言和現在的語言之間基本差異的反映。因此，人類的語言可能在五、六千年前最早的文字出現之前的相當一段時期，就達到了穩定階段。

現在我們所能確定的是：文字出現以來的幾千年間，並沒有對語言的演化進程產生重大的影響。考慮到從始以來到晚近時期，文字的使用一直侷限在極少數具有特殊的宗教或社會政治身分的人群之中，我們對此就不會感到奇怪了。識字在全世界變得更普遍，只是最近一百多年的事情。隨著識字普及的進展，文字更有可能將會對口語的演化進程，產生越來越大的影響。

在語言的穩定階段，語言的演化似乎跟生物的進化有某些相同的特徵。一個多世紀以前，達爾文早已注意到其中的一些現象，並在他 1871 年的著作《人類的遺傳》中對此進行了評論。在較早的語言學著作裡面，曾經過多地把語言說成

是一種有機體，比如「語言家族」和「姐妹語言」這樣的用法，在解釋中，也曾過於刻板地借用生物學上的遺傳樹狀圖，來說明歷史語言學。

排除某些基因特徵需要通過消化道獲得的例外，每個物種的遺傳進化，都是嚴格地以代代相傳的垂直方式傳遞。另一方面，在語言的進化過程中，每一個層面上的垂直傳遞都伴隨著水平傳遞。兒童不僅從他們的父母那裡，而且還從他的老師和同伴那裡習得語言。每一種語言，都經常處於跟其他語言在各種語言特徵的施與受之間互動，這種過程主要是通過雙語者進行。

無論如何，因爲語言確實既帶有文化的成分，同時也具有明顯的生物成分，所以把語言的演化和器官的變化進行嘗試性的對比，是很有益的。尤其是，我們可以對器官進化中的選擇和變異這兩個方面，跟語言演化的對應現象進行思考，就像我們從最近的語言歷史研究中得到的那樣。

爲了使語言對於說話人和聽話人更爲有效，選擇的力量顯然一直都在各種語言的語音系統的形成過程中發揮作用。關於說話人的一個很好的示例是：音段的選擇方式，是趨向於選取相互之間具有最大的聽感距離。我們的發聲機制能夠發出幾類主要的輔音，例如：塞音、擦音、塞擦音、鼻音、流音和滑音。一般來說，比起辨認同一類別內部的輔音，聽話人更容易辨認不同類別的輔音。代表聽話人這一方的選擇力作用於語音系統的事實有：幾乎所有的語言，在每個主要類別裡都採用很少的語音。因此可以這樣講，所有的語言都以一個標準的輔音「選單」爲基礎，建立起自己的複雜性。

元音音段的清單可以做同樣的考慮。世界上各種語言中最主要的三個元音是 /i/、/u/ 和 /a/。它們是元音的標準「選單」。通過測算共振峰的頻率，很容易判斷出這三個元音間在聲學上具有最大的差別。特別是，在我們所能發出的全部元音中，/i/ 的第二共振峰 F2 最高，/u/ 的第二共振峰 F2 最低，而 /a/ 的第一共振峰 F1 最高。有些學者認爲這些元音在知覺上具有特殊的重要性，因爲這三個元音，爲我們對其他元音的調整和校準建立了邊界條件。

我們同樣也可以考察說話人的選擇力所發揮的作用。爲防止外部因素侵擾，比如說，在跟其他語言接觸時，語音會傾向於對音變涉及的單念形式或者連讀狀態的發音，採用最省力的方式進行。如果我們完全忽略發音的方便省力，那麼任何一個語音，原則上都能夠變成其他的任意一個語音；但是事實並非如此。相反，語音區別性變化的數量非常少，並且幾乎所有的語音變化都是單向的，即：如果 x 變成 y 是常見的變化，那麼絕對不可能發生 y 變成 x 的語音變化。

事實上，由於這些常見的語音變化不時出現在各種語言裡，語言學著作中給它們冠以各種具體的名稱，如：齶化、濁化、鼻化、捲舌化、擦音化等等，每一

種變化都分別跟特定的適當的語言環境相聯繫。由於語言中總是帶有社會文化、人口統計學以及其他的超語言因素，造成難以想像的複雜情況，因此，我們可能無法預測一個特定的語音是否將會變化，以及將在何時變化。但是，如果有關語音 x 的變化已經發生，那麼我們通常可以合理地推測 x 是從哪一個先前的語音演化而來，並且 x 以後將會變爲哪一個語音。

這裡有很多經過仔細證明的音變的例子。舉一個人們熟知的例子：拉丁語中「水」這個詞讀爲 /akua/，其中包含一個清塞音 /k/。然而，位於兩邊濁元音之間的 /k/ 的發音需要暫時限制濁音。而使這個詞的發音更爲容易的方式，是在整個發音過程中一直保持濁音狀態。這樣的發音導致 /k/ 變成 /g/，讀爲 /agua/，實際上這種變化是在羅曼語中出現的。

像 /g/ 這樣的塞音，需要最大限度地緊閉聲道，來完全阻止外出的氣流，但是這個語音鄰接的元音發音，是最大限度地打開聲道。於是下一個更爲省力的發音動作是把一個塞音發成擦音 /ɤ/（擦化），降低阻塞的程度，這樣舌頭的動作幅度就不用那麼大了。這種從 k 到 g 再到 ɤ 的兩個階段的語音發展，在西班牙語的大部分方言中都可以找到。法語中的這種音變發展已經到達終點：輔音已經全部脫落，輔音兩側的元音融合爲一個音段，如法語單詞「水」讀爲 /o/。最早的 /k/ 就是這樣首先丟掉了清音特徵變爲濁輔音，然後失去塞音特徵變爲擦音，最後是輔音完全脫落。

如果我們從上述例子推展到所有的語音變化，那麼我們將得到一個荒謬的結論：鑒於所有說話人都有相同的發音機制，所有的語言都趨向於最省力的發音，因此，所有的語言最終會變爲具有相同的語音系統。有若干理由證明這種情況將不會發生。

一個理由是：生物學上的力量，在語言演化的圖畫中僅僅是一部分因素。許多社會文化因素同樣決定著語言演化的方向和速度。人們在不同的發音、語調、詞和短語中做出的很多選擇，不是由於它們語言學上的效能，而是出於它們的社會聯繫功能。另一個理由是：語言是由許多系統組成的一個整體，如語音、語素、句法、詞彙，並且各種不同的系統有著不同的需求。縮短單詞的平均長度，就會導致過多增加必需的語音的負擔。簡化動詞和名詞的形態變化系統，則會導致句法上的歧義。每一種語言都是在不斷受到各種社會因素和系統內部因素的多重壓力下進行演化，並不是只沿著一條道路前進。

還有一個理由是：除了少數偏僻的地區，世界上說不同語言的人們彼此經常接觸，導致語言自身發生變化。英語就是這種語言特徵混合的一個顯著例子。儘管傳統上英語歸屬於日爾曼語族，但是它的詞彙中有很大一部分來自羅曼語族，

尤其是在一千年以前，英格蘭被說羅曼語的人佔領的時期，更是如此。這種異質性是各種語言普遍的典型特徵。英語中的事實再一次表明，語言變化不是沿著單一的路線平穩進行。

9. 語音變化如何進行？

鑒於在一些語言中有語音 x 變成語音 y 的現象，自然會產生這樣的問題：這種變化到底是怎樣出現的？對這個問題有三種答案，每一種答案都有部分的正確性。要把這些答案整合爲一種一致的綜合音變理論，還需要做更多的研究。爲了方便起見，我們可以把這三種答案分別簡稱爲：(1) 新語法學派的機制；(2) 變項規則的機制；(3) 詞彙擴散的機制。

直到近些年前，所有歷史語言研究的主題，還是考察語音 x 如何以新語法學派假設的方式變成語音 y，這大約是 120 年前由一群歐洲學者提出的。假定這種語言中有一百個詞含有語音 x，新語法學派的假設是，所有這一百個詞中的 x，完全是嚴格按照同一個時間表進行變化。也就是說，這一百個詞範圍內的這個音，是整體地以相當一致的方式發生變化。這個假設的重要結果就是，這種歷史變化的規則性得以保證。

顯然，如果大量的詞語像這樣全面地改變發音，那麼必定會引起說這種語言的人、和研究這種語言的語言學家的注意。可是目前還沒有見到有關這類情況的可靠的觀察或報導。爲了解決這個難題，新語法學派在詞彙的一致變化後面、又附加了一條推論：即語音是漸變的。這種推論認爲 100 個詞的 x 變成 y，是以極小的程度逐漸積累的方式實現。事實上，由於這種音變積累的程度太小，很難通過兩、三代人的時間視窗觀察到這種語音差別。

在這裡我們可以看到，新語法學派提出的語音漸變論，跟達爾文首次提出的生物漸變論之間，有一定程度上的相似處。Thomas Huxley 和其他的生物學家，對達爾文的漸變論提出質疑。在生物學上，達爾文的漸變論已經越來越不合情理，部分原因是由於可用於說明這種變化方式的化石記錄，沒有任何連續性。

同樣，語音漸變論也不能輕易接受，因爲即使現在有了現代語音學最有力的測量儀器，還是難以證明這些極小的音變積累的存在。在新語法學派的語言學和達爾文的生物學中，都沒有對變異的普遍存在和變異的程度（在各種語言中和各個種群中），以及對於這種普遍性和變異程度在變化中的重要意義，給予足夠的重視。

一種考察語言中已有的變異的方法就是：通過附加概率係數，來限定這些音

變規則。這個方法是美國語言學家 William Labov 首先說清楚的。跟新語法學派一致變化的假設不同，我們可以說語音從 x 變爲 y 實際上有不同的程度，取決於一系列相互作用的因素，包括語言學因素以及社會文化因素，諸如有關說話人的年齡、性別、教育背景等。這些含有概率係數的說明，就稱爲變項規則。用變項規則的方法，已經證實了許多正在進行中的語音變化，並且已經表明，在獲取那些以前沒有觀察到的重要的語音變化方面，這是很有價值的方法。依靠變項規則，我們可以看到一種語音變化，是如何以統計學上的漸變方式進行的。隨著概率係數從 0 上升到 1，從 x 到 y 的語音變化相應地完全實現。

另一種重視語言變異的方法是詞彙擴散論。這種假設認爲，含有語音 x 的 100 個詞語並不是同時變化，而是一部分一部分地陸續發生變化。從 x 到 y 的音變方式，是通過詞彙在不同的說話人之間，於世紀更替中逐漸擴散來實現的。

我們可以劃分出詞彙擴散過程中的三個典型階段：最初的未變階段或 u 詞語 (Unchanged)；表現發音變異的中間階段或 v 詞語 (Variation)；已經完成變化的最後階段或 c 詞語 (Changed)。正是這些處於變化中的 v 詞語，爲我們提供了主要的由語音因素作出選擇的語音變項材料。這些詞語就好比生物學家所說，把不同的進化階段相互聯繫在一起的那種介體或中間形式。這三個階段就是 u > v > c。

許多語言中都已經找到了詞彙擴散的證據，台灣清華大學的連金發教授在 Encyclopedia of Langauge and Linguistics 已作過總結。確實，所有現在存活的語言，出於內部原因和外部原因，一直都在變化中，因此我們將預期在每個語言社群裡，都能發現三個階段的詞彙擴散過程。英語裡一個正在變化中的例子是長元音 /u:/ 向短元音 /ʊ/ 的轉變。mood、food 是還沒有受到影響的未變階段的 u 詞語。root、broom 是發音正處於變化階段的 v 詞語。最後，hood、wood 是已變階段的 c 詞語。實際上，其中有些短元音 /ʊ/ 已經加入了另一種音變過程，變爲 /ə/ 或中元音，如 blood 和 flood 已經達到 c 階段了。另一方面，good 仍處於中間的 v 階段，儘管它在 good morning、good night、goodbye 的高頻片語中經常發成央元音 /ə/。

這些例子來自現代英語，我們可以從中推斷英語過去的發展歷程。然而，在有些情況下，我們有足夠的歷史材料，來探尋一種音變穿越若干時段的歷史發展，以便我們能夠確實得到這種語音變化的一個年代上的輪廓。例如柏克萊的研究生 Don Sherman，通過利用 4 百多年來編纂的大量的發音詞典，對於英語中名詞變爲動詞的重音交替的發展進行的研究。根據 Samuel Johnson 在 1755 年的考察，無論 affix 這個單詞是作動詞還是作名詞，重音都在第二個音節上。但是 20 年以後，在 John Ash 編纂的一部詞典中，當 affix 作名詞時，重音已退到第一個

音節。在 1570 年，只有 outlaw、rebel 和 record 三個單詞在名詞變爲動詞時，有重音交替現象。4 個世紀以後，這種詞語已經超過了 150 個。

考慮到詞語的音變是由幾個詞幾個詞地陸續發生變化，這裡自然就會產生一個問題：哪些詞變得會早些，哪些詞變得會晚些？這種預測將不會如我們希望的那樣精確。所有的歷史理論都存在這種內在的侷限。正如有人已經指出的，對於各種進化理論，「預測不僅要求瞭解一種變化的主要力量，而且還要求預知所有未來的環境條件。」無論如何，以英語裡正在進行中的語音變化爲基礎的研究，在這個領域已經取得了一些進展。一個詞語在音變中是先變還是後變，主要依據似乎有兩個，就是它的使用頻率及音變的具體類型。在造成語音簡化的音變中，如 bribery 第二個元音脫落的變化，高頻詞語比低頻詞語變化得早一些。另一方面，在一種屈折模式替換另一種屈折模式的語音變化中，如 dive/dived 替換 dive/dove 的變化，低頻詞語先變，而高頻詞語後變。我們有理由認爲，由於音變以某種方式一代一代傳遞，而導致這種有趣的相對應的結果，對於其中具體的變化機制，還需要進一步詳細地進行研究。

在對於選擇和變異的機制進行考察時，我們發現語言演化和生物進化之間，有著明顯的相似之處。然而前者有一種重要的文化成分，在決定演化的速度和方向方面起關鍵的作用。在身體適應中，如長頸鹿脖子的長度改變或飛蛾翅膀的顏色改變，這些變化完全是在動物自主意識之外進行的。與此相反，一個說話人可以學著留意他是把 room 中的元音，讀成跟 mood 相同還是跟 look 相同，他也可以按照自己的社會優勢進行選擇，即使這種選擇可能在語音上付出更多努力。在這個方面，由於語言的演化，捲入生物力量和社會力量之間的一種複雜的相互作用之中，要把二者分清常常是極爲困難的。

10. 結語

語言演化的研究，儘管有內在的吸引力並且具有重要性，然而它基本上還屬於一個未劃定的領域，還有大量的研究工作等著我們去做。我們可以充分利用有關交叉學科的優勢進行探索，其中尤其是人類學、語言學、神經生物學及心理學等學科。僅僅根據我們在這裡所評述的各種間接的人體結構和基因及考古的證據，一個合理的猜想就是語言出現在約 10 萬年前，即最近現代人遷出非洲的時候。

儘管語言是交際行爲中的一種高度專化的形式，可是人們還沒有發現一個專爲語言而設的大腦區域。與此相反，語言的獨特性表現爲它似乎是一種介面，使

人類所有一系列早已存在的認知、運動、感覺等各種能力彼此互相影響。這種相互聯繫可能是逐漸組合性地發展起來，正如一幅鑲嵌圖案是一片一片拼合而成。

當然，語言一直在進化，但是它跟生物的進化，在某些基本的方式上有不同。後者的傳遞幾乎毫無例外，都是垂直式或縱式進行的，而語言的傳遞除了垂直式之外，很大程度上還有水平式或橫式進行。不過，生物進化表現出來的基本原則，如選擇和變異，也在語言的演化中有清楚的體現。

當我們面對語言的演化時，諸如「語言是什麼時候出現的？」「語言在頭腦中的什麼地方？」「語言是怎麼變化的？」等問題看上去是那麼簡單明白。然而，這裡又一次證實，恰恰正是最簡單的問題，使人們最難以回答。不可否認的是：自從把世界產生估算爲西元前 4004 年的 Ussher 主教的時代以來，我們已經取得了令人矚目的進展。然而，跟這項龐大的任務相比，我們的進展顯得有些令人沮喪。而且，我們現在仍然遠不能精確肯定地全盤回答這些問題。

確實，這些問題似乎是那麼難以解決，以至有時候我們會喪失回答的信心。我們不時地會聽到當年巴黎禁令的微弱的迴響：把我們的精力投入這些表面上看來似乎難以解答的問題，是一種浪費。也許我們最好把精力投入到那些會有更直接回報的問題上。然而，就我個人而言，儘管這樣一種觀念在一個世紀以前巴黎禁令的情勢下或許是適當的，可是現在許多原有學科交界處的科學知識爆炸般迅速增長，將會使這種悲觀念頭大爲消除。

這裡有個故事。有個人在路燈周圍的地上用雙手和兩膝爬著，尋找他丟失的鑰匙。他的朋友經過這裡，就跟著他一起尋找。找了很長一段時間沒有結果，朋友問他是否肯定鑰匙確實掉在路燈旁邊。他指著身後一條幽暗的小路，回答說：「不，我是在那邊丟的。」聽到這句話，他的朋友目瞪口呆。「那你爲什麼要在這兒找呢？」回答是：「因爲這兒燈光更亮。」

解開語言演化問題的鑰匙，同樣在離我們很遠的地方——被遺落在人類最初進化中的混沌而遙遠的過去。考慮到這種挑戰的性質，我們當然應該充分地認識這項工作的艱鉅性和重要性。我們不能把這個問題看得太簡單，像上文所提到的密涅瓦理論，把語言能力當作一種爲語言所特製的「器官」，這不能說明任何事情。然而，由組合理論的觀點出發，我們可以用不同方法，例如電腦建模、心理實驗、神經網絡分析，以及觀察和比較其他動物的行爲等等，來逐步尋找這枚鑰匙。解開語言演化的問題是一枚非常值得尋找的鑰匙，因爲人類的智力成果中，沒有比語言的創造更爲重要的了。我們越是深入地探索語言的本質和它的演化過程，就越能夠理解這項工作的偉大和壯麗。

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兒化小稱與鼻化小稱音變*

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漢語的小稱形式中研究得最廣泛的是兒化小稱和鼻化小稱，但是過往的研究因爲研究範圍通常僅侷限於一個方言或是一種小稱，因此往往無法掌握住小稱詞綴添加時所引起的音變共相及跨方言間的共同的趨勢。本文藉由觀察不同方言中兒化及鼻化小稱詞尾添加時詞幹韻尾及韻母產生的變化，試圖找出此變化背後的原因及其對語言系統造成的影響。

我們分析了三種不同小稱詞尾的添加，分別是：金華方言和義烏方言的 [n] 尾、湯溪方言的 [ŋ] 尾以及北京話和獲嘉方言的 [r] 尾。經由個別方言的檢視我們歸納出小稱音變有幾個參數變體 (parametric variations)：(一) 詞幹韻尾部分：多數刪除少數保留，刪除的韻尾有的會殘餘音徵有的則不會。(二) 詞幹母音部分：有的會發生變化。變化的情況有母音延長、母音音變及過渡音增生。母音音變有的是受到小稱詞綴的同化，有的則是受到詞幹韻尾的殘餘音徵同化。

鼻化小稱詞及兒化小稱詞對語音系統的衝擊有兩點討論：(一) 音節結構的遵守與創新：加綴過程中韻尾的刪除是基於對音節結構的遵守，但是詞幹韻尾的保留、過渡音的增生和母音的延長則會創造出有標的音節結構。(二) 韻母的新增與中和：鼻音尾及兒尾的加綴產生許多新的韻母，但韻尾及母音的變化也造成許多原本對立的韻母合流。

關鍵詞：漢語方言，小稱加綴，音變，音節結構限制，有標音節結構

1. 前言

漢語的小稱形式很多，但研究得較多的是北方的兒化小稱及南方的鼻化小稱二種。在此區分之下，北方的兒化小稱又因各方言的不同而有 [r]、[l] 等不同形式；南方的鼻化小稱也有 [n] 或 [ŋ] 等各種鼻音形式。文獻中對於小稱的探討題材非常廣泛，有從語意、語法化、語音各角度切入的。本文主要著眼於小稱詞綴添

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加時，詞幹韻尾及母音產生的變化。過往的研究因爲研究範圍通常僅侷限於一個方言或是一種小稱，因此往往無法掌握住小稱詞綴添加時所引起的音變共相及跨方言間的共同的趨勢。[1] 因此，本文將比較三種不同的小稱詞綴，分別是金華方言和義烏方言的 [n] 尾、湯溪方言的 [ŋ] 尾以及北京話和獲嘉方言的 [r] 尾。藉由觀察不同方言和不同的小稱詞尾添加時詞幹韻尾及母音產生的變化，試圖找出此變化背後的原因及其對語音系統所造成的影響。

2. 小稱詞綴 [n] 的音變

2.1 金華方言的鼻化小稱[2]

金華方言屬於南方方言吳語婺州片，它的小稱詞綴是 [n]。小稱詞綴 [n] 添加時，詞幹韻尾及母音的變化歸類如下：

2.1.1 母音未發生音變者：詞幹皆無韻尾，[n] 加綴成爲新韻尾。

(1) ɿ → ɿn： 紐子兒[3]
(2) i → in： 梨兒
(3) y → yn： 毛毛雨兒
(4) u → un： 小老虎兒
(5) æ → æn： 梅兒
(6) iæ → iæn(iɛn)[4]： 碟兒
(7) uæ → uæn： 方塊兒（撲克牌名）
(8) ua → uan： 小鴨兒
(9) ye → yen： 小桌兒

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[1] Lin (1989, 1992, 1993, 2001, 2004) 及 Duanmu (2000) 的研究雖然做了跨方言的分析，但是因爲他們的研究往往是以理論架構爲出發點，因此對於方言現象本身的分析較不足。

[2] 金華方言的語料根據的是朱加榮 (1992)。

[3] 我們在這裡沿用原作者所使用的漢字「兒」，雖然我們並沒有確切的證據證明此處的 [n] 原先來自「兒」。

[4] 朱加榮 (1992:161) 指出，[æ] 的音區在 [æ]-[ɛ] 之間，[e] 的音區在 [ɛ]-[ɪ] 之間，因而 [æ] 與 [e] 之間產生新音位 [ɛ] 的可能性很小。

2.1.2　母音音變者：詞幹若無韻尾，[n] 加綴成爲新韻尾；詞幹若原有韻尾 [n]、[ŋ]、[ʔ] 或 [u] 會被小稱詞綴 [n] 取代。詞幹母音發生音變。

A. 母音是 [e]：韻尾 [n] [ʔ] [u] 刪除，母音高化 (raising) 變成 [i]。[5]

(10) ie → in[6]：　辮兒
(11) en → in[7]：　麻雀卵兒
(12) ieʔ → in：　笛兒
(13) ieu → in[8]：小狗兒

B. 母音是 [ɤ]：母音高化 (raising) 變成 [ɯ]。

(14) ɤ → ɯn：　棗兒

C. 母音是 [a]：韻尾 [ŋ] [ʔ] [u] 刪除，母音前化 (fronting) 變成 [æ]。[9]

(15) a → æn：　獨個兒
(16) ya → yæn：　掃帚橛兒
(17) aŋ → æn：　黃鼠狼兒
(18) aʔ → æn：　扁柏兒
(19) uaʔ → uæn：　蟈蟈兒
(20) iaŋ → iæn(iɛn)[10]：小細娘（小姑娘）
(21) iaʔ → iæn(iɛn)：　夾兒
(22) iau → iæn(iɛn)：　鳥兒

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[5] 比較 (9) ye → yen 中的 [e] 未高化，原因待究。

[6] ie → in 更清楚地說應是 ie → iin，其中第一個 [i] 是介音，第二個 [i] 是由 [e] 高化而來的母音。例 (12) (13) 亦同。

[7] 韻尾 [n] 的丟失從表面看不出來，但從整個音韻系統的運作來看可以認定爲原先的韻尾被新的小稱韻尾所取代。

[8] 朱加榮 (1992:156) 歸納的規則是 ieu → ɯn，但在該文中討論“頭”字的段落中（頁 161-2）卻說 ieu→ in。因爲後者的變化似乎較合理，在此我們採用後者。

[9] 比較例 (8) ua → uan 中，[a] 並未前化，是一組例外的情形。朱加榮 (1992:162) 解釋是因爲歷史來源不同的關係（分別來自中古開口字及合口字）。

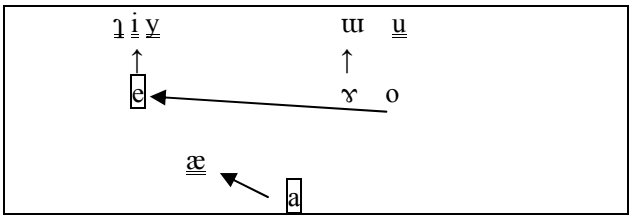
[10] 同註 4。

D. 母音是 [o]：韻尾 [ʔ] 刪除，母音前化 (fronting) 變成 [e]。

(23) uo → uen： 小鑊兒
(24) uoʔ → uen： 小屋兒
(25) ioʔ → yen： 桔兒

綜而言之，母音變化的情形大致如下圖所示：

(26) 金華方言小稱詞的母音變化



(26) 中標示底線的是加綴後未改變的母音，加框的 [e] 和 [a] 則是多數發生音變（但各有一組例外）的母音。由發生音變的母音列舉中我們看到：音變的母音不論原來詞幹是沒有韻尾或詞幹韻尾是 [n]、[ŋ]、[ʔ] 及 [u]，母音的變化結果都是一樣的，可見母音的變化應該不是詞幹韻尾造成的。(26) 顯示母音變化的趨勢是往前及往高兩個方向移動，對照金華方言加綴的 [n] 尾發音部位是屬於口腔的前、高區域，因此我們認爲金華方言小稱詞母音的改變應該是因爲 [n] 加綴後詞幹韻尾刪除，詞幹母音受到 [n] 尾的同化作用 (assimilation) 所致。

2.2 義烏方言的鼻化小稱[11]

根據方松熹 (1993) 的記載，義烏方言的兒字白讀唸 [n̩]，文讀唸 [əl]，做兒尾時唸成 [n] 並成爲前音節的韻尾。小稱加綴與詞幹的互動變化如下：

2.2.1 詞幹無韻尾者：[n] 加綴成爲新韻尾，詞幹母音變長。

(27) a → a:n
(28) ua → ua:n

[11] 義烏方言的資料來源是方松熹 (1993)。

(29) ɯa →ɯaːn
(30) o → oːn
(31) uo → uoːn
(32) e → eːn
(33) ie → ieːn
(34) ue → ueːn
(35) ye → yeːn
(36) ɔ → ɔːn
(37) iɔ → iɔːn
(38) ɛ → ɛːn
(39) iɛ → iɛːn
(40) uɛ → uɛːn
(41) yɛ → yɛːn
(42) ɿ → ɿːn
(43) i → iːn
(44) u → uːn
(45) y → yːn
(46) ɯɤ → ɯɤːn
(47) iɯɤ → iɯɤːn

2.2.2 詞幹有韻尾者：原韻尾被 [n] 取代，詞幹母音變長。

A. 韻尾 [ŋ] 刪除。

(48) oŋ → oːn

B. 韻尾 [ɯ] 刪除。

(49) əɯ → əːn
(50) iəɯ → iəːn

2.2.3 母音音變者：原韻尾被 [n] 取代，詞幹母音變長，母音發生音變。

A. 韻尾 [u] 刪除，詞幹母音高化 [a] → [o]。

(51) au → o:n
(52) iau → o:n

B. 韻尾 [i] 刪除，詞幹母音高化、前化 [a] → [e]。

(53) ai → e:n

C. 韻尾 [n] 刪除，詞幹母音前化 [ə] → [e]。

(54) ən → e:n

上列例子清楚顯示小稱的加綴會使詞幹母音全部變成長母音。沒有韻尾的母音在加上 [n] 綴時並不會發生音變，韻尾刪除的母音才會有音變的現象，可見在義烏方言中音變應該和刪除的韻尾較有關係，和 [n] 綴並無直接關係。但是韻尾刪除的情況中 2.2.2 組中的母音並未發生音變，僅 2.2.3 組有音變現象，因此我們需要進一步比較一下當中的差異。

首先我們先看發生音變的三組例子，以 (51) au → o:n 爲例，試比較其詞幹母音及原詞幹韻尾的音徵：

(55) au → o:n（母音高化）： 詞幹母音 [a] 音徵 [-高] [+低] [+後]
詞幹韻尾 [u] 音徵 [+高] [-低] [+後]

兩者的差距有明顯音高的不同（[高] [低] 兩音徵都不同值），因此當韻尾 [u] 刪除時，其音高的音徵殘餘與母音結合促使母音高化。再看看 (53) ai → e:n 的情形：

(56) ai → e:n（母音高化、前化）： 詞幹母音 [a] 音徵 [-高] [+低] [+後]
詞幹韻尾 [i] 音徵 [+高] [-低] [-後]

[a] 與 [i] 在高度及前後度 (backness) 上都有差距，因此當韻尾 [i] 刪除時 [a] 受其殘餘音徵影響而高化、前化。(54) 的音變則是前後度 (backness) 的改變：

(57) ən → e:n（母音前化）： 詞幹母音 [ə] 音徵 [-高] [-低] [+後]
詞幹韻尾 [n] 音徵 [-高] [-低] [-後]

母音與韻尾的差距是 [+後] 與 [-後]，因此母音受韻尾殘餘部分影響前化。

接下來我們看看詞幹韻尾刪除沒有造成母音改變者：

(58) oŋ → o:n： 詞幹母音 [o] 音徵 [-高] [-低] [+後]
詞幹韻尾 [ŋ] 音徵 [+高] [-低] [+後]

(59) əɯ → ə:n： 詞幹母音 [ə] 音徵 [-高] [-低] [+後]
詞幹韻尾 [ɯ] 音徵 [+高] [-低] [+後]

這兩組例子中詞幹母音與韻尾一樣具有 [+後] 的音徵，與音變組母音不同的是，雖然詞幹母音與韻尾有些微的高度差距，但並非 [高] [低] 兩音徵都不同值，因此母音並沒有發生音變。

2.3 小稱詞綴 [n] 的音變小結

比較金華方言及義烏方言的小稱音變，我們發現他們的小稱音變有相同也有不同之處。相同之處是這兩個方言的小稱詞綴 [n] 都會取代原來的詞幹韻尾，母音音變的原因也都是因爲同化作用，只是導致此同化作用的原因不同。在金華方言中，詞幹韻尾的刪除沒有留下任何痕跡，因此母音是受到新加綴 [n] 尾的同化；義烏方言中，遭刪除的韻尾會留下音徵，因此母音的音變是受到刪除韻尾殘餘成分的同化。

3. 小稱詞綴 [ŋ] 的音變

3.1 湯溪方言的鼻化小稱[12]

湯溪方言屬南部吳語，根據曹志耘 (2002) 的記載，湯溪方言的小稱詞綴是 [ŋ]。小稱加綴時詞幹的變化分類如下：

3.1.1 詞幹無韻尾者：[ŋ] 加綴成爲新韻尾。

(60) ʅ → ʅŋ

(61) i → iŋ

[12] 湯溪方言的語料根據的是曹志耘 (2002)。

(62) y → yŋ
(63) ɯ → ɯŋ
(64) u → uŋ
(65) ə → əŋ
(66) iə → iəŋ

3.1.2 詞幹有韻尾者：湯溪方言裡古陽聲韻和古入聲韻今白讀中全部失去鼻音韻尾和塞音韻尾，因此，詞幹原有的韻尾只有母音韻尾 [ɯ]、[i] 及 [o] 三種。[ŋ] 加綴時原韻尾有的保留、有的丟失。

A. 韻尾 [ɯ] 的丟失。

(67) əɯ → əŋ
(68) iəɯ → iəŋ

B. 韻尾 [i] 的丟失。

(69) ei → eŋ
(70) iei → ieŋ
(71) uei → ueŋ
(72) yei → yeŋ

C. 韻尾 [i] 的保留。

(73) ai → aiŋ
(74) iai → iaiŋ
(75) uai → uaiŋ
(76) yai → yaiŋ

D. 韻尾 [o] 的保留。

(77) ɑo → ɑoŋ
(78) iɑo → iɑoŋ

韻尾的保留與否目前看不出一定的規則，譬如一樣是韻尾 [i]，[ai] 的韻尾保留但

是 [ei] 的韻尾卻丟失。待看完母音音變後，我們再一併討論。

3.1.3 母音音變者：詞幹皆無韻尾，[ŋ] 加綴爲新韻尾，母音發生音變。

A. 母音是 [ɛ]：母音高化 (raising) 變成 [e]。

(79) ɛ → eŋ
(80) iɛ → ieŋ
(81) uɛ → ueŋ

B. 母音是 [e]：母音高化 (raising) 變成 [i]。

(82) ie → iŋ[13]

C. 母音是 [ɔ]：母音高化 (raising) 變成 [o]。

(83) ɔ → oŋ
(84) iɔ → ioŋ
(85) yɔ → yoŋ

D. 母音是 [o]：母音高化 (raising) 變成 [u]。

(86) o → uŋ
(87) io → iuŋ
(88) uo → uŋ
(89) yo → yuŋ

E. 母音是 [ɤ]：母音高化 (raising) 變成 [ɯ]。

(90) ɤ → ɯŋ
(91) iɤ → iɯŋ
(92) uɤ → uɯŋ
(93) yɤ → yɯŋ

[13] ie → iŋ 更清楚地說應是 ie → iiŋ。其中第一個 [i] 是原來詞幹的介音，第二個 [i] 是 [e] 高化而來的母音。但是例 (69)-(72) 中的母音 [e] 並未高化，原因待究。

F. 母音是 [a]：母音後化 (backing) 變成 [ɑ]。[14]

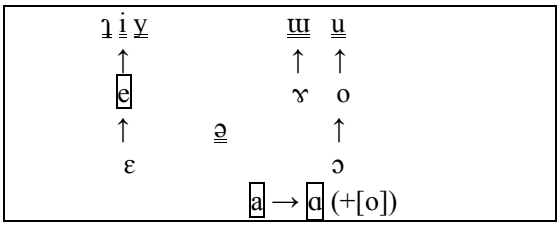
(94) a → ɑŋ
(95) ia → iɑŋ
(96) ua → uɑŋ

G. 母音是 [ɑ]：詞幹母音與後綴 [ŋ] 之間有過渡音 [o] 增生。

(97) ɑ → ɑoŋ
(98) iɑ → iɑoŋ
(99) uɑ → uɑoŋ
(100) yɑ → yɑoŋ

綜合上列三類，詞幹母音變化情形歸納如下圖：

(101) 湯溪方言小稱詞的母音變化



標示底線的是未發生音變的母音，加框者則爲部分改變的母音。由於發生音變的母音詞幹均無韻尾，音變的發生應與詞幹韻尾無關。由 (101) 的圖示我們可以清楚看到：母音的變化方向是朝高、朝後移動，這樣的趨勢顯然和加綴的 [ŋ] 尾的發音部位相當一致。也就是說，湯溪方言小稱詞的母音音變可能也和金華方言一樣，是受到鼻音尾小稱的同化作用所造成的。

我們再來仔細看看部分改變的母音 [a] 和 [ɑ]。[a] 的基本變化應是後化，只是在韻尾有 [i] 時，[i] 的存在使得 [ŋ] 的同化作用無法運作，因而維持原音值不變。[ɑ] 的變化既不朝高也不朝後，而是在詞幹母音與鼻音韻尾之間新增了一個新的母音 [o]。這個新增的 [o] 應可視爲 [ɑ] 與 [ŋ] 之間的一個過渡音。因爲湯溪方言中原來就存在有 [ɑo] 這個韻母，因此 [ɑ] 採取過渡音的方式產生的結果也能符合原來的韻母系統。

[14] 比較例 (73)-(76)，當 [a] 後還有韻尾 [i] 時，[a] 並不會變成 [ɑ]。

由 [a] 和 [ɑ] 的討論看來，我們認爲在湯溪方言中當小稱詞 [ŋ] 加綴時，原本詞幹的韻尾應該和金華方言一樣會被小稱詞綴所取代。詞幹韻尾未丟失的兩組例外 [ai] 和 [ɑo] 都造成比較特殊的母音變化。[ai] 未丟失的韻尾阻止了母音的後化，[ɑo] 則是爲 [ɑ] 加上過渡音 [o] 提供了一個合理的理由。

更值得注意的是，因爲 [ai] 和 [ɑo] 中原本詞幹的韻尾未丟失，而小稱詞綴 [ŋ] 又加附上去成爲新的韻尾，如此一來產生的音節結構 [aiŋ] 和 [ɑoŋ] 就有二個韻尾，即母音韻尾及鼻音韻尾。這樣的音節結構不但在漢語方言中非常特殊，也違反了湯溪方言原來存在的音節結構。一般說來，漢語的音節結構是 CGVX，其中 C 表示子音，G 表示介音，V 表示母音，X 可以是子音或母音。也就是說，主要母音之後可以有另一個母音或是一個子音爲韻尾，但是只容許一個韻尾。像 [aiŋ] 和 [ɑoŋ] 這樣擁有二個韻尾顯然違反了漢語方言基本的音節結構，也創造出湯溪方言原本不存在的音節結構。

4. 小稱詞綴 [r] 的音變

4.1 北京話的兒化小稱[15]

北京話的兒化應可算是北方方言中最具代表性的。根據王理嘉、賀寧基 (1985) 的記載，我們把北京話的兒化小稱重新分類如下：

4.1.1 詞幹無韻尾者：直接加 [r]。

(102) a → ar： 把兒
(103) ia → iar： 芽兒
(104) ua → uar： 花兒
(105) u → ur： 屋兒
(106) o → or： 婆兒
(107) uo → uor： 窩兒
(108) ɤ → ɤr： 歌兒
(109) iɛ → iɛr： 街兒
(110) yɛ → yɛr： 月兒

[15] 關於北京話的兒化，研究者非常多，文獻記載十分分歧，本文的分析主要根據王理嘉、賀寧基 (1985)。

4.1.2　詞幹有韻尾者：北京話中詞幹原有的韻尾有 [i]、[u]、[n] 及 [ŋ] 四個。名詞加 [r] 尾時，詞幹韻尾的變化有下列幾種：

A. 韻尾 [i]：韻尾刪除，加 [r]。

(111)　ai → ar：　牌兒
(112)　uai → uar：　拐兒

B. 韻尾 [n]：韻尾刪除，加 [r]。

(113)　ən → ər：　根兒
(114)　uən → uər：　棍兒
(115)　an → ar：　盤兒
(116)　ian → iar：　尖兒
(117)　yan → yar：　院兒
(118)　uan → uar：　罐兒

C. 韻尾 [ŋ]：韻尾刪除留下鼻化成分在母音，加 [r]。

(119)　aŋ → ãr：　缸兒
(120)　iaŋ → iãr：　亮兒
(121)　uaŋ → uãr：　筐兒
(122)　əŋ → ər̃：　燈兒
(123)　uəŋ → uər̃：　甕兒
(124)　uŋ → ũr：　空兒

D. 韻尾 [u]：韻尾保留，[r] 加綴於後。

(125)　au → aur：　刀兒
(126)　iau → iaur：　票兒
(127)　ou → our：　鈎兒
(128)　iou → iour：　球兒

詞幹韻尾的變化有兩個明顯的不對稱。第一，[i] 和 [u] 同樣屬於母音韻尾，但是在小稱加綴的過程中前者丟失，後者卻保留。[u] 未丟失的情況下兒化小稱詞就

有兩個韻尾：[u] 和 [r]。這與之前提到的湯溪方言音節結構的問題一樣，會創造出原本不存在的音節結構。第二，同樣屬於鼻音韻尾的 [n] 和 [ŋ] 雖然在加綴過程中都丟失，但是 [n] 是無條件的丟失，[ŋ] 卻會留下鼻化成分在母音。在此我們先做現象的描述，進一步的討論在看完母音變化現象之後一併提出。

4.1.3 詞幹母音音變者：

A. 母音 [ɿ] 變成 [ə]。

(129) ɿ → ər： 絲兒

B. 母音 [ʅ] 變成 [ə]。

(130) ʅ → ər： 枝兒

C. 母音 [e]：韻尾 [i] 刪除加 [r]，母音 [e] 變成 [ə]。

(131) ei → ər： 碑兒
(132) uei → uər： 櫃兒

D. 母音 [i]：韻尾刪除加 [r]，詞幹母音與 [r] 綴間有過渡音 [ə] 增生。

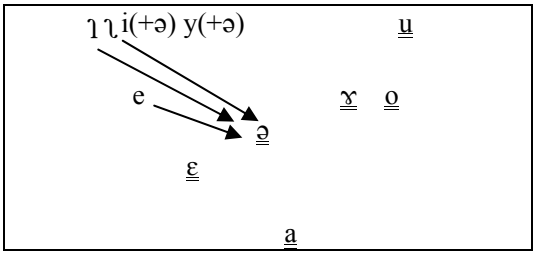
(133) i → iər： 雞兒
(134) in → iər： 今兒
(135) iŋ → iə̃r： 影兒

E. 母音 [y]：韻尾刪除加 [r]，詞幹母音與 [r] 綴間有過渡音 [ə] 增生。

(136) y → yər： 魚兒
(137) yn → yər： 裙兒
(138) yŋ → yə̃r： 熊兒

綜合以上三類，母音變化的情形大致如下圖所示：

(139) 北京話小稱詞的母音變化



表中標示底線的母音是未發生音變的。舌尖母音 [ɿ]、[ʅ] 及前高母音 [e] 都變成 [ə]，前高母音 [i] 及 [y] 則是有過渡音 [ə] 增生。對照後、低母音並未產生變化來看，母音變化的原因應該可以用趙元任 (1980) 所提出的「並存音的同時性」(simultaneity of compatible articulations) 來解釋。趙元任 (1980) 認爲：前、高母音發音時舌頭要平，無法同時容許捲舌，因此需要有個中元音。換句話說，北京話小稱詞中的母音音變是導因於前、高母音與 [r] 的捲舌特性不相容的關係。

回過頭來看看前面提到小稱詞加綴時韻尾的不對稱性，「並存音的同時性」似乎也可以提供一個合理的解釋。首先在母音韻尾的部分，韻尾 [i] 丟失而 [u] 卻保留。因爲 [i] 是前高母音，發音時無法同時容許捲舌，因此在 [r] 加綴時遭到刪除；而 [u] 是個後高母音，並沒有與捲舌音不相容的問題，因此得以保留。其次在鼻音韻尾的部分，[n] 遭到刪除但 [ŋ] 卻留下鼻音成分在母音上。若我們把鼻音成分視爲某種形式的保留，似乎也可以說因爲 [ŋ] 的發音部位偏後、高，而 [n] 的發音部位屬前、高，因此前者得以保留而後者卻遭刪除。[16]

至於爲何有變爲 [ə] 及加上 [ə] 兩種變化，我們的觀察是：採取加上 [ə] 的 [i] 及 [y] 兩母音因爲本身在國語中都可當介音 (glide) 使用，所以它們可重新分析爲上升介音 (on-glide) 而不需要刪除；而舌尖母音 [ɿ]、[ʅ] 因爲不具備這樣的條件，所以無法在最後的音節結構中保留。

4.2 獲嘉方言的兒化小稱[17]

獲嘉縣位於河南省北部，獲嘉方言屬於晉語的範圍。賀巍 (1982) 討論到獲嘉方言的韻母有相當多種複雜有趣的變韻現象，這裡我們只討論它的兒化韻部分。

[16] 因爲鼻音成分的產生與軟顎 (velum) 的移動有直接的關係，而 [ŋ] 又恰好是個軟顎鼻音 (velar nasal)，是不是有可能因爲發音部位的關連而導致鼻音成分的保留值得進一步探究。

[17] 獲嘉方言的語料參考賀巍 (1982)。

兒化小稱的變化分類如下：

4.2.1　　詞幹無韻尾者：直接加 [r]。

(140)　ʅ → ʅr
(141)　ʮ → ʮr
(142)　i → ir
(143)　u → ur
(144)　y → yr
(145)　ɤ → ɤr
(146)　uɤ → uɤr
(147)　yɤ → yɤr
(148)　iɛ → iɛr
(149)　yɛ → yɛr

4.2.2　　詞幹有韻尾者：韻尾刪除加 [r]。

A. 母音 [ə]：韻尾 [ʔ] [n] [ŋ] 刪除加 [r]。

(150)　əʔ → ər
(151)　ən → ər
(152)　əŋ → ə̃r

B. 母音 [ɐ]：韻尾 [ʔ] 刪除加 [r]。

(153)　ɐʔ → ɐr
(154)　iɐʔ → iɐr; iar
(155)　uɐʔ → uɐr
(156)　yɐʔ → yɐr

C. 母音 [o]：韻尾 [u] 刪除加 [r]。

(157)　ou → or
(158)　iou → ior

詞幹韻尾的變化有兩點值得注意。第一，韻尾 [n] 和 [ŋ] 的刪除跟北京話一樣有不對稱的現象，[ŋ] 的刪除會留下鼻化成分在母音而 [n] 則不會。第二，韻尾 [u] 和 [i] 一樣遭刪除，不像北京話的 [u] 會保留。

4.2.3 母音音變者：

A. 母音 [e]：韻尾 [i] 刪除加 [r]，母音 [e] → [ə]。

(159) ei → ər
(160) uei → uər

B. 母音 [i]：韻尾 [ʔ] [n] [ŋ] 刪除加 [r]，母音和 [r] 綴間有過渡音 [ə] 增生。

(161) iʔ → iər
(162) in → iər
(163) iŋ → iə̃r

C. 母音 [u]：韻尾 [ʔ] [n] [ŋ] 刪除加 [r]，母音和 [r] 綴間有過渡音 [ə] 增生。

(164) uʔ → uər
(165) un → uər
(166) uŋ → uə̃r

D. 母音 [y]：韻尾 [ʔ] [n] [ŋ] 刪除加 [r]，母音和 [r] 綴間有過渡音 [ə] 增生。

(167) yʔ → yər
(168) yn → yər
(169) yŋ → yə̃r; yã̃r

以上四組音變的結果和北京話大致相同，[i]、[y] 和 [e] 都是前、高母音，因爲和 [r] 綴不相容而被迫改變。但是 [u] 發生音變卻是比較令人意外的。[18] 母音 [i]、[u] 和 [y] 在韻尾刪除後有 [ə] 增生於 [r] 綴前，[e] 則是變成 [ə]，這應該也和北京話一樣是因爲 [i]、[u] 和 [y] 可以重新分析爲上升介音而 [e] 卻不允許的關係。

[18] [u] 的小稱變化在北京話及獲嘉方言中完全不同：[u] 當主要母音時，在北京話中不會發生音變在獲嘉方言則會；[u] 當韻尾時，在北京話中不會刪除在獲嘉方言則會。

E. 母音 [a]：母音 [a] 的變化情況與其韻尾似有一定程度的關連，我們分項來看：

a. 無韻尾者：與其他詞幹無韻尾的母音變化一樣，直接加 [r]。

(170) a → ar
(171) ia → iar
(172) ua → uar

b. 韻尾是 [ŋ]：與其他詞幹有韻尾 [ŋ] 的母音變化一樣，韻尾刪除留下鼻化成分在母音，加 [r]。

(173) aŋ → ãr
(174) iaŋ → iãr
(175) uaŋ → uãr

c. 韻尾是 [ʔ] [i] [n]：韻尾刪除加 [r]，母音音變 [a] → [ɐ]。

(176) aʔ → ɐr; ar
(177) uaʔ → uɐr
(178) yaʔ → yɐr
(179) ai → ɐr
(180) uai → uɐr
(181) an → ɐr
(182) ian → iɐr
(183) uan → uɐr
(184) yan → yɐr

d. 韻尾是 [u]：韻尾刪除加 [r]，母音音變 [a] → [ɔ]。

(185) au → ɔr
(186) iau → iɔr

不同於前四組音變是受到 [r] 綴的影響，母音 [a] 的變化可以看出原詞幹韻尾的殘餘，十分有趣。當 [a] 後無韻尾時，加 [r] 綴不會發生音變，足見 [r] 綴並不會對 [a] 產生影響；當 [a] 後有 [ŋ] 尾時，[ŋ] 尾刪除會留下鼻化成分與母音結合，形成鼻化母音；當 [a] 後有 [ʔ]、[i] 或 [n] 尾時，[a] 受這些韻尾的影響音位略爲提

高爲 [ɐ]；當 [a] 後有韻尾 [u] 時，[u] 的刪除明顯留下 [+高] [+圓唇] 的音徵，與 [a] 結合後產生 [ɔ]。

4.3 小稱詞綴 [r] 的音變小結

北京話及獲嘉方言的兒化小稱顯示小稱詞綴 [r] 的音變應是肇因於音變的母音與 [r] 的發音特性不相容而被迫改變，換句話說，此種音變也可算是一種廣義的同化作用。詞幹母音除了受到 [r] 尾的同化而發生音變之外，詞幹刪除韻尾的殘餘成分也會對母音造成影響。這一點從刪除 [ŋ] 尾造成的鼻化母音及獲嘉方言 [a] 組母音的音變可看出。最後，[r] 綴所引起的母音音變有過渡音 [ə] 增生，這和湯溪方言中 [ŋ] 尾引發過渡音 [o] 的增生是類似的情形，只是不同的詞綴增生的過渡音不同罷了。

5. 小稱詞對語言系統的衝擊

5.1 音節結構的遵守與創新

由前面三組詞綴的討論，我們可以看到：在小稱詞加綴的過程中，大抵看來，原來詞幹的韻尾會被小稱詞綴所取代。詞幹韻尾丟失的原因應該是因爲小稱詞綴與其競爭的結果。因爲漢語的音節結構只容許一個韻尾（即 CGVX 中 X 的位置），小稱詞綴比原來詞幹韻尾帶有更重要的訊息（有區別小稱與非小稱的辨義的作用），因此在兩者的競爭中小稱詞綴勝出取代詞幹韻尾。如此看來，詞幹韻尾丟失應可視爲對音節結構的遵守。

但矛盾的是，加綴過程中的某些機制卻又創造出違反音節結構的小稱形式。首先是湯溪方言韻尾 [i] 及北京話中韻尾 [u] 的保留產生像 [aiŋ] 和 [aur] 這樣的小稱韻母，違反了該方言原來的音節結構而創造出新的 CGVGC 音節。其次，湯溪方言過渡音 [o] 增生產生的音節 [ɑoŋ] 也是違反原來音節結構的例子。但是北京話及獲嘉方言過渡音 [ə] 的增生顯然又尊重音節結構，因爲只有可以重新分析爲上升介音的母音才會有過渡音的增生。最後，義烏方言中小稱加綴導致詞幹母音延長，延長的母音使韻母的節點下多佔了一個位置，也和多了一個韻尾的結構類似。因此在小稱詞加綴過程中，我們同時看到了對音節結構的遵守與創新，這一點十分有趣，值得進一步去探究其背後的動機與限制。

5.2 韻母的新增與中和

小稱詞加綴後，產生了許多新的韻母。以金華方言爲例，金華方言原來以 [n] 爲韻尾的韻母只有 6 個：[æn]、[uæn]、[en]、[in]、[uen] 和 [yen]。小稱詞韻母則新增了 7 個原本不存在的鼻音韻母：[ɿn]、[yn]、[un]、[iæn]、[yæn]、[uan] 和 [ɯn]，小稱詞加綴的結果使得鼻音韻尾的韻母數量激增。

但另一方面，小稱詞加綴的結果也會使得原本各自獨立的韻母合流，產生中和化 (neutralization) 的現象。韻母的合流有的肇因於韻尾的丟失，例如：北京話中的 [ai] 和 [an] 在加兒綴時，原來的韻尾 [i] 和 [n] 都被 [r] 取代，結果變成同樣的形式 [ar]，“牌兒”與“盤兒”一樣都唸 [pʰar]。有的韻母合流是因爲母音的改變，例如湯溪方言母音的高化：母音由 [e] 變成 [i]、母音由 [o] 變成 [u]、母音由 [ɤ] 變成 [ɯ] 造成了 [e] 與 [i]、[o] 與 [u]、[ɤ] 與 [ɯ] 三組韻母的合流。

韻母中和化的現象在各方言的小稱韻中都有發生，只是中和的數量及程度不同而已。這種中和程度在某些方言中幾乎可以說發展到極致。以鼻化小稱來說，武義方言[19] 的小稱韻母只有二個，[ən] 或 [aŋ]：

(187) 武義方言的小稱韻母

	ən	aŋ
開口韻	ɿ + n → ən	a + n → aŋ
齊齒韻	ie + n → iən	ia + n → iaŋ
合口韻	uo + n → uən	ua + n → uaŋ
撮口韻	y + n → yən	yə + n → yaŋ

由 (187) 中可以看到，原來武義方言中 8 個對立的韻母在加上小稱後只剩 [ən] 及 [aŋ] 兩韻的區別。

兒化小稱中，成都方言的兒化韻更是中和化的極致。在成都方言裡，所有的詞幹母音在兒化之後一律變成 [ə]，詞幹韻尾也全部被 [r] 取代，兒化韻母只剩介音的區別：

[19] 武義方言屬浙江吳語婺州片，語料來自於方松熹 (1993)。武義方言中鼻化小稱單獨成音節時唸 [ŋ]，做詞綴時唸 [n] 或 [ŋ]。

(188) 成都方言的兒化韻母

兒化韻母	基本韻母	例如
ər	ɿ	sɿ55 sər55 絲絲兒
	u	tsɿ53 mər53-31 拇指兒
	a	iau55 pər31 么爸兒
	ai	kai13 kər13-55 蓋蓋兒
	au	貓兒 mər55
	an	盤盤兒 pʰan31 pʰər31-55
	aŋ	巷巷兒 xaŋ13 xər13-55
	o	簸簸兒 po53 pər53-31
	oŋ	洞洞兒 toŋ13 tər13-55
	e	這兒 tsər13
	ei	杯杯兒 pei55 pər55
	əu	豆豆兒 təu13 tər13-55
	ən	根根兒 kən55 kər55
iər	i	米米兒 mi53 miər53-31
	ia	架架兒 tɕia13 tɕiər13-55
	ie	碟碟兒 tie31 tiər31-55
	iau	瓢瓢兒 pʰiau31 pʰiər31-55
	iəu	牛牛兒 ȵiəu31 ȵiər31-55
	ian	麵麵兒 mian13 miər13-55
	in	瓶瓶兒 pʰin31 pʰiər31-55
	iaŋ	香香兒 ɕiaŋ55 ɕiər55
uər	ua	褂褂兒 kua13 kuər13-55
	ue	蟈蟈兒 kue31 kuər31-55
	uai	筷筷兒 kʰuai13 kʰuər13-55
	uei	櫃櫃兒 kuei13 kuər13-55
	uan	管管兒 kuan53 kuər53-31
	uən	棍棍兒 kuən13 kuər13-55
	uaŋ	桩桩兒 tsuaŋ55 tsuər55
yər	y	女兒 ȵyər53
	yo	雀雀兒 tɕʰyo31 tɕʰyər31-55
	ye	缺缺兒 tɕʰye31 tɕʰyər31-55
	yan	圈圈兒 tɕʰyan55 tɕʰyər55
	yn	裙裙兒 tɕʰyn31 tɕʰyər31-55

（本表摘自崔榮昌 1997:68）

如此極致的中和化現象不禁讓人懷疑是否會造成理解上的困難。不過，由成都方言的例子中我們發現：兒化韻母的中和化似乎有其他相伴的條件，不致於造成溝通上的問題。首先，若是雙音節的名詞如：拇指兒、指甲兒、蒼蠅兒，因爲還有前一個音節的關係，所以基本上理解不太會有問題。比較容易會造成混淆的應該是單音節名詞。單音節名詞如果兒化韻母完全相同，可以倚賴聲母的子音及聲調的不同來區別。例如：

(189) 可由聲母區辨：碟 [tie31]　　碟兒 [tiər31-55]
　　瓢 [p^hiau31]　　瓢兒 [p^hiər31-55]
(190) 可由聲調區辨：褂 [kua13]　　褂兒 [kuər13-55]
　　管 [kuan53]　　管兒 [kuər53-31]

即使聲母的子音及聲調完全相同，成都方言特殊的重疊式構詞於前一個音節中保留了詞幹，仍然可以有所區別，例如：

(191) 洞洞兒 [toŋ13　tər13-55]
　　豆豆兒 [təu13　tər13-55]
(192) 瓢瓢兒 [p^hiau31　p^hiər31-55]
　　瓶瓶兒 [p^hin31　p^hiər31-55]
(193) 褂褂兒 [kua13　kuər13-55]
　　櫃櫃兒 [kuei13　kuər13-55]
　　棍棍兒 [kuən13　kuər13-55]
(194) 雀雀兒 [tɕ^{h}yo31　tɕ^{h}yər31-55]
　　缺缺兒 [tɕ^{h}ye31　tɕ^{h}yər31-55]
　　裙裙兒 [tɕ^{h}yn31　tɕ^{h}yər31-55]

如此看來，雖然兒化韻母中和的情形在成都方言中非常多，但是因爲還有其他種種的語言機制可供辨義之用，所以不至於造成理解上的混淆。

6. 結論

本文藉由檢視 [n]、[ŋ]、[r] 三種語音形式不同的小稱詞綴，企圖釐清小稱詞加綴時對詞幹產生的影響。整體而言，詞幹所受到的影響可分韻尾及母音兩方面：(一) 韻尾方面：由於受到音節結構的限制，韻尾只能有一個，因此詞幹韻尾

絕大多數都會被小稱詞綴取代，這是因爲小稱詞綴帶有更重要的訊息。在少數情況下詞幹韻尾與小稱詞綴並存了下來，結果就產生了比較有標 (marked) 的音節結構。(二) 母音方面：某些詞幹母音在加綴時會發生改變，義烏方言中小稱母音會延長，湯溪方言、北京話和獲嘉方言中母音與小稱詞綴間會有過渡音增生，各方言也都有母音發生音變的例子。音變的原因可能是受到小稱詞綴或原詞幹韻尾的同化作用。

不同的小稱詞綴及不同的方言發生的變化不盡相同，因此，我們把所觀察到的幾個參數變體 (parametric variations) 列出如下：

(195) 小稱音變之參數變體

(A) 詞幹韻尾部分

- 詞幹韻尾
  - 保留
  - 刪除
    - 完全刪除
    - 殘餘部分音徵與母音結合

(B) 詞幹母音部分

- 詞幹母音
  - 維持不變
  - 產生變化
    - 母音延長
    - 母音音變
      - 受韻尾殘餘音徵同化
      - 受小稱詞綴同化
    - 與小稱詞綴間增生過渡音

鼻化小稱詞及兒化小稱詞對語音系統的衝擊有兩方面值得討論：(一) 如前所述，詞幹韻尾的保留、過渡音的增生和母音的延長會創造出有標的音節結構。(二) 鼻音尾及兒尾的加綴產生許多新的韻母，但韻尾及母音的變化也造成許多原本對立的韻母合流。

本文的結論是我們觀察小稱詞綴對詞幹影響的初步結果，接下來我們會蒐集更多方言的資料來對本文的結論做進一步的驗證，期能更加掌握詞幹變化的現象及原因。此外，我們也發現了某些方言中詞幹變化的原因不單是語音條件的關係，也可能是歷史來源、語言接觸等其他因素，有待進一步觀察。另外，小稱詞的語音變化除了音段 (segmental) 方面之外，聲調的變化本文尚未涉及，這也是我們下一步要做的。

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分類詞「尾」在台灣閩南語與客語中的範疇結構之比較*

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本文利用誘發式分類詞產生實驗的研究方法，收集台灣閩南語及客語分類詞「尾」的使用語料，藉以建立其在這兩個漢語方言的範疇結構。受試者共八十人分四組（每組二十人）：閩南語單語受試者、客語單語受試者、國語/閩南語雙語受試者、國語/客語雙語受試者。我們發現蛇、魚在這四組受試者的認知範疇中都是中心成員，雖然雙語受試者使用「尾」的百分比普遍比雙語受試者低。本文也比較「尾」與「隻」在閩南語及「尾」、「條」與「隻」在客語的分布，進一步描述這三個分類詞的範疇交疊情況。最後探討分類詞「尾」受到國語影響而產生的演變與對詞彙擴散理論的意涵。

關鍵詞：誘發式實驗，閩南語，客語，分類詞，詞彙擴散理論，「尾」

1. 前言

「尾」在中國方言中是一個比較特殊的量詞。它有計量的功用，同時也有分類的作用，例如，「兩尾魚」、「三尾蛇」。它主要出現在閩南語與客語，以及部分官話方言（如昆明話）。「尾」在中文書面語中也可以用來計量魚蝦，但是在國語的口語中則是用「條」來計量魚蝦。

在閩南語與客語中，與「尾」搭配使用的名詞包括：魚、蛇、龍、蝦、泥鰍、蜈蚣、蛔蟲、蜥蜴、海蔘、海豚等。這一類的名詞的主要特徵爲：(1) 動物；(2) 長型；(3) 有尾巴，但沒有腳 (Tai 1999)。

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* 鄭錦全院士致力於漢語方言研究四十餘年，成就斐然。鄭院士於七十年代即與王士元院士攜手建立「詞彙擴散理論」，來闡釋語音之歷史演變。數年前返台後，積極建立台灣閩南語與客語之地理資訊系統。本文探討台灣閩南語與客語分類詞「尾」的範疇結構，及其變異與變遷，並嘗試將「詞彙擴散理論」延伸至語意範疇與詞彙的演變。謹以此文祝賀鄭院士七秩壽辰，並表達對鄭院士的崇高敬意。本文承蔡素娟教授撥冗閱讀初稿，提出寶貴的修改建議，在此一併致謝。

本文的主要目的在建構分類詞「尾」在閩南語與客語的範疇結構，並比較兩者範疇結構之異同。閩南語的語料主要來自戴浩一國科會研究計畫報告《台灣閩南語量詞的歸類型式及認知原則》（戴浩一 1997）；客語的語料來自戴浩一國科會研究計畫報告《台灣客家話量詞的歸類型式及認知原則》（戴浩一 2001）。[1]

本文第二節簡述量詞與分類詞分析的理論基礎；第三節介紹誘發式分類詞產生實驗的研究方法；第四節分析閩南語分類詞「尾」的範疇結構；第五節分析客語分類詞「尾」的範疇結構；第六節比較閩南語「尾」與客語「尾」的範疇結構；第七節根據國語/閩南語雙語受試者，以及國語/客語雙語受試者使用「尾」的語料，嘗試瞭解雙語者使用分類詞「尾」受到國語影響的情形。第八節總結本研究對詞彙擴散理論的意涵。

2. 量詞分析的理論基礎

(1) 量詞雖然都有計量的功能，但是很多量詞同時有分類的功用。因此可以把具有分類功能的量詞從「量詞 (measure words)」中分離出來，即「分類詞 (classifiers)」(Tai and Wang 1990)。漢語不同方言各色各樣複雜的分類詞對人類在認知上的範疇分類 (human categorization) 正好提供了寶貴、豐富的原始材料 (Tai 1992, 1994)。

(2) 分類詞的分析採用認知心理學中的原型範疇化理論 (Prototype Theory of Categorization) 以及文化經驗範疇化理論 (Experiential Theory of Categorization)。根據心理學家 Rosch (1975) 及語言學家 Labov (1973) 等人有關認知的實驗，發現人類對世界的物體做分類時，是先定出一個原型，再以此作爲認知上的參考點來作爲事物分類的依據，而不是像古典理論所說的，先訂出一組特徵，再把具有這一組特徵的事物歸爲一類，所以原型範疇化理論比起傳統範疇化理論對分類的看法更符合人類分類認知的實際行爲。文化經驗範疇化理論認爲分類是來自於不同的社會文化背景及人類與其周圍物質環境間的互動，而非單純的依據個體的客觀屬性特徵作分類。所以除了原型理論外，要廣泛解釋人類分類的行爲，仍需參照人類主觀經驗的因素 (Lakoff 1986, 1987)。

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[1] 《台灣閩南語量詞的歸類型式及認知原則》（戴浩一 1997）(NSC 86-2411-H-194-005)，研究助理爲李美齡、郭怡君。《台灣客家話量詞的歸類型式及認知原則》（戴浩一 2001）(NSC 89-2411-H-194-056, NSC 90-2411-H-194-024)，研究助理爲吳莉雯、劉慧娟、陳韻伃、陳美秀。謹在此感謝他們在忙碌的課業中，熱心收集並整理資料。

(3) 物體之形狀、大小、軟硬、以及整體的特徵部分爲人類對外界物體分類的基礎 (Allan 1977, Tai 1992, 1994)。

(4) 物體形狀以長、方、圓（或塊狀）爲主要的標準。從幾何形狀視之，長形物體爲一度空間的直線；以平面爲主的方形體爲二度空間的平面；圓形和塊狀物體同爲三度空間的立體 (Allan 1977, Pinker 1989)。

3. 誘發式的分類詞語料收集

根據以上的理論基礎，戴浩一 (1997) 設計一套誘發方式的研究方法，來收集閩南語分類詞的自然語料，以歸納它們分類的認知原則，並建立閩南語分類詞的範疇結構。研究方法是以實物的照片爲刺激材料，誘發受試者說出與該實物搭配的分類詞。根據此研究方法所收集的語料，瞭解每個分類詞所搭配的名詞的家族成員分布情形，並找出中心成員 (central member) 以及不同層次的非中心成員，藉以建構該分類詞的範疇結構。後續之客語研究即沿用此研究方法（戴浩一 2001）。本小節僅就分類詞「尾」的語料收集，介紹本研究方法。

3.1 刺激呈現方式

本研究方法是以實物的照片作爲刺激材料，讓受試者看到實物照片時，同時說出該實物之名稱以及搭配的分類詞。

在文獻中，Tzeng et al. (1991) 及 Ahrens (1994) 都曾經採用以圖片作爲刺激材料的方法。Tzeng et al. (1991) 研究失語症病人使用分類詞情形。他們的方法是同時呈現二張同樣物品的圖片，唯一的差別是物品的數量。然後要求受試者比較二張圖的不同處。例如，一張圖片有三個紅蘋果，另一張圖片有五個一模一樣的蘋果。當受試者被問到這兩張圖片有什麼不同時，他們會說出：圖片一有「三個紅蘋果」；圖片二有「五個紅蘋果」。

另外，Ahrens (1994) 研究正常人及失語症患者的分類詞使用情形時，所採用的繪畫圖片設計是每一張圖片皆包含可供描述的語境。例如，目標雖然是「兩匹馬」，但是圖片中不是只畫兩匹馬，而是兩匹馬在河邊喝水，讓受試者儘量對圖片做描述。

爲了瞭解圖片呈現方式的效果，本研究以這兩種圖片呈現方式進行預測，結果我們發現受試者在描述 Ahrens 的圖片時出現兩個問題。其一，即使圖片中的

物品是二個以上，如兩枝筆、三本書，但受試者通常只說圖片中有筆、有書，而較少注意到數量，以致於經常未說出數量，僅說出名詞。由於漢語的分類詞一定要伴隨數量出現，在受試者未說出數量的情形下，自然無法收集到搭配該名詞的分類詞。其二，Ahrens 所使用的圖片，畫圖者使用的筆調常偏漫畫式，對於受試者常發生辨識上的困難，往往要花上很長的時間慢慢認清圖片中所畫的物品爲何。因此即使最後認出圖像，也因認知的運作承載了太多的辨識工作，因而忽略了使用分類詞。更甚者是終究認不出圖像。

在此預測過程，由於 Tzeng et al. (1991) 的方法沒有上述兩個問題，因此所獲得的語料則相當豐富，其誘答的成功率極高，提供了原型範疇建構所需的原始材料。然而，我們發現 Tzeng et al. 所使用的圖片對受試者仍然比較抽象，因此我們決定採用實物照片。本研究結果發現實物照片的效果最好。〈圖 1〉、〈圖 2〉即本計畫所採用之對比照片的例子。

〈圖 1〉三個蘋果

〈圖 2〉五個蘋果

3.2 刺激材料的選擇

「尾」在閩南語與客語中是極爲特殊的分類詞，因此希望找出使用「尾」分類詞的動物中，哪一類是「尾」分類詞的中心成員。根據文獻，閩南語與客語使用「尾」分類詞的動物包括：蛇、魚、龍、蝦、蜥蜴等（陳輝龍 1934，陳修 1991，楊秀芳 1995，羅肇錦 1985，何耿鏞 1993，黃雪貞 1994），因此選擇這些動物的照片作爲刺激材料。

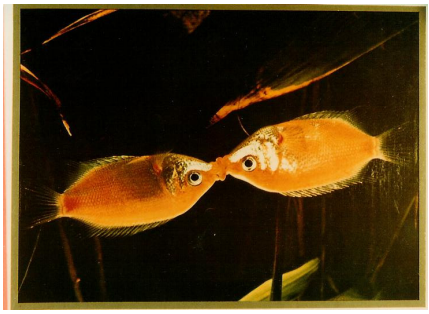
此外，在漢語方言分類詞的系統中，有時候同類物品如果形狀不同，會使用不同的量詞。例如，瓜類在國語中有時用「個」（西瓜、冬瓜），有時用「條」（絲瓜、黃瓜）(Tai and Wang 1990)。閩南語也有類似的現象，有時用「粒」（西

瓜、冬瓜），有時用「條」（菜瓜、刺瓜）。

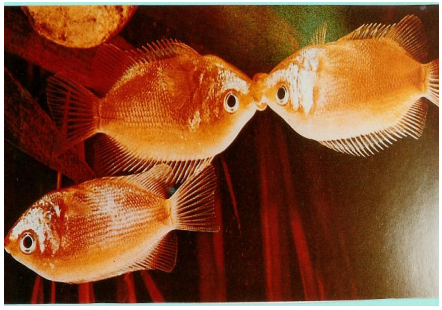
就魚類而言，其外表形狀有很大差異，故本研究進一步操弄「形狀」這個認知條件，以瞭解形狀對「尾」分類詞使用的影響。長得像一般魚的形狀的如鯉魚、吳郭魚等，因形狀沒有太大變異，因此只取一種。其他形狀變異較大的魚，如「長形」的鱔魚（或鰻魚），「八爪」的章魚，「扁形」的比目魚，到「四腳」的鱷魚、蜥蜴等，其照片都包含在研究刺激材料之中。唯一例外的是眾人熟悉、但非實際存在的「龍」，則採用常見的彩色繪畫圖片，翻拍而成。

本研究中，「尾」的家族包含蛇、一般的魚、比目魚、鱔魚、蝦、龍、蜥蜴、章魚、鱷魚、海豚。[2] 每一種動物都有兩張數量對比的照片，如〈圖 3〉「兩尾魚」與〈圖 4〉「三尾魚」的對照。

〈圖 3〉兩尾魚



〈圖 4〉三尾魚



3.3 受試者

本研究所用到的閩南語語料與客語語料都包含兩組受試者，即單語與雙語。雙語者都是以國語爲其另一語言，即國語/閩南語雙語、國語/客語雙語。

閩南語方面，爲確保本研究所搜集到的單語語料是未受國語影響的道地的閩南語分類詞用法，因此所採用的發音人爲未曾受過國語教育且不太識字、不會說國語的閩南人。受試者爲生長在嘉義縣民雄地區，說台灣閩南語，年齡五十歲以上者二十人。國語/閩南語雙語者來自同一地區，年齡在五十歲左右。

客語方面，爲確保本研究所搜集到的單語語料是未受國語與閩南語影響的道地的客語分類詞用法，因此所採用的發音人爲未曾受過國語教育且不太識字，不

[2] 爲了方便討論，所有動物名稱在本文中都以中文呈現。然而，閩南語與客語都有其詞彙與發音。例如，閩南語的蜥蜴有人說「四腳蛇」，也有人說「too ting」；而海豚則是「海豬」。對我們的分析而言並沒有影響。客語的情形亦同。

會說國語及閩南語的客家人二十人。受試者爲生長在苗栗縣銅鑼及公館地區，說台灣四縣客語爲主。[3] 國語/客語雙語者來自同一地區，年齡在五十歲左右。[4]

3.4 過程

在所有準備工作完成之後，接下來就是找受試者接受訪錄。在正式的訪錄工作進行之前，先找受試者做前測，以便找出考慮未週全之處加以改進，然後才正式進行訪錄。

首先對可能合格的受試者進行背景調查並記錄以確定：一、教育背景；二、語言背景；三、年齡；四、其他（住址、電話等等，以便後續的追蹤研究）。

確定受試者合乎研究的條件之後，即可展開訪錄的工作。語料收集的進行地點雖無嚴格的限制，但大致要在不受他人、雜事干擾及通風、採光良好之處進行，以確保受試者可以專心接受錄音，一口氣完成，最好不要有中斷。並且由於受試者大多上了年紀，因此要注意受試者是否需輔以眼鏡，以確定能看清照片，將所有不必要的干擾變數減至最少。錄音工具採可錄式 MD 隨身聽進行錄音工作，並在 MD 片上標明受試者的編號。

語料收集的指導語陳述如下：

說明：我一次給你看兩張照片，請你告訴我這兩張照片有什麼不一樣。如果有什麼看不懂的，可以問我。（指導語皆以閩南語/客語發音，也不做示範說明。）

錄音：讓受試者儘可能輕鬆自然地發揮，因無所謂正確答案，所以訪員除了扮演好的傾聽者並維持輕鬆的氣氛外，不對受試者有任何干擾或提示引導等動作，除非受試者有不明白之處才可回答其問題。

4. 閩南語分類詞「尾」的範疇結構

就如上述，刺激材料中，「尾」(bue53) 的家族包括蛇、一般的魚、比目魚、鱔魚、蝦、龍、蜥蜴、章魚、鱷魚、海豚等十種。根據本研究誘發收集的語料，

[3] 事實上在現代的台灣能操得一口純正客語的人已不多了，在純樸的鄉下農村尚能尋得一些寶貴的受試者，大多爲高齡。或許在十年、二十年後，便難有這樣的人了。相較之下，能說純正閩南語的爲數不少。

[4] 許多客語雙語者，除了客語、國語，也會說閩南語。因此，本研究的國語/客語雙語受試者以不說閩南語者爲優先考量。

閩南語受試者使用「尾」的情形如〈表 1〉所示。總數 S 指使用「尾」的受試者人數；20-N 指有回答的人數；總數中有 0.5 是指受試者第一次並非回答「尾」，但馬上做自我修正時才回答「尾」。

從〈表 1〉可見，對標的物「蛇」，受試者使用「尾」的比例是 100%，非常一致。其後使用「尾」的比例遞減，而以「海豚」使用「尾」的比例最低，爲 42%。

從〈表 2〉可見，當受試者不使用「尾」時，絕大多數都使用「隻」(ciah3)。其中章魚除了使用「隻」之外，還有使用「e24」的情形。從〈表 2〉中也可看出「隻」出現的比例。其中鱷魚使用「隻」的比例最高，達 48%。

〈表 1〉閩南語「尾」家族成員（閩南語單語受試者）

項目	分類詞	總數 S	(20-N)	S/(20-N)
蛇	尾 bue53	20	20	100%
一般的魚類	尾 bue53	18.5	20	93%
比目魚	尾 bue53	18	20	90%
鱔	尾 bue53	17	19	89%
蝦	尾 bue53	15	20	75%
龍	尾 bue53	15	20	75%
蜥蜴	尾 bue53	11	19	58%
章魚	尾 bue53	10.5	19	55%
鱷魚	尾 bue53	10.5	20	53%
海豚	尾 bue53	7.5	18	42%

〈表 2〉閩南語「尾」家族使用其他分類詞情況（閩南語單語受試者）

項目	分類詞	總數 S	20-N	S/(20-N)
一般的魚	尾 bue53	18.5	20	93%
	隻 ciah3	1.5	20	8%
鱔	尾 bue53	17	19	89%
	隻 ciah3	2	19	11%
鱷魚	尾 bue53	10.5	20	53%
	隻 ciah3	9.5	20	48%
章魚	尾 bue53	10.5	19	55%
	隻 ciah3	5.5	19	29%
	e33 (=個)	3	19	16%

項目	分類詞	總數 S	20-N	S/(20-N)
比目魚	尾 bue53	18	20	90%
	隻 ciah3	2	20	10%
蝦	尾 bue53	15	20	75%
	隻 ciah3	5	20	25%
龍	尾 bue53	15	20	75%
	隻 ciah3	5	20	25%
蛇	尾 bue53	20	20	100%
蜥蜴	尾 bue53	11	19	58%
	隻 ciah3	8	19	42%

5. 客語分類詞「尾」的範疇結構

客語受試者使用「尾」(mi24) 的情形如〈表 3〉所示。總數 S 指使用「尾」的受試者人數；20-N 指有回答的人數。

從〈表 3〉可見，對「一般的魚」、「比目魚」、「蛇」、「海豚」，受試者使用「尾」的比例是 100%。其他也都在 90% 以上，一致性很高。唯有「蝦子」使用「尾」的比例低到 25%。值得注意的是海豚雖然使用「尾」的比例也是 100%，但是只有 15 位受試者回答，其餘 5 人可能無法辨識照片中的動物。

從〈表 4〉可見，當客語受試者不使用「尾」時，除了使用「隻」(tsak2)，也有使用「條」(t'iau11) 的情形，這是客語與閩南語不同的地方。

〈表 3〉客語「尾」的家族成員（客語單語受試者）

項目	分類詞	總數 S	20-N	S/(20-N)
一般的魚	尾 mi24	20	20	100%
比目魚	尾 mi24	20	20	100%
蛇	尾 mi24	20	20	100%
海豚	尾 mi24	15	15	100%
龍	尾 mi24	19	20	95%
蜥蜴	尾 mi24	18	20	90%
鱔/鰻	尾 mi24	18	20	90%
章魚	尾 mi24	18	20	90%
鱷魚	尾 mi24	13	18	72%
蝦子	尾 mi24	5	20	25%

〈表 4〉客語「尾」家族使用其他分類詞情況（客語單語受試者）

項目	分類詞	總數 S	20-N	S/(20-N)
龍	尾 mi24	19	20	95%
	隻 tsak2	1	20	5%
蜥蜴	尾 mi24	18	20	90%
	條 t'iau11	2	20	10%
鱔/鰻	尾 mi24	18	20	90%
	條 t'iau11	2	20	10%
章魚	尾 mi24	18	20	90%
	隻 tsak2	1	20	5%
	條 t'iau11	1	20	5%
鱷魚	尾 mi24	13	18	72%
	隻 tsak2	3	18	16%
	尾/隻	2	18	12%
蝦子	尾 mi24	5	20	25%
	隻 tsak2	15	20	75%

6. 閩南語「尾」與客語「尾」範疇結構的比較

從〈表 5〉中可見，蛇與魚在這兩個方言中，都是「尾」家族的中心成員。雖然閩南語的魚使用「尾」的比例未達 100%，但是還是第二高的比例。龍在閩南語使用「尾」的比例只有 75%，不能算入中心成員；但它在客語中使用「尾」的比例高達 95%，應該算入中心成員。蝦子在閩南語使用「尾」的比例有 75%，不能算入中心成員，而在客語中使用「尾」的比例只有 25%，很清楚的是邊緣成員。蜥蜴在閩南語使用「尾」的比例只有 58%，可看成邊緣成員；但客語中使用「尾」的比例卻高達 90%，應該算入中心成員。海豚在閩南語使用「尾」的比例只有 42%，可看成邊緣成員。海豚雖然使用「尾」的比例是 100%，但是只有 15 位受試者回答，其餘 5 人可能無法辨識照片中的動物。它在客語中心成員的地位有待更進一步追查。

〈表 5〉「尾」家族在閩南語及客語的比較

	蛇	魚	龍	蝦	蜥蜴	海豚
閩南語單語受試者 (n=20)	100%	93%	75%	75%	58%	42%
客語單語受試者 (n=20)	100%	100%	95%	25%	90%	100%

7. 國語對分類詞「尾」的影響

一個語言與另外一個語言接觸，兩個語言都會互相影響而產生變化，特別是在詞彙方面。台灣的國語在語音、句法、及詞彙上都已經參雜了閩南語及客語的一些成分，而形成「台灣國語」。相對地，台灣的閩南語及客語也多多少少受了國語的影響，特別是受過教育的閩南人及客家人。因此，戴浩一在台灣閩南語及客語量詞的研究計畫中，用本文第三節所介紹的誘發式方法及相同的照片刺激材料收集會說國語的閩南人及客家人的語料。閩南語的受試者二十人，生長在嘉義縣地區；客語的受試者二十人，生長在苗栗縣銅鑼、公館地區。兩組受試者的年齡都在五十歲左右。

以下〈表 6〉、〈表 7〉呈現國語/閩南語雙語的受試者使用分類詞「尾」的情況。比較〈表 1〉與〈表 6〉，我們可以看出國語/閩南語雙語受試者用「尾」的比例沒有閩南語單語受試者那麼高。比較〈表 2〉與〈表 7〉，我們可以看出雙語受試者用「隻」(ciah3) 的比例增加，有些受試者用了閩南語分類詞「條」(tiau33) 之後，覺得不妥，又改回閩南語的「尾」或「隻」，因此在〈表 6〉及〈表 7〉中，以 0.5 計算。「隻」是閩南語計數動物最常用的分類詞，當有國語/閩南語雙語受試者對「尾」的語感不是很穩定的時候，自然就被「隻」取代。在〈表 7〉中，「隻」與章魚、海豚、龍的搭配率已超過 50%，與蜥蜴、鱷魚的搭配率更是超過 80%。對國語/閩南語雙語的受試者來說，蜥蜴、鱷魚可視爲「隻」的中心成員，「尾」的邊緣成員。這也是原型範疇化理論中，兩個範疇互動的正常現象。比較〈表 1〉、〈表 2〉與〈表 6〉、〈表 7〉，我們也能看出閩南語單語受試者與國語/閩南語雙語受試者除了都把蛇跟魚看成中心成員，其他成員的範疇地位就不一樣了。

〈表 6〉閩南語「尾」的家族（國語/閩南語雙語受試者）

項目	分類詞	總數 S	20-N	S/(20-N)
比目魚	尾 bue53	18	20	90%
蛇	尾 bue53	16.5	20	83%
鱔	尾 bue53	13.5	19	71%
一般的魚	尾 bue53	13.5	20	68%
蝦	尾 bue53	13	20	65%
章魚	尾 bue53	10	19	53%
海豚	尾 bue53	8	20	40%

項目	分類詞	總數 S	20-N	S/(20-N)
龍	尾 bue53	7	20	35%
蜥蜴	尾 bue53	3.5	20	18%
鱷魚	尾 bue53	3	20	15%

〈表 7〉閩南語「尾」家族使用其他分類詞情況（國語/閩南語雙語受試者）

項目	分類詞	總數 S	20-N	S/(20-N)
比目魚	尾 bue53	18	20	90%
	隻 ciah3	2	20	10%
蛇	尾 bue53	16.5	20	83%
	隻 ciah3	3.5	20	18%
鱔	尾 bue53	13.5	19	71%
	隻 ciah3	5.5	19	29%
一般的魚	尾 bue53	13.5	20	68%
	隻 ciah3	6.5	20	33%
蝦	尾 bue53	13	20	65%
	隻 ciah3	7	20	35%
章魚	尾 bue53	10	19	53%
	隻 ciah3	7	19	37%
	e33 (個)	2	19	11%
海豚	隻 ciah3	12	20	60%
	尾 bue53	8	20	40%
龍	隻 ciah3	12	20	60%
	尾 bue53	7	20	35%
	身 sin55	0.5	20	3%
	條 tiau33	0.5	20	3%
蜥蜴	隻 ciah3	16	20	80%
	尾 bue53	3.5	20	18%
	條 tiau33	0.5	20	3%
鱷魚	隻 ciah3	17	20	85%
	尾 bue53	3	20	15%

爲了方便讀者逐項比較，我們把〈表 2〉與〈表 7〉匯集於〈表 8〉。

〈表 8〉閩南語單語受試者與國語/閩南語雙語受試者使用「尾」與「隻」的比較

單語					雙語			
項目	分類詞	總數 S	20-N	S/(20-N)	分類詞	總數 S	20-N	S/(20-N)
一般的魚	尾 bue53	18.5	20	93%	尾 bue53	13.5	20	68%
	隻 ciah3	1.5	20	8%	隻 ciah3	6.5	20	33%
鱔	尾 bue53	17	19	89%	尾 bue53	13.5	19	71%
	隻 ciah3	2	19	11%	隻 ciah3	5.5	19	29%
鱷魚	尾 bue53	10.5	20	53%	隻 ciah3	17	20	85%
	隻 ciah3	9.5	20	48%	尾 bue53	3	20	15%
章魚	尾 bue53	10.5	19	55%	尾 bue53	10	19	53%
	隻 ciah3	5.5	19	29%	隻 ciah3	7	19	37%
	e33 (個)	3	19	16%	e33 (個)	2	19	11%
比目魚	尾 bue53	18	20	90%	尾 bue53	18	20	90%
	隻 ciah3	2	20	10%	隻 ciah3	2	20	10%
蝦	尾 bue53	15	20	75%	尾 bue53	13	20	65%
	隻 ciah3	5	20	25%	隻 ciah3	7	20	35%
龍	尾 bue53	15	20	75%	隻 ciah3	12	20	60%
	隻 ciah3	5	20	25%	尾 bue53	7	20	35%
					身 sin55	0.5	20	3%
					條 tiau33	0.5	20	3%
蛇	尾 bue53	20	20	100%	尾 bue53	16.5	20	83%
					隻 ciah3	3.5	20	18%
蜥蜴	尾 bue53	11	19	58%	隻 ciah3	16	20	80%
	隻 ciah3	8	19	42%	尾 bue53	3.5	20	18%
					條 tiau33	0.5	20	3%
海豚	隻 ciah3	10.5	18	58%	隻 ciah3	12	20	60%
	尾 bue53	7.5	18	42%	尾 bue53	8	20	40%

以下〈表 9〉、〈表 10〉呈現國語/客語雙語的受試者使用分類詞「尾」的情況。比較〈表 3〉與〈表 9〉，相對於客語單語受試者，我們可以看出國語/客語雙語受試者用「尾」的比例普遍降低。這一點與閩南語的情況一樣。比較〈表 4〉與〈表 10〉，我們可以看出國語/客語雙語受試者用「條」(t'iau11) 的比例明顯增加了。例如龍，從 0 增加至 5 人。這一點與閩南語的情況不一樣。有些雙語受試者用了客語「隻」(tsak2) 來搭配「尾」的家族的一些成員，例如蝦子有 18 人用「隻」，只有 2 人用「尾」(mi24)。然而，蝦子在〈表 4〉與〈表 10〉都是客

語「尾」的家族的邊緣成員，而是客語「隻」的家族的中心成員。再者，蝦子在閩南語「尾」範疇的地位比在客語高，不管是單語或雙語受試者的使用情況。

〈表 9〉客語「尾」的家族（國語/閩南語雙語受試者）

項目	分類詞	總數 S	20-N	S/(20-N)
一般的魚	尾 mi24	20	20	100%
比目魚	尾 mi24	19	20	95%
蛇	尾 mi24	18	20	90%
鱔/鰻	尾 mi24	16	19	84%
蜥蜴	尾 mi24	16	20	80%
海豚	尾 mi24	14	20	70%
章魚	尾 mi24	13	20	65%
龍	尾 mi24	13	20	65%
鱷魚	尾 mi24	11	20	55%
蝦子	尾 mi24	2	20	10%

〈表 10〉客語「尾」家族使用其他分類詞情況（國語/客語雙語受試者）

項目	分類詞	總數 S	20-N	S/(20-N)
比目魚	尾 mi24	19	20	95%
	條 t’iau11	1	20	5%
蛇	尾 mi24	18	20	90%
	條 t’iau11	2	20	10%
鱔/鰻	尾 mi24	16	19	84%
	條 t’iau11	3	19	16%
蜥蜴	尾 mi24	16	20	80%
	條 t’iau11	4	20	20%
海豚	尾 mi24	14	20	70%
	條 t’iau11	4	20	20%
	隻 tsak2	2	20	10%
章魚	尾 mi24	13	20	65%
	條 t’iau11	4	20	20%
	隻 tsak2	3	20	15%
龍	尾 mi24	13	20	65%
	條 t’iau11	5	20	25%
	隻 tsak2	2	20	10%

項目	分類詞	總數 S	20-N	S/(20-N)
鱷魚	尾 mi24	11	20	55%
	條 t'iau11	5	20	25%
	隻 tsak2	4	20	20%
蝦子	尾 mi24	2	20	10%
	隻 tsak2	18	20	90%

我們把〈表 4〉與〈表 10〉並列於〈表 11〉，以便比較客語單語與雙語受試者的用法。

〈表 11〉客語單語受試者與國語/客語雙語受試者使用「尾」、「條」、「隻」比較

單語					雙語				
項目	分類詞	總數 S	20-N	S/(20-N)	項目	分類詞	總數 S	20-N	S/(20-N)
龍	尾 mi24	19	20	95%	龍	尾 mi24	13	20	65%
	隻 tsak2	1	20	5%		條 t'iau11	5	20	25%
						隻 tsak2	2	20	10%
蜥蜴	尾 mi24	18	20	90%	蜥蜴	尾 mi24	16	20	80%
	條 t'iau11	2	20	10%		條 t'iau11	4	20	20%
鱔/鰻	尾 mi24	18	20	90%	鱔/鰻	尾 mi24	16	19	84%
	條 t'iau11	2	20	10%		條 t'iau11	3	19	16%
章魚	尾 mi24	18	20	90%	章魚	尾 mi24	13	20	65%
	隻 tsak2	1	20	5%		條 t'iau11	4	20	20%
	條 t'iau11	1	20	5%		隻 tsak2	3	20	15%
鱷魚	尾 mi24	13	18	72%	鱷魚	尾 mi24	11	20	55%
	隻 tsak2	3	18	16%		條 t'iau11	5	20	25%
	尾/隻	2	18	12%		隻 tsak2	4	20	20%
蝦子	尾 mi24	5	20	25%	蝦子	尾 mi24	2	20	10%
	隻 tsak2	15	20	75%		隻 tsak2	18	20	90%

最後，我們以〈表 12〉來歸納出四組各二十人受試者使用「尾」的百分比來呈現分類詞「尾」的範疇結構。表中魚的百分比是實驗材料中「一般的魚」的百分比。從〈表 12〉，可以看出雙語受試者的各項百分比都比單語受試者低，只有魚在客語單雙語受試者一致維持在百分之一百，沒有差異。

〈表 12〉「尾」家族在閩南語單雙語及客語單雙語的比較

	蛇	魚	龍	蝦	蜥蜴	海豚
閩南語單語 (n=20)	100%	93%	75%	75%	58%	42%
閩南語雙語 (n=20)	83%	68%	35%	65%	18%	40%
客語單語 (n=20)	100%	100%	95%	25%	90%	100%
客語雙語 (n=20)	90%	100%	65%	10%	80%	70%

8. 結語

本文介紹誘發式分類詞產生實驗的研究方法及其理論背景，並以分類詞「尾」爲例說明範疇結構的建立，進而比較閩南語「尾」與客語「尾」的範疇結構。這種研究方法雖然比傳統的田野調查，耗費人力與時間，但是收集的語料相當的豐富，不但呈現了漢語分類詞的範疇結構，更呈現了在一個範圍狹窄的小方言區分類詞使用的個人變異 (individual variation)。漢語方言有極其豐富分類詞系統供給語言學家及認知心理學家寶貴的研究材料 (Tai 1992, 1994)，我們相信以這個方法來收集漢語方言分類詞的使用，不但可以提供更客觀、更具實證的原始材料促進歷時與共時語言學更精準的研究，而且也讓我們更進一步認識語言變異及語言心理結構的複雜度。

王士元先生與鄭錦全先生於三十多年前提出「詞彙擴散理論」(Theory of Lexical Diffusion) 研究漢語方言的音變 (Wang 1969, Cheng and Wang 1971, Cheng and Wang 1972)。這個理論至今已經是眾所皆知，膾炙人口，對語言演變有深遠的洞察。這個理論的中心思想是：語音的變遷 (change) 經由變異 (variation) 的選擇(selection)，不規則逐詞地 (word by word) 進行的。本文以分類詞「尾」的範疇結構爲例，指出語意範疇跟語音範疇一樣，有其變異，而且受到國語影響而產生的演變，也是逐詞進行的，而不是一次全部完成的。因此漢語方言分類詞的變異與變遷也應該根據詞彙擴散理論來研究，特別是利用王士元先生近年來針對語言變遷所研發出的計算模式 (Wang, Ke and Minett 2004)。然而，我們也要指出語意範疇跟語音範疇也有不一樣的地方。語意範疇有認知的基礎，也有明顯的原型範疇，因此每一個語意範疇的成員份量 (weight) 及頻率 (frequency) 也不盡相同。要應用詞彙擴散理論的計算模式來研究漢語方言分類詞的變異與變遷，也得將原型效應 (prototype effect) 與頻率效應 (frequency effect) 納入計算公式。

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《論語》中第一人稱代詞的區分*

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本文主要探討如何解釋《論語》中的第一人稱代詞“朕”、“予”、“我”、“吾”的用法。一般學者都用語法來分析，但是語法只是一個層面，它能說出代詞特有的語法位置，但不能解釋在同樣的位置上，如主語，爲何有時用“予”，不用“我”等類似的問題。如果能認識各個代詞的特徵就能解答這些疑問，所以必須借助於用代詞的語境，如某個代詞的內容，語用上尊卑、指示物件、強調對比，話語分析的用法才能有完整的解釋。

文中指出在《論語》中，“朕”只用於堯的自稱；“予”的優先條件是語用學上的尊卑之分，用於上對下、師對生，而且重視內容，一定與“天”、“生老病死”等人們無法控制的課題有關；“我”也是重視內容的用法，一般用於討論道德教育意識的課題，而且也注重語用學上的指示語，強調對比和主觀的看法；“吾”的重點不在內容而是話語分析上的背景敍述作用。

關鍵詞：論語，第一人稱，語用學，話語分析，我，予，吾

1. 引言

本文探討的是《論語》中第一人稱代詞的區別。《論語》中的第一人稱代詞有“朕”、“我”、“予”和“吾”。筆者想研究這些不同的第一人稱代詞中是

* 記得幾年前，當我請教鄭錦全老師應該往哪一個方向作研究時，他曾鼓勵我以“說‘我’”爲題目，探討中國歷代名著中的第一人稱代詞。老師一方面要配合我的研究興趣，一方面希望讀語言學的學生有機會多讀中國名著。老師的意見我沒有忘懷，就是一直沒有開始這方面的研究，如今一方面爲了紀念老師多年來教育之恩，一方面有機會嘗試老師所提議的課題，以《論語》開始做起。一開始做這篇論文，我就由衷地佩服老師在語言學上的遠見，這個課題確實很有意義也很有挑戰性，我邊研究邊對老師的敬佩油然而生，希望這篇文章不會令老師失望。雖然鄭老師是以電腦語言學聞名語言學界，我很感激他讓我跟著興趣做研究，讓我從文本研究語言。他這種以學生爲重的態度奠定了我日後引導學生的原則。我要藉此向恩師致萬二分的謝意，並祝鄭老師永遠健康，永遠開心。謝謝兩位得力助手洪瑞祥同學和洪光益同學給與多方面的幫助，還有感謝吳潤強同學初期的幫忙。你們的幫助和討論給這篇文章的寫作過程增添了許多樂趣，所謂教學相長也。

否有不同的用法，或者是隨意使用的，從而嘗試區分它們的作用。

王力在《漢語史稿》中討論人稱代詞的發展時說“‘余’（予）、‘吾’、‘我’……相互間的界限，還沒有人能劃分清楚。”（王力 2001:260）。自從王力先生以來已有不少學者嘗試用不同的角度來區別第一人稱代詞的用法。最常見的是以語法區分這三種第一人稱代詞，其實語法只是最基本的分析，很多時候不能單以一個短句來理解代詞的使用意義，必須看上下文的意思，借助於語用學、話語分析的手段，使用各代詞時的內容等，還要分層次分析才能清楚地區分它們。

本文討論《論語》第一人稱代詞在語法方面，語用方面：尊卑、對比強調、指示物件、內容，以及話語分析的研究，然後討論如何有層次地區分這些代詞。

2. 區分第一人稱代詞的方法

2.1 從語法上區分“我”、“吾”和“予”

前人對“我”、“吾”和“予”在語法上做出了大略的區分，但似乎沒有辦法用語法區分清楚。根據王淑怡 (2005) 的統計，“朕”、“我”、“吾”和“予”在《論語》中的語法分布如下（筆者也證實其準確性）：

〈表 1〉《論語》中第一人稱代詞的出現頻率和語法位置

	我	吾	予	朕
主語	18	94	11	
賓語	25	3	10	
定語	2	16	2	2
共計	45	113	23	2

從表中很明顯的可以看出“我”和“予”的語法特徵相似，主要用作主語和賓語，“吾”主要是用作主語和賓語。如果可以解答“吾”爲何有三個作賓語的例子，“我”和“予”爲何有兩個作定語的例子，就可以說明在《論語》中“我”和“予”一般不做定語，“吾”一般不做賓語的規律與現象。

關於“吾”作爲賓語只有 3 見，王力先生已經爲此作出了解釋：“‘吾’字除了在否定句中（‘不吾知’）情況下，在先秦一般不用於賓語。”（王力 2001:266）。他舉了《論語・先進》爲例：

(1) 以吾一日長乎爾，毋吾以也。居則曰‘不吾知也！’（《論語・先進》）

韓峥嶸 (1985) 也指出“吾”多用於主語和定語，在否定句裡也可作賓語，放在動詞的前面，可譯爲“我”、“我們”。如：

(2) 夫子欲之，吾二臣者皆不欲也。（《論語・季氏》）

至於“我”只有兩個定語的現象，楊樹達在《高等國文語法》中曾指出“我”字用作定語表親愛。他舉例說在以下的例子裡，“我”表示“我的”、“我們的”的含義，又表示親愛的意義，如：

(3) 述而不作，信而好古，竊比於我老彭。（《論語・述而》）

從這裡我們可以從語法的分析上看到“我”和“予”有相似的語法特徵，主要是主語和賓語，一般不作定語，“吾”則不同，主要是主語和定語，一般不作賓語。因此，在定語的位置上，一般是使用“吾”，至於在賓語的位置上什麼時候用“我”和“予”？主語的位置上什麼時候用“我”、“予”和“吾”？就得做更深入的探討。

關於“我”和“吾”的區分，王力先生 (2001:260) 也只是指出“吾”主要是用於主語和定語，“我”用於主語和賓語，“我”用於賓語時，“吾”往往用於主語，“吾”用於定語時，“我”就用於主語，但沒有說明它們之間在主語或賓語上如何分工。周生亞 (1980) 說魯方言代表文獻是《論語》，該方言中“吾”之不足，剛好得到“我”做賓語的補充，也沒有進一步的分析。

2.2 從語用學的尊卑區分

不少語言的代詞，如日語、韓語等，都像漢語一樣有尊卑之分。筆者研究《紅樓夢》的代詞時發現當代詞出現單複數的矛盾時，往往是爲了帶出尊卑的差別 (Lee 1999)。《論語》的代詞如果也有尊卑之分，也許有助於我們瞭解不同第一人稱代詞的分工。

有關“朕”，一般學者認爲表莊重（錢宗武 1994:64），是尊稱形式（洪波 1996:80），在《論語》“朕”（2 見），均在〈堯曰〉篇出現，都爲定語，從其

意義來看，“朕”是那種自認爲秉承自然之氣，接受上天命令的人物的自稱，如：

(4) 朕躬有罪……罪在朕躬。（《論語・堯曰》）

由此向後發展，到秦朝時，“朕”的詞義縮小成爲皇帝專用的自稱。

有關“我”，一般學者認爲多用於表自謙（錢宗武 1994，趙君 2005），有的說是通稱（洪波 1996），但是在《紅樓夢》裡很多時候是上對下才可以用單數自稱“我”(Lee 1999)，可見一定要視語境而定。有關“吾”有學者說表示自尊（趙君 2005），但是在《論語》中沒有看出這種跡象。有關“予”有的學者說是表自尊（錢 1994），有的卻說是謙卑之稱（洪波 1996），筆者同意王淑怡 (2005) 的說法，認爲在《論語》中“予”是上對下、師對生的用法，如：

(5) 予有亂臣十人。（《論語・泰伯》）（主語）
(6) 來！予與爾言。（《論語・陽貨》）（主語）
(7) 天生德於予。（《論語・述而》）（賓語）
(8) 回也視予猶父也。（《論語・先進》）（賓語）
(9) 啟予足，啟予手。（《論語・泰伯》）（定語）

因此從尊卑來分析，《論語》中的“朕”只有皇帝使用，“予”是上對下、師對生時使用，“予”確實是重視尊卑的代詞。但是這樣也不能解釋其他對學生說話的情況爲何不用“予”卻用“我”和“吾”？因此除了尊卑，得借助於對比和指示語來解釋。

2.3 從語用學的對比作用、指示語區分

指示語 (deixis) 是語用學裡一個很重要的課題，指示語研究用代詞時該代詞指的是誰，說話物件又是誰。語用學大家 Levinson 曾說過在語言的結構中，最能反映語言與其語境的關係的莫過於指示語 (Levinson 1983:54)。人們說話的時候用“你”不一定就是指聽話的人，可以是指任何人而言，畢永峨 (1991) 就曾經研究漢語中“你”的不同用法。在這一節裡，我們會看到在《論語》中“我”的用法往往不但指說話人，而且還有強調的作用。

有學者指出“我”的特別用法是著重於對人自稱，似乎後來發展到與他人對

比的現象。張淵釗 (1994:40) 指出“我”常用於帶強調自身語氣的句子中，頗具濃厚的主觀色彩。曾令香 (2005) 比較《詩經》和《論語》第一人稱代詞“我”時說“《詩經》中的‘我’作主語時只表示自稱，但發展到《論語》時，已著重於對人自稱，在他稱與‘我’的對比中言‘我’，已重於相對於他稱的存在而自稱。”（曾 2005:86）例：

(10) 孟孫問孝於我，我對曰：“無違”。（《論語・為政》）
(11) 爾愛其羊，我愛其禮。（《論語・八佾》）

王淑怡 (2005) 說在《論語》中用作主語時，“我”表現出與“非我”的明顯對待，具有強調的意義、加重語氣的作用，如：

(12) 惟我與爾有是夫。（《論語・述而》）
(13) 人皆有兄弟，我獨亡。（《論語・顏淵》）
(14) 賜也賢乎哉？夫我則不暇。（《論語・憲問》）

因此，從對比的角度來分析，可以看出“我”常用於與人對比的情況，有較強的主觀性；“予”一般只限指說話本人。

關於指示和單複數方面，洪波 (1996) 也認爲“予”和“朕”一般都只限於稱代說者本人，所以是單數的（王淑怡 2005）。“我”原來既可以稱代說者本人也可以稱代說者和聽者雙方，還可以稱代與說者有關的第三者，所以“我”在上古時期是可以兼用於單數和複數的，但在《論語》中，“我”只用作單數（王淑怡 2005）。“吾”沒有專指性，即可用於單數，也可用於複數，舉一例“吾”用作複數的例子：

(15) 鳥獸不可與同群，吾非斯人之徒與而誰與？（《論語・微子》）

關於說話物件方面，“予”有明確的物件，所以說是用於上對下、師對生；用“我”的時候則不一定（洪波 1996）。

2.4 從內容區分“我”和“予”

上一節說到“我”的主觀性和對比性是離不開用“我”時的內容。筆者發現

用“我”時，一般談論道德教育，因此說話人容易提出主觀的看法，也容易與他人做對比。可見，用“我”的時候，內容是很重要的因素。

劉金玉 (2005:143) 在討論《論語》中的自我道德教育意義時提到《說文解字》釋“我”爲“施身自謂”，意思是說，將個體置身於他人之間而作的自我稱謂。換言之，“我”是相對於他人而言的。他認爲“《論語》中的我大多數情況都明確地指示出個體與他人的分別，而突出自己獨特的身份認同。”比如，孔子在自述時說的：

(16) 述而不作，信而好古，竊比於<u>我</u>老彭。（《論語・述而》）

這裡的“我”，其自我認同意識就特別強烈。當太宰問子貢，孔子是否聖人，他顯然是要弄清楚孔子的自我身分。孔子聞之，禁不住說：

(17) “太宰知<u>我</u>乎！”（《論語・子罕》）

從孔子的抒發中，我們可以知道，他完全明白太宰發問旨意，故使用“我”字來證明他本人是自覺到自我認同。

有關“予”的用法，洪波 (1996:84) 說“在金文裡，當時王向神靈祈禱或將自己與先王對舉時，自稱一般都用‘余’（予）而不用‘我’和‘朕’。”勞悅強 (2001:378) 討論《論語》中的自我觀念時說“‘予’的特殊身分意義就好像跟天有一定的關係”，例如孔子受困於宋，桓魋設法要除掉他，他卻充滿自信地宣稱：

(18) “天生德於<u>予</u>，桓魋其如<u>予</u>何”（《論語・述而》）

他也說孔子談到他自己的志向的時候也常用“我”字來作夫子自道，例如：

(19) “<u>我</u>非生而知之者，好古，敏以求之者也”（《論語・述而》）

在以下做定語的兩個特例是因爲用“予”時討論的內容有關病重的曾子的身體，即“生老病死”的課題。可見“予”的優先考慮是從內容出發。兩個定語的特例如下：

(20) 曾子有疾，召門弟子曰：啟予足！啟予手！詩云‘戰戰兢兢，如臨深淵，如履薄冰。’（《論語・泰伯》）

這樣看來，我們似乎可以從內容來區分“予”和“我”的用法：凡是談論“天”或人無法控制的境界如“生老病死”等用“予”，凡是談論“道理”的內容，主要用“我”。“我”（45 見）在《論語》中是“予”（23 見）的一倍是因爲《論語》中談論道德教育的篇幅比談“天”或“生老病死”的課題多。

2.5 從話語分析的角度分析“吾”

從上文的討論，我們發現“我”和“予”都是重視內容的代詞，“吾”則不同，似乎沒有跟討論的內容有任何的關係。王淑怡 (2005) 曾提到“吾”作主語時，一般是爲了表述與己有關的事，無強調意義，如：

(21) 吾十有五而志於學。（《論語・為政》）
(22) 自行束脩以上，吾未嘗無誨焉。（《論語・述而》）
(23) 吾自衛反魯。（《論語・子罕》）
(24) 雖曰不要君，吾不信也。（《論語・憲問》）

“吾”一般是作爲敍述用的，如以下用於定語的例子：

(25) 曾子有疾，召門弟子曰：“啟予足！啟予手！詩云：‘戰戰兢兢，如臨深淵，如履薄冰。’而今而後，吾知免夫小子！”（《論語・泰伯》）

Chafe (1980) 曾提到人們閱讀篇章的時候，往往會直覺地意識到焦點和背景資訊的差別。焦點提供的是豐富的資訊，其周遭伴隨著的是一些次要的資訊，我們雖然知道這些資訊存在，卻不給與很多注意力。

我們注意到，在《論語》中，如果是純屬敍述，就會用“吾”，所以“吾”沒有內容作用，其作用是話語分析中 (discourse analysis) 的敍述作用，是用來敍述背景的資訊 (background information)，與“我”成了對比，因爲“我”要突出內容所以是強調“前景”的資訊 (foreground information)，而且“我”也要突出與

他人相對的資訊。這點可以說明與“我”一同出現時的分別。在例子 (26) 中，前面只是一個普通的問句所以用“吾”，後面談到有“鄙夫”問“我”本人，所以突出“我”來。

(26) 子曰：“吾有知乎哉？無知也。有鄙夫問於我，空空如也，我叩其兩端而竭焉。”（《論語・子罕》）

3. 有層次的區分法

這一節我們將從上文所討論的內容，進行有層次地區分第一人稱代詞在《論語》中的使用。總結以上的討論，區分的層次是：

一、基本的區分是語法方面：“予”和“我”一般不用於定語，“吾”一般不用於賓語。
二、“予”除了有尊卑的關係，上對下、師對生以外，也和“我”一樣優先考慮內容，如果和“天”或“生老病死”有關，就用“予”，與道德教育有關，又做對比強調就用“我”。“予”的內容、“我”的內容或對比作用會超越語法的限制使之在特殊情況下充當定語。
三、“吾”的優先考慮是話語分析上的敍述作用，這個考慮也會使它在特殊情況下因爲敍述而充當賓語。

這種不同的特徵用〈表 2〉歸納出來。

〈表 2〉各個代詞的特徵和所強調的特點

	語法	內容	篇章	尊卑
予	SO(P)	**		**
我	SO(P)	**（強調）		
吾	SP(O)		**	
朕				

按：S=主語；O=賓語；P=定語；H=上對下；**=優先考慮

（一）從語法區分：“吾”一般不做賓語，“我”一般不做“定語”所以以下的例子反映了這個語法現象：“我”作賓語，“吾”作定語。

(27) 子曰：“回也，非助我（賓）者也，於吾（定）言無所不說。”（《論語・先進》）

（二）從內容區分“予”和“我”：

(28) 顏淵死，門人欲厚葬之，子曰：“不可。”門人厚葬之。子曰：“回也，視予猶父也，予不得視猶子也。非我也，夫二三子也。”（《論語・先進》）

在例子 (28) 裡，“予”用於主語和賓語時都是談論喪禮的事情，與“生死”有關，故用“予”。“我”是賓語，強調“非我”故用“我”。背景是顏淵死後的葬禮，門人想要辦得隆重些，可是孔子反對，並在通知門人自己的意見時以“予”自稱。這裡因爲和喪禮，與死相關所以使用“予”。同時也因爲孔子是顏淵的老師，有著身分的不同，所以自稱“予”。“非我也”是孔子爲了強烈反應厚葬顏淵並不是自己的意思而使用“我”的自稱。

（三）“我”：道德課題、強調對比，“吾”：敍述。

不論“吾”作主語、賓語或定語，“我”作主語、賓語或定語，我們都能夠發現“我”的用法主要是因爲內容上提到道德教育的課題或強調對比的作用，而“吾”是因爲作於敍述，可見語法並不能決定它們的用法。

（一）“我”作賓語，“吾”作定語：

(29) 顏淵喟然歎曰：“仰之彌高，鑽之彌堅。瞻之在前，忽焉在後。夫子循循然善誘人，博我（賓）以文，約我（賓）以禮，欲罷不能。既竭吾（定）才，如有所立，卓爾，雖欲從之，末由也已。”（《論語・子罕》）

雖然從語法上看，“我”不作定語，“吾”不作賓語，但是內容也一樣反映

這裡用“我”是因爲涉及到“文”和“禮”，都是培養道德的關鍵因素。之後用“吾”是因爲顏淵在敍述自身的欲罷不能，敍述成分較重。

（二）“吾”作主語，“我”作主語和賓語：

(30) 子曰：“吾(主)有知乎哉？無知也。有鄙夫問於我（賓），空空如也，我（主）叩其兩端而竭焉。”（《論語・子罕》）

例子 (30) 用“吾”是一般的問句，無需強調，而後來“有鄙夫問於我，空空如也，我叩其兩端而竭焉。”就有了孔子對於“知”的看法，是他自己的主觀意識，所以用“我”。

(31) 子夏之門人問交於子張。子張曰：“子夏云何？”對曰：“子夏曰：‘可者與之，其不可者拒之。’”子張曰：“異乎吾所聞：君子尊賢而容眾，嘉善而矜不能。我之大賢與，於人何所不容？我之不賢與，人將拒我，如之何其拒人也？（《論語・子張》）

例子 (31) 中“吾”是敍述用，“我”的兩個主語爲了強調，第三個“我”是賓語。子張的“賢”是他個人的修養，所以強調的是他個人的意識，他的賢與不賢並不是別人能改變的，而且每個人的賢是不同的。所以使用“我”就是要強調這樣的不同。

（三）“我”是賓語，“吾”是主語：

(32) 太宰問於子貢曰：“夫子聖者與？何其多能也？”子貢曰：“固天縱之將聖，又多能也。”子聞之曰：“太宰知我（賓）乎！吾（主）少也賤，故多能鄙事。君子多乎哉？不多也！”牢曰：“子云：‘吾（主）不試，故藝。’”（《論語・子罕》）

在例子 (32) 裡，“我”所反映的是道德層面的孔子。當孔子說太宰知他時，太宰所知道的孔子是在道德規範上能力不俗的孔子，所以孔子用了“我”。在之後，孔子做了純粹的敍述內容，說他小時候的情況，所以用了“吾”。

(33) 季氏使閔子騫為費宰。閔子騫曰：“善為我（賓）辭焉！如有復我（賓）者，則吾（主）必在汶上矣。”（《論語・雍也》）

例子 (33) 直接反應閔子騫不願隨季氏的個人意願。用“我”時，是爲了展現出自己不願隨季氏的意思，而後來用“吾”只是爲了敍述自己的行動，並不是爲了強調自己的意識。

(34) 公山弗擾以費畔，召，子欲往。子路不悅，曰：“未之也已，何必公山氏之之也。”子曰：“夫召我（賓）者而豈徒哉？如有用我（賓）者，吾（主）其為東周乎！”（《論語・陽貨》）

例子 (34) 中“我”要點出孔子希望公山氏“召”與“用”他時，是爲了孔子所能提供的道德價值爲目的。後面的“吾”純粹是敍述說可能發生的事。

(35) 子曰：“二三子以我為隱乎？吾無隱乎爾。吾無行而不與二三子者，是丘也。”（《論語・述而》）

例子 (35) 裡孔子想要說明自己並沒有隱瞞學生，不把所學都教於門人學生。這裡用“我”爲人稱代詞是爲了提出孔子強烈的個人意識，說明自己教學不會有所保留，他的行爲舉止都是在行不言之教。當孔子提出問題時，他要強調的是別人認爲他有所隱藏的強烈感覺，所以用“我”，之後改用“吾”是因爲後面是以敍述爲中心。

從以上的例子我們可以看出語法能區分“我”和“予”一般不做定語，只有“吾”作定語；“吾”一般不做賓語。至於“我”和“予”的不同主要是“我”是用於討論道德教育的課題，而且有強調自我以及對比的觀念，“予”是談到“天”、“生老病死”等的課題。“我”和“吾”的分別重點不在它們的語法位置，而是在於“我”是談論說話人本身對道德教育的看法，強調與他人的認同或不同，“吾”是用來敍述的。

4. 結語

從以上的討論可以看出《論語》中第一人稱代詞其實是很有規律的用法。以往的研究都只著重在語法上，雖然語法的規律是普遍性的，但是這只是其中一個

層面，還要考慮各代詞的內容用法，話語分析、語用的因素才可以有規律的窺探代詞在某一篇章中的作用。

在“予”、“我”和“吾”三者同時出現的段落裡，可以發現雖然語法可以大致確定它們的語法定位，卻不能說明爲什麼同樣是主語，爲何用“予”不用“我”或“吾”等問題，必須借助於各代詞的用法特徵才能解釋清楚。我們如果認識各第一人稱代詞的使用重點，就可以清楚地區分它們。例如在《論語》中，“予”一定是上對下、師生之間的對話，講究內容上一定與“天”或“生死”有關，都是人所無法控制的課題，其次，在語法上一般不充當定語，但是如果內容有關時也會以定語出現。“我”的重點是內容上一般與道德意識有關，而且強調說者與他人之不同或相同，語法上也一般不做定語，除非內容有關。“吾”不著重內容，重點是篇章中用來敍述。“朕”只出現在堯的自稱中。這樣一來，我們就能夠很圓滿的解釋《論語》中第一人稱代詞的用法了。

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Corpus Analysis for Innovative Online English Learning*

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Recently, computer language corpora have become essential to the construction of web-based language tasks. This paper reports on the applications of various corpora analyses and NLP technologies to construct online English learning environments. Analyses and comparisons were conducted across corpora of various genres including reference vs. learner corpora, and native vs. non-native corpora. The online learning environments were designed for either graduate students to write academic research articles, or college or senior high students to learn about various skills. The NLP tools include a bilingual concordancer, a collocation retrieval concordancer, and an academic concordancer. Most applications have been tested on real learners in the classroom with promising evidence. It is argued that online language teaching and learning can be enhanced with innovative corpus analyses or tools developed on corpora. Future development is suggested.

Key words: computer language corpora, bilingual concordancer, applications in English teaching, automatic text selection, word lists

1. Introduction

Recently, computer language corpora have attracted a great amount of interest among linguists, Computer Assisted Language Learning (CALL) researchers, and language teachers (see a special issue in *TESOL Quarterly* 2003). A corpus is "a collection of natural occurring language text, chosen to characterize the state or variety of a language" (Sinclair 1991:171). Language corpora research has made significant impact on English teaching materials and teaching methodology (Granger 1998, Hunston 2002, Kennedy 1998, Kettemann and Marko 2002, Wichmann et al. 1997). Corpus research has also provided insights into the design of CALL systems (e.g., Liou et al. 2005, Liou et al. 2006, Wible et al. 2001). The widespread applications of computer language corpora may have fundamentally changed our traditional ways we use, teach and learn a language, as well as describe the target or learner language. For instance, the hand-held

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compact bilingual dictionary has become a necessity for their study of millions of English learners in Asia, including Taiwan. Besides learners, engineers, English teachers, and professionals in Taiwan whose work involves bilingual use of Chinese and English or simply English for communication use Internet resources as their daily practice, among which various tools that apply corpora processing are essential in their workplace. Language data plus advanced natural language processing (NLP) techniques bring a great amount of convenience to modern people.

The use of computer techniques combined with corpora analyses for language education is based on a new language teaching pedagogy, data-driven learning. Early in 1980s, Tim Johns at the University of Birmingham (1991:2) proposed that "the language learner is also essentially a research worker whose learning needs to be driven by access to linguistic data" and hence the term "data-driven learning" (DDL) was born and was mainly used to describe the concordance-based learning approach. A concordancer is a text manipulation tool that displays character strings before and after a key word or phrase based on the computer text corpus the program is fed in. Originally, it was used by lexicographers and now has become popular among the language teaching fields. The data-driven language pedagogy encourages autonomous learning on students because intermediate or advanced foreign language learners need language exposure to internalize patterns or regularities by themselves and push up their proficiency level, after they leave formal instruction or schools. It is basically an inductive learning approach against the rule-based deductive approach, commonly used in English classrooms of North America or the Europe.

In this paper, various applications of language corpora analyses and comparisons and e-referencing tools that make use of natural language processing techniques (mainly quantitative corpus computation) for online English learning are described. The applications are components of two research projects under the National Science and Technology Project for E-learning in Taiwan, ROC. Usefulness of corpus-based instructional materials as tested on learners as well as knowledge derived from corpus analyses in the projects are argued to provide promises for innovative language teaching and learning.

1.1 CANDLE, Corpora and NLP for digital learning of English

The CANDLE project (http://candle.cs.nthu.edu.tw, http://candle.fl.nthu.edu.tw), one under the National Science and Technology Program for E-learning, aims to construct several advanced English learning tasks for intermediate learners in Taiwan. As a three-year project, CANDLE has integrated the expertise of researchers in four research groups: (1) advances in NLP technologies and applications, (2) construction of an intelligent self-access reading environment, (3) exploration of learning English as a

foreign language through some written exercises and translation, and (4) bilingual corpus and culture-based English learning (see Figure 1). In addition to construction of various NLP tools and online learning materials for college freshmen or senior high students in Taiwan, various studies on different student groups in course contexts have been conducted to assess their effects (e.g., Chan and Liou 2005, Tseng and Liou 2006) with additional focus on teacher development (Lin et al. 2005).

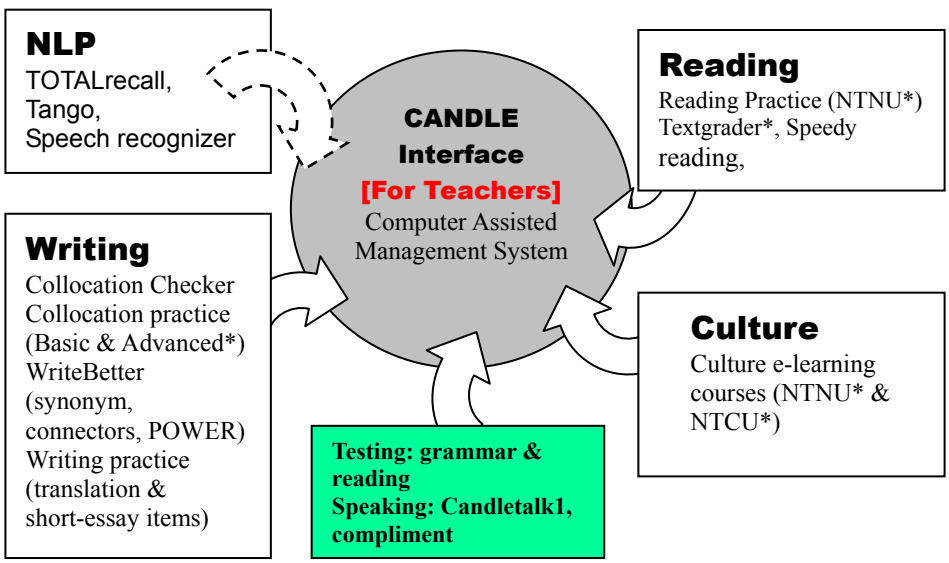

Figure 1: The Integration of sub-projects in CANDLE

The major NLP tool in Project CANDLE currently available is an advanced Chinese-English concordancer that allows sophisticated queries, *TOTALrecall* (Wu et al. 2003, see Figure 2), with a digitalized Chinese-English parallel corpus, the *Sinorama* magazine. A bilingual concordancer allows online search of various kinds and displays a large number of different contexts in two languages for a key word or phrase because its input database is a bilingual parallel corpus. Better than a dictionary entry, a concordancer can show much more examples for language learners to acquire the usage of the word. With learners' first language, a bilingual concordancer's output allows careful comparison and contrast between the differences of two languages, and facilitates thorough understanding and further learning of the key word or phrase. Our concordancer, *TOTALrecall* supports single word and multiple-word query, exact string query, query in English and/or Chinese, and conjunctive and disjunctive query. Under the monolingual mode, citations are listed according to sentence length. Under the bilingual mode query

of *TOTALrecall*, the translation counterpart of the query is highlighted and citations with same translation counterpart are shown in clusters. Another collocation retrieval concordancer, *TANGO,* can display verb-noun or adjective-noun collocations based on the keyword and part-of-speech choice (Jian et al. 2004, see Figure 3).

Figure 2: Bilingual citations for the word "hard" in *TOTALrecall*

Figure 3: *TANGO* with the display of AN collocates

1.2 EAP, English for academic purposes

Another national project targets at improvement of academic English writing of graduate students mainly in computer science or engineering as well as applied linguistics. The EAP project (Liou et al. 2005) built on corpus analysis of 120 journal articles, development of an academic concordancer and online course materials, and course delivery and assessment in order to construct online materials to teach graduate students to write acceptable research articles (RA). The focused disciplines were Applied Linguistics and Computer Science. Research on RA tends to focus on text analyses of article sections that include Abstract, Introduction, Method, Result and Discussion (A-I-M-R-D). Our EAP project conducted genre analyses and comparisons and infused the results into online content (http://eap.eng.ntnu.edu.tw/moodle, http://formoosa.fl.nthu.edu.tw/moodle).

2. Corpus-based applications for CALL or English teaching

Seven illustrative cases from the two projects that have a central foundation on corpus analyses are discussed (see Table 1). The first four were based on academic English corpora of research articles. The other three focused on general English corpora of various genres. The analyses were based on comparisons of corpora by experienced writers and novice writers or even learners (thus, a learner corpus by NNS, non-native speakers). Sometimes, the corpus of native speakers (NS) or a reference corpus was involved. The fifth study was to show how the analysis of a learner corpus while the learners were working online can tell us about their peer response processes. It is a kind of data that belong to the popular research strand of computer mediated communication (CMC). The last two aimed to develop writing materials for college students by comparing an NS corpus and an NNS corpus with the help of several reference corpora.

Table 1: A summary of corpus studies conducted in the CANDLE or EAP project

Name of graduate students or reference of the publication	**Topic of study with tools in CANDLE or EAP projects**	**Number and type of participating students**	**Major findings**
1. Liou et al. (2005)	120 research articles of two disciplines	51 graduate students took the EAP courses	Generally, the website was deemed useful; assessment of courses is still going on.
2. Hsieh and Liou (2005)	100 abstracts (half from NS, another half NNS writers) for analyses and construction of online abstract writing material	35 graduate students in Applied Linguistics	Learners gave feedback on what to improve concerning various aspects of the materials
3. Huang and Liou (2005)	Course impact and development of learner academic writing	Analyses of writing from 22 graduate students of different science areas before and after a classroom-based EAP course	Positive learner perception on the course and various degrees of development concerning academic register features
4. Hsieh et al. (2006)	24 research articles from CS and AL disciplines	Analyses of functional moves and hedge use across abstract, introduction and discussion and comparisons of genre interrelation	Disciplinary variations between typical science and humanities disciplines were found
5. Chien and Liou (2005)	Effects of online peer response on EFL college students' writing	17 college freshmen/ English-major; analyses of sampled 24 online discussion records	Online peer response could foster learners' ability in accuracy of word choice and overall writing quality; various dimensions of peer response processes were documented
6. Li and Yeh (2005)	Effects of online synonym materials and concordancing on EFL college writing	19 college freshmen/ English-major	Students showed improvement in the immediate posttest and their word knowledge for synonym use still retained in the delayed posttest with overall writing quality
7. Tseng and Liou (2006)	Effects of online conjunction materials on college EFL students' writing	19 college freshmen/ English-major	Students generally held a positive attitude toward the online units & demonstrated statistically significant improvements in the use of connectors

2.1 Analyses and comparisons of academic English corpus

To explore empirically the linguistic features and information structures of RA, we compiled and analyzed a representative corpus of journal articles in Computer Science and Applied Linguistics (CS, AL). Three major journals of computer science were selected as the sources of sample texts: *IEEE Transactions on Computers, IEEE Transactions on Pattern Analysis and Machine Intelligence,* and *Computational Linguistics*. The determination of the journals was based on the recommendation of the faculty members from related disciplines in well-established universities in Taiwan. Twenty RAs were then randomly selected from each journal, 60 texts in total. These sample texts were taken from issues ranging from 1996 to 2005. Corpus analysis was performed to identify important rhetorical moves in each section of the journal articles (A-U-M-R-D). A move, according to Santos (1996), is a communicative unit that serves the major communicative purpose of the genre. The textual unit can be one to several sentences in a research article. Example (1) illustrates a "conclusion" rhetorical move based on our coding scheme.

(1) //CC// We believe that these results, as well as the methodology, ***can*** be further exploited to guide the training of individual classifiers and coordination of multiple classifiers.

The first C (Conclusion) represents where the move appears. The second C means it is a "Conclusion" move; in our scheme, it is defined as "partial or complete conclusions, or evaluation" (see Table 2 for a full scheme). Similar coding was done by previous scholars (e.g., Bhatia 1993, Swales 1990, Thompson 1993). The current version was modified by adopting some of the previous codes and inventing new ones to accommodate our data analysis. We have identified: (1) major moves in each section of RA, (2) common patterns of moves in each section, and (3) the organization of moves throughout the whole articles. Likewise, 60 research articles were selected from five well-known international journals in the applied linguistics (AL) fields: *The Modern Language Journal*, *Language Learning*, *English for Specific Purposes*, *Studies in Second Language Acquisition*, and *CALICO Journal*.

Table 2: The coding scheme for analyses of research articles in CS and AL

Individual Tag	**Abstract**	**Introduction**	**Method**	**Result**	**Discussion**	**Conclusion**
Moves/Sections	A	I	M	R	D	C
B (background information)	AB	IB	MB			CB
P (purposes or major tasks)	AP	IP	MP	RP	DP	CP
M (methods or theories)	AM	IM	MM			CM
R (results)	AR	IR		RR		CR
D (explanations, implications, comparisons, limitations)			MD		DD	CD
C (partial or complete conclusions, evaluation)	AC	IC	MC	RC	DC	CC
L (literature review or reference to other studies)	AL	IL	ML	RL	DL	CL
O (local or global organization)		IO	MO	RO	DO	
G (gap or missing information)	AG	IG	MG			
F (reference to tables or figures)		IF	MF	RF		
J (justification and reasons)		IJ	MJ			
Moves in individual sections						
IQ (research questions)		IQ				
IV (values)		IV				
MS (populations, samples, or subjects)			MS			
MA (assumptions, conditions, criteria, or hypotheses)			MA			
MPo (procedure)			MPo			
MMl (equipment or materials)			MMl			
ME (definitions, variables, equations, or measurement)			ME			
MT (tests)			MT			
CF (recommendations or further research)						CF

The results of genre analysis revealed a few facts that deserve our notice. The "purpose" move and the "literature review" move may occur in more than one section (AP, IP, MP, RP, DP, CP and AL, IL, ML, RL, DL, CL) with different linguistic realizations. Second, most article authors use conventionalized headings of "Introduction" and "Conclusions," but they rarely used "Method," "Results," or similar words. Topic-related phrases are more often used for the two sections describing the method, process, and results of investigation.

Move tagging of all sample texts can serve not only automatic analysis of move patterns but also the retrieval of all cases of a certain move via concordance. Automatic analysis can help us identify common move patterns in each section, which are in turn

used in learning materials, while the latter can provide authentic move examples also for pedagogical purposes. Furthermore, a great many phraseological patterns associated with various discourse functions in each section of RA were identified and hand-tagged in the sample texts in the corpus (see Table 3). Three-word and 4-word lexical bundles (such as *on the other hand*), as well as verb-noun collocations (Gledhill 2000) from the two corpora with all frequencies were computed first and screened by researchers who have a background in EAP or English teaching. Linguistic features of academic writing as found in the corpus were also incorporated into the design of learning materials. The essential phraseology and lexical-grammatical usages included citation forms and functions, metadiscourse markers (such as hedges and boosters), and reporting verbs identified and extracted from the corpus, which are linked to the moves (Lin and Liou 2006, Tsai and Liou 2006). The results of genre and text analyses provide not only research support to the design of learning materials for the online EAP course but authentic language use data for the development of NLP tools such as an academic concordancer as follows. Although it was time-consuming to conduct the analyses manually or with the help of some automatic corpus programs, such work is a foundation of the design of both more precise instructional material and e-referencing tools such as a concordancer.

Table 3: A sample of phraseological patterns with the corresponding move functions

Move	Examples of bundles or collocations
IB (Background move under Introduction)	drew/ attract attention to, underscore/ receive importance of, represent advice in, become focus of, throw light on
IL (Literature review under Introduction)	examine/ investigate effect of, focus attention on, shed light on, show need, support/ challenge claim, take account of, limit finding

A new type of concordancer, called *CARE* (Concordancer of Academic wRitten English, see Figure 4, 5) that supports the target learners in this project was developed, which provides keyword search as well as search for metadata of discourse moves. The learner can enter the name of a discourse function (such as CC, IB, or IL) and a list of keywords and retrieve a list of examples for reference with the sentence before and after the target sentence. *CARE* provides access points for authentic academic written texts for teachers and learners. Learners can look up academic passages with important phrases for various language functions highlighted in order to raise the awareness of the learning and speed up their learning of academic writing. *CARE* was also augmented with a record-keeping function so that the developer or the teacher can use the function to understand the entries and frequency of look-ups by student-users over a period of

time as shown in Table 4. The learning history can help developers to understand how *CARE* was used and what entries learners may feel difficult with.

At the time of writing, three online courses which were developed on a course management system, MOODLE (Modular Object-Oriented Dynamic Learning Environment) based on the results of corpus analyses and NLP tools are being delivered to 51 graduate students in either AL or CS in three public universities. Initial assessment on student learning of the Introduction section of AL research articles indicates that the learners benefit from the online materials with various degrees of maturation on different academic register features and they show a positive attitude toward the design of such e-learning.

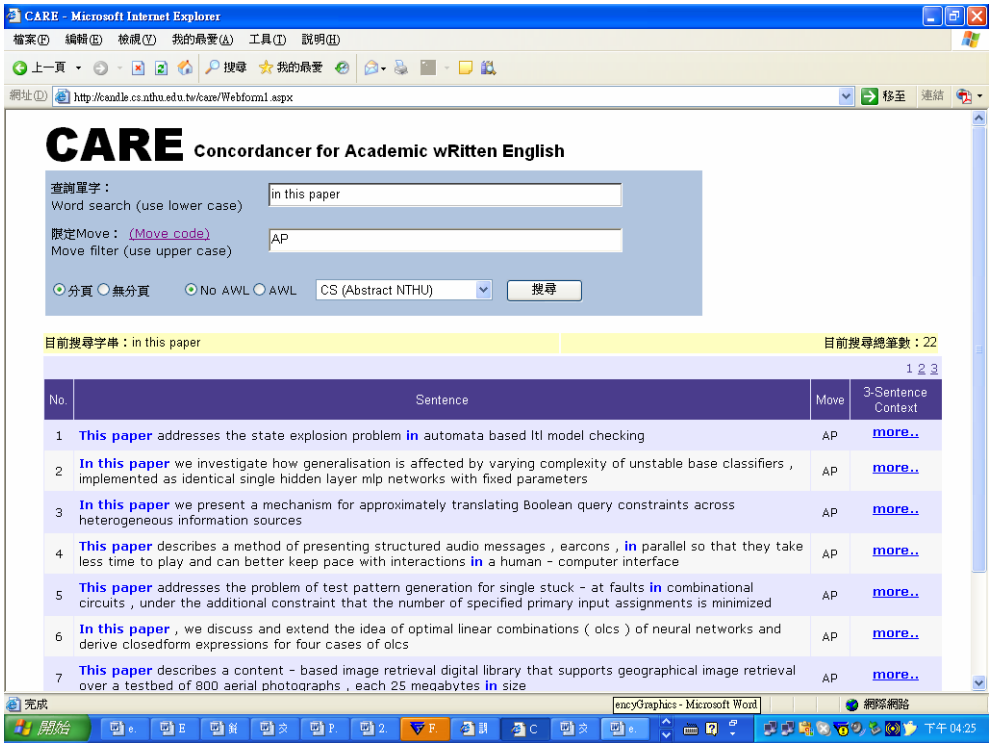

Figure 4: Illustration of *CARE* search with a key phrase and a rhetorical move code

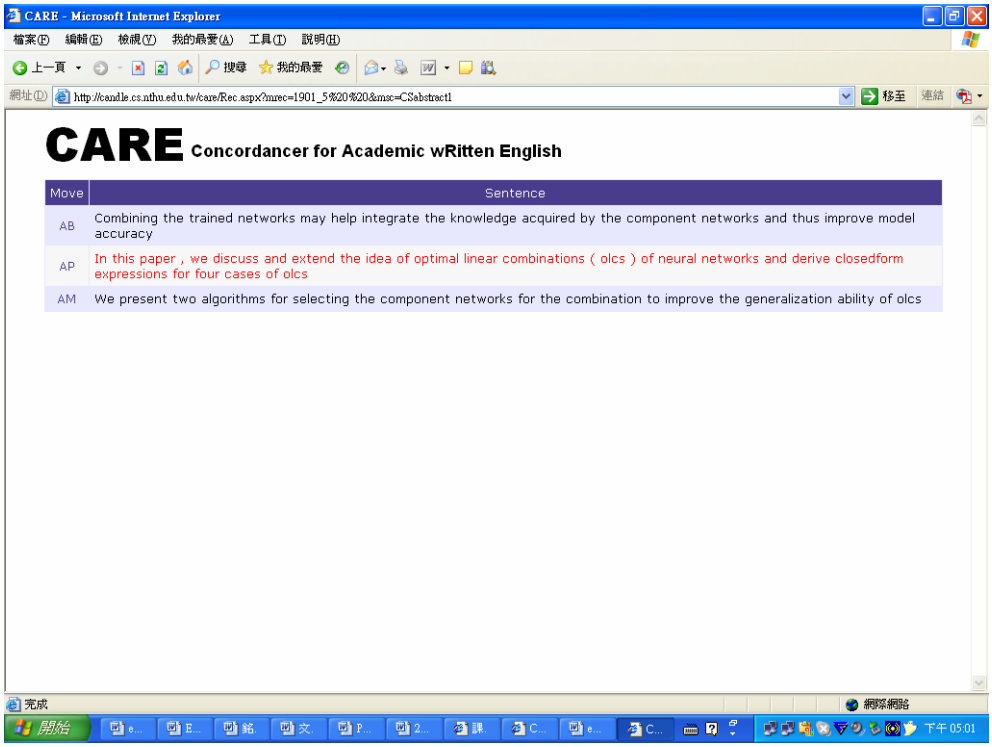

Figure 5: Illustration of a larger context for the "more" button

Table 4: Records of search results from *CARE*

Specific text in corpus retrieved	User	Key word	Move	Kind of corpus	Date
1693755745.TXT	username	See	IP	ALfullarticle	2006/3/16
1693975392.TXT	username	investigate	IL	ALfullarticle	2006/3/16
1695285885.TXT	username	provide		ALfullarticle	2006/3/16
1703469482.TXT	username	investigate	DD	ALfullarticle	2006/3/16
1716289266.TXT	username	provide	IL	ALfullarticle	2006/3/16
1723191994.TXT	username	consider	IL	ALfullarticle	2006/3/16
1751718109.TXT	username	provide	IL	ALfullarticle	2006/3/16
1798227246.TXT	username	provide		ALfullarticle	2006/3/16
1801708044.TXT	username	provide	IL	ALfullarticle	2006/3/16
1898682829.TXT	username	consider	IL	ALfullarticle	2006/3/16

ALfullarticle: among various sub-corpora, the chosen one is full articles in the discipline of applied linguistics

2.1.1 Comparisons of the abstracts in the applied linguistics disciplines

As a sub-project of the EAP project, Hsieh and Liou (2005) extended the results of abstract analysis further to develop relevant online course content for explicit teaching of abstract writing in the AL discipline. By conducting text analysis and comparisons on a corpus of abstracts from 50 published journal RAs (corpus by experienced writers) and 50 non-native conference paper abstracts (non-native novice writers, NNS corpus) that were published in Taiwan, patterns and problems concerning organization such as functional moves, word use of patterns and phraseology were located. Next, a review of learning and teaching principles on L2 academic writing as well as existing websites designed for EAP teaching were conducted in order to transform all the insights, with our own text analysis results, to the instructional design and development of online material development. The academic concordancer, CARE, and a peer-editing tool, POWER (Chien and Liou 2005) were incorporated into the instructional unit of the abstract writing under one AL EAP course.

Four phenomena were found in the NNS corpus that deserve our attention: (a) inverted move sequence, (b) missing obligatory moves, (c) disproportional move structure, and (d) listing information in one move. We might infer that the conference paper writers were less familiar with abstract writing conventions, and were not using language that is efficient and succinct enough in their writing process. The results of the corpus analyses shed light on our development of online learning materials in that we could focus on the presentation of the overall organization of abstracts, together with effective language use that targets at Taiwanese writers. 35 graduate students were asked to use the online abstract unit and responded to a questionnaire as formative evaluation of the online materials. Refinement was made based on the questionnaire responses.

2.1.2 Disciplinary variation through corpus analysis for English teaching

Academic discourse usually conforms to a fixed set of conventions in order to be received in each disciplinary discursive community. However, how writing in humanities is different from that in science, in particularly across various sections of research articles remains anecdotal or observational, although disciplinary discourse of a range of disciplines on respective sections was ambitiously investigated in Hyland (2000). Although Hyland (2000) compared features of several academic disciplines, he did not look into relations among genre sets or article sections. Scholars have claimed that genre relations across various research article sections are important for students of academic English writing; likewise, the variation across disciplinary boundaries may also have an impact on different generic interrelatedness (Connor and Mauranen 1999,

Samraj 2005). For instance, Samraj (2005) found in her comparison study that centrality claims and discussions of gaps were prevalent in the area of Conservation Biology, but not in the area of Wildlife Behavior. Hsieh, Tsai, Lin, Liou, and Kuo (2006) compared genre sets (including abstracts, introductions, and discussions) in 12 research articles from a humanities area (applied linguistics) and 12 articles from the computer science area in order to understand the subtleties among genre sets between the two illustrative disciplines. The functional move structures and the use of hedges were the focus for contrast. The hedges were based on word types of hedging words which are classified into five grammatical categories (modals, verbs, nouns, adjectives and adverbs such as *potentially, probably*).

Overall, several aspects in genre analysis confirm to those of previous studies: introductions in humanities disciplines such as AL are longer than the hard discipline, computer science, the longest of all the six sections analyzed in the two disciplines (Hyland 2000). The discussion sections again are the most heavily hedged section of all (e.g., Salager-Meyer 1994). Additionally, rank orders of hedge classes in the two disciplines, based on incidents found in the twenty-four articles, indicate that both auxiliaries and lexical verbs were used the most often in the two areas, but adverbs were the least. As for variation between the two disciplines, only the importance of 'establishing the territory (centrality claims)' move, not the gap move, parallels in CS abstracts and introductions. No consistent relationship can be found in the other aspects of abstracts and introductions between the AL and CS disciplines. Comparison of the introductions and discussions between the two areas indicate they move by following a mirror-image: from outside-in, then inside-out, with much more emphasis on moves one and three in the two genres. The frequency for each move is slightly different in respective disciplines of the two genres. Other minor sporadic variation between the AL and CS corpora is also noted, which warrants future thorough analysis and explanation. The findings are significant for English for academic purposes instructors who are teaching students from different disciplines. EAP learners can be taught to become aware of both variations across genres (different sections in a research article) as well as between disciplinary boundaries.

Additionally, teaching of hedges warrants more attention. Non native speaker (NNS) writers may hardly use the hedging device appropriately in the academic discourse due to the constraints of language competence or cultural background. According to Hinkel (2004:314), "research has shown that NNS writers have a restricted lexical repertoire that often leads to a shortage of hedging devices employed in L2 written text" (cf. Huang and Liou 2005). Hyland (1996) claims that adopting the authentic data on the high frequency use of hedging can be feasible and instrumental for NNS writers to develop their academic literacy. Lin and Liou (2006) in their development of online materials of teaching how to write discussions have designed exercises that make use of

a concordancer with academic corpora (http://formoosa.fl.nthu.edu.tw/moodle) that focuses on hedge use.

2.1.3 Writing development with corpus analysis insights

In Huang and Liou (2005), 22 graduate students of science and engineering disciplines participated in an academic writing course in a traditional class setting. Their pre-instruction and post-instruction writing samples were collected, together with responses to an evaluation questionnaire and compared regarding academic register features in order to show the maturation effects of L2 academic writing writing as influenced by the course instruction. The samples were a portion of the Result section of a research article where the learners were asked to describe and comment on a graph. The features for analyses included move analysis, colloquial vocabulary, metadiscourse markers, and academic variation features.

The in-class activities required learners to read academic articles extensively, observe modal writings, and generalize principles on essential elements common in research articles. Besides in-class activities and online exercises, students were to hand in a writing assignment about every two weeks for a certain section of a research article. The instructor encouraged both deductive and inductive ways of learning in this course. During the two-hour class, generally, students were classified into small groups in the first hour for discussions on text analyses, grammar or vocabulary exercises, peer reviews, and group writings. The design in the second hour was more teacher-dominant as the instructor specifically pointed out writing conventions and common errors in students' writing.

From our analysis as shown in Table 5, we affirm what was found in Shaw and Liu (1998) that awareness-raising on students in the course is advantageous in familiarizing their exposure of academic conventions, lexis and syntactic devices.

Table 5: Learners' development across the five linguistic dimensions of academic register

Linguistic dimensions	Whether learners have shifted towards the academic pole	Summary of findings
Formality	Yes	1. Less contractions found. 2. More formal verbs.
Impersonality	Yes	1. Significantly less use of *I*. 2. More passives.
Explicitness	Little obvious evidence	1. Though the overall frequencies did not differ, learners seemed to use more appropriate metadiscouse markers within the writing context.

Hedges	Yes	1. General increase in use.
Complexity	Little obvious evidence	1. Increased use in WH relatives. 2. The use of nominalization, past participial phrases on noun, and adjectives or adverbial modifiers were rare.

Almost all of them knew how to use appropriate moves in writing the Results section in their post-course writing tasks. Comparisons of pre-course and post-course writing show that contractions and personal pronouns in learners' writing were reduced; learners' writing shifted not only towards the academic pole but also to a style conventional in result sections. Increased features of impersonality, hedges, and formality, typical in academic writing, seemed more easily learned, compared with explicitness and structural complexity. It seems that explicitness as marked by metadiscourse markers with the exception of hedges and sentence complexity may take longer time to develop, or should develop with their overall English proficiency. Although students did not write more accurately, they have mastered certain features of academic discourse and could write more effectively. From the questionnaire data, students also pointed out specific future English courses they need, according to their stages of learning. Research of this type offers a window for both EAP teachers and researchers to look into what exactly students' writing develops in an academic writing course with reasonable expectation, given a two-credit semester-long course context.

2.2 Analysis of an online learner corpus while learners were at work

Peer response has often been used in writing classrooms under the influence of the process writing pedagogy, sociocultural theory, and collaborative learning. With the widespread use of updated Internet and computer technologies, online peer response has become an option for writing teachers. Yet, few of the previous studies have explored what has happened in online peer response from a comprehensive perspective. Chien and Liou (2005) bridges the gap by reporting the effects of using a web-based co-editing platform, *POWER* (Peer Online Writing & Editing Room, http://formoosa.fl.nthu.edu.tw/power) to help 17 college EFL learners to write more accurate and better English essays in a composition course. Based on a single group pretest-posttest research design with three cycles of drafting, peer response and revising in pair-work, a test on adverbial connectors and verb-noun collocation and a timed writing task were given before and after the three cycles, followed by an evaluation questionnaire. Additionally, students' learning processes were documented using their drafts and revised versions, and the online discussion logs out of four representative peer dyads. Results showed that online

peer response could foster learners' ability in both the use of collocations and connectors, and overall writing quality with students' satisfaction. Moreover, with explicit instruction and prior preparation for online peer collaboration, the learners were found capable of using various language functions to scaffold their peers or to complement each other collaboratively during online peer response sessions.

The analysis of the learner corpus of online discussion in this study is illustrated in this paper to help applied linguists and English teachers to understand what may have happened while EFL college students are doing peer review. Twenty-four pieces of discussion logs were sampled from four pairs and analyzed from three perspectives: *content of talk*, *function of talk* and *students' reader and writer stances*. First, all the discussion logs were divided into idea units (Chafe 1980), roughly equivalent to a clause. Then each idea unit was coded by self-devised schemes of content, function, and stances with frequencies in each main or sub-category counted. Example (2) shows a segment of the discussion logs.

(2) Example

11:34 Debby> I think it would be better for this marked blue line to be "I hope that he can be a vibrant and energetic person."

11:35 Debby> so that he "will" have the courage to overcome "difficulties" in his life.

11:36 Debby> o-oh! You misused the "not only..., but also..." sentence pattern.

11:36 Debby> Here, it should be "delighting", not "delighted".

11:37 Debby> "Being modest" can... (You shouldn't have just said modest, cuz it's an adjective.)

11:40 Debby> The verb "make" should be followed by words of present tense. So, you should have said "make everybody like him even more".

11:43 Debby> Overall, I really enjoyed reading your article, especially the description of your ideal mate.

11:44 Debby> Thanks for providing me a great article to edit. Because while doing it, I also learned some things myself.

It was found that the learners devoted great attention to the writing tasks with *social*, *technical*, or *task-related* discussion with little off-task talk, as far as the content of the talk is concerned. Among all the task-related talk, most of the utterances were on form-based issues, indicating the EFL learners showed excessive concern for grammatical accuracy. The students were also able to apply different language functions in online peer response sessions. The scheme for analyses has four categories: questions, explanations, restatements and suggestions. In particular, most students were willing to share their

experiences and knowledge with their partners as 66.7% of the idea units of task-related talk were on explanations of opinions and information in order to negotiate the meaning. The reader-writer stance scheme has six descriptors: active, collaborative, and self-confident, authoritative, probing, and interpretative as shown in Table 6. Idiosyncratic features of each pair were summarized in Table 7.

Table 6: Sampled students' reader stances and writer stances

Students (pseudonames) \ Stances		**Reader Stance**	**Writer Stance**
Pair A	**Janet**	Collaborative	Collaborative
	Mike	Interpretative	Collaborative
Pair B	**Cindy**	Probing	Active
	Debby	Authoritative	Self-confident
Pair C	**Rita**	Collaborative	Active
	Kate	Collaborative	Collaborative
Pair D	**Vicky**	Collaborative	Collaborative
	Celina	Probing	Active

Table 7: Idiosyncratic features of sampled peer dyads

Pair	**Characterization**	**Idiosyncratic Description**
Pair A	the balanced collaborative dyad	2 students contributed equally
Pair B	the unbalanced dyad	one student was more proficient
Pair C	the dyad with writing blocks	their talk mostly was on content issues
Pair D	the sociable dyad	they used L1 for communication

Conflicting with the discouraging findings of Connor and Asenavage's (1994) study, the results of the present study show that a great deal of peer feedback was considered useful and applied at large (72.2%) when students revised their first drafts. During the online peer response process the learners were found to be able to cooperate with their peers mainly with task-related talk, and comments from peers were valued highly and adopted constructively to polish the first drafts. Though the group dynamics showed a wide range of co-working patterns, the sampled four pairs deemed highly the online revising task, scaffolded the peers, or complemented with each other constructively for improved revision.

2.3 Insights of corpus analyses for online material development

The function of conjunction to link propositions logically is essential in constructing a coherent text. However, EFL learners' ability to use conjunction properly in writing is less satisfactory than expected. Connector usage is an area revealing non-native style markedly (Lorenz 1999). Both overuse and underuse of particular devices are detected (Field and Yip 1992, Granger and Tyson 1996, Granger and Rayson 1998). Misuse of particular devices are also uncovered by qualitative analysis, e.g. the device *so* in Taiwanese students' writing (Kuo 2002). Syntactic positioning of the conjunctives is found to reveal non-nativeness as well (Field 1994, Field and Yip 1992, Granger and Tyson 1996, Lorenz 1999).

Since insights derived from the analysis of learner corpora can provide a basis for improving learners' overuse of some word categories in writing (Granger and Tribble 1998), Li and Yeh (2005) and Tseng and Liou (2006) initiated a comparison between a non-native speaker (NNS) corpus of EFL learners in this country and a native speaker (NS) corpus before designing online units for writing with precise diction. The NNS learner corpus contains, with a total of 114,045 words, descriptive and argumentative essays by freshman English-major students in a public university. The NS data for contrastive analysis is LOCNESS (Louvain corpus of Native English essays, part of International Corpus of Learner English, http://www.fltr.ucl.ac.be/fltr/germ/etan/cecl/cecl.html) corpus, consisting of 66,598 words of argumentative writing by British students. A self-developed error coding scheme was used to tag errors in the NNS corpus; word choice such as adjectives and connectors was found among the most frequent types of mistakes. Examples of run-on sentences, misuse of certain connectors, and overuse and under-use of some connectors were detected in the learner corpus to provide insights or actual language samples for the online connector units. Based on the results yielded from the comparison, the learners tended to use five relatively general adjectives 20 times higher in frequency than native speakers did: *important*, *beautiful*, *big*, *hard*, and *deep*. It was also found that misuse of connectors was a major category among all word choice errors. There were thus chosen as main content of the online synonym and connector units to help improve the phenomenon of overuse and misuse.

Additional steps were taken for material preparation. To select synonymous words for the five general adjectives, *WordNet* were used because detailed information for distinguishing semantically similar words is provided. *WordNet* (http://wordnet.princeton.edu/), an English lexical database, is an online reference system developed by a group of linguists, psycholinguists, and computer experts at Princeton University (Miller, Beckwith, Fellbaum, Gross, and Miller 1993). Further, Tschichold (2003) stressed that learners needed to be offered comprehensible alternative words or expressions for practice; we

then selected only those words with higher frequency in the British National Corpus (BNC, A balanced synchronic text corpus containing 100 million words with morphosyntactic annotation, http://www.natcorp.ox.ac.uk/) to serve as the target words for learning. Finally, to facilitate successful learning with induction, only synonyms with sufficient instances provided by the *Sinoroma* parallel corpus (which goes with *TOTALrecall*) were selected.

The final product is two sections under 'WriteBetter' of the CANDLE project (http://candle.cs.nthu.edu.tw): *synonyms* and *conjunctions.* Based on pedagogical principles and corpus analyses, the design features of the four conjunction units are illustrated below in Table 8.

Table 8: Design principles of the 4 online conjunction units

Online Design	**Principle**
Divide the connectors in the units according to their grammatical functions	Start from the differentiation of grammatical functions in the teaching of connectors (Zamel 1983)
Cover 5 to 7 commonly-used connectors in each unit	Teach a limited set of commonly-used connectors to learners (Crewe 1990)
Provide precise description of semantic and stylistic properties of each connector	Avoid misleading lists of connectors and offer detailed information on each connector's semantic and stylistic properties (Crewe 1990, Granger & Tyson 1996, Zamel 1983)
Supply the larger context button	Provide authentic examples with extended context based on concordance output (Granger & Tyson 1996, Zamel 1983)
Design the sentence combining exercise	Offer exercises requiring learners to use a proper conjunct to connect pairs of sentences (Field 1994, Johnson 1992, Zamel 1983)
Design the gap-filling exercise	Offer exercises asking students to fill in an appropriate conjunction in accordance with the context (Zamel 1983)
Design the reformulation activity	Offer activities requiring students to sequence scrambled sentences in order according to the relationships among them (Basturkmen 2002, Zamel 1983)

Both of the online *synonyms and connectors* units were put to use in a writing course on 19 college learners over a period of time. Pre-treatment and post-treatment writing and test measures were collected for comparison. Results indicated that students generally held a positive attitude toward the online units and demonstrated statistically significant improvements in the use of connectors and synonyms in both the test and free production contexts. Moreover, students avoided using general adjectives and tried to apply more specific items in writing with improvement of their overall writing quality. The participants could induce some patterns for the words out of the target 30 synonyms with various degrees of success concerning the five general terms. On average, the

accuracy rate of induction was over 50%. Students' feedback showed that they did benefit from concordancing learning though it was somewhat difficult and time-consuming to find out the differences among synonymous words.

The case study argues that pedagogically sound instructional design for online synonym and conjunction materials plus authentic examples from corpus-based concordancing can help college EFL learners write more accurate and appropriate essays, and as a crucial element, improvement in synonym and conjunction use can enhance EFL students' overall writing quality.

3. Conclusion

In this paper, we used seven case studies from two National E-learning projects to address what corpora research and updated NLP tools can offer for English teaching and CALL. Although it was time-consuming to conduct the analyses manually or with the help of some automatic corpus programs, such work is a foundation of the design of both more precise instructional material and more useful e-referencing tools such as a concordancer. The seven case studies illustrate how corpora-based research can further our understanding about learner language in academic contexts, in a computer-mediated communication context, and about language development given corpus-informed instructional materials. Thus, it is argued that online language teaching and learning can be much more enhanced than before with innovative corpus analyses or tools developed on corpora.

More profound learner corpus research is our next step. It has been claimed that corpora generated from language learners not only help linguists understand their learning process, but also help English teachers make sensible decisions in their instructional methods and material design (Granger 1998, Granger 2003). Wible, Kuo, Chien, Liu, and Tsao (2001) have initiated such efforts on English digital learning for learners in Taiwan. Yet, much more is left for future researchers to explore and design. For instance, tagged learner corpora with structure or discourse codes can be automatically transformed into various exercise types to reinforce language learning.

Another line of language-corpora-based technologies, which is not reported here, is the use of learner speech corpora to help the construction of a speech recognition engine that can understand learners' English speech that may carry a local accent (http://candle.cs.nthu.edu.tw, compliment under "Speaking" Chiu et al. 2006).

Computer language corpora have opened up a huge array of potential innovations for CALL developers to explore. This paper reports our efforts to meet different learners' English learning needs. More advanced applications may appear in the near future.

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Morphological Causatives Versus Resultative Compounds in Taiwan Southern Min*

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In Taiwan Southern Min V-*hoo*-V morphological causatives and V-V resultative compounds are semantically similar; that is, they both denote cause and effect. Their forms are also related in that they only differ in the presence/absence of the causative marker -*hoo*-. However, not every morphological causative has a resultative compound as its counterpart. What is more, these two forms are used in different contexts. This paper thus aims to discuss their semantic similarity, explore their close syntactic relation, and point out their different usage.

Key words: Taiwan Southern Min, analytic causative, morphological causative, lexical causative, resultative compound

1. Introduction

Causation is a common concept in human language. As such, every language has a means of expressing this concept. In a typological sense, causatives are often classified into three types: analytic, morphological, and lexical (Comrie 1981, Shibatani and Pardeshi 2001). Among the three types of causative, morphological causatives are particular intriguing in Taiwan Southern Min (TSM) as they are so closely related to resultative compounds that some even also consider the latter a subtype of causative constructions (Lien 1999). Regarding morphological causatives and resultative compounds in TSM, this paper aims to discuss their semantic similarity, explore their close syntactic relation, and point out their different usage.

2. Defining causatives

2.1 Form and meaning of causatives in general

The meaning of causative constructions consists of the cause component and its

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effect (result) component, and the forms of causative constructions can be classified into three types: analytic causative, morphological causative, and lexical causative (Comrie 1981). To illustrate, (1a) is a case of analytic causative in English, where two separate verbs *cause* and *go* are used to indicate cause and effect, respectively. The Turkish word *ye-dir* 'feed/cause to eat' in (1b) is a morphological causative, which is derived after the causative suffix *-dir* is attached to *ye* 'eat'. In (1c) *kill* in English encodes both the meaning of cause and effect in one form while holding no regular formal relationship with the word denoting the effect 'die', and thus *kill* is considered a lexical causative.

(1)	a.	I caused him to go.	analytic causative
	b.	ye-dir eat-CAUS 'feed/cause to eat'	morphological causative
	c.	kill	lexical causative

In English, there are also many causatives formed without any morphological change to their non-causative counterparts. *Melt* in (2a) is this kind of lexical causative and its non-causative counterpart is shown in (2b).

(2) a. The sun melted the ice.
b. The ice melted.

2.2 Causatives in Taiwan Southern Min

Taiwan Southern Min (TSM) is the variety of Southern Min spoken in Taiwan and it is spoken by more than 80% of people living in Taiwan (Cheng 1985). There are other varieties of Southern Min spoken in Fujian and Guangdong provinces in China. The causatives in TSM can also be classified into the three types defined by Comrie (1981). Sentences involving the use of causative verbs such as *hoo* 'cause', *kio* 'cause', *su* 'cause', etc. are analytic as shown in (3), where cause and effect are expressed by two separate verbs. For instance, in (3a) the verb *hoo* 'cause' denotes cause while the stative verb *huannhi* 'happy' indicates the effect. In (3) the two verbs in each example are underlined. Even though these three verbs *hoo*, *kio*, and *su* are all causative, they do slightly differ in their meaning. The exact meaning for *kio* is actually 'order someone to do something', and *su* is used in a rather formal and literary context. Among these three, *hoo* is used most often and it does not carry any extra meaning other than causativity.

(3) a. cit e ho siausit hoo gun cin huannhi.[1, 2] analytic causative
this ASSOC good news cause we very happy
'This good news made us very happy.'
b. bo-cing e miaun kio gua likhui li.
merciless ASSOC fate cause I leave you
'Merciless fate caused me to leave you.'
c. i e koosu cin su lang kamtong.
he ASSOC story very cause people feel-touched
'His story touched everyone.'

V-*hoo*-V forms such as *phah-hoo-si* 'hit-CAUS-dead' as in (4) are considered morphological causatives for the following reasons. As Comrie (1981) argues, morphological causatives must demonstrate two characteristics. One is that "the causative is related to its non-causative predicate by morphological means." The other is that "this means of relating causative and non-causative predicates is productive" (Comrie 1981:167). V-*hoo*-V forms in TSM are argued to be related to resultative V-V compounds (Lin 2001). For instance, *phah-hoo-si* 'hit-CAUS-dead' is derived from *phah-si* 'hit-dead' by inserting the infix *-hoo-*. Moreover, this type of derivation is highly productive as most, if not all, resultative compounds have causative counterparts. More examples of resultative compounds and their causative counterparts are listed in (5).

(4) li hit ciah lagia ai phah-hoo-si. morphological causative
you that CL spider must hit-CAUS-dead
'You must kill that spider.'

(5) resultative compounds	morphological causatives
ciah-liau 'eat-up'	ciah-hoo-liau
lim-ta 'drink-up'	lim-hoo-ta
sau-chutkhi 'sweep-out'	sau-hoo-chutkhi
chong-hai 'do-break'	chong-hoo-hai

Kill-type lexical causative verbs are hard to find in TSM.[3] As pointed out by Tai

[1] Romanization used in this paper is according to the TLPA (Taiwan Language Phonetic Alphabet), which is promulgated by the Ministry of Education in Taiwan in 1998.

[2] Abbreviations used in this paper are listed below:
ASP: aspect, ASSOC: associative, CAUS: causative, CL: classifier, DUR: durative, PRT: particle

[3] As discussed in section 3, even though Lien (1999) proposes that verbs such as *chi* 'feed', *si* 'die', and *thau* 'untie' are lexical caustives, these verbs no longer denote result or have a causative use in modern TSM.

(1984) the Chinese counterparts of accomplishment verbs like *kill* and *build* are resultative compounds such as *sha-si* 'kill-dead' and *gai-hao* 'build-finished' in Mandarin, whose counterparts in TSM are *thai-si* 'kill-dead' and *khi-ho* 'build-finished'. Lexical causatives in TSM are more like *melt*-type verbs in English. For instance, causative verbs/compounds such as *kiann* 'scare' in (6a) and *kiann-si* 'scare (sb) to death' in (7a) in TSM come closer to the category of lexical causatives, since they bear the same form as their non-causative counterparts as shown in (6b) and (7b).

(6) a. li mai kiann lang a. — lexical causative
you not scare people PRT
'Don't scare people.'

b. i e kiann. — ergative
he will feel-scared
'He will feel scared.'

(7) a. li mai kiann-si lang a. — lexical causative
you not scare-dead people PRT
'Don't scare people to death.'

b. i kiann-si a. — ergative
he scare-dead PRT
'He felt scared to death.'

Among these three types of causative, this paper will mainly discuss morphological causatives and further compare them with resultative compounds. Resultative compounds are not considered a subtype of causative in this paper; however, scholars such as Lien (1999) do classify resutlative compounds as causatives. Before going into the analysis for morphological causatives, I will summarize Lien's typological study of causatives and then make a comparison between his classification and the classification proposed in this paper.

3. Lien's (1999) typological study of causatives in TSM

In Lien's (1999) typological study of causatives in TSM, he classifies causatives into three types: lexical, synthetic (morphological), and analytic (syntactic, periphrastic). Lexical causatives are further classified into two subtypes: labile causatives and suppletive causatives. Labile causatives are simplex verbs used as causatives with zero derivation such as *kiann* 'scare' as illustrated in (6). Suppletive causatives refer to causatives such as *kill* in English which denote both cause and result while holding no morphological relationship with the word denoting the result. Examples of suppletive causatives in

TSM given by Lien are verbs like *chi* 'feed', *si* 'die', and *thau* 'untie'. However, these so-called suppletive causatives either do not denote result or are not used as causatives in modern TSM. For instance, *thau* 'untie' alone as in (8) does not denote result and that is why the result can still be negated by the following clause *thau-bo-khui* 'do not succeed in untying it'. To express that the result is achieved, one has to add a stative verb such as *khui* 'open' to denote the result of untying as in *thau-khui* 'untie-open'. With the addition of the stative verb *khui*, *thau-khui* does denote that a result is achieved and thus the negation of the result renders the sentence unacceptable as illustrated in (9).

(8) i thau te-a thau nng pai a, mko long thau-bo-khui.
he untie bag untie two time PRT but all untie-not-open
'He tried to untie the bag twice but did not succeed.'

(9) *i te-a thau-khui nng pai a, mko long thau-bo-khui.
he bag untie-open two time PRT but all untie-not-open
'He untied the bag twice but did not succeed.'

Si 'die' is another verb that is taken to be causative by Lien; however, in modern TSM *si* does not have the transitive usage anymore. Even when *si* is followed by a noun phrase, the noun phrase does not serve as the object of *si* as shown in (10).[4]

(10) i choekin si ang.
she recently die husband.
'She lost her husband recently.'

As a result, in this paper the lexical causatives in TSM only refer to the *melt*-type causatives, that is, verbs such as *kiann* 'scare' in (6).

For Lien, morphological causatives are those that are morphologically related to their non-causative counterparts. For instance, *tng*^{2} 'cause to break' is related to *tng*^{7} 'break' through tonal alternation; *thit* 'straighten' is related to *tit* 'straight' through initial alternation. These two types of morphological relation, however, are not productive. This paper will look to productive morphological causatives with the form V-*hoo*-V such as *lim-hoo-ta* 'drink-CAUS-up'. As mentioned in section 2.2., V-*hoo*-V is taken to be a morphological causative for the reason that this form is morphologically related to V-V resultative compounds; that is, the causative V-*hoo*-V form is derived from resultative V-V after the insertion of the infix -*hoo*-. Moreover, this morphological relation is productive and most resultative compounds have causative counterparts.

[4] (10) is taken from Teng (1995:5, (1)).

Lien also considers the sequence of the causative verb *hoo* followed by an object and a predicate such as the example in (3a) an analytic causative. Moreover, Lien proposes another subtype of analytic causative, that is, V-V resultative compounds. By definition, resultative compounds are compounds where the second verbal element (V2) describes the result caused by the event denoted by the first verbal element (V1). Sinitic languages such as Mandarin Chinese and TSM abound with resultative compounds. For instance, in *phah-si* 'hit-dead' of TSM, *phah* denotes the activity of hitting while *si* represents the result of being dead. More examples of resultative compounds are listed in (5). Since semantically the components of resultative compounds also denote cause and result, one might be tempted to treat resultative compounds as causatives as Lien does. Lien further indicates that most resultative compounds can take an infix-like element *hoo* (*i*) 'CAUS he/she' as in *phah-hoo* (*i*)-*si* 'hit-CAUS he/she-dead'. The resultant form V-*hoo* (*i*)-V, however, is taken to be a morphological causative in this paper.

Although V-V resultative compounds and V-*hoo*-V morphological causatives are similar in meaning and related in form, they do differ in their usage, which will be elaborated in the following section. Due to the differences in form and usage, resultative compounds are thus not considered true causatives in this paper.

4. More differences between morphological causatives and resultative compounds

In terms of semantics, both morphological causatives and resultative compounds denote cause and result. Speaking of form, resultative compounds differ from morphological causatives in the lacking of the causative marker *-hoo-*. The close relationship between these two forms is obvious. However, resultatives are not classified as one subtype of causative in this paper for they do have different usages from causatives. As discussed in Allen (1995, 1996, 1998) and Shirai, Miyata, Naka, and Sakazaki (2000), imperatives are often related to causatives. As such, causative forms are often used to express the imperative meaning. To illustrate, *ciah-hoo-liau* 'eat-CAUS-up' in (11) expresses an imperative meaning, while its resultative counterpart *ciah-liau* 'eat-up' as in (12) lacks such an imperative meaning and thus is not compatible with the second person subject *li* 'you'. (12) is improved after the subject is changed to other persons such as the third person singular pronoun *i* 'he/she' as in (13).

(11) li png ciah-hoo-liau.
you meal eat-CAUS-up
'You must eat up your meal.'

(12) ?li png ciah-liau a.
you meal eat-up PRT
'You finished eating your meal.'

(13) i png ciah-liau a.
he meal eat-up PRT
'He finished eating his meal.'

Because of the close relationship between resultative compounds and morphological causatives, children sometimes get confused about these two and misuse one form for the other. For instance, as illustrated in (14)[5] the child sometimes omitted the causative marker -*hoo*- and resulted in V-V sequences, which are resultative compounds. The use of the resultative compound in this context, however, is not appropriate, since an imperative use is required in that particular context. That is, *luah-tit* 'comb-straight' was wrongly used to replace *luah-hoo-tit* 'comb-CAUS-straight' in (14). That means the child sometimes misused resultative compounds as morphological causatives to express the imperativeness.

(14) INV: koh thaumng koh khiukhiu ne.
still hair still curly PRT
'The hair is still curly.'
CHI: Target: luah-hoo-tit.
Error: *luah-tit e.
comb-straight PRT
'Comb it straight.'

The mistake made by the child once more confirms that resultative compounds and morphological causatives are related in form and meaning but differ in their usage. Next section then moves on to discuss the relationship between the forms of resultative compounds and morphological causatives.

5. The analysis

Resultative compounds are taken to be analytic causatives by Lien for the reason that they allow the insertion of *hoo* (*i*) 'CAUS he/she' and thus like phrases they are more analytic than compounds. However, it should be noted that resultative compounds

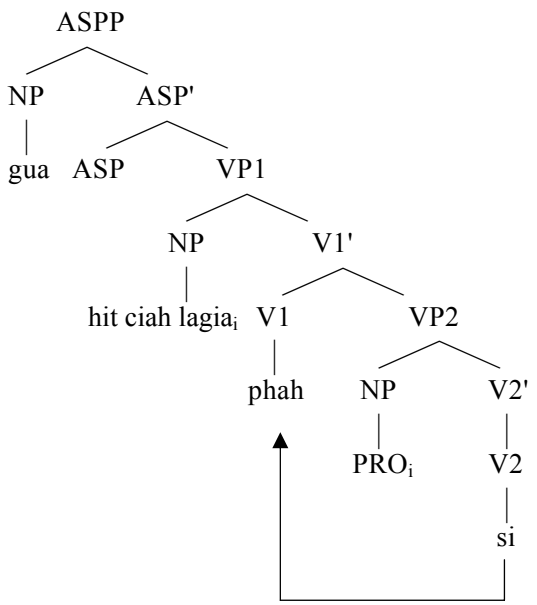
[5] The data is taken from Taiwan Child Language Corpus developed by Tsay (2005). INV stands for investigator and CHI stands for child.

behave more like simplex verbs in that they can take postverbal objects as shown in (15).

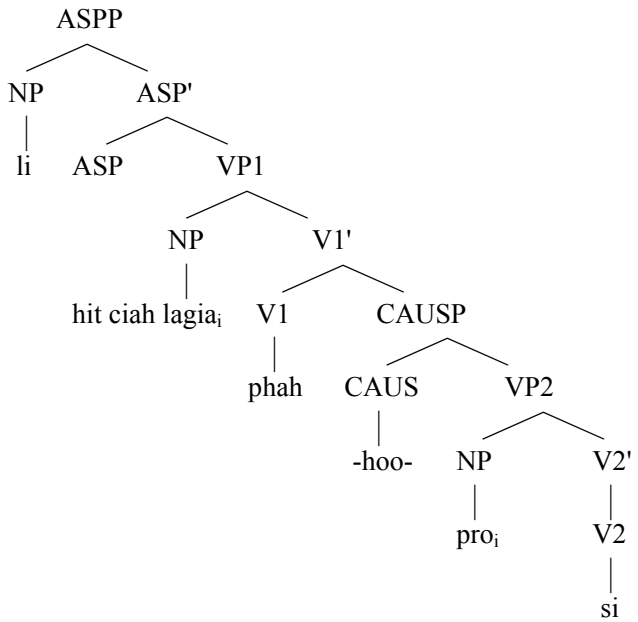
(15) gua phah-si hit ciah lagia a.
I hit-dead that CL spider PRT
'I killed that spider.'

To account for the dual properties of resultative compounds, Lin (2001) proposes that resultative compounds are derived in the syntax. To illustrate, (16) is the D-structure of (15). In (16) V2 moves up to incorporate with V1 and thus the resultative compound *phah-si* is derived. The idea of deriving a word from domains other than the lexicon comes from Borer (1988). She provides a different view on word formation by arguing that morphology is parallel to the other three components of grammar: lexicon, syntax, and phonology. Morphology is not linearly ordered before or after syntax, and it is also distinct from the lexicon where morphemes, idiosyncratic words, idioms, and lexically formed words are stored. Yoon (1989) also proposes that morphology as a rule system is distinct from grammatical components, such as the lexicon and syntax, and that the rules of morphology can occur in different components. Compounding at the post-syntactic level is similarly proposed by Shibatani and Kageyama (1988) for Japanese post-syntactic compounds. The insertion of -*hoo* (*i*)- in resultative compounds is captured by the extra phrasal projection CAUSP between VP1 and VP2 as shown in (17).

(16)



(17)



Even though resultative compounds and morphological causatives are closely related, not every morphological causative has a resultative counterpart. For instance, the morphological causative *phah-hoo-si* 'hit-CAUS-dead' has a resultative counterpart *phah-si* 'hit-dead', while *chiunn-hoo-thiann* 'sing-CAUS-listen' as in (18) does not have a resultative counterpart **chiunn-thiann* 'sing-listen' as shown in (19). This paper thus moves to investigate what kind of morphological causatives have resultative counterparts.

(18) li chiunn-hoo-thiann.
you sing-CAUS-listen
'You sing for him to listen.'

(19) *gua chiunn-thiann.
I sing-listen
'I sing for him to listen.'

This paper proposes that morphological causatives that have resultative counterparts are those in which V2 is an intransitive stative and is predicated of the object of V1 if V1 has an overt object. By definition, V2 in a resultative compound denotes the result caused by the event denoted by V1; therefore, V2 is often a stative verb denoting the resultant state. V2 in a morphological causative, however, is not always a stative verb since the semantics of a causative construction is Event 1 causing Event 2 and V2 can

denote a resultant event, not necessarily a state. To illustrate, the V2 in the morphological causative in (18), i.e. *thiann* 'listen', denotes the resultant event of listening to your singing. However, the same verb, *thiann* 'listen', cannot serve as the result in a resultative compound as in (19) since it does not denote a state.[6]

The restrictions on resultative counterparts can be explained if we assume that morphological causatives have (17) as their D-structure and their resultative counterparts have a related D-structure as shown in (16). (16) and (17) differ in that (16) lacks the causative projection CAUSP headed by *-hoo-*. A resultative compound such as *phah-si* as in (15) is derived from a structure like (16) and the PRO in the embedded clause headed by V2 in (16) has to be controlled by the nearest c-commanding NP, according to the Principle of Minimal Distance (Rosenbaum 1970, Chomsky 1980). That is, *si* 'dead' must be predicated of PRO, which is controlled by the object of V1, *hit ciah lagia* 'that spider'.

If V1 in a resultative compound does not have an object, according to the Principle of Minimal Distance, the PRO in VP2 should be controlled by the subject of V1 and a subject-oriented resultative compound should be derived. This prediction is indeed borne out as a morphological causative such as *khun-hoo-pa* 'sleep-CAUS-full' in (20) does have *khun-pa* 'sleep-full' as its resultative counterpart as shown in (21). In the compound, V2 *pa* 'full' is predicated of the main subject *gua* 'I' and (21) has the meaning that I felt metaphorically full because I had enough sleep.

(20) li ai khun-hoo-pa.
you must sleep-CAUS-full
'You must have enough sleep.'

(21) gua khun-pa a.
I sleep-full PRT
'I had enough sleep.'

---

[6] Cheng et al. (1999) takes examples such as (i) to be serial verb construction while (ii) is causative. However, these two constructions only differ in the properties of V2. That is, V2 in (i), *thiann* 'listen', is transitive while that in (ii), *khun* 'sleep', is intransitive. Therefore, this paper does not distinguish these two types of construction just because of their difference in V2 and these two types are both considered causative. More specifically, they are classified as analytic causatives as those examples in (3).

(i) guo chiunn cit siu kua hoo li thiann. (Cheng et al. 1999:147, (1D))
I sing one CL song cause you listen
'I will sing a song for you to listen.'

(ii) guo chiunn cit siu kua hoo li khah ho khun. (Cheng et al. 1999:147, (1F))
I sing one CL song cause you more good sleep
'I will sing a song for you to sleep better.'

However, it should be noted that subject-oriented resultative compounds like *khun-pa* 'sleep-full' in (21) are rare in TSM. For example, even though *cau-hoo-thiam* 'run-CAUS-tired' is a possible morphological causative as shown in (22), its would-be resultative counterpart is not available as the ungrammaticality of (23) indicates.

(22) li to ai it-tit cau, cau-hoo-thiam.
you TO must continuously run run-CAUS-tired
'You must keep running to the extent that you get tired.'

(23) *gua cau-thiam a.
I run-tired PRT
'I ran to the extent that I got tired.'

Nevertheless, (23) does not really invalidate the analysis proposed in this paper. In fact, the Mandarin counterpart of (23) is perfectly acceptable as shown in (24). The reason why many morphological causatives do not have resultative compounds as counterparts is the nature of TSM. That is, TSM is more analytic than Mandarin, which means TSM tends to use phrases or clauses to express the same idea which in Mandarin is expressed by words or compounds.

(24) wo pao-lei le.
I run-tired PRT
'I ran to the extent that I got tired.'

Another difference between the structures in (16) and (17) is that the empty subject in VP2 is pro in (17) but PRO in (16). This difference indicates that the empty subject in (17) can be replaced by an overt NP such as the third person singular *i* 'he, she, it'. Therefore, (25) with an overt NP serving as the subject of VP2 is a possible sentence.

(25) li hit ciah lagia ai phah-hoo i-si. (cf. (4))
you that CL spider must hit-CAUS it-dead
'You must kill that spider.'

This paper would like to propose that in morphological causatives when the subject of VP2 is empty it is actually occupied by a covert third person singular pronoun *i* 'he/she'. The evidence for this proposal is that even though the subject of VP2 is not limited to the third person singular when it is overt as shown in (26), when the subject of VP2 is empty it is often interpreted to indicate the third person singular as shown in (18).

(26) li chiunn-hoo guan thiann.
you sing-CAUS we listen
'You sing for us to listen.'

6. Concluding remarks

Even though both Mandarin and TSM have resultative compounds, only TSM has morphological causatives and this fact is due to the analytic nature of TSM. That is, TSM tends to use phrases or clauses to express semantic concepts that can be further decomposed rather than using words or compounds. Resultative compounds and morphological causatives in TSM are not only semantically similar but also syntactically related. That is, they differ in the presence/absence of the causative marker -*hoo*-. The close relation between these two forms is captured by their similar D-structures which differ in the presence/absence of CAUSP. However, as similar as they could be, not every morphological causative has a resultative compound as its counterpart. This difference results from the different make-up of these two forms. In a morphological causative, V1 denotes an event and V2 can also denote an event caused by V1. However, in the case of resultative compounds, V2 has to denote a resultant state, and thus only state-denoting verbs can serve as V2 in a resultative compound.

Moreover, even though both subject-oriented and object-oriented resultative compounds can be found in TSM, far fewer subject-oriented ones are available. This phenomenon is again due to the analytic feature of TSM. In Mandarin subject-oriented resultative compounds are not so rare; however, they are proposed to be formed in the lexicon by Lin (1998) because syntactic derivation cannot explain their properties and also they are not as productive as object-oriented resultative compounds.[7] Since phrasal or clausal constructions are more commonly used in TSM, lexical subject-oriented

[7] Lin (1998) proposes that subject-oriented resultative compounds in Mandarin such as *qi-lei* 'ride-tired' in (i) are derived in the lexicon for the reason that a control analysis cannot account for the fact that the PRO in VP2 is predicated of the main subject *Zhangsan* rather than the NP closer to the PRO, that is, *ma* 'horse'.

(i) Zhangsan qi-lei le ma.
Zhangsan ride-tried ASP horse.
'Zhangsan got tired from horseback riding.'

This lexical derivation approach, however, is not adopted in this paper for the derivation of subject-oriented resultative compounds in TSM. The reason is that subject-oriented resultative compounds are so rare in TSM and the kind of problematic cases such as *khia-thiam* 'ride-tired' are simply not available in TSM. Therefore, a different mechanism is not needed in order to account for the problematic cases.

resultative compounds are thus not as available to express the same idea as their Mandarin counterparts. Instead, to express the subject-oriented concept, TSM would prefer to use phrasal resultative constructions as illustrated in (27).

(27) gua cau kah cin thiam. (cf. (23))
I run KAH very tired
'I ran to the extent that I got tired.'

To sum up, in comparison with Mandarin, the analytic nature of TSM is manifested in the prevalence of V-*hoo*-V morphological causatives, which are not available in Mandarin. As to resultative compounds, subject-oriented resultative compounds are not as productive as object-oriented ones in Mandarin. When it comes to subject-oriented resultative compounds in TSM, there are even far fewer examples available.

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Can Numerals Really Block Definite Readings in Mandarin Chinese?

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On the assumption that in Mandarin Chinese (MC hereafter) 'noun phrases with overt numerals necessarily yield an indefinite interpretation,' Cheng & Sybesma propose the structures (1) [$_{\text{ClP}}$ Cl [$_{\text{NP}}$ N]] and (2) [$_{\text{NumeralP}}$ Numeral [$_{\text{ClP}}$ Cl [$_{\text{NP}}$ N]]] to account for interpretive and distributional differences of nominal phrases in MC. With (1), N-to-Cl movement results in definite or generic readings, whereas with (2), such readings are necessarily blocked by the overt or covert numeral (1999: 528-530).

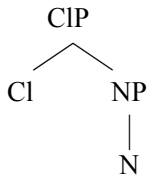
This paper shows that contrary to the assumption that MC numeral-classifier noun phrases ([Num-Cl N] hereafter) cannot have definite readings, such readings are common where a context set is available with presupposed cardinality matching that of the numeral denotation, except when the numeral is *yi* 'one'. Since both definite and indefinite readings are possible with [Num-Cl N] with an overt numeral, it follows that the numeral cannot block definite readings as C&S proposed. Turning to the 'not-so-bare' [Cl N], [*yi*-Cl N] with unstressed *yi* 'one' does not just indicate cardinality but also functions as an indefinite marker (Chao 1968:567-568, etc.), which is not compatible with definite readings. [Cl N] is [one-Cl N] phonologically reduced further, so besides indicating cardinality one, it too cannot have definite readings. Prosodic patterns observed of *yi*-reduction in various [*yi*-Cl N] and [*yi*-Mv (N)] (Mv = verbal measures) expressions suggest that *yi*-reduction is subject to structure-related prosodic constraints within the VP and therefore a matter of VP internal prosody that should be accounted for in a unified way. There is also some support from V-*ge*-O, where the unstressed non-classifier *ge* must be part of the V-O and indicates lightness of tone. This *ge* may be replaced by some Cls, which shows they share some properties. Likewise restricted to post verbal position, [Ø-Cl N] and [Ø-Mv] with reduced Num and Cl/Mv also indicate lightness of tone and could be just as tied to the V as the other post-verbal unstressed forms.

Key words: numeral-classifier NP, definiteness, Mandarin Chinese, prosodic restriction

Cheng and Sybesma claim that in Mandarin Chinese (MC hereafter), "noun phrases with overt numerals necessarily yield an indefinite interpretation" (1999:528).

On this assumption, they make the generalization that "the indefinite interpretation of nominals in Chinese is linked to the presence of a NumeralP (the head of which may be overt or nonovert)" (1999:528) and further propose the structures in (1) and (2) to account for interpretive differences of nominal arguments in Chinese, where Cl stands for *classifier* and ClP, for *classifier phrase*, respectively.

(1)



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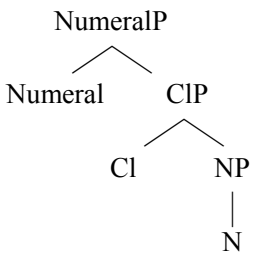

With (1), N-to-Cl movement results in definite or generic readings, whereas with (2), such readings are necessarily blocked by the covert or overt Numeral (1999:528-530).[1] The following are counterexamples to C&S's claim that in MC, numeral-classifier noun phrases (hereafter [Num-Cl N]) cannot have definite readings, supposedly blocked by the numeral (overt or covert).[2] The examples showing that definite readings are available with [Num-Cl N] in MC suggest that whether a nominal has definite or indefinite readings does not hinge on the presence or absence of Num (overt or covert) but needs to be accounted for in some other way.

[1] In C&S (1999), Cl has a deictic discourse function and a singularizing function (pp.517-518). It type-shifts predicates (<e, t>) to arguments (e) and is comparable to the ι operator for definite readings (pp.520-521). The numeral is associated with existential quantificational force (p.534) and is required (overt or covert) when Cl is overt in MC (p.530). Also, empty heads must be lexically governed (p.518).

[2] Different syntactic structures have been proposed for numeral-classifier noun phrases in MC (e.g., Tang 1990, Chierchia 1998, Li 1998, 1999, Li and Lu 2002, Wen and Chen 2002, just to mention a few). Instead of taking a position on which NP or DP proposal is best, I will simply use [Num-Cl N] to indicate the string, which should suffice for the present purpose.

1. [Num-Cl N] with definite readings

1.1 Subject [Num-Cl N]

First, consider these examples from *Liaozhai Gushi Xuanyi* 'Translations of selected stories from *Liaozhai* (also known as *The Dark Tales*)' by Yu (1978), one of a series aimed at introducing Chinese classics to ordinary folks. The text, which is written in smooth, modern-day colloquial MC, shows that given the right context, [Num-Cl N] phrases in MC do have a definite reading. Such readings are normal and not uncommon in MC. In the story "Xi Fangping", it is established before (3) that two goblins were escorting the main character Xi Fangping back to the world from the underworld, and before (4) that three bad officials (gods of the underworld) were being tried for wrong-doing (see Yu 1978:138-139). For easy reference, the [Num-Cl N] phrases are in bold. In the gloss, CL stands for *classifier*, PL for *plural*, and LE for either an aspectual or a sentence-final particle; DE and BA stand for grammatical particles *de* and *ba* respectively.

(3) **Liang-ge xiaogui** chen ta bu fangbei,
two-CL goblin take-advantage-of he not on guard
ba ta wang menkan-li yi tui. (Yu 1978:138)
BA he toward doorway-in one push
'**The two goblins** pushed him through the doorway while he was off guard.'

(4) **San-ge wen guan** xia -de zhi daduosuo, …. (Yu 1978:139)
three-CL rotten official scare-DE keep shiver
'**The three rotten officials** were shivering with fear, ….'

The sentence-initial subject [Num-Cl N]s in (3) and (4) do not read as 'two goblins' or 'two certain goblins' and 'three rotten officials' or 'three certain rotten officials' but as 'the two goblins' and 'the three rotten officials' respectively, where the reader/hearer is supposed to know from previous discourse the referents consisting of the contextually relevant set.[3] That is, the [Num-Cl N]s are clearly used referentially, and with the

[3] I assume that when used as referring expressions, indefinite NPs introduce new (unfamiliar) discourse referents whose existence is not presupposed in the shared knowledge of the speaker S and the hearer H, and such NPs normally signal to H that the identity of the referent is not important (Kronfeld 1990:112). Definite NPs, on the other hand, denote (familiar) referents whose existence is presupposed, and their interpretation requires a context set, namely, a contextually selected sub-universe, or 'NP universe', *à la* Westerståhl (1985), consisting of all the contextually relevant entities in the denotation of N in the given context. Furthermore, when the definite NP is a numeral NP, the cardinality of the context set is presupposed by S

existence and cardinality of the contextually relevant set of familiar referents presupposed, the readings are definite, assuming that indefinites introduce new (unfamiliar) discourse referents whereas definites require familiar referents and a contextually relevant set with presupposed cardinality not required by indefinite and specific NPs.

Next is a set of examples from the story "Taoist Priest of Laoshan", also in *Liaozhai* (Yu 1978). In this story, a student entered a Taoist temple hoping to learn some magical tricks. One night, his master had two guests. They pasted a piece of paper on the wall and turned it into a moon. They then played some other magical tricks, including turning a chopstick into Chang-e, the beautiful goddess residing in the moon, who descended from the moon to join them and after some song and dance turned back into a chopstick. The story continues as in (5) below (see Yu 1978:8).

(5) a. Na daoshi he **liang-ge keren** dou ha-ha da-xiao.
that Taoist priest and **two-CL guest** all ha-ha laugh-heartily
'That Taoist priest and **the two guests** laughed heartily.'

b. **Yi-ge keren** shuo: "Jintian wanshang zhen gaoxin,
one-CL guest say today night so happy
'**One guest** [i.e., **one of the guests**] said, "It's so joyful tonight,'
keshi wo jiu ke lai-bu-de -le, gai gaoci -le,
but I wine truly cannot-have-LE should say-goodbye-LE
'but I can drink no more. It's time to say goodbye.'
gei wo shang yuegong-li qu song-ge-xing haoma?"
for me to moon-palace-in go see-sb-off is-it-OK
'How about seeing me off in the moon?" '

c. **San-ge ren** jiu yidong jiuxi, manman-de ban-dao na
three-CL person thus move feast slowly -DE move-to that
'The three thus moved the table [with wine and all] slowly into that'

---

and H to be that denoted by the numeral. The indefinite-definite distinction may be illustrated by the following English examples with numeral NPs, where indefinites and definites have distinct phonetic representations.

(i) Two students left.
(ii) The two students left.

With the indefinite subject in (i), the sentence is true so long as at least two students left. There is no assumption regarding which two entities are intended and the total number of students in the relevant context. In comparison, with the definite subject in (ii), the number of contextually relevant students is presupposed to be 2, and (ii) is true only if these two students, identifiable by S and H, left. In terms of interpretation and presupposition and context set requirements, MC [Num-Cl N]s are like the English indefinite and definite numeral NPs in (i) and (ii), although without the phonetic distinction.

yueliang-li qu. … Guole hao-yi-hui-er, yueliang jianjian anxiaqu.
moon-in go after a-good-while moon gradually dimmed
'moon. … After a good while, the moon gradually dimmed.'

d. Tudi-men dianshang lazhu lai, zhi jian na daoshi
disciple-PL lit candle come only see that Taoist-priest
'The disciples lit some candles, and saw that Taoist priest'
duzige-er zuo zai nali, **liang-ge keren** yijing bujian -le.
all-by-oneself sit at there **two-CL guest** already disappear-LE
'sitting there all by himself—**the two guests** already disappeared.'

The [Num-Cl N] phrases in (5a), (5c), and (5d) clearly read as definites (i.e., 'the two guests' and 'the three people', not indefinites or just the specific but not definite 'two certain guests' and 'three certain people') with familiar referents and presupposed cardinality information: *liang-ge keren* 'two-CL guest' in (5a) and (5d) refers to the guests introduced earlier in the story, with a presupposition that the total number of guests is two; *san-ge ren* 'three-CL person' in (5c) refers to all the people making up the contextually relevant set of three. The [Num-Cl N] in (5b) reads as partitive, which is arguably not indefinite either.[4] We notice that the [Num-Cl N] phrases in (5a), (5c), and (5d) are followed by *dou* 'all', *jiu* 'thus, then', and *yijing* 'already' respectively. Could it be that the [Num-Cl N] phrases have definite readings due to such words? Not in this case, because in the given context, we can take out the *dou* 'all', *jiu* 'thus, then', and *yijing* 'already', and the NPs have definite readings just the same, which shows that the definite readings do not depend on the following *dou* 'all', *jiu* 'thus, then', and *yijing* 'already'. The examples show that contrary to what is generally assumed, [Num-Cl N] phrases are not restricted to an indefinite interpretation, and definite readings are available with such phrases in MC.

1.2 Non-subject [Num-Cl N]

It can be shown that MC [Num-Cl N]s may have definite readings in non-subject positions as well. For example, also from "Xi Fangping", it is established before (6) that an instrument of torture down the hall has a wooden pole and two wooden boards, all stained with blood.

[4] For discussion regarding partitives, see Li and Thompson (1975:175, 1981:168), Barwise and Cooper (1981:184), Keenan and Stavi (1986:287, 298), Link (1986:3), Enç (1991:6, 10), and so on.

(6) Xia-le diantang, xiaogui-men yong **liang-kuai muban**
leave-LE hall goblin-PL use **two-CL wooden-board**
jiazhu Xi Fangping, …. (Yu 1978:136)
hold-between Xi Fangping
'Having left the hall, the goblins sandwiched Xi Fangping with **the two wooden boards**, ….'

The [Num-Cl N] in (6) reads as 'the two wooden boards', which is definite. In the given context, it cannot read as 'two wooden boards' or 'two certain wooden boards', although such readings would be possible had the context been different.

In (7), from Jin's popular novel *She diao yingxiong zhuan* 'Legend of the eagle-felling heroes', given that the readers know Guo Jing has six mentors at this point in the story, the non-subject [Num-Cl N] gets a definite reading, too.

(7) Guo Jing xiang Huang Yaoshi yu **liu-wei shifu**
Guo Jing towards Huang Yaoshi and **six-CL mentor**
gongshen xingli, zong ma qianxing. (Jin 1994.5:965)
bend-over bow gallop horse forward
'Guo Jing bowed at Huang Yaoshi and **the/his six mentors** and galloped forward on his horse.'

1.3 Summary

Examples as such abound. They show that contrary to what is commonly assumed, definite readings of [Num-Cl N] are not only possible but also quite common in MC. The [Num-Cl N]s with overt numerals and definite readings where the cardinality of a contextually relevant set of familiar referents is assumed show that the numeral does not block definite readings in MC as C&S proposed. In other words, [Num-Cl N] with a numeral that is unmistakably present may have a definite or an indefinite reading depending on whether there is a contextually relevant set with presupposed cardinality. Without the presupposition, [Num-Cl N] cannot be definite; with it, [Num-Cl N] gets a definite instead of an indefinite reading. The numeral indicates the cardinality required of the presupposition but not the availability of the presupposition itself. There is one exception, however, that is, when the numeral is *yi* 'one'. Unlike the other [Num-Cl N]s, MC [One-Cl N] does not seem to have definite readings in any position unless explicitly marked, for example, occurring with a demonstrative *zhe* 'this', *na* 'that', and so on.[5]

[5] Of the 5000 lines that turned up with a keyword search for *yi* 'one' in the Academia Sinica Balanced Corpus of Modern Chinese (5/2006), only three tokens of one type of [One-Cl N]

Assuming that this observation is correct, the question then is, why is it not possible to simply provide a presupposition contextually and get a definite reading as with the other [Num-Cl N]s? There is no ready answer to this question, but the following are some observations that may shed some light on the issue.

2. [One-Cl N] and [Cl N]

2.1 *yi* 'one'—a numeral with special functions

First of all, the numeral *yi* 'one' serves many functions other numerals do not in MC. For instance, besides indicating cardinality 1, *yi* 'one' may combine with a noun to mean 'all, full of', as in (8), or combine with a verb to mean 'simply Ved and right away …', or with an adjective to mean a change of state followed by some quick results, as in (9). The numeral cannot be replaced by other numbers in such cases.[6]

(8) a. **Yi** **lu(-shang)** jingse hen mei.
one **road(-on)** scenery very beautiful
'**All the way**, the scenery is/was beautiful.'

b. Ta nong-le **yi-shou** **you**.
she got-LE **one-hand** **grease**
'She got **grease all over her hand(s)**.'

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have a definite reading, namely, *yi-ke xin* 'One-CL heart' in (a) and (b), and *yi-zhang lian* 'One-CL face' in (c), which denote unique body parts of a certain person in the narrative. The same should apply to a class including 'mouth', 'nose', etc. not in the data. The three lines are listed below, with the [One-Cl N] underlined:

(a) 明年就要考研究所，一顆心始終無法擱在書本上，悶悶的，想到
(b) 順從慣了的，只得拍馬提韁，向前奔馳，一顆心卻已如寒冰一樣，不但是心，
(c) 錢一高興就拿錢讓人吃紅，第二天輸了，一張臉顯出豬肝色。賭錢就是

A possible explanation to the seeming exceptions would be that in the given context, the [One-Cl N] must be interpreted with an understood possessor, who has but one heart/face, which contributes to the definite reading, so it is not really the reading of just the [One-Cl N] anymore. Also, the Num and Cl are not unstressed and therefore the [One-Cl N] is not used to indicate indefiniteness here. For discussion regarding prosodic constraints, see section 2 below. The phenomenon does raise some questions as to how to best account for the [One-Cl N] readings, though.

[6] Examples and discussion of a variety of extended uses of the numeral *yi* 'one' are available in authoritative works on MC such as Chao (1968), Zhu (1982), Lü (1991), Fang (2000:74-77), Liu et al. (2001:127), etc. and in journal articles as well.

(9) a. Ta **yi** **zhuanshen**, kanjian yi-ge moshengren.
he **one** **turn-body**, saw one-CL stranger
'**As** he **turned around**, he saw a stranger.'
b. Ta lian **yi** **hong**, bu xiang-le.
he face **one** **red**, not make-sound-LE
'His face **turned red**, and he fell silent (right away).'

2.2 Indefinite readings

As Chao observes, *yi* 'one' has the special behavior of serving as an indefinite marker in [Num-Cl N]: a stressed *yi*-Cl differs from an unstressed *yi*-Cl somewhat as English *one* differs from *a* and *an*, which are in fact derived from a weakened *one*, and when weakened still more, *yi* 'one' is entirely dropped, leaving just the [Cl-N]. The omission of unstressed *yi* 'one' from [*yi*-Cl N] occurs only after verbs, and such omission is rare with temporary measures (e.g., *bizi* 'nose') and quasi-measures (e.g., *zhan* 'station') (Chao 1968:555, 567-568). Also, with [Cl N], stress falls on the N, and the Cl is unstressed (Chao 1968:554, Zhu 1982:52).

The special functions of [One-Cl N] is a topic discussed by many besides Chao (1968), for instance, Li and Thompson (1975:174-179, 188-189, 1981:132), Fan (1985), Okochi (1993), Uchida (1993), Sanui (1993), Wu (1997:210-214), Liu et al. (2001:142-147), Tang (2003), Gao (2004), Meng (2005), and Chao (2005). Chinese [One-Cl N] is argued to have indefinite, specific, non-specific, generic (kind) readings and referential/non-referential distinctions. Factors contributing to such readings involve more than just the syntax and semantics of the [One-Cl N] *per se* and go beyond the scope of this paper. Directly relevant here is that MC [one-Cl N] with an unstressed *yi* 'one' is similar to English *a/an N* (or *one N*, *A N*, *some N*) with an indefinite interpretation, hence not compatible with definite readings.[7]

C&S's proposal was meant to account for restrictions on the interpretation and

[7] There are different opinions as to whether unstressed *yi* 'one' has grammaticalized to become an article, or quasi-indefinite article, *à la* Lyons (1999), like the English *a* in MC (Gao 2004:81-85, 95). The status of the unstressed *yi* 'one' aside, I am looking at [one-Cl N] functioning as a whole here. As observed in Wu (1997), the pair Ø~*yi* 'Ø~one' patterns with numeral~NUMERAL (i.e., numerals with normal vs. prominent stress) where the numeral is not *yi* 'one' in certain contexts, and there is a three way distinction Ø~*yi*~YI 'Ø~one~ONE' where [*yi*-Cl N] has English counterparts like [*one* N], [*A* N], [*some* N] rather than [*a* N], which is more like [Ø-Cl N], and [YI-Cl N] would be like English [*ONE* N], where the numeral is stressed (1997:213). The differences need to be taken into account when computing the NP readings. That [Ø-Cl N] and [*yi*-Cl N] pair with English [*a* N] and [*one* N] respectively is also a point made in Tang (2003:298-299).

distribution of bare nouns and the 'not-so-bare' [Cl N] in MC and Cantonese. In MC, unlike bare nouns, [Cl-N] is always interpreted as indicating a single unit measured by the CL, as the contrast in (10) and (11) shows.

(10) Limei mai-le **shu**.
Limei buy-LE **book**
'Limei bought **a/some/the book(s)**.'

(11) Limei mai-le **ben shu**.
Limei buy-LE **CL book**
'Limei bought **a/one book**.'

That is, [Cl N] is understood as [one-Cl N] with the unstressed 'one' weakened further.[8] Given the MC facts that [Num-Cl N] may have definite readings when the required presuppositions are available, and that [one-Cl N] with an unstressed *yi* 'one' serves an indefinite-marking function, it follows that [Cl N] not having a definite reading is not because of the presence of a syntactic category Num, which cannot and should not block definite readings, but because [Cl N] is a phonologically reduced form of [one-Cl N] that marks indefiniteness in MC.

2.3 Prosodic restrictions within V-O

What about the distributional restriction on MC [Cl N]? MC [Cl N] only occurs post-verbally. As already mentioned, even in post-verbal position, not all [One-Cl N]s may be reduced to [Cl N] (Chao 1968:568). In (12) and (13) where the Cl is a container-measure, for instance, *yi* 'one' is optional in the (a) expressions but is required

[8] C&L claim that [Cl N] is not simply a phonological reduction of [One-Cl N], their main reason being that [Cl N] and [*yi*-Cl N] have a different distribution: [*yi*-Cl N] can be interpreted as specific or nonspecific indefinites, but [Cl N] phrases in MC 'must be nonspecific indefinites' and therefore are not possible in certain contexts where [*yi*-Cl N] may occur (1999:525-526). The following is a counterexample to C&S's claim that [Cl N] in MC must be nonspecific indefinite (1999:525-526, 530, 535).

Wo zhongwu chi-le **wan niuroumian**.
I noon eat-LE **CL beef-noodles**
'I had **a bowl of beef noodles** at noon.'

Given the time expression *noon* and aspect marker *le*, the sentence is about a past event and with realis modality. The bowl of noodles I already ate denoted by the [Cl N] IS indefinite specific. Accordingly, C&S's (30) and (31b) which are supposed to be bad because [Cl N] can only be nonspecific indefinite need to be explained in some other way.

in the (b) expressions, as the contrasting (c) expressions show.[9]

(12) a. Lisi mai-le **(yi-)guan** **tangguo**.
b. Lisi mai-le **yi-guanzi** **tangguo**.
c. *Lisi mai-le **Ø-guanzi** **tangguo**.
Lisi buy-LE **one-CL** **candy**
'Lisi bought **a jar of candy**.'

(13) a. Lisi jia-le **(yi-)shao** **gaotang**.
b. Lisi jia-le **yi-tangshao** **gaotang**.
c. *Lisi jia-le **Ø-tangshao** **gaotang**.
Lisi added-LE **one-CL** **broth**
'Lisi added **a ladle of broth**.'

In the (a) expressions, the measures *guan* 'jar/can' and *shao* 'ladle' have a single syllable, whereas in the (b) and (c) expressions, *guanzi* 'jar/can' and *tangshao* 'ladle' have two syllables. It could be that with the extra syllable, the measure words cannot be sufficiently reduced phonologically for the required [Cl N] stress pattern here. Also, when nouns are used as temporary measures, as in (14), they usually only take *yi* 'one' with the 'all over' reading, and the number is rarely left out (Chao 1968:603). With quasi-measures, as in (15), the number cannot be left out either. In both cases, the number *yi* 'one' and the Cl are stressed.

(14) a. Lisi liu-le **yi-di** **zang** **jiaoyin**.
b. *Lisi liu-le **Ø-di** **zang** **jiaoyin**.
Lisi leave-LE **one-CL** **dirty** **footprint**
'Lisi left **dirty footprints all over the floor**.'

(15) a. Gongche kai-le **yi-zhan** **lu**, meiyou you-le.
b. *Gongche kai-le **Ø-zhan** **lu**, meiyou you-le.
bus drive-LE **one-CL** **road** not-have gas-LE
'The bus drove **the distance of one stop** and ran out of gas.'

That phonological reduction may not always be possible with [One-Cl N] in post-verbal position is observed with standard measures, too, as (16) and (17) show.

[9] There are detailed discussions regarding Chinese classifiers and measure words in Chao (1968) and Zhu (1982), and in more recent textbooks such as Fang (2000), Qi (2000), and reference books like Liu et al. (2001), among others. I am labeling all the different types of classifiers and measure words as CL and mention the distinctions only when it matters for the current purpose.

(16) a. Lisi zou-le **yi-li/yingli** **lu**
b. *Lisi zou-le **Ø-li/yingli** **lu**.
Lisi walk-LE **one-CL** **road**
'Lisi walked **a li/mile**.'

(17) a. Lisi mai-le **yi-jin/gongjin** **pingguo**
b. Lisi mai-le **Ø-jin/*gongjin** **pingguo**.
Lisi buy-LE **one-CL** **apple**
'Lisi bought **a jin/kilogram of apples**.'

In (12) through (17), with the lexical verb present, lexical licensing is available for [Ø-Cl N]. However, phonological reduction to [Cl N] is ruled out due to factors such as the types of Cl and stress patterns required of the [One-Cl N].

It can be shown that stress patterns also matter with [One-Cl N]s that CAN be reduced in V-O constructions, as in (18). Stress is indicated with '´' on the vowel.

(18) a. Lisi mai-le **yi-ben** **shú**. 'Lisi bought **a/one book**.'
b. Lisi mai-le **Ø-ben** **shú**. 'Lisi bought **a/one book**.'
c. Lisi mai-le **shú**. 'Lisi bought **a/some/the book(s)**.'
d. Lisi mai-le **yí-ben**. 'Lisi bought **a/one copy**.'
e. *Lisi mai-le **Ø-ben/bén**. '?'
Lisi buy-LE **one-CL** **book**

While (18d) without the N would be possible provided that the type of book at issue is clear in the given context, (18e) with the phonologically null *yi* 'one' followed by only a Cl is simply not possible, perhaps because object expressions usually have a stressed central expression (Chao 1968:554) but the Cl must not be stressed with the phonologically reduced yi 'one'. We know that phonological reduction does not simply occur anywhere. Take Labov's examples of Standard English (SE) BE contraction and Black English Vernacular (BEV) BE deletion in (19) for example. The contractible BE in SE is deleted in BEV without exception. (Labov 1972:73-74, Fromkin et al. 2003:462).

(19)

Standard English	Black English Vernacular
He is nice./He's nice.	He nice.
They are mine./They're mine.	They mine.
I'm going to do it./I'm gonna do it.	I gonna do it.
He is/He's as nice as he says he is.	He as nice as he say he is.
*He's as nice as he says he's.	*He as nice as he say he.
How beautiful you are.	How beautiful you are.

*How beautiful you're.	*How beautiful you.
Here I am./*Here I'm.	Here I am./*Here I.
*He's now.	*He now.
*What's it?	*What it?
What's it for?	What it for? Wha's it for?

As shown in (19), the BE's that may be contracted in SE are those that may be unstressed in the sentences according to grammatical relations and structure-related prosodic patterns.[10] In MC, [Cl N] has its prosodic requirements, too, and where the requirements cannot be met, [Cl N] cannot occur.

2.4 Further observations

It is worth pointing out that *yi*-reduction does not just apply to [One-Cl N] with nominal measures. It is also found with other post-verbal expressions in MC, for example, with complements of times and V-*yi*-V. In (20), for instance, the *yi* 'one' before the Mv *tang* 'time' measuring how many times the action takes place is optional in (20a) but is required in (20d), as their counterparts in (20b) and (20e) show. Stress is indicated with '′' on the vowel.

(20)	a.	Lisi	**qu-le**	**yi-tang**	Táipei.	'Lisi **made a/one trip** to Taipei.'
	b.	Lisi	**qu-le**	**Ø-tang**	Táipei.	'Lisi **made a/one trip** to Taipei..'
	c.	Lisi	**qu-le**		Táipei.	'Lisi **went** to Taipei.'
	d.	Lisi	**qu-le**	**yí-tang**.		'Lisi **made a/one trip** [to x].'
	e.	*Lisi	**qu-le**	**Ø-tang/táng**.		'?'
		Lisi	**go-LE**	**one-Mv**	Taipei	

The patterns in (20) resemble those shown with nominal measures in (18). Like [*yi*-Cl N] and its phonologically reduced forms in (18), [*yi*-Mv (N)] may be phonologically reduced to [Ø-Mv (N)] where *yi* 'one' may be unstressed according to the prosodic constraints of the sentences, but not when such conditions cannot be met.

In V-*yi*-V, a syntactic construction of verb plus cognate object with V itself as a measure, the *yi* 'one' is also unstressed and may be omitted, as (21) shows.[11]

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[10] The phenomenon is actually rather complicated. Detailed discussion of the many factors at play can be found in Labov (1972), Chapter 3.

[11] Chao considers the reduplicate VV a borderline case between morphological and syntactic constructions, and V-*yi*-V, a syntactic construction of verb plus cognate object (1968:204-205). VV is an action verb repeated in the neutral tone to indicate tentative aspect, whereas in

(21) a. kan-yi-kan = kankan 'take a look'
b. xiang-yi-xiang = xiangxiang 'think a little'
c. zou-yi-zou = zouzou 'walk around a little'

The constructions in (20) and (21) are all related to a V grammatically, and the phonological reductions are constrained by the VP internal prosody. Together, they suggest that *yi*-reduction in (cognate) object NPs is really a matter of VP internal prosody. If this is correct, then [Cl N] phrases, which are so much like the post-verbal cognate objects, should be accountable in a unified way, and should not be expected to occur sentence-initially without the verb. We indeed do not find [Cl N] or [Mv (N)] there.

In MC, there are also expressions like those in (22), where an unstressed *ge* may be inserted into a verb, sometimes with an *yi* 'one' before it, too. This *ge* is an extended use of the individual measure unit *ge*. Although sometimes replaceable by other classifiers and measure words, it does not always behave like a regular Cl or Mv. It turns a V-O compound into V plus a noun that then becomes expandable, plays a role in prosodic adjustment, and semantically indicates lightness of tone, which is non-truth-functional (Li 2002). This *ge* is glossed as GE in the examples below.

(22)	a.	bangmang	bang-ge-mang	bang-yi-ge-mang	'to help'
		help-busy	help-GE-busy	help-one-GE-busy	
	b.	xizao	xi-ge-zao	xi-yi-ge-zao	'take a bath'
		wash-bath	wash-GE-bath	wash-one-GE-bath	
	c.	maicai	mai-ge-cai	?mai-yi-ge-cai	'buy some produce'
		buy-produce	buy-GE-produce	buy-one-GE-produce	

The non-classifier *ge* in the examples in (22) overlap with Mv in meaning and can be replaced by the Mv *xia*, as in (23).

(23)	xizao	xi-xia-zao	xi-yi-xia-zao	'take a bath'
	wash-bath	wash-Mv-bath	wash-one-Mv-bath	

V-*yi*-V, the verb itself is a measure serving as a cognate object for times of an action (1968: 312-313, 616). The two forms, and another verb plus cognate object *V yi-ci* 'V one-time', are closely connected. There is historical evidence that V-*yi*-V was already in use during the Song Dynasty (A.D. 960-1279), and that it is likely that *yi* 'one' omission began during the Yuan Dynasty (A.D. 1279-1368), and VV has become more common since (Yu and Cao 1998:197-198).

Similarly, the non-classifier *ge* may be replaced by nominal measures, as in (24), where it is replaced by the Cls *lan* 'basket' and *gen* 'root' respectively, showing a tendency towards non-classifier-*ge*-like usages with regular nominal Cls (Li 2002:230). *li*, glossed as LI, is an interjection.

(24) a. Shi-ge-meizha mai-ge-bangbing, yi-tian yeyou liangsan-kuai li!
pick-up-GE-cinder sell-GE-ice-lolly, one-day also-have ¥2~3-CL LI
'Just by gathering cinder and selling ice-lollies, there'd be ¥2~3 a day!'

b. Shi-lan-meizha mai-gen-bangbing, yi-tian yeyou liangsan-kuai li!
pick-up-CL-cinder sell-CL-ice-lolly, one-day also-have ¥2~3-CL LI
'Just by gathering cinder and selling ice-lollies, there'd be ¥2~3 a day!'

The non-classifier *ge* cannot exist outside the V-O (Li 2002:231-232). Although it differs from regular Cl and Mv in major ways, the tendency for Cls to be used like this *ge* suggests that there are important properties they share. Like expressions with the non-classifier *ge*, [Ø-Cl N] and [Ø-Mv] have unstressed counterparts and indicate lightness of tone as well. They too only occur post-verbally. It could be that like *ge*, [Ø-Cl N] is tied to the verb, too.

3. Conclusion

The language facts presented in this paper show that contrary to C&S's claim, [Num-Cl N] with definite readings are common in MC. They require a context set with presupposed cardinality, however, and the numeral must not be *yi* 'one', for [one-Cl N] with an unstressed *yi* 'one' also functions as an indefinite marker, which is not compatible with definite readings. [Cl N] is [one-Cl N] phonologically reduced further, so besides indicating cardinality one, it too cannot have definite readings. The definite and indefinite readings do not hinge on there being a numeral phrase or not and must be accounted for in some other way. Prosodic patterns observed of *yi*-reduction in various [*yi*-Cl N] and [*yi*-Mv (N)] expressions suggest that *yi*-reduction is subject to structure-related prosodic constraints within the VP and therefore a matter of VP internal prosody that should be treated in a unified way. There is also some support from V-*ge*-O, where the unstressed non-classifier *ge* must be part of the V-O and indicates lightness of tone. With their unstressed counterparts, [Ø-Cl N] and [Ø-Mv] also indicate lightness of tone, and, restricted to post-verbal position also, [Ø-Cl N] could be tied to the V as the other post-verbal unstressed forms are, too.

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The Falling of the Rising Tone in Mandarin Chinese*

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This paper mainly examines four issues within the framework of Optimality Theory (Prince and Smolensky 1993, McCarthy and Prince 1993): the nature of the changed Tone 2, Tone 2 Sandhi (T2S), Tone 3 Sandhi (T3S), the interaction with T2S and T3S. T2S refers to the phenomenon in which the contour of final Tone 2s produced by Southern Min (SM) speakers in Taiwan becomes falling. In this paper, T2S is treated as a weakening/neutralization process in final positions. Phonetic evidence shows that the changed Tone 2 does fall. Evidence from perception and its interaction with T3S imply that changed Tone 2 is phonologically Tone 3. For T2S, the constraint **Rising* $]_{\#}$, which disallow rising contour in final positions, is proposed to be the triggering constraints. To avoid violating **Rising* $]_{\#}$, a final Tone 2 is forced to change. This paper shows that this T2S, as well as its interaction with T3S, can be well captured in OT.

Key words: tone sandhi, second tone sandhi, third tone sandhi, sandhi interaction

1. Introduction

This paper is aimed to discuss an unexplored sandhi phenomenon—The Second Tone Sandhi (henceforth T2S) which occurs in the Mandarin Chinese spoken by Southern Min (henceforth SM) speakers in Taiwan.[1] T2S manifests itself by changing the rising contour of a second tone to a falling one[2] in final positions when not preceded

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[1] In Mandarin, there are four phonemic tones: Tone 1, Tone 2, Tone 3, and Tone 4, which are represented in this article as H, LH, L, HL, respectively. The three Chinese dialects spoken in Taiwan are Southern Min, Hakka, and Mandarin. The population of Southern Min speakers is about 76% of all the people in Taiwan.

[2] For distinction, the sandhi tone derived from the second tone is marked as *ML, reflecting the falling contour in phonetics.

by a third tone. See the data below.

(1)		UR	→	PR	Glossary
a.	i.	t^{h}ian^{H} t^{h}aŋ^{LH}	→	i. t^{h}ian^{H} t^{h}aŋ^{*ML}	'heaven'
	ii.	tɕin^{H} lin^{LH}	→	ii. tɕin^{H} lin^{*ML}	'elf'
b.	i.	tɕia^{H} nian^{LH} xua^{LH}	→	i. tɕia^{H} nian^{LH} xua^{*ML}	'festival'
	ii.	ʈʂou^{H} tɕie^{LH} lun^{LH}	→	ii. ʈʂou^{H} tɕie^{LH} lun^{*ML}	'personal name'
c.	i.	ɕi^{HL} tɕie^{LH}	→	i. ɕi^{HL} tɕie^{*ML}	'details'
	ii.	wu^{HL} tʂɨ^{LH}	→	ii. wu^{HL} tʂɨ^{*ML}	'substance'
d.	i.	yn^{L} ʂɨ^{LH}	→	i. yn^{L} ʂɨ^{LH}	'aerolite'
	ii.	tɕ^{h}iaŋ^{L} xuei^{LH}	→	ii. tɕ^{h}iaŋ^{L} xuei^{LH}	'grab back'
e.	i.	y^{LH} k^{h}uai^{HL}	→	i. y^{LH} k^{h}uai^{HL}	'joyful'
	ii.	tɕia^{H} nian^{LH} xua^{LH} xuei^{H}	→	ii. tɕia^{H} nian^{LH} xua^{LH} xuei^{H}	'festival meeting'
	iii.	tɕie^{LH} lun^{LH} tʂou^{H}	→	iii. tɕie^{LH} lun^{LH} tʂou^{H}	'Mr. Zhou'

As we can see in (1a-c), the second tone undergoes a tonal change (LH → *ML) in final positions when the preceding tone is H, LH, HL, respectively. (1d) shows that the final LH does not change when preceded by L. The data in (1e) indicate that T2S does not apply when the LH is not in final positions.

The data in (1d) suggest that there exists some constraint prohibiting L-*ML sequence and thus forcing the final LH to stay unchanged. However, Some SM speakers, especially the elders, make the final LH fall, regardless of this constraint. In this kind of cases, the preceding L tone changes to LH after the final LH changes to *ML. Below are some examples.

(2) a. pən^{L}-lai^{LH} jaw^{H} tʂə^{H}-jaŋ^{H} … → pən^{LH}-lai^{*ML} jaw^{H} tʂə^{H}-jaŋ^{H}
originally want this way …
'Originally (I) want (to do it) in this way.'

b. ta^{H} hen^{L} nan^{LH} shi^{H} hou^{H} → ta^{H} hen^{LH}-nan^{*ML} ʂi^{H} hou^{H}
he very difficult serve
'He is very hard to get along with.'

In (2a), the underlying L-LH sequence (pən^{L}-lai^{LH}) comes up as LH-*ML (pən^{LH}-lai^{*ML}). This process is reminiscent of the well-known Mandarin Tird Tone Sandhi (henceforth T3S).[3] Is it T3S that really plays a role here? If it is, the interaction

[3] The Third Tone Sandhi is essentially formulated as: L ⟶ LH / ___ L. However, it is not

between T2S and T3S will be worth exploring. (See later sections)

Several questions arise concerning the data above. First, what role does *ML play phonologically? Second, what is the nature of T2S, and what phonological processes are involved? Third, why is a final LH immune to T2S when it is preceded by a L tone, and how does T2S interact with other sandhi processes, for example, T3S? These questions will be explored from an *Optimality Theory* (henceforth OT, Prince and Smolensky 1993) perspective, which sees a grammar as a set of universal, violable constraints. To account for the tonal alternations resulting from T2S, pre-OT theories, or rule-based theories, cannot do without exceptions or extra conditions for a rule. For example, if a rule is formulated as *a LH tone falls in final positions*, we cannot explain why it does not fall when preceded by a L tone. All we can do is claim it as an exception or make it a specific condition attached to the rule. This is, however, not *explanatorily adequate* and not economic enough. Unlike rule-based theories, OT constraints evaluate input and output forms at the same time and there may be more than one constraint involved in a single phonological process. The reason why a LH tone does not fall in final positions before a L tone becomes palpable with the observation that the candidate "L-*ML" incurs a fatal violation while others do not. In this way all the relevant processes concerning T2S can be fully captured at the same time.

2. Relevant studies

2.1 Falling of LH in Taiwanese Mandarin

In the previous literature, the falling of LH is barely mentioned in Duanmu (2000), which points out that one of the major characteristics of Taiwanese Mandarin (henceforth TM) is the use of *ML[4] at a phrase boundary for what is LH or H in *Standard Chinese* (henceforth SC, the dialect considered standard by people in Mainland China). His examples are given as follows:

(3)	Phonetic sounds	Taiwanese Mandarin	Standard Mandarin
a.	[tsəu-lə]		
	'walk ASP (left)'	L-*ML	L-H
b.	[xai-xau-la]		
	'still good ASP (not bad)'	LH-L-*ML	LH-L-H

phonologically that simple. For more discussion, see Cheng (1973), Shih (1986) and Chung (1992).

[4] Duanmu ues L, which is replaced with *ML to make it consistent here.

c.	[kʰɤ-nəŋ]		
	'maybe'	L-*ML	L-LH
d.	[tʰai-fəi]		
	'too fat'	HL-*ML	HL-LH
e.	[ɕa-zən]		
	'shrimp (without shell)'	H-*ML	H-LH

There is, however, difference between Duanmu's descriptions and our data here. According to our collection, few, if any, TM speakers do produce *L-L* (*L-*ML*) sequence. Most of them abide by T3S and turn *L-L* into *LH-L*. Thus, [kʰɤ^{L}-nəŋ^{LH}] 'maybe' is still *L-LH* in TM. Moreover, Duanmu does not spend much space probing into the nature of this tonal alternation. Much room, therefore, has been left for this article.

2.2 Previous OT-based treatments to T3S

Since the interaction of T2S with T3S is one of our main concerns, we are going to review and discuss some OT-based approaches to T3S in this section.[5]

2.2.1 Lin's (2001) analysis

In her thesis, Lin (2001) proposes three constraints for the nature of T3S, which are given in (4). The constraint ranking is listed in (5).

(4) The Tonal Constraints (Lin 2001)
  a. **LL*: Avoid adjacent low tones.
  b. *IO-Ident*: The tones in the output must be identical to those in the input.
  c. *ParseR*: Parse the tonal value of the rightmost tone of the outmost domain.

(5) The ranking of these constraints
  *ParseR >> *LL >> IO-Ident*

By nature, (4a) is a constraint directly translated from the Mandarin tone sandhi rule that disallows two low tones to occur in an adjacent string and is motivated by OCP, which prohibits adjacent identical elements. *IO-Ident* is a *Faithfulness* constraint demanding an output form to be exactly the same as its input. *ParseR* is a constraint based on the claim that Mandarin, like Min and some Southern Wu dialects, has a right-dominant prosody that tends to maintain the identity of the right-most tone. With these three constraints, the selection of the optimal T3S output is shown in (6).

[5] For a detailed review and comments on pre-OT treatments to T3S, see Lo (2004).

(6)

	L	L	ParseR	*LL	IO-Ident
☞ a.	LH	L			*
b.	L	LH	*!		*
c.	LH	LH	*!		**
d.	L	L		*!	

In words, (6a) is the optimal output, which only violates the low-ranked *IO-Ident*. As for the candidates in (6b,c), the second L is changed to LH (L → LH), violating the undominated *ParseR* and thus being ruled out. The candidate (6d) changes nothing, violating **LL*, in spite of its satisfying the low-ranked *IO-Ident*.

Lin's analysis adapts a general constraint *IO-Ident* to show the conflict between the *Markedness* constraint (**LL*) and this *Faithfulness* constraint, which sticks to OT's basic essence. Unfortunately, however, this analysis overlooks some generalizations.

First, it fails to explain why T3S can only turn L into LH but not into H or HL. The tableau in (7) shows the model would wrongly select "*HL-L*" and "*H-L*" as optimal.

(7)

	L	L	ParseR	*LL	IO-Ident
☞ a.	LH	L			*
✋ b.	HL	L			*
✋ c.	H	L			*
d.	L	L		*!	

Second, if the anti-two-adjacent-third-tone constraint is set to be **LL*, then why is there no tonal change in words like *xaj*^{L} *jang*^{LH} 'ocean' and *fa*^{HL} *y*^{L} 'French (HL-L)', where there are also *L-L* sequences? This can be explained by stating that contour tones in Mandarin act as a whole. However, if it were incorporated into the concept of constraints, the analysis would be much more complete. (see later sections).

2.2.2 Wu (2002)

One chapter in Wu (2002) is devoted to the analysis of disyllabic reduplicated terms in Mandarin. There is a class of terms in Mandarin that utilize reduplication to show emphasis. When a monosyllabic term like "*xaw*^{L} '*good*'" reduplicates, there are two possible surface structures. In one surface structure, T3S applies (*xaw*^{LH} *xaw*^{L}) while in the other T3S fails to apply. Instead, the second L tone changes to a neutral tone (*xaw*^{L} *xaw*^{Neutral}). In what follows, our attention will be placed on the former case. Some examples are provided in (8) below (The tone of a syllable is upper-marked. N stands for a neutral tone.).

(8)

	UR	Reduplicated Form	Glossary
a.	/tʂoŋ^{L}/	$\sigma^{LH}\sigma^{L}$ / $\sigma^{LH}\sigma^{N}$	'each kind'
b.	/tɕjaŋ^{L}/	$\sigma^{LH}\sigma^{L}$ / $\sigma^{LH}\sigma^{N}$	'just talk'
c.	/ɕjaŋ^{L}/	$\sigma^{LH}\sigma^{L}$ / $\sigma^{LH}\sigma^{N}$	'just think'
d.	/xaw^{L}/	$\sigma^{LH}\sigma^{L}$ / $\sigma^{LH}\sigma^{N}$	'good'

Clearly, T3S applies here. To deal with this process, Wu proposes six relevant constraints, which are listed below in (9). Their ranking is shown in (10).

(9) The constraints for the reduplicated kinship forms (Wu 2002)

a. **LL*: No adjacent Tone 3.
b. **σ*: Every syllable bears a tone.
c. **T*: Surface tone must not be the same as its underlying tone.
d. *Ident-BR*(*T*): A tone in the Red (reduplicant) must be the same with its correspondent in the Base.
e. *Ident-IB*(*T*): A tone in the Base must be the same with its correspondent in the input.
f. *Ident-IR*(*T*): A tone in the Red must be the same with its correspondent in the input.

(10) The Ranking of These Constraints

**σ >> *LL >> *T, Ident-IR*(*T*) *>> Ident-IB*(*T*) *>> Ident-BR*(*T*)

The constraint **LL* in (9a) prohibits two adjacent low tones, which is based on Lin (2001). In (9b), **σ* requires that every surface syllable bear a tone. This constraint is based on the fact that Mandarin Chinese is a tone language, in which tones are phonemic. **T* in (9c) is an "Anti-Faithfulness Constraint" (Alderete 1999), which requires tones to surface as changed tones. With these constraints defined, the formation of these reduplicated forms can be depicted in the following tableau (B stands for Base and R for Reduplicant).

(11)

σ^{L}, RED	*σ	*LL	*T	Id-IR(T)	Id-IB(T)	Id-BR(T)
a. $\sigma_B^{L}\ \sigma_R^{L}$		*!	**			
☞b. $\sigma_B^{LH}\ \sigma_R^{L}$			*		*	*
☞c. $\sigma_B^{LH}\ \sigma_R^{N}$				*	*	*
d. $\sigma_B^{L}\ \sigma_R^{N}$			*	*!		*
e. $\sigma_B^{L}\ \sigma_R^{LH}$			*	*!		*
f. $\sigma_B\ \sigma_R$	**!					

The candidate (11a), in which there are two adjacent L tones, violates **LL* and therefore is ruled out. (11b) violates **T* and (11c) violates *Ident-IR*. These two are selected as optimal because (11d) and (11e) violate both **T* and *Ident-IR* and thus are inferior to (11b) and (11c). The candidate (11f) is wiped out by the undominated **σ* because the two syllables are toneless.

Wu's analysis, too, gets some demerits. First, as Lin's analysis, the constraint **LL* is a little *ad hoc.* Second, the reason why it is the first L in the L-L pair to change, but not the second one, is left unanswered. While Lin (2001) makes use of the constraint *ParseR* to limit the change to the first L, there is no such a mechanism in Wu's analysis. Third, under the constraints and their ranking in (10), candidates such as $\sigma_B^{H}\ \sigma_R^{L}$ and $\sigma_B^{HL}\ \sigma_R^{L}$ can be wrongly selected as optimal, as shown in the tableau below.

(12)

σ^L, RED	*σ	*LL	*T	Id-IR(T)	Id-IB(T)	Id-BR(T)
a. $\sigma_B^{L}\ \sigma_R^{L}$		* !	**			
☞b. $\sigma_B^{LH}\ \sigma_R^{L}$			*		*	*
☞c. $\sigma_B^{LH}\ \sigma_R^{N}$				*	*	*
✋d. $\sigma_B^{H}\ \sigma_R^{L}$			*		*	*
✋e. $\sigma_B^{HL}\ \sigma_R^{L}$			*		*	*
f. $\sigma_B\ \sigma_R$	**!					

The candidates (12d) and (12e) are as optimal as (12b) because they incur the same violations on the same constraints, the hence are (wrongly) selected. Fourth, there are some problems with the violation mark incurred by (11b) of **T*. The candidate $\sigma_B^{LH}\ \sigma_R^{L}$ incurs one violation mark of **T* in (11). However, according to the definition of **T* (*Surface tone must not be the same as its underlying tone*.), (11b) sweetly satisfies **T* because the tone on the first syllable (LH) is not the same as its underlying tone (L) and the tone on the second syllable does not have a correspondent underlyingly (Reduplicants do not have inputs afterall.) and is not sensitive to **T*. In consequence, (11b) does not violate **T* and will be the only optimal form under this analysis.

The fifth problem resides in the theoretical assumption for Mandarin Reduplication. Throughout Wu's analysis, the reduplicant is always by the right side of its base, that is, reduplicant behaves as a suffix. There is, however, another possibility. The reduplicant can work as a prefix and settled by the left side of its base. These two cases are equally possible because the two surface syllables have the same segments. The differences between the two are shown in (13) below.

(13) a. <u>Reduplicant as prefix</u>

Red	←	Base	
xaw_R		xaw_B	'good'

b. <u>Reduplicant as suffix</u>

Base	→	Red	
xaw_B		xaw_R	'good'

For T3S, setting the reduplicant as a prefix may answer the question why the first L undergoes change but not the second one. Since the second L has a corresponding input and the first one (reduplicated one) does not, the first one is more likely to change, immune to any *Faithfulness* constraint. However, a successful analysis on this topic may not neglect such a point.

3. Our analysis

We are now ready for proposing our account for T2S within the framework of OT. We will first examine the nature of the changed LH. Then, we will provide the OT analyses of T2S, T3S, and the interaction between T2S and T3S.

3.1 The status of *ML

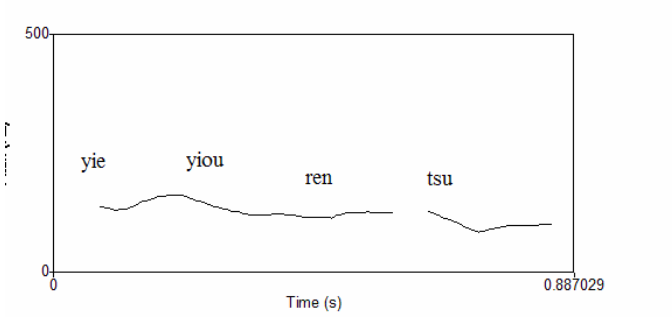
This section examines the nature of the changed *ML resulting from T2S. Evidence from phonetic analyses, listeners' perception, and the interaction with T3S will be provided to shed more light on the nature of *ML.

3.1.1 It does fall!

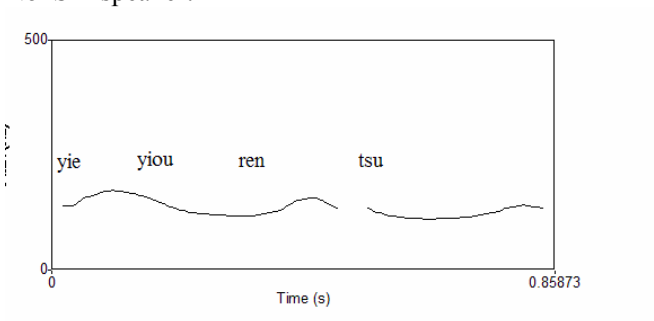
It can easily be noticed that the LH produced by SM speakers truly falls in final positions, sometimes with a little rise at the end, just like L in Mandarin Chinese. With the advent of powerful tools for phonetic analysis such as *Praat*, we can get a more substantial picture of the *ML in phonetics. In (14) are two pitch graphs of LH in final positions. The SM speaker in (14a) is a twenty-four-year-old male and the NonSM speaker in (14b) is a twenty-five-year-old male.

(14) yie^{L} you^{L} rən^{LH} tsu^{LH} '(There is) also species of human.'

a. SM speaker:



b. NonSM speaker:



As shown in (14a), the LH on the final syllable *tsu* apparently falls down dramatically at first and then rises a bit at the end. On the contrary, the LH on *tsu* in (14b) rises smoothly to the end. The slight and gradual fall at the beginning is due to the rising of the preceding LH. This influence of the preceding rise is not unusual if we look at tones in Chao's digits. Two adjacent LHs can be represented in Chao digits as *35-35*. Reasonably, when one produces the first LH, which finishes at a high pitch *5*, he/she must lower their pitch to or approximately to *3* in order to start the second LH. Therefore, this act of lowering may carry on to the beginning part of the producing process of the second LH, generating the slight falling in (14b). The beginning fall of the final LH in (14a), however, is quite different because of the following two reasons. First, the LH before the final LH in (14a) does not rise so high as that in (14b), which implies the change occurring to the final LH influences the preceding LH more or less, and thus reflects differences between the two final LHs. Second, the rise at the end of the final LH in (14b) rises higher than its beginning point, which makes it sound like a normal LH. On the other hand, the final rise of the final LH in (14a) does not rise so high. The ending point of the final rise is lower than the beginning point of the LH, which makes it sound, holistically, as a falling tone.

From the discussions above, there is no doubt that the final LH does fall. Hence, we have good reason to have the falling LH represented as *ML.

3.1.2 *ML perceived as L

The changed LH, which is denoted with *ML here, is also supported by the following dialogue.

(15) A: ni^{L}-mən^{LH} k^{h}ə^{HL}-tɕia^{H}-xua^{H} xu^{LH}-tie^{*ML} tsən^{L}-mə^{N} tɕiang^{L}?
you – PL Hakka – language butterfly how speak
'How do you say "butterfly" in Hakka?'
B: a^{N} ? ʂən^{LH}-mə^{N} ku^{LH}-tian^{L}?
Q what classic
'What? What classic?'

In (15) what speaker A wants to convey is [xu^{LH}-tie^{LH}] 'butterfly,' which is a disyllabic word with LH on both syllables. Speaker B, however, misunderstands it and perceives it as *ku*$^{L[LH]}$*-*tian*^{L} "classic." Apparently, this is due to the fact that speaker B perceives the second syllable of *xu*^{LH}-*tie*^{LH} as *ML (the changed LH), which is phonetically similar to the Mandarin L tone. Cases like (15) are quite common in our everyday conversations. Further data can be shown in (16). Note that those data are extracted from a dialogue. They are taken from one of the author's personal experiences. "S" stands for the speaker and "L" for the listener.

(16) a. S: aj^{HL} ɕjaŋ^{H}-swej^{*ML}
love each other-follow
'title of a song (love following each other)'
L: aj^{HL} ɕjaŋ^{H}-ʂwej^{L}
love fragrant-water
'love perfume'
b. S: p^{h}wo^{HL}-laŋ^{HL} tɕjaŋ^{LH}-ni^{*ML}
break-wave Johnny
'surfing Johnny'
L: p^{h}wo^{HL}-laŋ^{HL} tɕjaŋ^{*L} ni^{L}
break-wave rob you
'surfing to rob you'
c. S: lju^{LH}-ɕin^{H} xwa^{H}-yan^{*ML}
float-star flower-field
'title of a soap opera (the garden of shooting stars)'

L: lju^{LH}-ɕin^{H} xwa^{H} yan^{L}
float-star flower far
'N/A'

d. S: pwo^{H}-li^{LH} ɕje^{*ML}
glass shoe
'glass shoes'

L: pwo^{H}-li^{LH} ɕje^{L}
glass blood
'N/A'

In (16a), the final LH syllable "swej" is perceived as a L syllable "ʂwɛj," whereby "following each other" becomes "perfume." The final LH syllable "ni" becomes L in the listener's perception. T3S is also at work here, leading "tɕjaŋ^{LH}-ni^{*ML}" to "tɕjaŋ^{*L} ni^{L}." (16c) and (16d) are the instances in which the misunderstanding leads to meaningless expressions. It seems that the T2S incurs misunderstanding in communication.

The data discussed in this section present a picture in which *ML is usually realized as L in perception. In other words, people fail to differentiate *ML from L without being particularly specified.

3.1.3 T2S and T3S

As mentioned in the preceding section, on many occasions the changed LH [*ML] is realized as L. If this is the case, the next question is raised: Is there any psychological reality for the *ML? If *ML is psychologically supported, it naturally follows that it would trigger T3S, which means that the L tone will change to LH if it is followed by *ML. It implies that T3S can be reformulated as L → LH / ____ [L or *ML]. To test whether this is true, consider the data below:

(17) a. ji^{L}-ʂaŋ^{HL} swo^{L}-jen^{LH}… → ji^{L}-ʂaŋ^{HL} swo^{LH}-jen^{*ML}…
above be said
'(What) has been mentioned above, …'

b. tɕ^{h}in^{LH}-tʂəŋ^{HL}, ni^{L} laj^{LH} lə. → tɕ^{h}in^{LH}-tʂəŋ^{H}, ni^{LH} laj^{*ML} lə.
personal name you come ASP
'tɕ^{h}in-tʂəŋ, you (have) come.'

c. ttɕ^{h}jen^{LH}-nəŋ^{LH}, ʂɨ^{HL} xən^{L} tɕ^{h}jaŋ^{LH} xən^{L} tɕ^{h}jaŋ^{LH} xən^{L} tɕ^{h}jaŋ^{LH} tə.
→ tɕ^{h}jen^{LH}-nəŋ^{*ML}, ʂɨ^{HL} xən^{L} tɕ^{h}jaŋ^{LH} xən^{L} tɕ^{h}jaŋ^{LH} xən^{LH} tɕ^{h}jaŋ^{*ML} tə.
hiding-power, is very powerful very powerful very powerful Adj-suf.
'Potential, is very very powerful.'

In (17a), underlying "swo^{L}-jen^{LH}" becomes "swo^{LH}-jen^{*ML}" in surface. This can hardly be accounted for if we do not assume that the L-LH sequence becomes L-*ML, due to T2S, and then the L-*ML sequence becomes LH-*ML under T3S. The two stage derivations in phonology are also observed in (17b) and (17c), where "ni^{L} laj^{LH}" becomes "ni^{LH} laj^{*ML}" (17b), and "tɕ^{h}jen^{LH} -nəŋ^{LH}" and the final "xən^{L} tɕ^{h}jaŋ^{LH}" become "tɕ^{h}jen^{LH}-nəŋ^{*ML}" and "xən^{LH} tɕ^{h}jaŋ^{*ML}" respectively (17c). Note that the aspect marker "lə" (17c) and the suffix "tə" (17c) have no tone of their own and hence they are treated as a final position for the preceding element. That the changed LH (*ML) triggers T3S provides powerful evidence for the psychological reality of *ML.

In a nutshell, we conclude that the changed LH, phonetically realized as *ML, plays a role on a par with L for SM speakers in Taiwan.

3.2 The nature of T2S: an OT perspective

In this section, we are going to approach the nature of T2S in the light of OT. In the form of rules, T2S may be captured as a final LH falling down when not preceded by L. This sandhi process is illustrated in (18). The dot denotes a syllable boundary and the symbol $]_{\#}$ indicates a final position.

(18) <u>Falling of LH in Final Positions</u>

Input	*Output*
H.LH $]_{\#}$	H.L $]_{\#}$
LH.LH $]_{\#}$	LH.L $]_{\#}$
HL.LH $]_{\#}$	HL.L $]_{\#}$

Here, we assume that the falling of LH is a neutralization, or weakening process. For the weakening to apply to a full extent, what one needs to do is to format a constraint allowing only the elements which involve fewest efforts from the articulators. In terms of tone, this element will be "no tone at all". This constraint for can be formatted as $*T\ ]_{\#}$.[6] However, this is not the case with T2S, in which L occurs in the final position. The simplest resolution might replace $*T\ ]_{\#}$ with $L\ ]_{\#}$, which allows only L to occur at the syllable boundary. This, however, is much like the spirit of rule-based account in ruling out other tones without further interpretation. On the other hand, it also predicts that Mandarin has only L-toned monosyllabic words, which is not the case. Therefore, we must find some other way out.

In Yip (2002), it is proposed that a constraint like *T is a tonal markedness

[6] This kind of constraints is referred to as "context-sensitive markedness constraints" in Kager (1999).

constraint that prohibits any surface association of tones. This proposal is quite different from*T* in Lin (2001) and Wu (2002), where it is treated as an anti-faithfulness constraint, requiring a tone to surface as its sandhi form. According to Yip 2002, **T* is a cover constraint for all the other tonal markedness constraints, including **H*, **L*, **Rising*, and so on. When there is no need to consider these constraints, it is convenient to use the cover constraint. When they are active and play an important role, they can be decomposed and have different rankings depending on different languages.

Here we follow Yip by assuming that **T* $]_{\#}$ is a cover constraint, incorporating constraints such as **H* $]_{\#}$, **L* $]_{\#}$, and **Rising* $]_{\#}$. In this way we can limit the tone subject to T2S to LH by the following constraint:

(19) **Rising* $]_{\#}$
No rising tones are allowed in final positions

This tonal markedness constraint forces the final LH to change; however, this change violates the faithfulness cover constraint, *FaithTone*. As a result, **Rising* $]_{\#}$ must out-rank *FaithTone.* Moreover, that other tones do not undergo any change in final positions implies that *FaithTone* is ranked higher than any other tonal constraints referring to final positions (**H* $]_{\#}$, **L* $]_{\#}$, **Falling* $]_{\#}$,…). For convenience, we still use the cover constraint **T* $]_{\#}$ for them. We now have the ranking **Rising* $]_{\#}$ >> *FaithTone* >> **T* $]_{\#}$. However, this is not the end of the story. One important question remains to be answered: Why does T2S change a final LH to *ML (or L), rather than to any of the other tones?

By reasoning, H and HL are allowed to occur in final positions, for neither of them violates **Rising* $]_{\#}$. Note that under the ranking **Rising* $]_{\#}$ >> *FaithTone* >> **T* $]_{\#}$, the failure of generating H and HL in final positions comes very naturally (blocked by **H* $]_{\#}$ and **Falling* $]_{\#}$). However, it also prevents L from being generated in final positions (by **L* $]_{\#}$). For this problem, Yip (2002) provides another inspiration. It is proposed that within a syllable, the first (or only) tone is the head tone and the second one, the non-head. For example, in the contour tone LH, L is the head tone and H is the non-head. It is the non-head tone that is prone to change. With this background, we have the following constraint:

(20) *FaithNuclearTone*
The head tone of a syllable must be identical with its correspondent in the input.

Given that *FaithNuclearTone* is undominated, the LH can only change to *ML, or phonetically, L (LH → L). The ranking is presented in (21) and the tableau for the falling of the LH in final positions is shown in (22).

(21) The Ranking for the Falling of LH in Final Positions
FaithNuclearTone, **Rising* $]_{\#}$ >> *FaithTone* >> **T* $]_{\#}$ >> **T*

(22) Tableau for the Falling of LH in Final Positions

H.LH $]_{\#}$	FaithNucTone	*Rising $]_{\#}$	FaithTone	*T $]_{\#}$	*T
a. H.LH $]_{\#}$		*!			***
☞b. H.L $]_{\#}$			*(Max-T)		**
c. H.H $]_{\#}$	*!		*(Max-T)	*(*H $]_{\#}$)	**
d. H.HL $]_{\#}$	*!		*(Linearity)	*(*Falling $]_{\#}$)	***

The most faithful candidate (22a), in which the final LH remains unchanged, incurs a fatal violation of **Rising* $]_{\#}$, so it is ruled out in spite of its satisfying *FaithTone*. Candidates (22b), (22c), and (22d) satisfy **Rising* $]_{\#}$, but (22c), and (22d) violate *FaithNuclearTone*. This makes (22b) the most harmonic candidate and thus it is selected as the optimal output.

The constraints and ranking in (21) are anything but the final version for T2S. A full account must include a final L-LH string, where the final LH stays unchanged. We will explore this in the next section.

3.3 Interactions between T2S and T3S

In the previous sections, the interaction between T2S and T3S has been identified. When preceded by L, the final LH stays intact. When the final LH changes, it triggers T3S. In what follows, we first provide our OT-based analysis for T3S. Then we will look into the interaction between T2S and T3S.

3.3.1 Our OT analysis for T3S

Simply put, T3S requires the L to change into LH when *followed* by another L. This has been an intriguing topic in the literature (Cheng 1973, Shih 1986, Lin 2001, Wu 2002). However, they are inadequate in one way or another, as reviewed in Section 2.

The prohibition on the two successive L tones reflects that there is an *OCP* constraint banning two adjacent low tones. Note that *OCP* is also a cover constraint which can further be decomposed into constraints like *OCP*(*H*), *OCP*(*L*), and *OCP*(*LH*). The constraint at work here is *OCP*(*L*), which is shown in (23).

(23) *OCP*(*L*)
No adjacent low tones are allowed.

The constraint (23) works in conjunction with other OCP constraints staying in the general OCP cover constraint: *OCP*(*General*) (Yip 2002). A rough picture of T3S can be captured by this ranking: *OCP*(*L*) >> *FaithTone* >> *OCP*(*General*) >>**T*, as is illustrated below.

(24) The Tableau for the General T3S Pattern

L.L	OCP(L)	FaithTone	OCP(Gen)	*T
a. L.L	*!			**
☞b. LH.L		*(Dep-T)		***

In (24), the candidate (24a) is ruled out because it incurs a fatal violation on *OCP*(*L*). Consequently, (24b) is selected as optimal. These constraints and their ranking seem to be able to account for T3S successfully. However, interested readers may ask the following questions: Why is it always the first L that changes? Why should L change to LH but not other tones?

In Lin (2001), the constraint *ParsR* (see Section 2) is adopted to account for why it is always the first L that changes. *ParsR* works under the assumption that Mandarin Chinese is right-dominant in prosody. However, the headedness of the prosody of Mandarin Chinese is still a controversial issue. Shih (1986) and Chen (1996) argue that Mandarin feet are right-headed, while Duanmu (1994, 1996) argues that they are left-headed. In the following discussion, we will follow the former proposal that Mandarin feet are right-headed.

According to Yip (1999), there is a cross-linguistic tendency for prosodic heads to retain their properties in output and non-headed elements tend to change. It naturally follows that we have a cover constraint for the faithfulness in head positions:

(25) *HeadFaithTone*
A tone in head position must be identical with its correspondent in the input.

This constraint prohibits any change on the head tone. In T3S, *HeadFaithTone* is ranked topmost, ensured by the fact that only the left L is subject to change.

As for the next question why L should change to LH but not other tones, the constraint *FaithNuclearTone* comes into play. Since the nuclear of L is L in itself, a L tone can change only to LH (LH) in order to preserve its nuclear tone.

In terms of raking, *FaithNuclearTone* is ranked on a par with *HeadFaithTone*, both of which are undominated. So we have the following ranking: *FaithNuclearTone*, *HeadFaithTone*, *OCP*(*L*) >> *FaithTone* >> *OCP*(*General*) >> **T*. The general T3S

pattern thus comes into light, as shown below in (26).[7]

(26) The Tableau for T3S (final version)

L.L	FaithNucT	HeadFaithT	OCP(L)	FaithTone	OCP(Gen)	*T
a. H.L	*!			*(Ident(T))		**
☞b. LH.L				*(Dep-T)		***
c. L.L			*!			***
d. HL.L	*!			*(Dep-T)		***
e. L.LH		*!				

Both the candidates (26a) and (26d) are ruled out at the beginning since they violate the undominated *FaithNuclearTone*. The candidate (26e) violates *HeadFaithTone* because there is change on the head. Thus, (26d) is chosen as optimal.

In this way, our OT account has overcome the difficulties encountered in the literature. Now we are ready for the analysis of the interaction between T2S and T3S.

3.3.2 T2S interacting with T3S

We first look at the case in which the final LH does not fall when preceded by a L tone. Presumably, this results from the fact that *OCP*(*L*) outranks **Rising* $]_{\#}$. With this in mind, we will get the ranking in (27) if we combine the constraint rankings in (22) and (26).

(27) *FaithNuclearTone*, *HeadFaithTone*, *OCP*(*L*) >> **Rising* $]_{\#}$ >> *FaithTone* >> *OCP*(*General*), **T* $]_{\#}$ >> **T*

However, this ranking cannot prevent the candidate LH.L $]_{\#}$ to become optimal. This is illustrated in the tableau in (28) (The undominated *FaithNuclearTone* and *HeadFaithTone* are omitted here).

[7] Actually, this tableau leaves one question unanswered: Does an input like (26d) with two adjacent Ls (HL.L) violate *OCP*(*L*) and triggers T3S? This problem can be taken good care of by separating *OCP* constraints into two general constraints: *OCP*(*Whole Tone*) and *OCP*(*Constituent Tone*) (Yip 2002). In this way, the *OCP* constraint for T3S is actually *OCP*(*Whole L*). See Lo (2004:58-61) for more detailed discussions.

(28)

L.LH]#	OCP(L)	*Rising]#	FaithTone	OCP(General)	*T]#	*T
☞ a. L.LH]#		*				***
b. L.L]#	*!		*(Max-T)			**
✋ c. LH.L]#			**(Dep-T,Max-T)			***

In (28), the candidate (28c), which represents the result of T3S, passes through both *OCP*(*L*) and **Rising*]# and is wrongly selected as the optional. To cope with this, we assume that the faithfulness constraint *Dep-T*, previously hidden under the cover constraint *FaithTone*, now plays a crucial part here. *Dep-T* prohibits any *epenthetic* tone without an input correspondent. (29c) violates *Dep-T* because of the *epenthetic* H. Therefore, *Dep-T* is ranked between *OCP*(*L*) and **Rising*]#. Now we have the final version of our T2S. The constraints and ranking are indicated in (29) and the tableau in (30) (The undominated *FaithNuclearTone* and *HeadFaithTone* are omitted here).

(29) <u>The Constraints and Ranking for T2S</u>
FaithNuclearTone, *HeadFaithTone*, *OCP*(*L*) >> *Dep-T* >> **Rising*]# >> *FaithTone* >> *OCP*(*General*), **T*]# >> **T*

(30) <u>The Tableau for the Final LH Preceded by Tone 3</u>

L.LH]#	OCP(L)	Dep-T	*Rising]#	FaithTone	OCP(General)	*T]#	*T
☞a. L.LH]#			*				***
b. L.L]#	*!			*(Max-T)			**
c. LH.L]#		*!		*(Max-T)			***

Note that drawing *Dep-T* out of *FaithTone* doesn't influence our treatment to T2S above. Providing HL.LH]# as input, we still have HL.L]# as the optimal output, as shown in (31).

(31)

HL.LH]#	FNucT	OCP(L)	Dep-T	*Rising]#	FaithTone	OCP(Gen)	*T]#	*T
a. HL.LH]#				*!				***
☞b. HL.L]#					*(Max-T)			***
c. HL.H]#	*!				*(Max-T)		*(*H]#)	***
d. HL.HL]#	*!				*(Linearity)	*	*(*Falling]#)	****

For the case in which T2S does apply and trigger T3S, the constraint **Rising*]# is

ranked above both *OCP*(*L*) and *Dep-T*. This ranking is in need to save the violation of **Rising*]# when T2S activates. Then to avoid violating *OCP*(*L*), the lower-ranked *Dep-T* is violated. Since **Rising*]# and *OCP*(*L*) are never violated in this case, we assume that they are both undominated. Putting *Dep-T* back to its cover constraint *FaithTone*, we get the ranking in (32) below and the tableau is provided in (33) (The undominated *FaithNuclearTone* and *HeadFaithTone* are omitted here).

(32) The Constraints and Ranking for T2S Triggering T3S
FaithNuclearTone, *HeadFaithTone*, **Rising*]#, *OCP*(*L*) >> *FaithTone* >> *OCP*(*General*), **T*]# >> **T*

(33) The Tableau for T2S Triggering T3S

L.LH]#	*Rising]#	OCP(Wh,L)	FaithTone	OCP(Gen)	*T]#	*T
a. L.LH]#	*!					***
b. L.L]#		*!	*(Max-T)		*(*L]#)	**
☞c. LH.L]#			**(Dep-T, Max-T)		*(*L]#)	***

Note that (33c) incurs two violation marks on *FaithTone* now (*Max-T* and *Dep-T*) since *Dep-T* is set under the cover constraint. This shift of rankings between or among constraints, however, raises a theoretical problem. Is there any possibility that in one language more than one ranking exist? The answer is positive. Some researchers like Itô and Mester (1995), Garrett (1996), and Feliu (2001), to name just a few, propose that differences in a single language result from different rankings, too. Therefore, the differences dwelling in the interaction between T2S and T3S is raised from the different rankings.

3.4 Concluding remarks and further issues

In this paper, we first point out the specific behavior of the LH tone in Mandarin Chinese, which has never been fully explored in the literature. Briefly speaking, the LH tone will become a falling tone, which is denoted as *ML here, in final positons. Furthermore, it is indicated that tone sandhi patterns in Taiwan Mandarin can be well-captured in the framework of OT. The OT analysis gives proper and effective accounts not only for the nature of T2S and T3S, but also for the interaction between these two sandhi phenomena. In addition, this paper provides empirical support for the theories proposed in Yip (1999, 2002) that constraints like **T* and OCP behave like an integrated unit on some occasions, while on others they can be further decomposed into more smaller constraints.

However, there is still room for further studies concerning T2S. When a sandhi

phenomenon is not limited to certain specific context, the sandhi pattern depends largely on the prosodic structure of the language. T3S, for example, applies according to the foot structure of the expression. Similarly, when T2S is not confined to final positions, the prosodic structure, especially the foot structure of the expression it applies to, might influence its application. Therefore, different prosodic structures will induce different sandhi patterns. However, in tone languages like Chinese, the structure of foot has always been controversial. Given that a fully successful account for issues related to tone sandhi, whether it is put under OT or rule based framework, lies heavily upon the foot structure, there seems to be a long way to go for the prosodic exploration in the future.

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A Phonostatistic Approach to the Effect of Accent on Intelligibility

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Some linguists have proposed phonostatistic approaches to classify languages or varieties of a language. For instance, Cheng (1996) quantifies the sound correspondences of 17 Chinese dialects to classify them based on their phonological differences. To compare the sound systems of two dialects (such as A and B), he first quantifies the one-way intelligibility of A to B and then computes the unidirectional intelligibility of B to A. Finally, he calculates the systemic mutual intelligibility between the two dialects by taking the mean of the two unidirectional intelligibility values.

In this study, I have developed a phonostatistic measure to examine how pronunciation may influence word-recognition intelligibility. Although intelligibility has been judged by human subjects for different purposes, "phonological differences in the language systems under consideration," as Milliken and Milliken (1996:15) remark, "provide crucial keys to intelligibility unavailable through other approaches." In this regard, my phonostatistic approach offers a method to separate human attributes such as familiarity and bias from participant-based research into intelligibility.

Key words: phonological variations, phonostatistic approaches, intelligibility, lexicostatistic approaches

1. Introduction

Accent has long been found to be a significant factor affecting intelligibility (Gumperz 1982, Munro, Flege, and MacKay 1996, Jenkins 2000). Earlier studies have used three techniques to measure how accent influences intelligibility among distinctive English varieties. The first technique consists of a questionnaire that is given to informants to judge the pleasantness and 'correctness' of different English varieties (e.g., Preston 1996). An alternative technique asks listeners to hear audiotaped utterances and then asks them to rate levels of accentedness and intelligibility (e.g., Munro & Derwing 1995). The final technique asks respondents to identify, repeat, or write down the words that they hear (e.g., Matsuura, Chiba, and Fujieda 1999). According to these techniques,

we can distinguish three types of intelligibility: impressionistic intelligibility, perceived intelligibility, and word-recognition intelligibility. However, this line of research into intelligibility judged by human subjects has revealed that people who have negative attitudes towards language variation might be adversely affected in their performance of word identification tasks and tend to overstate the unintelligibility of English speakers with ethnic, regional or national accents other than their own (Mettler 1989, Baugh 1996, Preston 1996, Lippi-Green 1997, Lindemann 2001, Kachi 2004). Comparatively speaking, impressionistic intelligibility is most influenced by informants' affective-attitudinal reactions to distinctive English varieties, whereas word-recognition intelligibility is least affected by listeners' attitudes towards different English speakers because it does not rely on informants' impressions but their performances on word-recognition tasks. Accordingly, if we would like to assess actual intelligibility, we can adopt word identification tasks to reduce the risk of discrimination to the minimum and, at the same time, select listeners who display positive or neutral attitudes towards other English accents. Additionally, we can also control the parameter of familiarity by selecting listeners who are unfamiliar with speakers' accents or English varieties.

In short, carefully-designed word identification tasks can be deployed to avoid the influence of bias and familiarity on research into actual mutual intelligibility between two interlocutors talking in distinctive English varieties with each other for the first time. This influence can be controlled through careful selection of listeners who display positive or neutral attitudes towards examined English accents and who are unfamiliar with English varieties under investigation.

2. Linguistic measures of intelligibility

In contrast to participant-based measures, some linguists have proposed lexicostatistic or phonostatistic approaches to quantify linguistic differences and use them to compute linguistically inherent intelligibility or what Cheng (1996:280) terms "systemic mutual intelligibility" (SMI), which he defines as describing a pair of dialects or varieties "in terms of their systems and correspondence patterns." These linguistic methods not only enable us to separate subjective attributes such as bias and familiarity from the examination of intelligibility, but they also provide us with unique ways to address the following questions: How different are the varieties of a language? Are they mutually intelligible to each other? Why are two interlocutors able to communicate although they speak different varieties of a language? What is the threshold of linguistic divergence to maintain or impede mutual intelligibility? What types of linguistic differences impair intelligibility more than others? How similar do two linguistic systems have to be for mutual understanding to occur? How can we quantify linguistic differences of two

dialects or varieties to measure their linguistic affinity? To address these questions in a linguistic way, Simons (1979) proposes a lexicostatistic method. He investigates overall linguistic similarities between dialects as part of his model for predicting intelligibility. According to his method, SMI is derived from the ratio of the number of similar words (supposedly cognates) over the total number of words on the compared word list. His vocabulary-based intelligibility measure, however, might not be reliable because words are far more likely to be borrowed than phonemes (Van Coetsem 1988). Furthermore, a lexicostatistic approach is inappropriate for measuring the inherent intelligibility of different English varieties because basic vocabulary is largely shared by many English varieties due mainly to the influence of American English on technology and media around the globe (Peyawary 1999).

As opposed to lexicostatistic methods, some linguists have proposed phonostatistic approaches to classify languages or varieties of a language. For instance, Cheng (1996) quantifies the sound correspondences of 17 Chinese dialects to classify them based on their phonological differences. To compare the sound systems of two dialects (such as A and B), he first quantifies the one-way intelligibility of A to B and then computes the unidirectional intelligibility of B to A. Finally, he calculates the systemic mutual intelligibility between the two dialects by taking the mean of the two unidirectional intelligibility values. In his calculation, a syllable is given the value of 1.0. Since a Chinese character (a monosyllabic word) contains five syllable elements (including the initial, medial, vowel, ending, and the tone), each element has the value of 0.20. According to Cheng (1996), the syllable elements that appear in more than half of the Chinese characters with all of the corresponding elements are regarded as "signals." By contrast, those corresponding elements that appear in less than half of the relevant characters are viewed as "noises." Cheng (1996) further bases his concept of "signals" and "noises" to design a weight scale for computing the SMI of two Chinese dialects, as given below:

Table 1: Weight scale for a syllable element in Cheng's model (1996)

Condition	Signal	Noise
a. If an element is the same as that of the source dialect	0.2	-0.05
b. If an element is different from that of the source dialect		
b1. and occurs elsewhere in the source dialect	0.05	-0.2
b2. but does not occur in the source dialect	0.10	-0.10

However, since Chinese differs from English in sound systems, a proper phonostatistic approach is needed to measure the SMI of distinctive English varieties.

Milliken's (1989) study, to my knowledge, is the only attempt to examine the inherent intelligibility of different English varieties based on their phonological differences.

This study compares six regional varieties of English, including four varieties of American English and two varieties of Scottish English. To survey SMI, the researcher enumerates sound changes that each variety of English has undergone. She considers sound modifications that result in incongruent correspondences between two English varieties to be the most crucial factor that impedes inherent intelligibility; accordingly, she assigns these types of sound changes ten times the weight of the other sound alterations. Put simply, her phonostatistic approach is based on the extent to which each English variety becomes divergent from early Middle English. Nonetheless, since the degree of phonological divergence from the parent language might not reflect the phonological affinity among the daughter languages, it is not clear how the enumeration of sound changes relates directly to the degree of inherent mutual intelligibility between a pair of English varieties. In addition, Milliken (1989) did not consider the occurrence rate of the phonological rules. Accordingly, the degree to which each sound rule affects the phonological intelligibility between two varieties of English remains unexplored.

As a whole, earlier studies of linguistically inherent intelligibility have employed lexicostatistic or phonostatistic approaches to provide alternative measures for the traditional genetic classification of languages or dialects (Cheng 1996), or to examine the threshold of the language-dialect distinction (Milliken 1989). However, none has provided an applicable or suitable approach to address the SMI of different English varieties. Accordingly, I designed a phonostatistic measure to quantify phonological differences between two English speakers. My sound comparison is based only on phonological differences. I neither rely on listeners to examine perceived accentedness nor depend on their performance on word identification tasks to investigate intelligibility; accordingly, my phonostatistic measure offers a unique method to separate listeners' attitudes (e.g., bias) and experiences (e.g., familiarity) from the assessment of the accent-intelligibility correlation. In other words, my sound analysis can provide a linguistic index of participant-dependent research into intelligibility.

3. Calculation of systemic mutual intelligibility

To quantify the phonological differences of two different English speakers, I have modified my phonostatistic method from time to time for a more precise calculation of SMI. In what follows, I will explain how I developed my phonostatistic measure.

In the beginning, I considered four syllable elements of a word, including onset, nucleus, coda, and the primary word stress for the calculation of SMI. Each word is given the value of 1.0, and each element in a word is given the same value (0.25) because there is no evidence that one syllable feature is more salient than others. If an element in a word is different, the word will lose the value of 0.25 because the different

element is regarded as linguistic 'noise' for word recognition. This computation, however, was later abandoned because polysyllabic words contain primary and tertiary stresses.

I later devised the following formula to count SMI:

$$(1) \quad \mathrm{SMI} = \frac{(\mathrm{W1} + \mathrm{W2} + \mathrm{W3} ..... + \mathrm{W1000})}{1000}$$

In this formula, W refers to the value of a word, and SMI is gained by computing the average value of 1,000 high-frequency words. In short, the SMI between two different English speakers can be calculated by using Formula (1) to calculate the average value of 1,000 high-frequency words, and in this formula, the value of each word is derived by dividing the number of the same syllable elements by the number of total syllable elements.

Nonetheless, when a different syllable element results in homophones, the value of W is 'zero' because the phonemic difference causes lexical neutralization and hence makes it impossible to distinguish one word from another. While the discourse may enable listeners to understand homophones from the contextual information, I assigned no value to the word that results in homophones because I would like to explore how systemic mutual intelligibility is affected strictly by phonological difference.

This formula, however, needs revision because it can only calculate SMI and is therefore unable to address one-way intelligibility. As we know, between two English varieties often exists an asymmetry of inherent intelligibility. For example, if variety A includes the contrastive vowels of /i/ and /ɪ/ while variety B merges /ɪ/ into /i/, then speaker A will misrecognize speaker B's pronunciation of the word *pick* as *peak*. In real-world communication, any confusion of this nature is often cleared up with help of contextual cues or discursive information (such as *you can <u>peak</u> whichever one you like*). However, if the two words are played back in isolation to speaker A, he will misperceive speaker B's intended word *pick* as *peak* because there is no external information available for speaker A to decode speaker B' merger of the vowel /ɪ/ into /i/. Speaker B, by comparison, may not misperceive speaker A's intended word *pick* as *peak* as long as he perceives speaker A's pronunciation of the word *pick* to be different from his own pronunciation of the word *peak*; in this case, speaker B may not think the intended word is *peak* and hence may think of its minimal pair *pick*. As a result, formula (1) measures only systemic mutual intelligibility, losing important information regarding one-way intelligibility.

To address unidirectional inherent intelligibility (UII) in the measurement of SMI, I further modified formula (1). If all syllable elements in a word are the same, the word is given the value of 1.0. If syllable elements in a word cause phonetic differences,

formula (1) applies to count the value of the word. If a syllable element in speaker A's pronunciation of a word results in a phonemic difference that makes speaker B misidentify as another word, the value of the word is 'zero.' Reversely, if a syllable element in a word leads to a phonemic difference, the value of the word is counted according to the following rule: If a phonemic difference makes it difficult for a speaker to distinguish two words (usually a minimal pair) which are both on the list of the 1,000 high-frequency words, the value of the word is given 0.5. This value is given because both of the words may occur simultaneously to listeners from the psycholinguistic perspective. In other words, a listener may recognize either word 50% of the time when the two words are both high-frequency words. However, if a phonemic difference causes confusion about a minimal pair in which only one word is a high-frequency word and it is the intended word, the value of the word is 1.0. This value is given because there is evidence that, if one of the words is more common than the other, it is usually recognized as the intended word (Bradlow & David 1999). Table 2 summarizes the weight scale for the calculation of inherent intelligibility in the descending order of the conditions a > b > c > d > e:

Table 2: The revised weight scale for the calculation of word value

Condition	Value ('weight')
a. If a syllable element in a word spoken by speaker A results in a phonemic difference that makes speaker B misidentify another word	0
b. If a syllable element in a word spoken by speaker A results in a phonemic difference that makes it difficult for speaker B to distinguish two words (usually a minimal pair)	
b1. which are both high-frequency words	0.5
b2. in which only one word is a high-frequency word and it is the intended word	1.0
c. If a syllable element in a word causes a phonemic difference (such as /æ, ɑ/)	0
d. If a syllable element in a word is the same	1/N
Note: N = the number of total syllable elements	

The following tables demonstrate how this weight scale differs from formula (1) when speaker A has the sound /tʃ/ while speaker B has /ɕ/ and when speaker A has vowels /i/ and /ɪ/ while speaker B merges /ɪ/ into /i/.

Table 3: The results from formula (1)

	SMI	Note
cheap	2/3	Speakers A and B differ only in the onset.
pick	0	Speaker B's pronunciation causes homophones.
beach	2/3	Speakers A and B differ only in the coda.
heat	2/3	Speakers A and B differ only in the nucleus.
hit	0	Speaker B's pronunciation causes homophones.

Table 4: The results from the revised weight scale

	UII with speaker A as the source	UII with speaker B as the source	SMI	Condition	Note
cheap	2/3	2/3	2/3	c and d	Formula (1) applies.
pick	1	0	0.5	b2 in speaker A; a in speaker B	*Pick* is a high-frequency word, while *peak* is not.
beach	2/3	2/3	2/3	c and d	Formula (1) applies.
heat	2/3	2/3	2/3	c and d	Formula (1) applies.
hit	0.5	0	0.25	b1 in speaker A; a in speaker B	*Hit* and *heat* are both high-frequency words.

As the above two tables indicate, formula (1) is unable to provide information about unidirectional inherent intelligibility (UII). In comparison, the SMI of the word *pick* calculated from both formula (1) and the revised weight scale has different values. Its value obtained from formula (1) is 0, while the revised weight scale gives the word the value of 0.5 due to the asymmetrical inherent intelligibility. Accordingly, formula (1) is stricter than the revised weight scale in the calculation of SMI.

Finally, I added one more condition to the weight scale. This condition considers the degree of phonological divergence in the comparison between two phonetically different but acoustically similar phonemes. For instance, the difference between /ʌ/ and /o/ is greater than that between /ʌ/ and /a/ because /ʌ/ and /ɑ/ are both central vowel while /o/ is a back and round vowel. The finalized weight scale is given below in the descending order of conditions a > b > c > d > e:

Table 5: The finalized weight scale

Condition	Value ('weight')
a1. If a syllable element in a word spoken by speaker A does not result in a phonemic difference from speaker B	1
a2. If a syllable element in a word spoken by speaker A results in a phonemic difference that makes speaker B misidentify another word	0
b. If a syllable element in a word spoken by speaker A results in a phonemic difference that makes it difficult for speaker B to distinguish two words (usually a minimal pair)	
b1. which are both high-frequency words	0.5
b2. in which only one word is a high-frequency word and it is the intended word	1.0
c. If a syllable element in a word causes a phonemic difference (such as /æ, ɑ/)	0
d. If a syllable element in a word is phonetically different but acoustically similar (such as /ʌ, ɑ/, /i, ɪ/, and /u, ʊ/)	1/2N
e. If a syllable element in a word is the same	1/N
Note: N = the number of total syllable elements in word	

The following table demonstrates how this complete weight scale works to calculate unidirectional inherent intelligibility (UII) and SMI when, for instance, speaker A distinguishes /i/, /ɪ/, /æ/ and /ɑ/ while speaker B merges /ɪ, æ/, respectively, into /i, ɑ/:

Table 6: Examples of how the weight scale works

	UII with speaker A as the source	UII with speaker B as the source	SMI	Condition	Note
heat	1	1	1	e	Identical syllable elements
hit	0.5	0	0.25	b1 in speaker A; a in speaker B	*Hit* and *heat* are both high-frequency words
pick	1	0	0.5	b2 in speaker A; a in speaker B	*Pick* is a high-frequency word, while *peak* is not
cheap	(2/3) + (1/2x3)	(2/3) + (1/2x3)	(2/3) + (1/2x3)	d and e	
fact	3/4	3/4	3/4	c and e	

4. Justification for the calculation of SMI

As illustrated in the preceding section, SMI is computed by calculating sound differences in word syllable elements, including onset, nucleus, coda, and word stress. In what follows, I will justify this calculation on the grounds of linguistic evidence.

First, my sound analysis only considers differences in syllable elements without consideration of differences in intonation and discursive stress. There has been some debate concerning the relative importance of suprasegmental and segmental features of speech in intelligibility judgments. For instance, Anderson-Hsieh et al. (1992) found prosodic cues to be the better predictor of intelligibility, whereas Koster and Koet (1993) found segmental features to be more crucial than prosodic information in ratings of accented speech. However, since studies like these rely on human subjects in the evaluation of perceived intelligibility, judges' reactions to prosody may bias their ratings of intelligibility. As a result, it is not clear whether prosody actually influences word-recognition intelligibility.

According to Gumperz's (1982) research, it seems that intonation has much less influence on word-recognition than on comprehensibility and interpretability. For example, to native speakers, the expression *How can I help you?* with a rising tone sounds 'friendly,' 'warm,' and 'enthusiastic,' but a falling tone sounds 'impersonal,' 'aloof,' and 'inapproachable.' Accordingly, native speakers may misunderstand nonnative speakers' intentions when decoding nonnative intonation from the perspective of native English

speakers' intonational usage. Nonetheless, as far as intelligibility is concerned, differences in intonation alone do not contribute to non-understanding. Simply put, pitch differences do not affect word-recognition intelligibility but, rather, listeners' perceptions of the intended utterances.

In fact, Jenkins (2000) observes, from her database of Interlanguage Talk, that mesolectal or intermediate-level English speakers are often unaware of, or are unable to produce, intonational cues, although intonation carries pragmatic information to native speakers. She found that communication between two mesolectal or intermediate-level English speakers largely decode each other's messages based mostly on word recognition—that is, the pronunciations of intended words, rather than intonation. According to her survey, non-understanding between two intermediate-level English speakers is largely caused by segmental, not suprasegmental, differences. Therefore, she concludes that intonation is irrelevant to mutual understanding. She further observes that the misuse of contrastive stress rarely results in non-understanding without the combination of segmental errors. To summarize, intonation and discursive stress relate to comprehensibility and interpretability, instead of word-recognition intelligibility. Since my sound comparison aims to analyze how pronunciation differences may generate linguistic 'noises' for word recognition, I did not consider intonation and discursive stress in the calculation of SMI.

In addition, my sound comparison does not consider the acoustic nuances of a vowel because they do not influence word recognition (Nishi 2002). Although acoustic analysis may indicate that a vowel in different languages displays distinctive acoustic properties, the same vowel can still be recognized by different language speakers. For instance, the vowel /i/ appears in the sound inventories of both Chinese and English, but it has minor acoustic properties. The second formant (F2) of the vowel in Chinese is lower than in American English; this means that Chinese speakers produce the vowel /i/ with less advancement of the tongue as compared with American English speakers (Chen et al. 2001). This articulatory nuance is, however, not salient enough to be perceived to be another vowel, such as /e/ and /ɑ/. Accordingly, if Chinese learners of English transfer their native /i/ sound to their pronunciation of the English vowel /i/, English speakers will still perceive it as /i/, albeit slightly accented. Therefore, the acoustic deviation of a vowel will not be considered in the calculation of SMI.

Furthermore, each syllable element is regarded as having the same value because there is no evidence that one syllable feature is more salient than others. Although the nucleus (i.e., the vowel) is purportedly a prominent feature in a mono-syllabic word, syllable-initial and syllable-final consonants are equally crucial for listeners to distinguish the word from others, as shown in minimal pairs, such as *peak/beak* and *seat/seek*. Furthermore, the replacement of a vowel with other variants in a poly-syllabic word

does not usually affect word recognition because the phonetic environment provides a clue for a listener to reconstruct the intended word. For instance, if the vowel in the first syllable of the word *politics* is replaced with a cough or a different vowel (such as /o/ or a schwa), a listener can usually figure out the intended word because the word-initial consonant /p/ and the ensuing syllables help the listener recognize the word; this is evidenced by research on human top-down language processing (e.g., Carson & Tanenhaus 1989). Accordingly, it is inconclusive that vowels are more significant than consonants in terms of word recognition.

Moreover, the question of whether word stresses are more important than syllable segments also remains unresolved. Although Bansal (1969) found that some Indian English speakers' misplacements of word stresses cause listeners of other nations to misidentify the intended words (such as *cha'racter* as *director*, *wri'tten* as *retain*, *atmos'phere* as *must fear*, *ye'sterday* as *or study*, *'prefer* as *fearful*, *'correct* as *carried*, and *'about* as *come out*), he does not quantify misplaced stresses and compare their overall effects on intelligibility. It is therefore unclear whether word stresses are more significant than syllable segments in the word recognition of common spoken English words. In fact, according to Jenkins' (2000) study, non-understanding among non-bilingual English speakers is rarely caused by differences in word stress unless a different stress is in combination with a segment substitution. Therefore, without specific evidence about the auditory scale of syllable elements, each syllable feature is viewed as having the same weight in the calculation of SMI.

5. Methodology

Having justified my calculation of SMI between two different English speakers, I would like to address my methodology. First, a word-list reading is appropriate for sound comparison because this data collection can enable a researcher to take control of the data variable for a consistent comparison between a pair of speakers. Second, high-frequency spoken words used in people's daily lives are suitable to examine how different pronunciations of common words influence general mutual intelligibility between two different English speakers. Specifically, the words considered in this study consist of *concept* words which denote the basic forms of words (e.g., *write*); *graphic* words (e.g., *writes*, *wrote*, *written*, and *writing*) are excluded in this study, considering that intelligibility are actually not affected by irregular finite forms and plural/tense suffixes because the context is usually clear in the discourse, as shown in such utterances as *He go home yesterday*, *He like her*, and *He don't eat shrimp*.

My pilot study suggests that 1,000 high-frequency spoken words are apposite to explore two distinctive speakers' general systemic mutual intelligibility. I examined 10

recent Oprah Winfrey's guest interviews[1] during 2003 to 2004, and I found that only 3,862 concepts words are used in the interviews, although there are in total 81,252 words spoken in the interviews. Table 7 shows detailed information about the results of my pilot study.

Table 7: The corpus of spoken English established from 10 of Oprah Winfrey's TV interviews

	Topic	Date	Duration	Number of participants	Total words	Concept words	Graphic words
1	What ya cookin'?	07/18/03	40 mins	M: 6, F: 9	8,886	1,017	1,223
2	Is your child living a double life?	10/02/03	40 mins	M: 3, F: 9	8,671	956	1,191
3	Children left home alone	01/14/04	40 mins	M: 2, F: 9	8,417	1,025	1,276
4	Weight loss success stories	01/19/04	40 mins	M: 2, F: 8	8,154	1,060	1,289
5	Life after war	04/06/04	40 mins	M: 16, F: 1	7,445	1,055	1,287
6	How to be a millionaire couple?	04/27/04	40 mins	M: 6, F: 4	8,228	938	1,116
7	Faced death and lived to tell about it	04/30/04	40 mins	M: 8, F: 3	7,763	1,094	1,498
8	I want my child to be a star	05/04/04	40 mins	M: 5, F: 7	8,553	1,022	1,243
9	What not to wear this summer?	05/18/04	40 mins	M: 0, F: 9	7,725	941	1,145
10	The mistake I can't take back	05/20/04	40 mins	M: 5, F: 4	7,410	950	1,187
Total	**10 topics**	**2003-4**	**400 mins, 6.67 hrs**	**117 including Oprah**	**81,252**	**3,862**	**5,173**

Specifically, my findings show that only 840 words are found to occur more than ten times out of the 81,252 words, as demonstrated in Table 8.

Table 8: The frequency of spoken English words

Occurrence times in the corpus totaling 81,252 words	The accumulative number of concept words
50	215
25	385
15	592
10	840
5	1,355

Since the number of the concept words that appear more than ten times in the corpus is only 840, I think that 1,000 high-frequency concept words would suffice for sound comparison.

[1] For a description of the Oprah Winfrey television show, please visit its website: www.oprah.com.

6. Phonostatistic measure

In this section, I will demonstrate how the phonostatistic measure that I presented above can be utilized to calculate the phonological differences between two different English speakers. This measure is reiterated below:

Table 9: The phonostatistic measure

Condition	Value ('weight')
a. If a syllable element in a word spoken by speaker A results in a phonemic difference that makes speaker B misidentify another word	0
b. If a syllable element in a word spoken by speaker A results in a phonemic difference that makes it difficult for speaker B to distinguish two words (usually a minimal pair)	
b1. which are both high-frequency words	0.5
b2. in which only one word is a high-frequency word and it is the intended word	1.0
c. If a syllable element in a word causes a phonemic difference (such as /æ, ɑ/)	0
d. If a syllable element in a word is phonetically different but acoustically similar (such as /ʌ, ɑ/, /i, ɪ/, and /u, ʊ/)	1/2N
e. If a syllable element in a word is the same	1/N
Note: 1) N = the number of total syllable elements in a word 2) The conditions apply in the descending order of a > b > c > d > e	

I will use 10 words to illustrate my phonostatistic measure because they display salient sound differences that apply the conditions of the weight scale (see Table 9). I will compare two different English speakers (Lee and Kai) to obtain their respective unidirectional inherent intelligibility (UII) and their SMI.

The first word I would like to use as an example is *ask* /æsk/, which consists of one syllable with two elements: the nucleus (/æ/) and the coda (/sk/). Because a word is assigned the value of 1.0, and because each syllable element has an equal value, one of the two syllable elements in the word *ask* has the value of 1/2 according to Condition (e). Lee reads this word as [æsk], while Kai pronounces it as [ɑsk]. The coda is the same; accordingly, it delivers a linguistic signal and thus remains its value of 1/2. The vowel, by contrast, is phonemically different so that it is regarded as a linguistic noise and hence has no value according to Condition (c). As a result, the total value of the word is 0.5.[2]

[2] The concept of linguistic "signals" and "noises" in the present study differs from Cheng's (1996) concept. In my sound analysis, if the corresponding syllable elements are the same, they are regarded as "signals." If they are different, they are viewed as "noises." According to Cheng's

The word *ear* is pronounced by Lee and Kai respectively as [ir] and [ɪə]. This monosyllabic word includes two elements: the nucleus and the coda. While the two syllable segments are phonetically different, they are acoustically similar. Accordingly, Condition (d) applies to compute the phonological differences in the word whose value equals the sum of its two syllable elements: 1/2x2 + 1/2x2 = 0.5.

The word *window* is also pronounced differently by Lee and Kai respectively as [ˈwindo] and [ˈvɪndo]. This polysyllabic word contains 6 syllable segments with the word stress. All of the segments, except for the onset and the stressed vowel, are the same, thus gaining the value of 4/6 according to Condition (e). Because the onset is phonemically different, it has no value according to Condition (c). Furthermore, the vowel is acoustically similar so that it only has the value of 1/2x6 according to Condition (d). Taken together, the word value amounts to 4/6 + 1/12 = 0.75.

Lee and Kai also differ in their pronunciations of the word *mouth*. Lee articulates it as [mauθ], while Kai enunciates it as [maut]. This word includes three segments, only one of which is phonemically different. Accordingly, the word value is 2/3 according to Conditions (c) and (e).

Moreover, Lee and Kai differ in their readings of the word *cause*, which includes three syllable segments: /k/, /ɔ/, and /z/. Because the acoustic analysis does not show that Kai uses aspiration, the stressed syllable-initial /k/ is perceived as /g/, resulting in a phonemic difference. Accordingly, the onset has no value according to Condition (c). The other two segments are, however, identical in the two speakers' pronunciations, hence giving the word the value that amounts to 2/3 according to Condition (e).

The SMI of a word equals its UII unless the pronunciation of the given word leads to homophones. For example, the word *pull* is read by Lee as *pool*, and therefore, it does not gain any value according to Condition (a). By comparison, the word is enunciated as [pʊl] by Kai. When Lee hears Kai's articulation, he might be able to recognize it as the intended word *pull* because *pool* is not included in the top 1,000 high-frequency words and because it is used far less frequently than *pull* in the corpus (*pull* appears 14 times in the corpus, while *pool* appears 4 times). Accordingly, Condition (b2) applies to give the word the value of 1.0.

In comparison, the word *right* is pronounced by Kai as *light*. Because of this phonological confusion, Lee might misidentify it as *light* when Kai is the speaker. Consequently, Kai's UII to Lee is zero accordingly to Condition (a). Lee, by contrast, articulates the word as [raɪt]. When Kai is the listener, he might hear it as *right* or *light*

(1996) definition, however, the syllable elements that appear in more than half of the Chinese characters with all of the corresponding elements are regarded as "signals." By contrast, those corresponding elements that appear in less than half of the relevant characters are viewed as "noises."

because both of the words are high-frequency words. Accordingly, Condition (b1) applies to give the value of 0.5 to Lee's UII of the word *right*.

Interestingly, both Lee and Kai articulate the word *then* as *den*. In this case, Conditions (b) and (e) can apply because their pronunciations result in phonemic differences. Nonetheless, Condition (b) applies before Condition (c) in accordance with the ordering of the weight scale. Furthermore, while the sound alteration results in homophones, the word *den* is not a high-frequency word. Therefore, the value of the word *then* is 1.0 according to Condition (b2).

Moreover, Kai reads *pay* like *bay* because the word-initial /p/ is unaspirated. Thus, his UII to Lee is zero according to Condition (a). Lee's pronunciation [p^h], however, might enable Kai to recognize the intended word because *bay* is not a high-frequency word. Accordingly, Lee's UII to Kai is 1.0 according to Condition (b2).

The last example I would like to provide is *put*. Kai pronounces it like *boot* because of his unaspiration of the word-initial /p/ so that his UII to Lee is zero. By comparison, if a speaker reads it as [pʊt], Kai might recognize either *boot* or *put* because the two words are both high-frequency words. Therefore, the speaker's UII to Kai is 0.5 according to Condition (b1). However, Lee articulates the word as [p^hut] with the tensing of the vowel. As a result, his UII to Kai is only half of 5/6 according to Condition (d), that is, 0.42. Table 10 summarizes the 10 examples presented above.

Table 10: Ten examples illustrating the phonostatistic measure

	Word	Lee	Kai	Lee's UII	Kai's UII	SMI	Condition
1	ask	[æsk]	[ɑsk]	½	½	1/2	c, e
2	ear	[ir]	[Iə]	¼ + ¼	¼ + ¼	0.5	d
3	window	['windo]	['vIndo]	4/6 + 1/12	4/6 + 1/12	0.75	c, d, e
4	mouth	[mauθ]	[maut]	2/3	2/3	2/3	c, e
5	cause	[k^hɔz]	[kɔz]	2/3	2/3	2/3	c, e
6	pull	[pul]	[pʊl]	0	1	0.5	a, b2
7	right	[raIt]	[laIt]	0.5	0	0.25	a, b1
8	then	[dɛn]	[dɛn]	1	1	1	b2
9	pay	[p^he]	[pe]	1	0	0.5	a, b2
10	put	[p^hut]	[pʊt]	0.42	0	0.21	b1, d

Note: UII: unidirectional inherent intelligibility
SMI: systemic mutual intelligibility

Following the calculation presented above, a researcher can, therefore, analyze the SMI between the different English speakers, Lee and Kai by computing the average value of 1,000 high-frequency words.

7. Conclusion

In this study, I have developed a phonostatistic measure to examine how pronunciation may influence word-recognition intelligibility. Although intelligibility has been judged by human subjects for different purposes, "phonological differences in the language systems under consideration," as Milliken and Milliken (1996:15) remark, "provide crucial keys to intelligibility unavailable through other approaches." In this regard, my phonostatistic approach offers a method to separate human attributes such as bias and familiarity from participant-based research into intelligibility. While a comprehensive linguistic comparison must consider other linguistic correspondence patterns, such as syntactic, semantic, and discursive systems, it is my hope that this study has provided us with a phonology-based approach to explore the potential impact of sound differences on the extent to which different English speakers understand each other.

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Nativization of English Usage in Advertising in Taiwan: A Study of Readers' Attitudes*

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English mixing has become a very popular advertising strategy in Taiwan. However, perhaps due to either copywriters' originality or their lack of good English proficiency, some nativized English devices have come into being such as e-Europe (derived from e-commerce), easy play (meaning 'a DVD player can be played easily'), and green your heart.

This study intends to investigate readers' attitudes toward these advertising devices occurring in newspapers and magazines in Taiwan. The data of this study were drawn from a questionnaire survey conducted to a quota sample of 425 subjects of various age, levels of education and occupations.

The results indicate that among the patterns surveyed, phrases such as easy play are most acceptable while long strings of English sentences derived from the verbatim translation from Chinese structures are least acceptable. Major factors determining the degree of readers' acceptability of these devices include the semantic interpretability of these patterns, the appropriateness and compatibility of the language usage, and the stylistic and advertising effects induced by the usage.

In terms of what sociolinguistic factors correlate with subjects' degree of acceptability of the nativized patterns, it is shown that subjects' English proficiency and their degree of preference for using English in advertising in general are at work. Those subjects whose English proficiency is either very advanced or very low are most judgmental about the nativized patterns whereas those who prefer using English in various product domains and in advertising in general have a higher degree of acceptability of these nativized patterns.

On the whole, the survey subjects hold a positive attitude toward the development of nativization of English usage in advertising. The overwhelming favorable attitudes towards almost all the surveyed patterns suggest that the development of nativization of English in advertising in Taiwan will continue as a trend.

Key words: English mixing in advertising in Taiwan, nativization of English usage, nativized English devices, readers' attitudes, sociolinguistic factors

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1. Introduction

English mixing has become a worldwide trend in the global advertising and has been studied by Masavisut et al. (1986), Bhatia (1987, 1992, 2000, 2001), Takashi (1990), Pavlou (2002), Hashim (2005), and Martin (1998, 2002a, 2002b, 2005, 2006), to name just a few. While the advertising discourse in Taiwan is undergoing its process of Englishization, nativization of English usage is concurrently taking its course (Hsu 2000). Linguistic devices such as e-go (derived from e-commerce), easy select (select something without any difficulty), and give me high are some of the examples, which I will elaborate on in the following sections.

So far, the majority of works studying English mixing in global advertising focus on textual analyses. For example, Bhatia (2001) studies magazine advertisements from nine languages to explore the formal features, structural domain allocation, and the socio-psychological features of English mixing in these advertisements.

Martin (1998, 2002a, 2002b, 2006), examines the product categories and positioning of English mixing as well as cultural images of English in French advertisements, mainly using the corpus of magazine advertisements and TV commercials**.** By analyzing TV commercials and print advertisements, Takashi (1990) investigates the relationship between the functions of English loanwords and the features of targeted audience in Japanese advertising. Hashim (2005) surveys the visual and verbal interactions within an advertisement and their association to the construction of cultural identities, employing a genre-based approach.

Quite different from the focus of the previous works, the present study attempts to examine the general public's attitudes toward the nativized devices of English usage newly developed in the advertisements in magazines and newspapers in Taiwan. The following issues will be explored: (1) the general public's attitudes toward the nativized devices; (2) the underlying reasons that account for the public's attitudes in the acceptability or lack of acceptability of these devices; (3) the sociolinguistic factors that correlate with the public's attitudes; (4) the general public's attitudes toward the development of nativization of English as a trend.

2. Methodology

2.1 Data collection

The data of this study were drawn from a survey questionnaire conducted to a quota sample of 425 subjects consisting of 189 males and 236 females aged from 14 to 87, with their level of education ranging from junior middle school to doctoral degree,

and from more than forty-nine professions.[1] For the detailed demographic information of subjects, please see Appendix 1.

In the questionnaire, three major parts of questions were posed. The first part elicited the demographic information of the subjects regarding their gender, age, level of education, occupation, and the dialects spoken at home.

In the second part, seven patterns of nativized English usage were presented, copied directly from the corpus of 1263 newspaper and magazine advertisements collected from October to December in 1999. Here, by "nativized" is meant that the linguistic patterns provided in the survey deviate systematically from the standard English grammar. "Systematically" further means that the patterns of deviation are consistent in various advertisements created by different copywriters. According to Kachru (1986), nativization is the 'result of those productive linguistic innovations which are determined by the localized functions of a second language variety, the "culture of conversation" and communicative strategies in a new situations, and the transfer from local languages.' As shall be demonstrated in the following discussions, the nativized patterns provided in the survey result from the direct transfer from the Chinese language (Hsu 2000). A brief listing of these patterns is provided below.

The first pattern of devices includes e-color, e-go, e-people, and e-match. The emergence of these compound words derive from the current usage of English compound words such as e-commerce.

The second category of devices consists of phrases conjoining an English adjective easy with either an English verb or a Chinese verb. The former type of instances includes easy select, easy go, easy talk, easy touch, easy show, and easy play. The latter subtype is exemplified by cases such as easy 敷 (fu) (cosmetics which can be put on the face easily) and easy 抽 (chou) (a piece of tissue paper which can be easily drawn from the box). In such device, easy is used for the sake of its translated meaning in Chinese, 容易 (rongyi) "effortless and easily." Hence, the phrase of easy select means "select something easily." Such native innovations of coining new verb phrases totally disregard the grammatical constraints from English.

In the third type of patterns, English words are freely mixed in an English sentence or with Chinese text, without observing parts of speech of these words. Take Give me high for example. High serves originally as an adjective and is now used as a noun. In the instance of Green Your Heart, the adjective green has become a verb.

As regards mixing English words with Chinese text, these English words are

[1] Due to the restriction that for subjects to be able to read the English mixing devices presented in the questionnaires and respond accordingly, it is required that subjects need to receive at least two years of English education. Therefore, subjects' minimum level of education was confined to the third year of junior middle school.

borrowed based on their translated meaning in Chinese, regardless of their original parts of speech. In the advertisement of 幫助您的愛心快速 ONLINE (bangzhu ninde aixin kuaisu online) meaning "to help you to quickly contribute your charity online," online, originally an adjective or an adverb in English, is borrowed due to its Chinese translated meaning 上網 (shangwang), a verb in Chinese, and thus functions as a verb. Another instance is 給您最 fly 的音樂 (geinin zuiflyde yinyue) meaning "I'll show you the most enjoyable music that will make you feel like flying." In this example, the English verb fly is borrowed owing to its corresponding meaning in Chinese, 飛躍 (feiyao), together with the use of the adjectival suffix 的 (de), it is transformed into an adjective.

The next type of patterns consists of text totally written in English; however, the underlying structure is entirely Chinese. That is, it is only the English lexicon and not the English structure that is borrowed into the wording. Thus, the composition of such text is a verbatim translation of Chinese structure into English. In some extreme cases, unintelligibility of the text arises. Take the following texts for example, where the first two cases are drawn from advertisements promoting sales of residential real estate properties and the third one is from travel agency advertisement.

(1) 鳳凰城 (fenghuangcheng) (WONDERFUL VILLA) Along the road, You will find the woods around us. Season over the leaves that love us. Where can give us so fresh so much as here?
(2) Experience The Art Of Living Between The Building And The Garden, You Will Know What Is You Always Waiting For.
(3) 太陽假期 無限驚奇 Sun Vacation Very Surprise
taiyangjiaqi wuxianjingqi sun vacation very surprise
You'll be so much surprised by our sun vacation tour packages.

In the above instance of (2), the English sentence You will know what is you always waiting for is a direct verbatim translation into English of the Chinese structure 你將會知道什麼是你一直在等待的 (nijianghuizhidao shemoshi niyizhizaidengdaide). Likewise, the underlined wording in the instances of (1) and (3) is also a word-for-word translation from the meaning of their Chinese structural counterparts.

The last type of device is made up of sentences mixed with English and two dialects of Chinese, Mandarin and Southern Min. One instance follows.

希望房價低的人買到保證 You happy, he happy, everybody 攏 happy
xiwang fangjiadideren maidao baozheng you happy, he happy, everybody long happy
For those who want to buy residential real estate properties at the lowest cost, we guarantee that your purchase with us will make everyone happy.

In this example, other than mixing English and Mandarin Chinese, 攏, meaning "all," is borrowed from the Southern Min dialect.

Concerning the arising of the above types of deviation of English usage, according to interviews conducted with a total of 13 copywriters from a variety of prestigious local and internationally-based advertising agencies in Taiwan, some local copywriters' originality on the one hand and some other copywriters' lack of good English proficiency on the other hand are held responsible (Hsu 2004).[2] However, syntactic mistakes arising from the verbatim translation from Chinese structure are mainly attributable to some copywriters' lack of good English command, especially those in the field of real estate property advertising.[3]

After the presentation of the seven nativized English patterns, the subjects' general attitudes toward these patterns were surveyed. A scale of five grades of attitudinal choices was provided, ranging from 'completely acceptable,' 'acceptable,' 'neutral,' 'unacceptable,' to 'completely unacceptable.'

Other than the multiple-choice format of questions, open-ended questions concerning why subjects made their certain attitudinal choices were also posed so that underlying reasons accounting for their multiple-choice answers could be obtained.

The last part of questionnaire investigated subjects' attitudes toward the general trend of development of nativization of English usage. In addition, subjects' level of competence in English, degree of preference for using English mixing in advertising in general and in specific domains as well as their preferred advertising language for various types of products were also examined. The specific items of investigation are provided in the discussion of the result of correlation analysis.

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[2] When inquired whether the deviations from Standard English evident in advertising in Taiwan are defined as innovations or mistakes, most of the copywriters reach the consensus that syntactic deviations based on word-for-word translation from Chinese are intolerable errors while other devices may be termed innovations.

[3] Based on the interviews conducted with five real estate copywriters (Hsu 2004), due to the time and budget limit, many copywriters in the lower-scale real estate property advertising companies have to both write the English mixing in the body copy and use English mixing as the graphic design, without being able to recruit any professional help to proofread their English wording. For these copywriters, the purpose of attention-getting suffices as long as the English wording is easy to read and write. Consequently, mistakes such as verbatim translations from Chinese structure prevail in the real estate property advertisements.

2.2 Statistical analysis

2.2.1 Frequency count

Frequency counts were performed for the analysis of the multiple-choice format of questions based on the five grades.

Regarding the analysis of the underlying reasons that account for subjects' attitudinal choices made in the section of the multiple-choice format of questions, i.e., their degree of acceptability of a certain nativized pattern, a total of 2657 responses were elicited. Since some subjects provided more than one reasons in their responses, 3190 reasons were gathered. However, for the purpose of this study, only responses pertaining to positive and negative attitudes were recorded. All the responses pertaining to neutral attitudes and those involving contradictory or inconsistent reasons were excluded. Therefore, only 1823 responses with 2207 reasons were gathered as the corpus of data for analysis. Then all the reasons were classified into 20 categories. Each reason based on the categorization was coded into the computer, and a frequency count of these categories was carried out.

These categories are listed as follows.

1) Whether the meaning of the pattern is interpretable.
2) Whether the usage is attention-getting.
3) Whether the usage is familiar and common (or overused or never heard of).
4) Whether the linguistic device is innovating or creative.
5) What are the effects, purposes or functions of the advertised products that the advertisers intend to impress on the consumers?
6) Whether the usage is trendy.
7) Whether the code-mixing devices are considered essential and appropriate to advertise the intended products. Alternatively, can Chinese-only devices also serve the same purposes? Additionally, are the Chinese and English structures compatible to each other in the code-mixing devices? (不中不西, 不相容, 不搭調)
8) Whether the language usage yields a sense of modernization.
9) Whether the language usage yields a sense of internationalism.
10) Whether the usage copes with the standard English grammar.
11) Whether the devices sound smooth in reading and oral utterances (通順, 順口, 順眼, 順耳) (口語化).
12) Who are the major target audience of the advertisements?
13) What are the types of the advertised products?
14) What are the stylistic effects induced by the language usage?

15) What influences may the linguistic devices have on the English learners?
16) Whether the language usage is pure advertising gimmicks.
17) Whether the linguistic pattern is a nativized device.
18) Whether the usage copes with the Chinese literary convention.
19) Whether the device copes with the essence and characteristics of language development such as language change and creativity.
20) Personal emotional responses without providing any explicit account that can fall into any of the previous categories.

For a brief illustration of a few examples from each category of reasons, please see Appendix 2.

2.2.2 Correlation analysis

For the correlation study between the sociolinguistic variables and the degree of acceptability of the seven nativized devices, a five-point scale from one to five was set up. Point one was assigned to choices made for 'completely unacceptable,' three to 'neutral,' and five to 'completely acceptable.' Therefore, a scale from 5 to 35 was set up: the higher the score, the higher degree of acceptability of these nativized devices by subjects.

Variables chosen for the correlation study consist of several sets of data. These included personal demographic information such as gender, age, level of education, occupation, the school one attended, and one's major field of study; dialects spoken at home, such as Mandarin, Southern Min, Hakka, and other minor dialects. Other sets of variables included these subjects' attitudes toward Englishization of advertising text and nativization of English in advertising as a trend, their self-rated command of English, and their preference for using English in different product domains. Analysis of variance was used to analyze the data.

3. Results

3.1 Percentage of the surveyed patterns

As Table 1 indicates, in terms of the degree of acceptability of the seven surveyed patterns, three are rated with a percentage over 50%. These patterns include phrases such as easy go, English sentences which change the parts of speech such as give me high, and the Chinese-English mixing pattern of 幫助您的愛心快速 ONLINE (bangzhu ninde aixin kuaisu online). In particular, expressions such as easy go receive the highest rating, almost doubling the frequency of the Chinese style of long English sentences,

which receives the lowest frequency.

3.2 Underlying reasons accounting for the acceptability and unacceptability of the nativized patterns

An analysis of the underlying reasons accounting for the acceptability and unacceptability of these nativized patterns indicates that factors as follows play significant roles in determining subjects' attitudes toward these devices—semantic interpretability of the patterns, stylistic effects and advertising effects induced by the language usage, and the appropriateness of the language use as advertising devices, including the compatibility of these devices with Chinese grammar. A detailed discussion on the top three factors determining why a certain pattern is acceptable or unacceptable is provided in the following sections, based on the descending order of the acceptability of these patterns.

To begin with, as regards the most acceptable pattern such as easy play and easy select, as shown by Table 2, the major type of responses favoring such usage is concerned with its semantic interpretability. According to the feedback elicited, since a great number of people know the word easy, the message conveyed by the advertisements is easy to understand. In addition, for some other subjects, compared with the standard English usage, such a nativized device based on the translated meaning of its Chinese counterpart makes the meaning even more transparent. However, one subject notes that such usage is easy to be understood by young people only while it does not work with the older generation, suggesting that age may play a role in influencing subjects' attitudes in accepting this pattern.

As for the other two less dominant factors contributing to subjects' favorable attitudes, one is the positive stylistic effects induced by the language usage. Subjects hold that such device consisting of easy English vocabulary makes the whole expression sound straightforward, dynamic and full of fun. Another factor is related to the positive advertising effects yielded by the language use. Based on the observation of some subjects, the simple English word easy fully features the characteristics of the advertised products and yields in the readers a feeling of user-friendliness concerning the products. For these readers, via the use of the expression such as easy play, they are lured to believe that they can operate the advertised products such as a DVD player successfully and effortlessly.

By contrast, among the negative responses, although very few, the violation of Standard English grammar by this device mainly accounts for the unacceptability of this pattern. Comments such as "It's Chinese English" and "a word-for-word translation from Chinese structure" are elicited. In spite of such objection to the nonstandard

English usage involved in this pattern, due to its easy-to-understand meaning brought about by the verbatim translation from Chinese grammar, such pattern is rated with the highest degree of acceptability.

With regard to the second most acceptable devices such as give me high and green your heart, where the parts of speech have been changed, whether the patterns are semantically interpretable largely determines subjects' acceptability of this usage. See Table 3 for the percentage. For those subjects who can understand these patterns, the message conveyed by the advertisements is easy to read. However, for those having difficulties understanding the patterns, they complain that the meanings are unintelligible to those readers whose proficiency of English is low. Some of them affirm that if the advertising text is mixed with both Chinese and English, the meaning will become more clear.

The next factor determining whether the pattern is acceptable is the stylistic effects induced by the language usage. Subjects who accept this pattern find its rhetorical style simple, lively, dynamic and full of fun whereas those who are against such usage find it ludicrous. Still some other opponents who are concerned with the appropriateness or linguistic accuracy of such usage argue that for Chinese audience, Chinese should be the only language used in advertisements and such usage messes with Standard English grammar. In this part of analysis, the same leading two factors, viz., the semantic interpretability of the patterns and the stylistic effects of the usage determine both the acceptability as well as the unacceptability of these English-only patterns. Although the language barrier of English may lead to the lack of semantic interpretability of these patterns, favorable responses still surpass unfavorable ones to a large extent.

The following devices analyzed are composed by the Chinese text mixed with single English words such as 幫助您的愛心快速 ONLINE (bangzhu ninde aixin kuaisu online) and 給您最 fly 的音樂 (geinin zuiflyde yinyue). Table 4 shows that semantic interpretability once again constitutes the primary factor in accounting for the acceptability and unacceptability of this pattern. For subjects who can comprehend this pattern, the meaning of the English words can be easily derived. By contrast, subjects not being able to understand the meaning claim that it takes an above-average level of English proficiency to understand the expression. Thus, for those who do not possess such level of English proficiency, they fail in the task of comprehending the meaning.

Other than semantic interpretability of the patterns, stylistic effects induced by the language usage also come into play in influencing subjects' attitudes in either accepting or not accepting the patterns. Subjects who like the style maintain that when using equivalent Chinese words entails wordiness, the code-mixing of English helps to convey the message more clearly and creates a simple, forceful, and lively style. For example, in the instance of 給您最 fly 的音樂 (geinin zuiflyde yinyue), one subject asserts that

the English word fly is used so lively that he/she can feel the bouncing of the musical notes. On the other hand, for those who do not appreciate the code-mixing style or find the English expressions an inappropriate way to advertise the products, they think that it is unnecessary to code-mix English at all and the code-mixing style looks unnatural and ludicrous.

Again in this part of analysis, the same factors, namely, semantic interpretability of the devices, stylistic effects induced by the language usage, and the inappropriateness of the linguistic expressions as advertising devices, determine subjects' attitudes towards the patterns.

When it comes to the e-derived words such as e-color, e-go, e-color and e-match, as indicated by Table 5, the most distinguishing positive feature of such language usage is the trendiness involved in the terms. Based on some subjects' comments, these e-words represent the trendy development of the 21st century since this is an e-era (electronic era). To a much lesser extent, the semantic transparency of these newly coined terms wins the heart of some other subjects. For them, by looking at these English terms, the meanings can be automatically entailed. Still another 12 percent of favorable views regard such devices as innovating and seminal.

Among the unfavorable feedback, lack of semantic interpretability mainly accounts for the unacceptability of these expressions. One subject points out that semantic obscurity is often involved in all the e-words in that they look like professional jargon which is foreign to readers not in the related fields.

In sum, as far as such e-words are concerned, though whether their meanings can be interpretable constitutes one major reason to account for their degree of acceptability and unacceptability, representing the trendy development has become the most distinct merit of such devices.

The next pattern to be analyzed consists of mixing of English, Mandarin and Southern Min. For percentages of the top three factors, please see Table 6. Among the three languages mixed, Southern Min in particular has a special meaning: it represents binary values in the current phase of Taiwan. On the one hand, Southern Min stands for a symbol of solidarity, an ethnic and cultural identity of local Taiwanese people. On the other hand, since Southern Min used to be associated with the language used by the rural people and people of lower socio-economic status, it has been stigmatized as non-standard and uncultured. Therefore, such polarizing views are witnessed by subjects' feedback. The same leading factor "the stylistic effects induced by the language usage" creates completely opposite impacts on subjects' attitudes. Subjects who find the style positive argue that this pattern yields a sense of local flavor, familiarity, forcefulness, cuteness, and liveliness. As for those finding this pattern disagreeable, they regard it as vulgar, uncultured, like the expression used by a country bumpkin. However, the frequency of

the positive feedback sill outnumbers that of the negative by almost doubling it.

Other than the positive stylistic usage of the pattern, semantic interpretability also accounts for some subjects' favorable attitudes. According to some of the feedback elicited, subjects' knowledge of at least a little bit of English and Southern Min contributes to their understanding of this pattern. Conversely, though small in number, subjects with negative attitudes complain that half of the Southern Min speakers in Taiwan do not understand any English and some speakers of other dialects do not understand any Southern Min. For these speakers, the communication breakdown occurs accordingly. Therefore, based on these comments, people's language barrier of either English or Southern Min or both entails the incomprehensibility of this pattern.

Regarding what other major factors contribute to subjects' negative attitudes, the unnecessary, inappropriate and incompatible language mixing of the pattern largely affects the subjects' choices. Some subjects state that the mixing of the two entirely different languages, namely, English, symbolizing internationalism, and Southern Min, representing localism, produces incongruity and incompatibility in the style.

The third dominant negative factor pertains to the non-standard English usage involved in the pattern. Some subjects note that such usage is ungrammatical and informal. One subject, however, adds that the majority of people in Taiwan do not care about Standard English grammar anyway, implying that no matter how ungrammatical the advertising language may be, the general public's positive views stay unaffected. This view is cross-referred by Hsu (2002).[4]

This part of analysis suggests that whether subjects have a basic knowledge of both English and Southern Min as well as their underlying attitudes toward the symbolic meaning of Southern Min mainly determine their attitudes toward the surveyed pattern.

The following patterns to be examined are easy 抽 (chou) and easy 敷 (fu). Once again the factor of semantic interpretability plays the most important role in accounting for subjects' positive attitudes toward this device, as indicated by Table 7. Subjects state that the English word easy is easy to understand; due to the special combination of Chinese and English words, the meaning of these phrases is transparent.

On the other hand, subjects holding a negative attitude are mainly concerned about the lack of necessity and appropriateness in mixing English. According to these subjects, such device consists of unnecessary language combination, yielding a sense of incongruity

[4] In Hsu's study (2002) and the present study, the same sampling population was surveyed. However, different research questions were posed in these two works. In Hsu (2002), subjects were investigated concerning their attitudes towards mistakes in English mixing in advertising in Taiwan. The result shows that 61 percent as opposed to 39 percent of subjects hold that the identification of English mistakes in advertisements would not affect their extent of acceptability of these advertisements.

and incompatibility. They believe that without mixing English, the Chinese language will produce the same advertising effects.

The second important factor, stylistic effects of the usage, contributes to both favorable and unfavorable attitudes. Subjects with positive attitudes find such patterns cute, concise, and full of fun whereas subjects with negative attitudes consider them ludicrous, vulgar and uncultured.

The third main types of factors accounting for subjects' attitudes, positively vs. negatively, are the positive advertising effects induced by the language usage as opposed to the lack of smoothness in its structure. Informants who favor the device consider that the word easy renders a feeling of user-friendliness, making readers feel that the operation of the advertised products is easy. By contrast, those with disapproving attitudes argue that the mixed pattern does not sound smooth in reading or in oral utterances.

To sum up, though the pattern of easy 抽 (chou) consists of both Chinese and simple English vocabulary, it receives a much lower degree of acceptability than the all-English phrases such as easy play. Its incompatibility with either Chinese or English and the lack of smoothness in its structure largely account for such outcome.

Concerning the last pattern rated with the lowest degree of acceptability, the English-only sentences based on the verbatim translation from Chinese structure, the responses elicited shed a great deal of light on the underlying mentality of the general public's inferiority of their English proficiency. Table 8 indicates that once again semantic interpretability of these expressions determines the subjects' attitudes, positively vs. negatively. However, this is the only device where the number of negative responses surpasses that of positive ones. For subjects who find such patterns interpretable, some remark that since these expressions are word-for-word translations from Chinese grammar, the meaning of English is easy to understand. Others claim that such usages are semantically transparent to foreigners (the literal meaning copied from the responses, implying "native speakers of English") and Chinese speakers who frequently travel abroad and who have higher socio-economic status. What such statement implies is that since these English sentences are so difficult to understand, only native speakers of English and Chinese speakers in the middle-upper class with good command of English can deal with such texts easily.

By contrast, for subjects having difficulty understanding the meaning of the patterns, two types of feedback were elicited. The first group of subjects maintains that two reasons contribute to the incomprehensibility of these English sentences. On the one hand, most of the people in Taiwan lack an adequate command of English to understand the meaning of such English-only type of sentences. On the other hand, the great amount of English words used in the devices further contributes to the semantic incomprehensibility of such sentences. In contrast to the above view, the second group

of informants, whose English is good enough to identify the ungrammatical English usages in the sentences, hold that the immense amount of English errors in the sentences actually render these patterns unintelligible.

Besides semantic comprehensibility, two other factors that equally account for the subjects' favorable attitudes are the positive advertising effects and the positive stylistic effects induced by the language usage. As regards the advertising effects, in the case of the advertisement campaigning the sales of the residential real estate property which brand name is "Wonderful Villa" 鳳凰城 (feng-huang-cheng), some subjects affirm that the English-only wording seems to stimulate more of their imagination than does its Chinese equivalent, creating for the readers a sense of being abroad. Some others believe that the English-only usage helps to enhance the quality of the advertised products and satisfy the consumers' mentality of idolatry for foreign affairs. In terms of the positive stylistic effects, the language usage is depicted as "lively, simple, easy to read and without any difficult words."

As for the other two factors leading to subjects' negative attitudes, these are the inappropriateness of the linguistic expressions as advertising devices and the non-standard English usage involved in the patterns. The former category of responses is rated with almost the same frequency as that of the semantic incomprehensibility. According to subjects' feedback, since the target audience of the advertisements is Chinese speakers, using English-only type of devices is not appropriate. In addition, the sentences are too long, filled with so many English words; the general public may easily lose their incentive and patience to read the text, a finding cross-referred by Hsu (2002).[5] This is particularly the case with those readers whose English proficiency is low and they tend to skip the whole text completely.

The latter type of negative comments is made by informants, though in a very small number, who are able to identify the English mistakes made in the advertising text. They observe that such English sentences are the outcome of the Chinese or Taiwanese style of English, deviating seriously from the norm of Standard English. Copywriters who create such advertising text possess an extremely bad command of English. Such English mistakes occurring in the advertising text arouse ridicules from the readers, leaving them highly doubtful about the quality of the advertised products.

The analysis of the elicited responses in this section points to two things worth noting. First, except for a small group of subjects, the general public's English proficiency is so low that most of them cannot even identify the deviations from Standard English grammar involved in the sentence patterns. Second, being totally aware of and ashamed

[5] In Hsu (2002), when subjects are inquired whether a large number of English words employed in advertising text would affect their interest in reading the advertisements, 56 percent vs. 43 percent of them respond that their interest would be affected.

of their low proficiency in English, many of the subjects presume that any long length of English text entails difficulty and incomprehensibility in reading due to their own language barrier.

As evidenced by the rates of acceptability of all the code-mixed patterns shown in Table 1, when the English mixing involves a single word or easy vocabulary, such usage is welcome. Overwhelmingly favorable attitudes are induced because these patterns are semantically transparent to them. However, when it comes to long strings of English words based on the word-for-word translation from Chinese structure, the rate of acceptability drops tremendously. Based on the their feedback, the majority of subjects blame themselves for not being able to understand the English sentences because a great amount of English words are involved and their command of English is very low. Some of them presume that as long as the advertising text consists of English-only type of long sentences, these patterns must be standard: only native speakers of English and Chinese audience with good English competence can deal with them. Some of the subjects even believe that these advertising texts are so standard that they can serve as a good model for English learning. Overall, except for a relatively small number of subjects, the general public do not have the knowledge that the semantic unintelligibility of the advertising text actually stems from the serious ungrammaticality involved in the English usages.

On the other hand, since most of these subjects tend to think that long strings of English words entail difficulty in reading, even before they actually process the long length of advertising texts, with their low command of English, they believe that they will fail in the interpretation of the text, thus feeling psychologically inhibited to read the text. In other words, the language barrier created by the long English sentences blocks these subjects' interest to read the text and contributes to the semantic incomprehensibility of the text. For most of the subjects, the equation works in this way: long strings of English words are synonymous to the difficulty of the text and their inability to comprehend the text.

In short, the analysis indicates that subjects' language barrier of English, the prescriptive attitudes towards the ungrammatical English usage and the inappropriateness in using such long strings of English to the Chinese target audience amount to the subjects' overwhelmingly negative attitudes toward the English-only type of long sentences based on verbatim translation.

In summary, Table 9 indicates that in terms of the top three categories of reasons accounting for the acceptability of the nativized devices, semantic interpretability has cast its effect throughout all of the seven patterns. Positive advertising effects and stylistic effects of the language usage have come second in equally contributing to the favorable attitudes toward the following five patterns: easy select, easy 敷 (fu), 幫助

您的愛心快速 ONLINE (bangzhu ninde aixin kuaisu ONLINE), the mixing pattern of the three languages, i.e., everybody 攏 (long) happy and the Chinese style of long English sentences. The device of e-color is regarded as both trendy and innovating whereas the pattern Give me high is marked by its stylistic effects and innovating language usage.

On the other hand, among all the factors accounting for the negative attitudes toward the nativzed patterns, the inappropriateness or lack of necessity of the language usage, including the incompatibility of the usage with Chinese or English grammar, has repeatedly influenced subject's attitudes toward all the seven patterns. The next dominant factor is the semantic interpretability of these devices. It contributes to the subjects' judgmental attitudes toward all the patterns except for two of them—easy 敷(fu) and the mixing pattern of three languages, everybody 攏 (long) happy. The negative stylistic effects of the language usage also equally cast their influences on subjects' disproving attitudes toward all the patterns other than easy play and the Chinese style of long English sentences.

With regard to the patterns of easy play, Chinese style of English sentences and the mixing of three languages, everybody 攏 (long) happy, they have been particularly identified as violating Standard English grammar. The device of easy 敷 (fu), on the other hand, is marked by its lack of smoothness in its structure. Intrinsically, the language barrier of English and Southern Min, the inappropriateness and incompatibility in using English in advertising texts to the Chinese target audience, and the prescriptive attitudes toward the non-standard English usage have contributed to subjects' critical attitudes toward these nativized English patterns.

3.3 The public's attitudes toward the trend of nativization of English in advertising in Taiwan

Concerning the subjects' general attitudes toward the trend of nativization of English usage in advertising in Taiwan, as Table 10 shows, out of the 502 responses gathered, almost two thirds of them hold that such nativized devices are just instances of copywriters' creativity for the purpose of attention-getting and therefore, grammatical observance should not be strictly demanded. Along the same line, 14 percent of responses assert that such devices demonstrate the unique characteristics of creativity via the process of nativization of English usage in Taiwan. By contrast, only a total of 16 percent of feedback is prescriptive, concerned that these devices violate the standard English usage and the copywriters' English proficiency should be enhanced. The statistics shows that the majority of responses, more than 75 percent of them, regard the nativized devices of English usage as linguistic creativity rather than deviations from standard English. In other words, the majority of the public take a descriptive attitude

rather than a prescriptive one in dealing with the nativization of English in advertising in Taiwan.

3.4 The correlation between sociolinguistics factors and the subjects' degree of acceptability of the nativized patterns

The results of the correlation analysis indicate that subjects' level of competence of English and their degree of preference for using English in advertisements correlate with their extent of acceptability of the surveyed patterns. Following next are the attitudinal factors pertaining to subjects' preference for using English in advertisements that are shown to have a correlation.

1. Whether using English to advertise products imported from abroad vs. those manufactured locally will enhance subjects' level of confidence in the advertised products.
2. Whether using a great number of English words to advertise the above two types of products will help to enhance subjects' level of confidence in the advertised products.
3. Subjects' views and degree of acceptability of using English to advertise products that are culturally sensitive in nature such as the traditional clothing, food and medicine.
4. Subjects' views concerning the trend of development of using English in general and nativized English in particular in advertising in Taiwan.
5. Whether using difficult English words in advertisements will inhibit or enhance subjects' incentive or interest to read the advertisement.
6. Subjects' preferred language for advertising products imported from abroad as opposed to those manufactured domestically.

Table 11 indicates that regarding subjects' self-rated level of competence of English, subjects who rate their command of English at the two ends of the spectrum hold a more negative attitude toward all the nativized patterns than those who rate their English competence in the middle. In other words, informants whose self-rated proficiency is "alright" or "barely alright" have a higher degree of acceptability of the surveyed patterns than those who consider their English proficiency to be either very good or very bad. As evidenced by the analysis of the underlying factors accounting for subjects' degree of unacceptability, subjects whose English is very good are able to identify the non-standard English usages in the advertising text and thus are very judgmental and critical about such Chinese style of English usage. By contrast, those whose English proficiency is very low either have difficulty in understanding the meaning of the nativized devices or

find the code-mixed English usage unnecessary due to their language barrier of English. Consequently, these two types of subjects are more judgmental and have a lower degree of acceptability than those who rate their English proficiency in the middle of the spectrum.

Tables 11 and 12 show that subjects holding a favorable attitude toward using English in advertising products, regardless of the product type, whether imported from abroad, manufactured locally or pertaining to traditional domains, have a higher degree of acceptability of the nativized patterns than those whose attitudes are negative.

The same result is obtained, as indicated by Tables 13 and 14, when it comes to the positive correlation between subjects' degree of acceptability and their views regarding the trend of development of using English in general as well as using nativized English in particular in advertising in Taiwan. The more they favor the trend, the higher their degree of acceptability of the nativized patterns is.

In addition to the attitudinal factors mentioned above, Table 15 shows that other factors such as the number of English words used in advertisements, using difficult English words in advertisements, and the preferred language to be used in advertising products imported from abroad and manufactured domestically also come into play in correlating with subjects' degree of acceptability of the nativized patterns. The result indicates that those who are negative about using difficult English words, using a large number of English words, and using any English at all in advertising any type of products come up with a lower extent of acceptability of the surveyed patterns than those who hold favorable attitudes.

The analysis so far suggests that one's command of English and the preference for using English in advertising correlate with one's degree of acceptability of the nativized devices. Subjects with the highest and lowest proficiency of English hold the most negative attitudes toward the nativized devices. Those who prefer using English in whichever product domains and are positive about the development of Englishization as well as nativization of English in advertising hold more favorable attitudes.

4. Conclusion

Among the seven patterns surveyed, devices such as easy go are most popular while the Chinese style of long English sentences, which derive from verbatim translations from the Chinese structure, are least acceptable.

In examining the top three factors that determine whether a nativized pattern is acceptable, the same major factors such as whether a pattern is semantically interpretable, whether a pattern is considered appropriate, essential and compatible with the Chinese grammar, whether the English usage copes with the standard English grammar, and

what are the stylistic and advertising effects induced by the language usage repeatedly come into play in influencing subjects' attitudes. Other minor factors include whether a device is linguistically seminal or trendy and whether a device sounds smooth in reading.

Although some subjects who take a prescriptive attitude toward the non-standard English usages keep on voicing their concerns that such nativized devices, based on the word-for-word translation from Chinese grammar, violate the norm of Standard English, such concerns are still outweighed to a huge extent by the public's general preference for such linguistic ingenuity. As demonstrated by the statistics of subjects' attitudinal choices toward the trend of nativization of English usage in advertising in Taiwan, more than three quarters of the feedback is positive.

However, since in this study, the semantic interpretability of a mixed pattern depends on the understanding of English, especially when it comes to devices consisting of only English, subjects' proficiency of and preference for English influence their acceptability of the patterns as well. A consistent observation is obtained by the correlation analysis where subjects' English proficiency and their degree of preference for using English in advertising in general correlate with their level of acceptability of the nativized patterns. Those whose English proficiency is either very good or very bad and those who oppose using English in advertising are most critical about the nativized patterns. On the contrary, those who posses a medium level of English competence and those who favor using English in various product domains have a higher degree of acceptability of these nativized patterns.

In general, according to the analysis of this survey, though the majority of the public have a very low level of competence in English, who cannot even identify the serious ungrammaticality involved in the Chinese style of long English sentences, which is the sole factor responsible for the semantic unintelligibility of those patterns, they have such an immense enthusiasm toward English mixing in advertising. However, such enthusiasm is only limited to the text where the English vocabulary mixed is simple and easy to read. When it comes to the reading of long length of English text, their interest in and comprehension of the text will be automatically inhibited due to their psychological and language barriers.

To conclude, in spite of subjects' general language barrier of English and the prescriptive attitudes held by a small number of subjects, based on the public's favorable reactions towards the nativized advertising devices newly developed, it is predicted that the future development of such process will continue as a trend and further into a major discourse development in advertising in Taiwan.

Table 1: Percentage of acceptability of the nativized patterns

SURVEYED PATTERNS	Entirely Acceptable	Acceptable	Neutral	Unacceptable	Entirely Unacceptable
All-English phrases: easy play, easy go, easy select	11.5	57.9	24.5	4.7	1.2
	69.4			5.89	
All-English sentences: Give me high Green your heart	11	47	28	12.2	1.2
	58.1			13.4	
Chinese-English mixing: 幫助您的愛心快速 ONLINE, 給您最 fly 的音樂	8.7	43.9	32.8	13	0.9
	52.6			13.9	
All-English compounds: e-color, e-go, e-people	6.1	42.4	31.8	17	2.8
	48.5			19.8	
English-Mandarin-Southern Min mixing: 希望房價低的人買到保證 You happy, he happy, everybody 攏 happy	8.5	37.2	30.1	22.4	1.9
	45.7			24.3	
Chinese-English mixing phrases: easy 抽, easy 敷	7.8	33.7	31.8	24.7	2.1
	41.5			26.8	
Chinese style of long English sentences: Along the road, You will find the woods around us. Season over the leaves that love us. Where can give us so fresh so much as here?	4.2	32.5	28.7	29.2	5.4
	36.7			34.6	

Table 2: Percentage of the top three categories of reasons accounting for the acceptability and unacceptability of the patterns such as easy play and easy select

Easy play, easy select	**Acceptable**		**Unacceptable**		
Top three categories of reasons	**Frequency**	**Percentage**	**Top three categories of reasons**	**Frequency**	**Percentage**
Such pattern is semantically interpretable.	110	33.5	Such English usage is non-standard.	8	29.6
Such language usage induces positive stylistic effects such as "simple, straightforward" and "lovely."	59	17.8	The linguistic expression is not considered appropriate, essential or compatible as an advertising device.	5	18.5
Such pattern induces positive advertising effects.	52	15.7	Such pattern is not semantically interpretable.	4	14.8
Total number of reasons elicited	331		Total number of reasons elicited	27	

Table 3: Percentage of the top three categories of reasons accounting for the acceptability and unacceptability of the pattern Green your heart

Green your heart	**Acceptable**		**Unacceptable**		
Top three categories of reasons	**Frequency**	**Percentage**	**Top three categories of reasons**	**Frequency**	**Percentage**
Such pattern is semantically interpretable.	55	22.4	Such pattern is not semantically interpretable.	19	29.2
Such language usage induces positive stylistic effects such as "simple" and "lovely."	38	15.5	Such language usage induces negative stylistic effects such as "ludicrous."	9	13.8
Such device is innovating and creative.	32	13.1	The linguistic expression is not considered appropriate, essential or compatible as an advertising device.	8	12.3
			Such English usage is non-standard.	8	12.3
Total number of reasons elicited	245		Total number of reasons elicited	65	

Table 4: Percentage of the top three categories of reasons accounting for the acceptability and unacceptability of the pattern 幫助您的愛心快速 ONLINE

幫助您的愛心快速 ONLINE	Acceptable		Unacceptable		
Top three categories	**Frequency**	**Percentage**	**Top three categories**	**Frequency**	**Percentage**
Such pattern is semantically interpretable.	42	18.8	Such pattern is not semantically interpretable.	18	29.5
Such language usage induces positive stylistic effects such as "simple" and "lovely."	36	16.1	The linguistic expression is not considered appropriate, essential or compatible as an advertising device.	12	19.7
Such language usage induces positive advertising effects.	26	11.7	Such language usage induces negative stylistic effects such as "vulgar" and "ludicrous."	11	18
Total number of reasons elicited	223		Total number of reasons elicited	61	

Table 5: Percentage of the top three categories of reasons accounting for the acceptability and unacceptability of the pattern e-color

e-color	Acceptable		Unacceptable		
Top three categories	**Frequency**	**Percentage**	**Top three categories**	**Frequency**	**Percentage**
Such language usage represents being trendy.	52	23.3	Such pattern is not semantically interpretable.	35	38.5
Such pattern is semantically interpretable.	33	14.8	Such language usage induces negative stylistic effects such as "vulgar" and "ludicrous."	13	14.3
Such device is innovating and creative.	26	11.7	The linguistic expression is not considered appropriate, essential or compatible as an advertising device.	9	9.9
Total number of reasons elicited	223		Total number of reasons elicited	91	

Table 6: Percentage of the top three categories of reasons accounting for the acceptability and unacceptability of the pattern of You happy, he happy, everybody 攏 happy

You happy, he happy, everybody 攏 happy	**Acceptable**		**Unacceptable**		
Top three categories	**Frequency**	**Percentage**	**Top three categories**	**Frequency**	**Percentage**
Such language usage induces positive stylistic effects such as 'localized' and 'cute.'	67	32.1	Such language usage induces negative stylistic effects such as "vulgar" and "ludicrous."	36	31.9
Such pattern is semantically interpretable.	35	16.7	The linguistic expression is not considered appropriate, essential or compatible as an advertising device.	26	23
Such pattern induces positive advertising effects.	20	9.6	Such English usage is non-standard.	13	11.5
Total number of reasons elicited	209		Total number of reasons elicited	113	

Table 7: Percentage of the top three categories of reasons accounting for the acceptability and unacceptability of patterns such as easy 抽, easy 敷

Easy 抽, easy 敷	**Acceptable**		**Unacceptable**		
Top three categories	**Frequency**	**Percentage**	**Top three categories**	**Frequency**	**Percentage**
Such pattern is semantically interpretable.	66	34.6	The linguistic expression is not considered appropriate, essential or compatible as an advertising device.	34	28.1
Such language usage induces positive stylistic effects.	34	17.8	Such language usage induces negative stylistic effects.	32	26.4
Such language usage induces positive advertising effects.	20	10.5	The structure does not sound smooth in reading.	19	15.7
Total number of reasons elicited	191		Total number of reasons elicited	121	

Table 8: Percentage of the top three categories of reasons accounting for the acceptability and unacceptability of the Chinese style of long English sentences

Long English sentences	**Acceptable**		**Unacceptable**		
Top three categories of reasons	**Frequency**	**Percentage**	**Top three categories of reasons**	**Frequency**	**Percentage**
Such pattern is semantically interpretable.	43	34.1	Such pattern is not semantically interpretable.	50	28.2
Such language usage induces positive advertising effects.	13	10.3	The linguistic expression is not considered appropriate, essential or compatible as an advertising device.	49	27.7
Such language usage induces positive stylistic effects.	13	10.3	Such English usage is non-standard.	21	11.9
Total number of reasons elicited	126		Total number of reasons elicited	177	

Table 9: The top three categories of reasons for acceptability and unacceptability of the nativized devices

The top three categories of reasons for acceptability of the nativized devices

★ Semantic interpretability:
All patterns

★ Positive advertising & stylistic effects induced by the language usage:
easy play
easy 抽
everybody 攏 happy
幫助您的愛心快速 ONLINE
Chinese style of English sentences

★ Positive stylistic effects:
Give me high

★ Trendy:
e-color

★ Innovating:
e-color
Give me high

The top three categories of reasons for unacceptability of the nativized devices

★ Not an appropriate, essential or compatible usage as advertising language:
All patterns

★ Not semantically interpretable:
easy play
e-color
Give me high
幫助您的愛心快速 ONLINE
Chinese style of English long sentences

★ Negative stylistic effects induced by the language usage:
e-color
easy 抽
Give me high
everybody 攏 happy
幫助您的愛心快速 ONLINE

★ Non-standard grammar:
easy play
everybody 攏 happy
Chinese style of English long sentences

★ Not smooth in structure:
easy 抽

Table 10: Percentage of subjects' attitudinal choices towards the trend of development of nativization of English usage in advertising in Taiwan

Attitudinal choices	Percentage	
Such devices are merely copywriters' creativity for the purpose of attention-getting; readers don't need to be too demanding on the grammatical observance.	62.5	76.6
Such devices demonstrate the unique characteristics of creativity by the process of nativization of English usage.	14.1	
Such devices violate the standard English usage and should not be promoted.	8.6	16.3
These copywriters' English proficiency needs to be enhanced.	7.7	
Others	7	

Table 11: Statistical results of the attitudinal test. P's represent the probability of obtaining the observed difference by chance alone

Variables	Number of Subjects	Mean Rank
Subjects' self-rated proficiency of English.		
Very low	87	22.40
Barely alright	158	23.95
Alright	98	24.16
Very good	17	22.53
		P=0.0199
To use English in ads helps to enhance the degree of consumers' confidence in the advertised products imported from abroad.		
Yes	197	24.19
No	146	22.67
		P=0.0071
To use more English words in ads helps to enhance the degree of consumers' confidence in the advertised products.		
Yes	28	25.96
No	318	23.15
		P=0.007
To use English in ads helps to enhance the degree of consumers' confidence in the advertised products manufactured locally.		
Yes	24	25.75
No	321	23.19
		P=0.0025
To use more English words in ads helps to enhance the degree of consumers' confidence in the advertised products manufactured locally.		
Yes	18	27.22
No	330	23.22
		P=0.0002

Table 12: Statistical results of the attitudinal test. P's represent the probability of obtaining the observed difference by chance alone

Variables	Number of Subjects	Mean Rank
Subjects' degree of acceptability of using English to advertise local and traditional products.		
Very unacceptable	26	21.92
Unacceptable	142	22.39
Neutral	106	23.82
Acceptable	86	24.86
Very acceptable	9	30.11
		P<0.0001
Using English to advertise the traditional and local products helps to market these products internationally.		
Yes	130	24.25
No	240	23.15
		P=0.0230
Using English to advertise the local and traditional products is highly expected.		
Yes	82	24.77
No	288	23.18
		P=0.0046
Using English in ads is incompatible with the nature of the traditional and local products.		
Yes	136	22.90
No	234	23.91
		P=0.0367
It's difficult to accept using English to advertise the local and traditional products.		
Yes	36	21.44
No	334	23.76
		P=0.0031

Table 13: Statistical results of the attitudinal test. P's represent the probability of obtaining the observed difference by chance alone

Variables	Number of Subjects	Mean Rank
The nativized English devices demonstrate the copywriters' linguistic originality stemming from the nativization of English.		
Yes	55	25.63
No	314	23.17
		P=0.0007
Such nativized usages violate the standard English grammar. They are not worth promoting.		
Yes	36	19.08
No	334	24.01
		P<0.0001
Such nativized devices are merely copywriters' linguistic originality for the purpose of attention-getting; observance for the grammatical rules should not be strictly required.		
Yes	278	24.20
No	92	21.52
		P<0.0001
The proficiency of English of these copywriters should be enhanced, who created such nativized English usage.		
Yes	31	20.90
No	339	23.78
		P=0.0006

Table 14: Statistical results of the attitudinal test. P's represent the probability of obtaining the observed difference by chance alone.

Variables	Number of Subjects	Mean Rank
Using English in advertising is a way to market Taiwan's products internationally.		
Yes	110	24.66
No	248	23.07
		P=0.0018
It's an international trend to use English in advertising. So let the nature take its course.		
Yes	218	24.20
No	140	22.56
		P=0.0006
Using English in advertising stands for an idolatry for foreign affairs. Such trend should be prohibited.		
Yes	5	18.8
No	353	23.63
		P=0.016

Table 15: Statistical results of the attitudinal test. P's represent the probability of obtaining the observed difference by chance alone

Variables	Number of Subjects	Mean Rank
Using difficult English words in advertisement will inhibit my interest of reading the advertisement.		
Yes	165	22.98
No	198	24.05
		P=0.0228
Mixing English sentences in Chinese text is the most preferred way to advertise products imported from aboard.		
Yes	58	24.93
No	300	23.3
		P=0.0104
Using Chinese only is the most preferred way to advertise products imported from aboard.		
Yes	23	21.35
No	335	23.71
		P=0.0137
Using Chinese only is the most preferred way to advertise products manufactured domestically.		
Yes	182	22.9
No	176	24.23
		P=0.0007

Appendix 1: The demographic profile of the survey subjects

	Frequency	Percentage
TOTAL NUMBER OF SUBJECTS	425	
VARIABLES		
GENDER		
Male	189	44.5
Female	236	55.5
AGE		
14-20	70	16.5
21-30	129	30.4
31-40	93	21.9
41-50	103	24.2
51-60	20	4.7
61-70	5	1.9
71-80	4	0.9
80-90	1	0.2
LEVEL OF EDUCATION		
Junior high	14	3.3
Senior high	80	18.8
Junior college	35	8.2
Technical (Vocational) college	57	13.4
College and university	161	37.9
Master Degree	65	15.3
Doctoral Degree	13	3
OCCUPATION		
Students	98	23
Teachers	64	15
Businessmen	40	9.4
Government employees	32	7.5
Service	20	4.7
Homemakers	18	4.2
Insurance salesmen/real estate agents	18	4.2
Journalists/magazine editors/mass media workers	12	2.8
Electronics/information engineers	11	2.6
Policemen	4	0.09
Dentists/doctors/psychiatrist	4	0.09
DIALECTS SPOKEN AT HOME		
Mandarin Chinese	398	55.7
Southern Min Dialect	265	37.1
Hakka	34	4.8
Other dialects	17	2.4

Appendix 2

Examples of the 20 categories of underlying factors accounting for subjects' acceptability and unacceptability of the nativized patterns

1) Whether the meaning of the pattern is interpretable.
   a. Such usage yields more semantic interpretability than that of the standard English.

2) Whether the usage is attention-getting.
   a. Such usage attracts the public's attention.
   b. It looks appealing to me, motivating me to find out what the content of the advertisement is (or what the English words are about).

3) Whether the usage is familiar and common (or overused or never heard of).
   a. I seem to often hear such type of Chinese style of English.
   b. I have got used to it.
   c. Such usage has become a convention.
   d. English is not so common yet.

4) Whether the linguistic device is innovating or creative.
   By innovating or creative is meant that the advertising language is full of linguistic originality.
   a. It's a new invention from the copywriters.
   b. Such device reflects nativized creativity.

5) What are the effects, purposes or functions of the advertised product that the advertisement intends to impress on the readers?
   a. Simple oral English strengthens the effect of the advertisement.
   b. As a reader, the word 'easy' gives me a feeling of being user-friendly.
   c. Such language device (Chinese style of long English sentences) makes me feel that I am already abroad.
   d. Such language usage upgrades the quality of the advertised product and satisfies the readers' psychology of foreign idolatry.
   e. How is it likely that such broken English can yield to the readers any sense of professionalism and any good impression on the quality of the advertised product?

6) Whether the usage copes with the trend of development.
   a. Such usage is a fashion of the time.
   b. Time is changing.
   c. Since this is an e-era, why cannot we use this device?

7) Whether the code-mixing devices are considered necessary and appropriate to

advertise the intended products or convey the message delivered by the advertisements. Alternatively, can Chinese-only devices also serve the same purposes? In the code-mixing devices, are the Chinese and English structures compatible to each other?

a. Such English sentences are too long. It makes readers feel bored, impatient and unmotivated to read them.
b. (easy 敷 and easy 抽) Such Chinese-English combination seems to be odd and incongruent.
c. Using Chinese words can equally convey the same meaning as the English mixing. There is no need to use English at all.
d. Such mixing is incompatible with either language; it's neither Chinese nor English. (不中不西, 不相容, 不搭調)
e. The meaning of the English mixing can hardly be conveyed by the equivalent Chinese words.
f. As long as the meaning is conveyed clearly, there is nothing wrong with using such expression.
g. Since this advertisement of real estate property aims at Chinese audience, the English-only device is not appropriate.

8) Whether the language usage yields a sense of modernization.
   a. Such device gives readers a feeling of modernized quality.

9) Whether the language usage yields a sense of internationalism.
   a. Such device gives readers a feeling of internationalism.
   b. (Code-mixing of English, Mandarin and Southern Min) Such usage can be termed "nativization of internationalism."

10) Whether the usage copes with standard English grammar.
   a. It is too exaggerating that such device follows no grammar at all.
   b. Such usage is a word-for-word translation from Chinese structure. It has serious grammatical mistakes.
   c. It is only proper for the copywriter to use standard English in creating such English sentences. If he/she fails to do so, he/she is only making himself/herself a target of ridicule from others.
   d. Since it is advertising language, grammatical rules should not be strictly demanded.

11) Whether the device sounds smooth in reading and oral utterances (通順, 順口, 順眼, 順耳) (口語化)
   a. It sounds smooth orally.
   b. It sounds weird.

c. It is easy to read.

12) Who are the major target audience of the advertisements?
   a. Such advertisement aims at the e-generation or young people who appreciate novelty in life.
   b. For the consumers whose English competence is not good, they can hardly accept such type of advertising language.

13) What are the types of advertised products?
   a. The advertised product is manufactured locally; there is no need to use English in the advertisements.

14) What are the stylistic effects or impressions induced by the language usage?
   a. Such device is simple and easy.
   b. Such style is too vulgar.
   c. Pretty good.

15) What influences may the linguistic devices have on the English learners?
   a. It helps readers to learn their English.
   b. Such English usage is misleading the general public.

16) Whether the language usage is a pure advertising gimmick.
   a. Such usage is only a pure advertising gimmick. There is nothing wrong with it.
   b. The copywriter is only showing off his/her English. Such advertising language does not agree with the advertised product.

17) Whether the linguistic pattern is a device of nativiztion.
   a. When English usage is nativized, it makes people feel more at ease to accept it.
   b. Such device integrates the local culture.

18) Whether the usage copes with the Chinese convention.
   a. (Green your heart) The change of word class also occurred in ancient Chinese poetry.
   b. To change the class of words is not such a big deal. In Chinese ancient text, such cases were quite common.

19) Whether the device copes with the essence and characteristics of language development such as language change.
   a. Language is subject to human use. It has its flexibility and variation.

20) Personal emotional responses without providing any explicit account that can fall into any of the previous categories.
   a. It's not important.
   b. Very repulsive.

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On the *Bei*-Construction in L2 Chinese

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The ultimate goal of this study is to examine four properties of the *Bei*-construction, i.e., *animacy*, *reversibility*, *truncation*, *transitivity*, to see if they have the same degree of difficulty to L2 learners. A comprehension task (i.e., a grammaticality judgment task) and a production task (i.e., a picture-cued description task) were designed and given to forty English and Japanese learners of Chinese who registered in the Mandarin Training Center of National Taiwan Normal University. In addition, twenty native speakers of Chinese participated in the present experiment. The results showed that parts of the results in the GJ task matched those in the PD task. It was found that the L2 learners had an easy time dealing with non-reversible, non-truncated passives as well as passives with action and experiential verbs in both tasks. Additionally, the English subjects had difficulty dealing inanimate agents and truncated sentences. The English group exhibited significant L1 interference, but the Japanese group did not. Furthermore, the L2 learners performed better on the semantic properties than on the syntactic properties although only the English group reached a significant level (t-value=3.301, p=.003), suggesting that the semantic properties be easier for L2 learners to acquire than the syntactic properties. This finding supports Goodluck's (1991) claim that semantics is acquired earlier than syntax.

Key words: *Bei*-construction, L2 acquisition, animacy, reversibility, truncation, transitivity

1. Introduction

Passivization has been for decades a heated topic in linguistics and acquisition research. Linguists pay much attention to this peculiar construction by discussing various languages, and acquisition researchers are interested in the question of how children acquire this complex structure. In this study, we designed comprehension and production tasks to see how L2 learners acquire this construction. Some researchers (Izumi and Lakshmanan 1998, Liu 1998) have conducted the study on the L2 acquisition of the passive construction, particularly English passives by Japanese or Chinese speakers to inspect the issue of L1 transfer and Universal Grammar (UG), advocated by Chomsky (1981). L1 transfer has figured prominently in the acquisition of syntax (e.g., Flynn and

Espinal 1985), and semantics (e.g., Ard and Homburg 1992). In cases where the L1 and target language patterns are identical, positive transfer will occur so that learning takes place easily, but in cases where they are different, this will result in interference or negative transfer; therefore, learning difficulty arises and errors resulting from negative transfer are likely to emerge (Ellis 1994). Consequently, it would be noteworthy to observe whether L2 learners' carryover of their L1 knowledge to L2 acquisition in essence occurs. In particular, two ideas, 'semantics first' and 'syntax late' frequently occurring in the literature on child language acquisition are open to debate (Goodluck 1991). In the present study, whether for L2 learners the semantic property is acquired earlier than the syntactic one or vice versa will be further examined. Besides, the illumination of the language development in SLA field is necessary and indispensable; that is, the explanation for why certain grammatical structures are discovered earlier than others should be provided. Relevant to the study is the application of the avoidance strategies, which can be used to determine the learning difficulty of the target constructions. In other words, what is consciously or unconsciously avoided seems to pose the most difficulty to L2 learners (Tarone et al. 1976, Tarone 1977, Varadi 1980). And the level of difficulty can be accounted for by the law of cumulative complexity (Brown 1973).

On the basis of the theoretical background taken up earlier, the present study aims to address the following questions:

1. Will Japanese- and English-speaking learners carry over their L1 knowledge into the L2 acquisition of the Chinese *bei*-construction?
2. Will subjects perform significantly differently between tasks?
3. Will L2 learners perform better on the semantic property than on the syntactic property?

This paper is organized as follows: in section 2, we will review the related literature and in section 3, we will describe the subjects, methodologies, materials, procedures and results of the present study. In section 4, we will discuss the findings of the present experiment; later, in section 5, we will briefly summarize the main points of this paper.

2. Literature review

Izumi and Lakshmanan (1998) conducted a small-scale study of the acquisition of the English passive by 15 Japanese ESL learners to explore the effects of formal instruction. Three different types of tests—a translation task, a picture-cued production task and a grammaticality judgment task were used to elicit subjects' knowledge of the

English passive through three different sessions, a pretest session, first post-test session and second post-test session. It was found that the error scores of the pretest in the three tasks showed that most of the Japanese ESL subjects produced and accepted the indirect passive in English, indicating that they initially treated the auxiliary *be* as *rare* with the dual status in Japanese, which can function not only as a non-thematic (auxiliary) verbal element but also as a lexical/thematic verb.[1] In the first post-test, all the subjects in the experimental group got 0% mean error score in the three tasks whereas the mean error scores of the control group either remained around the same level as that on the pretest or even decrease or increase on the post-test. This showed that negative evidence given to the ESL learners in the experimental group enabled them to realize that the English passive *be* and Japanese *rare* were quite different. Furthermore, the error scores of the second post-test administered to only two subjects on the three sections are also 0% except one subject on the grammaticality judgment task. The explanation for the exception on one item by a subject was that perhaps the subject mistakes the indirect passives involving transitive verbs for direct ones involving verbs with double objects. On the whole, the negative evidence was effective in helping the learners to distinguish the passive *be* from *rare*, which further confirms the important role played by the negative evidence in the acquisition of the English passive.

Tibaut (1995) replicated Rondal et al.'s results for the actionality effect,[2] in response to actional and nonactional sentences in four conditions obtained by crossing the voice of the test-sentences with the voice of the interpretive requests A-A (active sentence-active interpretive request), A-P (passive sentence-passive request), P-P (passive sentence-passive request), P-A (passive sentence-active request). A-A sentence pattern is like this: "The boy hits the girl." "Who hits?" by examining the relation between mental imagery and sentence comprehension. The experiment was given with 48 French-speaking children aged 5;0-7;11 who were independently classified as visualizers or nonvisulizers in order to investigate the relation between sentence actionality and mental imagery. Five variables were completely crossed in the experimental design: two class variables (age and imagery), and three variables with repeated measures (actionality, voice, and situation). Various types of drawings were given to the children at the same time as the

[1] As the passive morpheme *rare* is interpreted as an auxiliary morpheme, it aPDears as a suffix on the thematic verb, just as the auxiliary *be* in English so that the direct passives result. But when it functions as a lexical/thematic verb, taking an experiencer NP as its external argument and an untensed clause as its internal argument, the indirect passives are formed, which are considered minimally biclausal (Howard and Niyekawa-Howard 1976).

[2] Recent studies have demonstrated that passive sentences constructed around actional verbs are better understood by children than nonactionals—the so-called actionality effect. However, in Rondal et al.,'s study (1990), the actionality effect is not restricted to passive sentences.

test-sentences were presented. Conflict between sentences and drawings can lead to the suppression of the actionality effect or to a reversal of this effect. It was found that passive sentences were more difficult to understand no matter which voice was used in the interpretive request. The actionality effect was not necessarily linked to the passive voice. The significant interaction between imagery and actionality revealed that visualizers demonstrated better performance with actionals and worse performance with nonactionals. So, mental imagery plays an important role in sentence interpretation. The mental image helps sustain the semantic representation constructed from the sentence. The effect of mental imagery was related to general cognitive development; it was not specifically tied to individual differences in the capacity to form mental images. The actionality effect might be more tied to the intrinsic difficulty of the task rather than to the passive voice. That is, it did not appear in all experimental conditions. The hypothesized link between the actionality effect and task difficulty was also confirmed. Leaving aside pragmatics, the subjects might rely on semantic and syntactic information in order to comply with the interpretive request.

To capture children's tacit knowledge of the *bei*-construction, Tseng (1997) conducted three experiments (two for comprehension and one for production) employing four tasks—the imitation task, the act-out task, the production task, and the grammaticality judgment task. The results suggested that children must be equipped with knowledge of the *bei*-construction, and their performance on resultative verbs was better than that on action verbs; the performance on nonreversible sentences outweighs the reversible ones. This outcome supported the influential role of verb transitivity and sentence reversibility. Concerning object animacy, since neither of the two groups show significant differences between their performance on animate and inanimate types of *bei*-sentences despite their higher percentage of misinterpretation on the *bei*-sentences with animate object, it was unclear whether children preferred an animate or an inanimate logical object for the *bei*-construction. Accordingly, the effect of object animacy was not supported. In addition, the overall percentage of elicitation of the *bei*-construction was around 76.6% in the production task, which implies that the children did not have much difficulty with the *bei*-construction. The hierarchy of active form preference found in the production task is: action verbs = experiential verbs > resultative verbs, implying that subjects were able to sort out the semantic constraints on the class of verbs. Therefore, among the elicited *bei*-sentences, the overall tendency for the *bei*-sentence elicitation is: action verbs = resultative verbs > experiential verbs, which further confirms the effect of transitivity. However, it was found that younger children did not perform quite differently among the three types of verbs, suggesting that younger subjects were unable to completely sort out the semantic and pragmatic constraints specifically pertaining to experiential verbs and the pragmatic functions that the *bei*-construction is to fulfill. In

addition, as the subjects were found to do better with nonreversible sentences, which further supported the claim that non-reversibility increases ease of interpreting and acquiring the *bei*-construction. Similarly, the factor of object animacy was not found influential in children's use of the *bei*-construction, either. Therefore, only two factors, namely, verb transitivity and sentence reversibility, played an important role in children's developmental process of the *bei*-construction. The results of the grammaticality judgment task confirmed the assumption that there was an empty pronoun rather than a trace following the verb in the *bei*-construction since the verb still maintained its case assigning ability.

3. Experimental methods and results

In this section, we will describe our experimental designs and results.

3.1 Subjects

The primary subjects for investigation were 20 Japanese-speaking and 20 English-speaking adults learning Chinese at the MTC (Mandarin Training Center) of NTNU (National Taiwan Normal University) in Taipei. These L2 learners, selected on the basis of the performance on the MTC Placement Test, were high-beginners or low-intermediate learners. In addition, they attended class regularly, two hours per day, 10 hours per week with Chinese-speaking teachers; all of the classes, which proceeded in Chinese, were designed on the basis of the topic with some degree of explicit grammar. But they did not receive any specific instruction or training with respect to the Chinese *bei*-construction. The mean age of the two experimental groups was quite similar: the Japanese group is 26.64; the English group, 25.4. However, the gender was somewhat different between the two groups. The Japanese group had 6 males and 19 females while the English group included 17 males and 8 females. But the discrepancy was insignificant. In addition, both the experimental groups obtained the similar number of years of L2 learning though the English group's amount of exposure to Chinese was slightly longer than the Japanese counterpart's: the year of learning L2 is 1.53 for the Japanese group and 1.72, for the English group. Besides, the period of staying in the L2 environment between the two groups was almost the same. On average, the Japanese speakers spent around 0.61 years in the L2 environment and English speakers, 0.69.

3.2 Materials

Two types of tasks were designed in this experiment, i.e., a grammaticality judgment

(GJ) task and a picture description (PD) task. On the basis of the properties discussed previously, sentences featuring (1) animate agents vs. inanimate agents, (2) reversible vs. non-reversible passives, (3) truncated vs. non-truncated passives, and (4) verbs of transitivity were designed. In the GJ task, each feature was tested with two grammatical sentences and two ungrammatical ones. The four types of sentences are randomly ordered in the questionnaire. Active sentences are the distractors in the questionnaire. If the sentence is grammatical, the subjects need to write 'T'; if not, they should write 'F'. Hence, the GJ task consisted of 20 questions in a true/false format. In the PD task, the subjects have to describe 12 pictures into the proper forms in Chinese.

3.3 Procedures

Before administering the test, a pretest was given to see if the test sentences were valid. The results of the pretest showed that all test sentences in the questionnaire were valid. Few problems appeared in the questionnaire; thus, the formal experiment was conducted in one month. Each subject finished the two tasks in a separate room with the researcher and her assistants. After the subjects finished the PD task, they took the GJ task. The subjects were told that there was no time limit, and they could write until they finished; when everyone finished the questionnaire, the test papers were collected. The total length of time consumed for the two tasks was about 30-40 minutes. t took the subjects about 25 minutes to finish the first task (the PD task), and about 10 minutes the second (the GJ task).

After all the data were collected, we employed Repeated Measures, and LSD post hoc to analyze the results.

3.4 Results

Now let us discuss the results of the two tasks according to the four features we mentioned.

3.4.1 The GJ task

Animacy

The first issue widely discussed in the literature is whether agent animacy will affect children's use of the passive construction, either English or Chinese. The results of both animate and inanimate agents are illustrated below:

Table 1: The mean scores of animate and inanimate agents in the GJ task

Group / Type	English		Japanese		Chinese		Significance
	Mean	SD	Mean	SD	Mean	SD	
Inanimate agents	0.8333	0.3185	0.9375	0.1689	1.0000	0.0000	E vs. C *p=.026
Animate agents	1.000	0.0000	0.9583	0.1412	1.0000	0.0000	No significance p=.131

As shown in Table 1, the L2 learners' correct responses on animate agents were slightly higher than those of inanimate agents though there was no significant difference. Besides, the group effect was not obvious for animate agents, but for inanimate agents (F(2, 69)=3.927, p=.024); the English speakers failed to make an accurate judgment on sentences with inanimate agents as the Chinese controls (p=.026) while the Japanese group and the native speakers responded in a similar way.

Reversibility

The second factor assumed to play an important role in the first language acquisition of the passive is sentence reversibility. Let us see if this factor was significant in L2 acquisition. Listed in Table 2 are the correct responses to reversible and non-reversible passives:

Table 2: The mean scores of reversible and non-reversible passives in the GJ task

Group / Type	English		Japanese		Chinese		Significance
	Mean	SD	Mean	SD	Mean	SD	
Reversible	0.8750	0.2658	0.9375	0.1689	0.9792	0.1021	No significance p=.172
Nonreversible	0.9792	0.1021	0.9792	0.1021	1.0000	0.0000	No significance p=.609

As we can see in Table 2, all of the subjects' mean scores on reversible passives were close to those of non-reversible passives since no significance was obtained for each group. In particular, there was no group effect for both reversible (F(2, 69)=1.806, p=.172) and non-reversible passives (F(2, 69)=.500, p=.609), suggesting that reversibility should not be crucial for adult L2 acquisition of the Chinese *bei*-construction.

Truncation

Different from the previous factors, which are related to learners' semantic

knowledge, the third factor pertains to learners' syntactic knowledge, as shown in Table 3:

Table 3: The correct responses of truncated and non-truncated passives in the GJ task

Group / Type	English		Japanese		Chinese		Significance
	Mean	SD	Mean	SD	Mean	SD	
Truncated	0.4583	0.4643	0.7500	0.3297	0.9375	0.1021	E vs. J *p=.017 E vs. C **p=.000
Non-truncated	0.9583	0.1412	0.9792	0.1021	0.979	0.1021	No significance P=.775

Table 3 shows that only the English speakers were affected by sentence truncation for they statistically more accurately judged non-truncated passives than truncated ones (p=.000) whereas the distinction was not obvious for both Japanese and Chinese speakers. Accordingly, there was a group effect on truncated passives (F(2, 69)=11.899, p=.000) rather than on non-truncated sentences. The English group's judgment on truncated sentences was significantly less accurate than either Japanese or Chinese speakers' (p=.017 for E vs. J; p=.000 for E vs. C). For all that the Japanese group's mean score was lower than the Chinese controls', it did not reach a significant difference.

Transitivity

At length, many previous studies have shown some evidence for children's sensitivity to verb of transitivity. Let us see if L2 adult learners are aware of this property. The mean scores concerning this property are given in Table 4:

Table 4: The mean scores of the passives involving verbs of different degrees of transitivity in the GJ task

Group / Type	English		Japanese		Chinese		Significance
	Mean	SD	Mean	SD	Mean	SD	
Action	0.9167	0.2823	0.9583	0.2041	0.9583	0.2041	No significance p=.775
Experiential	0.7917	0.4149	0.7083	0.4643	0.7083	0.4643	No significance p=.759
Abstract	1.0000	0.0000	1.0000	0.0000	0.9167	0.2823	No significance p=.131
Non-prototypical	0.9167	0.2823	0.9583	0.2041	0.9583	0.2041	No significance p=.775

As shown in Table 4, all of the subjects' responses on experiential verbs were the lowest though only the Japanese and Chinese group reached a significance (experiential vs. verb of more abstract, p=.02 for the Japanese group; experiential vs. action verb & verb of non-prototypical p=.047 for the Chinese group). Therefore, the hierarchy of the accuracy for the L2 learners was: verb of more abstract > action = verb of non-prototypical > experiential, but for the native speakers, it was: action = verb of non-prototypical > verb of more abstract > experiential. However, the group effect for each type of verb was no significant.

Animacy, reversibility, truncation and transitivity

Now let us take a closer look at the four properties presented early and see which property is the most difficult for the subjects, as shown in Table 5:

Table 5: The mean score of the passives involving four properties in the GJ task

Group / Type	English		Japanese		Chinese		Significance
	Mean	SD	Mean	SD	Mean	SD	
Animacy	0.9167	0.1593	0.9479	0.1037	1.0000	0.0000	E vs. C *p=.037
Reversibility	0.9271	0.1375	0.9583	9.517E-02	0.9896	05.103E-02	No significance p=.108
Truncation	0.7083	0.2624	0.8646	0.1948	0.9583	0.1204	E vs. J *p=.032 E vs. C **p=.000
Transitivity	0.9063	0.1617	0.9063	0.1439	0.8854	0.1803	No significance p=.877

It is obvious that the English learners' correct responses on the property of truncation were statistically lower than the other three properties (p=.01 for truncation vs. animacy; p=.006 for truncation vs. reversibility; p=.004 for truncation vs. transitivity), but for the Japanese learners, their responses to the four properties were not significantly different. For the Chinese controls, their responses on transitivity was statistically lower than those on animacy (p=.03). What was noteworthy was that there was a group effect on animacy and truncation, but not on transitivity and reversibility. The English learners were less accurate at detecting sentences concerning animacy (p=.037) and truncation (p=.000) than our native speakers. Moreover, it was found that the Japanese group significantly outperformed the English group on truncation.

3.4.2 The PD task

Animacy

Table 6 shows the results of animate and inanimate agents in the PD task:

Table 6: The frequency of animate and inanimate agents in the PD task

Group / Type	English	Japanese	Chinese	Significance
Inanimate agents	33	41	47	E vs. C **p=.000 J vs. C *p=.027
Animate agents	42	36	48	E vs. C *p=.011 J vs. C **p=.000

Similar to the GJ task, the PD task also showed that the English group's performance on animate agents was better than that on inanimate agents (p=.026), but the Japanese group's number of production on the former was lower than the latter though there was no significant difference. In addition, there was a significant difference between groups on both animate (Chi-Square value=13.741, p=.001) and inanimate agents (Chi-Square value=15.316, p=.000). The English group as well as the Japanese group were statistically behind the Chinese controls on animate agents (p=.011 for the English group; p=.000 for the Japanese group) and inanimate agents (p=.000 for the English learners; p=.027 for the Japanese learners). Nonetheless, the English group's frequency of production was similar to the Japanese speakers'.

Reversibility

Similar to the GJ task, our L2 learners' production of sentences of non-reversibility was equivalent to that of reversibility in that there was no significant difference, as shown in Table 7:

Table 7: The frequency of reversible and non-reversible passives in the PD task

Group / Type	English	Japanese	Chinese	Significance
Reversibility	42	41	48	E vs. C *p=.011 J vs. C **p=.006
Non-reversibility	44	45	47	No significance P=.396

However, the group effect was observed on reversibility (Chi-Square value=7.272, p=.026), but not on non-reversibility. Our L2 learners' performance on reversible passives was statistically worse than the Chinese native speakers' (p=.011 for E vs. C; p=.006 for J vs. C).

Truncation

With respect to sentence truncation, the subjects' frequency of production on non-truncated passives was more than that on truncated passives; there was a significance for each group (p=.000), as illustrated below:

Table 8: The frequency of truncated and non-truncated passives in the PD task

Group / Type	English	Japanese	Chinese	Significance
Truncated	9	12	20	E vs. C *p=.014
Non-truncated	47	43	46	No significance P=.179

Table 8 shows that there was a group effect on truncated passives (Chi-Square value=6.615, p=.037) instead of on non-truncated sentences. The English group lagged far behind the Chinese group (p=.014) when producing the truncated sentences, but the Japanese speakers did a satisfactory job as either the native speakers or the English speakers.

Transitivity

Let us turn to see the results on verb of transitivity, as revealed by Table 9:

Table 9: The frequency of the passives involving verbs of different degrees of transitivity in the PD task

Group / Type	English	Japanese	Chinese	Significance
Action	20	23	23	No significance P=.195
Experiential	17	18	15	No significance P=.632
Verb of more abstract	20	21	24	No significance P=.128
Non-prototypical	9	20	18	E vs. J **p=.001 E vs. C **p=.009

In Table 9, all the subjects' production rate for each verb type was not the same. The production rate on the verb of transitivity for the English group is: action = verb of more abstract > experiential verb > non-prototypical (action (p=.001), experiential (p=.02) and abstract (p=.001) are significantly better than non-prototypical) while the Japanese group's production rate for the four verb types did not show any significant distinction. However, the Chinese group's production rate for verbs of transitivity is: verb of more abstract > action > verb of non-prototypical > experiential (action & abstract vs. experiential p=.004 and p=.001; action & abstract vs. non-prototypical p=.041 and p=.009). Moreover, there was no group effect among each verb type verb except for the non-prototypical verb; the English speakers did not produce as many sentences with non-prototypical verbs as both the Japanese and native controls (p=.001 for J vs. E; p=.009 for C vs. E) did.

Animacy, reversibility, truncation and transitivity

Presented in Table 10 are the results of the four properties in the PD task:

Table 10: The frequency of passives involving four properties in the PD task

Type \ Group	English	Japanese	Chinese	Significance
Animacy	75	77	95	E vs. C **p=.000 J vs. C **p=.000
Reversibility	86	86	95	E vs. C **p=.005 J vs. C **p=.005
Truncation	56	55	66	No significance P=.196
Transitivity	66	82	80	E vs. J **p=.006 E vs. C *p=.018

We found that all of the subjects performed the best on reversibility and did the worst on truncation. For the English speakers, their production on reversibility statistically outnumbered that on animacy (p=.031), transitivity (p=.000) and truncation (p=.000). In addition, the sentences of animacy were also more than truncated passives (p=.003). For the Japanese group, their performance on the property of truncation was significantly worse than the other three properties (p<.01). The situation was quite similar for the Chinese group. They also did a less satisfactory job on the property of truncation than on the other three types (p<.01 and p<.05). Meanwhile, the Chinese native controls' production rate for transitivity was also lower than animacy and reversibility (p<.01). With regard to the group effect, the English learners were statistically worse than native

speakers with the exception of the truncation (p<.01), yet the Japanese group was behind the native controls merely on animacy and reversibility (p<.01). Above all, the Japanese learners outperformed the English learners on verbs of transitivity.

4. Discussion

4.1 L1 transfer

In the SLA field, L1 transfer has been widely discussed since the main distinction between L1 and L2 acquisition is that L2 learners have been equipped with their L1 knowledge. But whether L1 will exercise any effect on L2 acquisition has been controversial. For those who argue that the processes of L1 and L2 acquisition are similar, the native language has no impact on L2 learners in the course of L2 acquisition, but for those who observe that L1 and L2 acquisition, indeed, undergo different processes, the mother tongue does play an important role in L2 acquisition. If L1 is distinct from L2, this will result in L1 interference or negative transfer. If L1 and L2 are similar, then positive transfer will occur. Now we will see if the L2 learners, in effect, carry their L1 knowledge into L2 learning in the present study.

As stated previously, the way for forming the truncated sentences in Japanese and English is dissimilar to Chinese since the former two languages can omit the agents together with pre(post)positions, *ni* and *by* respectively whereas the latter language allows only the deletion of the agent without the company of *bei* to construct a truncated passive. Given this, we will see if our learners transfer their native language to the target language in L2 acquisition. Table 11 shows the L2 learners' mean score of the truncated passives in comparison with the control group in the GJ task:

Table 11: The experimental group's mean score in comparison with the Chinese group in the GJ task

Group / Property	English	Japanese	ES vs. JS
Truncated passives	** (p=.000)		* (p=.017)

**p<.01, *p<.05

As can be seen in Table 11, only the English speakers' average mean concerning the truncated passives was statistically lower than the Chinese group's. It is evident that L1 interference was obtained only by the English group, but not by the Japanese group, who even performed better than the former group. As a matter of fact, this result can be attributed to the fact that since Japanese is a [+pro-drop] language, it is quite common

to allow omissions of either subjects or objects so that the Japanese speakers can correct judge the sentences as the Chinese group. Let us turn to the PD task to see if the similar result is obtained, as shown in Table 12:

Table 12: The experimental group's mean score in comparison with the Chinese group in the PD task

Group / Property	English	Japanese	ES vs. JS
Truncated passives	* (p=.014)		p=.459

*p<.05

Similar to the GJ task, the English learners also produced less truncated passives than the native speakers, further indicating that the English learners were affected by their mother tongue. However, the Japanese group, under the positive transfer of the [+pro-drop] parameter, exhibited a similar production rate as the Chinese speakers did.

Furthermore, the passives of the three languages, can have either animate or inanimate NPs as their agents. And both reversible and non-reversible passives are possible among the three languages. Likewise, the verb with a higher degree of transitivity provides a facilitative context for a sentence to be passivized in both the native languages and the target language. We will see if the similarity between languages will lead to positive transfer. Presented in Table 13 are the experimental group's responses to the similar properties in comparison with the native speakers in the GJ task:

Table 13: The experimental group's mean score in comparison with the Chinese group in the GJ task

	English	Japanese	ES vs. JS
Animate agents			p=.216
Inanimate agents	* (p=.026)		p=.230
Reversible			p=.530
Non-reversible			p=1.00
Actional			p=.826
Experiential			p=.813
Verb-abstract			p=1.00
Non-prototypical			p=.826

*p<.05

As can be seen in Table 13, the Japanese speakers' judgment was close to the Chinese group's, suggesting that the similarity between languages did facilitate L2 learning. With respect to the English group, their performance is also native-like except for the responses of the inanimate agents, positive transfer thus occurs. The exception of inanimate agents could be due to the possibility that since the subjects in the present study were high beginners, the inanimate agents, which could not actively initiate any disposal action on the patients were difficult to be passivized for them.

Table 14: The experimental group's frequency of occurrence in comparison with the Chinese group in the PD task

	English	Japanese	ES vs. JS
Animate agents	* (p=.011)	** (p=.000)	p=.117
Inanimate agents	** (p=.000)	* (p=.027)	p=.052
Reversible	* (p=.011)	** (p=.006)	p=.765
Non-reversible			p=.396
Actional			p=.195
Experiential			p=.632
Verb-abstract			p=.128
Non-prototypical	** (p=.009)		** (p=.001)

**p<.01, *p<.05

Table 14 shows that the L2 learners had positively transferred their L1 knowledge into L2 learning on some similar properties; however, regarding some other properties the experimental group's performance was still far behind the Chinese control's. The inconsistency can be attributed to the task effect, which will be taken up later on.

4.2 The methodological effect

Although the two tasks undergo different scoring procedures, we still can see if one task matches the other. Tables 15 and 16 illustrate the results of the two tasks for each property:

Table 15: The comparison with the control group for each type in the two tasks

Task	Groups	Inani	Ani	Rev	N-Rev	Tru	N-Tru	Act	Exp	V-Ab	Non-Pro
GJ task	English	*				**					
	Japanese										
p-value	E vs. J					*					
PD task	English	**	*	*		*					**
	Japanese	*	**	**							
p-value	E vs. J										**

**p<.01, *p<.05

Table 16: The comparison with the control group for four properties in the two tasks

Task	Groups	Animacy	Transitivity	Reversibility	Truncation
GJ task	English	*			**
	Japanese				
p-value	E vs. J				*
PD task	English	**	*	**	**
	Japanese	**		**	
p-value	E vs. J		**		**

**p<.01, *p<.05

From Tables 15 and 16, we can see that only parts of the results in the GJ task were correspondent with those in the PD task. First of all, the L2 learners had an easy time dealing with non-reversible, non-truncated passives as well as passives with action, experiential and more abstract verbs in both tasks. Additionally, the English speakers had difficulty tackling inanimate agents and truncated sentences in both tasks.

Nonetheless, the distinct parts between the two tasks showed that it was salient that though the L2 learners could make an accurate judgment pertaining to most of the properties as native speakers did in the GJ task, their frequency of production, once in a while, was not necessarily equivalent to the Chinese controls', suggesting that in the language development, decoding often precedes encoding. For instance, the Japanese speakers' judgment on the sentences related to inanimate agents was as accurate as the Chinese group's, their frequency of production, however, was still far from native-like. The case with the English learners was even more obvious. As can be seen in Table 11, the English speakers' correct responses to inanimate agents and reversible passives were quite native-like, however, they could not produce as many sentences involving these properties as the Chinese controls'. In a word, these phenomena reveal that our subjects, more often than not, could comprehend what they could not produce.

In addition, we can further examine whether the tendency of the acquisition hierarchy of the four properties among the L2 learners was similar in the two tasks, as shown in Figures 1 and 2:

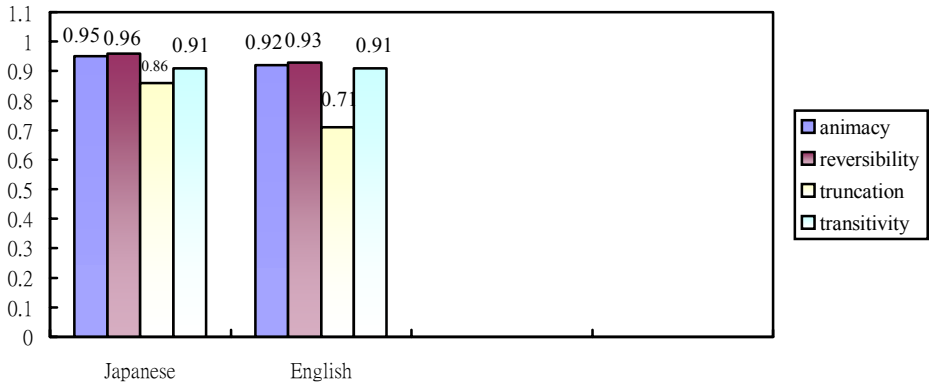

Figure 1: The average mean of the four properties by the L2 learners in the GJ task

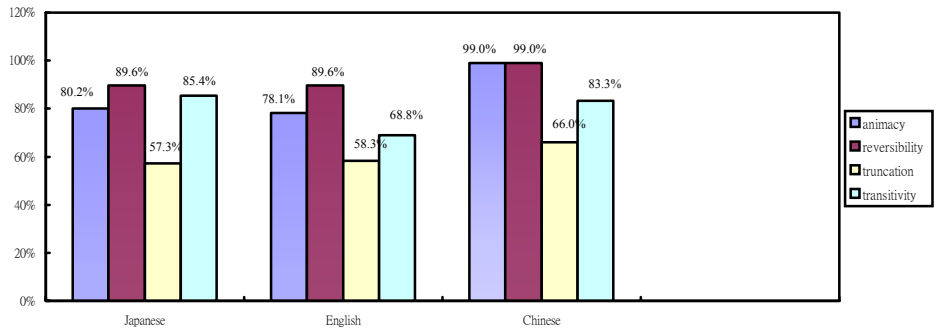

Figure 2: The frequency counts of the four properties by the L2 learners in the PD task

After comparing Figures 1 with 2, we found that the L2 learners' responses to the four properties in the GJ task were consistent with those of the PD task; the acquisition hierarchy of the four properties in the two tasks is: reversibility > animacy > transitivity > truncation, indicating that reversibility is the easiest one to be acquired by the L2 learners and truncation poses the most difficulty. This suggests that both of the two tasks can effectively reveal learners' knowledge, either semantic or syntactic, about the Chinese *bei*-construction.

4.3 Semantics vs. syntax

In essence, whether the semantic property is easier than the syntactic property or vice versa has been widely discussed in L1 acquisition. Included in the present study are

two semantic properties (animacy and transitivity) and two syntactic properties (reversibility and truncation). Now let us turn to see whether the semantic and syntactic properties will pose different levels of difficulties to the subjects. Figure 3 shows the responses of the two properties by our subjects in the GJ task:

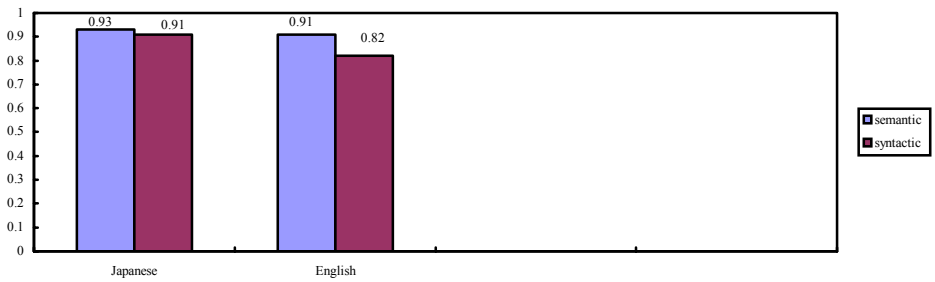

Figure 3: The mean score of the semantic and syntactic properties by the L2 learners in the GJ task

As revealed by Figure 3, the L2 learners performed better on the semantic property than on the syntactic property although only the English group reached a significant difference (t-value=3.301, p=.003), suggesting that the semantic property should be easier than the syntactic property for our subjects. This further supports Goodluck's (1991) claim that semantics is acquired earlier than syntax in L1 acquisition. Let us further examine the PD task to see if the tendency is similar, as shown in Figure 4:

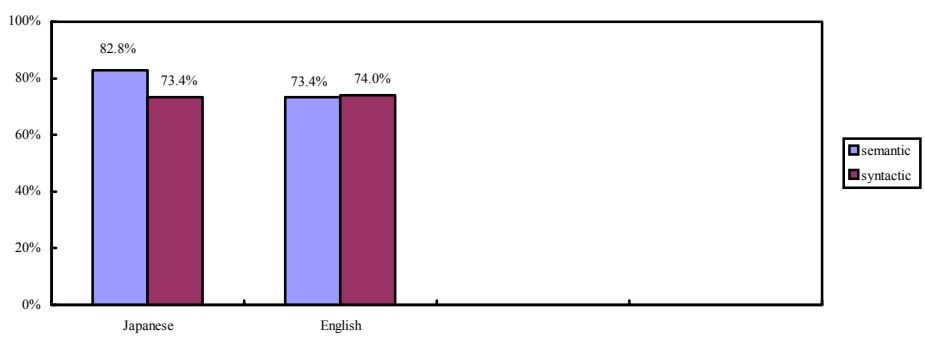

Figure 4: The frequency count of the semantic and syntactic property by the L2 learners in the PD task

The results found in the PD task were not exactly the same as those in the GJ task. The Japanese group's production of the semantic property was statistically larger than that of the syntactic property in number (Chi-Square value=4.937, p=.026), lending further support to Goodluck's claim that semantics is prior to syntax. But the English learners' performance on the syntactic property was different from that on the semantic property though the difference was not significant (Chi-Square value=.013, p=.908). The reason why the distinction between the semantic and syntactic performance was not so obvious for the English group could be that their knowledge about the non-prototypical verb was insufficient so that they could not produce as many *bei*-sentences with this kind of verb as the Japanese group could. Actually, the *bei*-sentences with the non-prototypical verbs were those with the post-verbal elements, henceforth, the English speakers' bad performance indicated that producing the *bei*-sentences with the post-verbal elements posed the most difficulty to them.

5. Conclusion

The present study examined Japanese- and English-speaking learners' acquisition of the Chinese *bei*-construction by conducting an experiment with two tasks, namely the GJ task and the PD task. It was found that the L2 learners indeed resorted to their L1 knowledge in the acquisition of the Chinese *bei*-construction, hence the similarities and differences between the native and target languages did lead to positive and negative transfer respectively. Evidently, L1 transfer is supported. In addition, it was found that the L2 learners' responses to the four properties in the GJ task were generally consistent with those of the PD task. Generally speaking, the semantic property was found easier than the syntactic property in both tasks. Accordingly, Goodluck's claim that the semantic property is easy to acquire in the L1 acquisition is proved by the present study.

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The Cognitive and Metacognitive Strategies NNES Writers Performed When Composing in L1 and L2

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Writing is a complex cognitive activity that involves both cognitive knowledge and strategies for writing, and metacognitive knowledge and strategies that regulate one's cognitive writing process and actions. The cognitive activity of writing can be even more complicated for the NNES writers when they learn to write in English, for their native language and the literacy skills acquired in the L1 inevitably exert influences on their L2 writing process and performance. Thus, this study intends to investigate the cognitive and metacognitive strategies the NNES writers, including both EFL experienced writers and inexperienced writers, employ when they compose in both their native language, Chinese, and the target language, English. The six subjects were required to write on the same topic in both L1 and L2; they verbally reported their writing processes by thinking-aloud, and the processes were audio and video-taped. Their think-aloud protocols were then analyzed, and the time spent on the cognitive and metacognitive strategies were calculated. The results indicate firstly, the NNES writers spent more time on strategy use when they composed in English than in Chinese. Secondly, the EFL experienced writers appeared to be more like *knowledge-transformer* in English, but more like *knowledge-teller* in Chinese. Thirdly, the statistical results lend further supports to the differences between EFL experienced and inexperienced writers reported in the literature. Future research should investigate more NNES subjects with various L1 language proficiency so that the influence of L1 on how NNES learn to write in English can be further explored.

Key words: EFL writing, L1 writing, writing strategies, metacognitive strategies, metacognitive regulation

1. Introduction

1.1 The nature of writing

Writing is a complicated cognitive activity that requires knowledge of language, subject, and convention (cf. Kaplan 1983), and involves cognitive actions of planning, writing, and reviewing and revision (cf. Flower and Hayes 1981, Grabe and Kaplan 1996, Hayes 1996, Scardamalia and Bereiter 1987, Zamel 1983, etc.). In order to write,

one needs firstly linguistic knowledge of the language that is used to write. According to Grabe and Kaplan (1996), the knowledge of language should include not only vocabulary and syntactic knowledge but also sociolinguistic, discoursal, pragmatic, etc. knowledge. In addition to knowing the language, one needs to know about the subject or topic he or she is writing on. During the composing process, one needs to retrieve the related knowledge stored in their long-term memory and then organize the retrieved information into a piece of coherent text. Moreover, one needs to be capable of adopting appropriate writing convention of the language so that the written products can meet the requirements of conventions.

Alike one needs strategies as well as knowledge in order to write. In the 1980s, a large amount of research that investigate writers' composing processes and performed cognitive activities concludes that writing is a *meaning-construction* process, which involves one's *active* cognitive actions of problem-solving and is a *recursive* process of planning, writing, reviewing and revising. The research findings yield fruitful results concerning the writing strategies a good writer tend to employ when he or she undertakes a writing task. During the composing process of meaning construction (Zamel 1983), one first of all *plans* for the writing task, involving the strategies of planning such as setting goals, generating ideas, selecting and organizing ideas, outlining, etc., and those of *writing*, i.e., translating one's intended meanings into linguistic representation, including substrategies like paraphrasing, adding/deleting ideas, selecting appropriate lexical expressions, etc. Moreover, when *reviewing* and *revising* the written product, one needs to possess the strategies of both local and global reviewing and revising. The strategies enables the writer to both detect the local problems such as misspelling, grammatical errors on the sentence level, and to observe such global problems as incoherence, invalid argument, etc. on the discourse level. With the above knowledge and strategies that are necessary for one to write, he or she can thus perform a cognitive task of writing.

1.2 The metacognitive theory and its application to writing

In addition to possessing the knowledge and strategies for writing, a good writer metacognitively monitor his or her own cognitive process of activities of writing, making use of his or her metacognitive awareness to assess their knowledge and strategies, and to check and regulate their cognitive performance. The metacognitive theory was introduced in the 1970s (cf. Flavell 1979), and flourished in reading research in the 1980s. Later more and more researchers apply the theory to writing instruction and research as well as reading and other subject learning such as social science, mathematics, social science, etc., which are cognitive activities and involve process of problem-solving. The two

essential components of metacognition are *self-appraisal*, or *knowledge of cognition*, and *self-management*, or *regulation of cognition* (Baker and Brown 1984, Brown 1987, Jacob and Paris 1987, Paris and Winograd 1990, Schraw 2001, Schraw and Moshman 1995). Self-appraisal is one's conscious awareness of and personal reflections about his own cognitive states, and about his own knowledge of himself as a cognitive entity and of the task demands. One's metacognitive knowledge can be described in terms of *declarative*, *procedural* and *conditional* knowledge, which answer questions about *what* a strategy and knowledge is, *how* the knowledge or strategy is applied, and *when* and *why* it is employed. Self-management is the metacognition in action, consisting of the actions of planning, monitoring, evaluating, and regulating, which orchestrate one's cognitive actions when he undertakes a cognitive task. Knowledge of cognition is regarded as the prerequisite of regulation of cognition; that is, one needs to be consciously aware of his own cognitive processes and activities in order to monitor and regulate his problem-solving process and performance.

The relationship between the main writing research approaches and the metacognitive theory is best highlighted by Devine's (1993) study. By following Flavell's (1979, 1987) taxonomy, she pinpoints that what the textual approach (cf. Johns 1990, Silva 1990) examines is the metacognitive knowledge of *task* variable, and the fruitful findings of the process approach provide the basis for the metacognitive knowledge of *person* variable and *strategy* variable. In effect, another major approach, social constructivist view (cf. Johns 1990) or English for academic purpose (cf. Silva 1990) also contribute understanding the metacognitive knowledge of *task* and *strategy* variables. When the metacognitive theory is applied to investigate how one writes, in order to effectively perform a writing task, not only does one need the knowledge and strategy necessary for writing, as summarized in the previous paragraph, but also he needs to be consciously aware of, i.e., possess the metacognitive awareness of, his cognitive state of knowledge and ability. Namely, he needs to know *what* he knows about the knowledge and strategy, *how* he can apply the knowledge and strategy, and *when* and *why* he employs them. For instance, he needs to know the strategy of global reviewing is to review the written product globally to check its coherence, continuity, logic, etc. To apply this strategy, he needs to check the cohesion within each sentence, and coherence between sentences and paragraphs, logical flow and validity of arguments, etc. He also needs to know this strategy can be adopted any time during the composing process and after the product is completed, and the purpose is to produce a piece of coherent text to achieve communication with the intended audience.

The notion of metacognitive awareness and monitoring is, in fact, included and discussed in the major writing models (e.g., Flower and Hayes 1981, Hayes 1996, Grabe and Kaplan 1996, Scardamalia and Bereiter 1987) as an essential component in

one's cognitive process of writing. The notion is not explicitly explicated in either Flower and Hayes' (1981) model or Scardamalia and Bereiter's (1987) model; however, the recursive nature of writing process depicted in both models involves one's metacognitive monitoring of his cognitive actions. According to the models, writing is a recursive cycles of planning, writing, and reviewing and revising. For instance, during writing when one encounters the problem of running out of ideas, he may review what has previously been written down, and then undergo the process of planning again to generate more ideas. The actions of reviewing and checking the outcomes of one's cognitive actions in order to further regulate his cognitive performance by adopting regulatory strategies to adjust the cognitive process and actions are indeed executed by one's metacognitive awareness and metacognitive strategies.

Later in Grabe and Kaplan's (1996) model, the notion of metacognitive awareness and monitoring is explicitly, though not thoroughly, discussed and referred to as *metacognitive processing* in the model. According to them, *metacognitive processing* in the *verbal processing*, which is one of the three components in one's internal cognitive process, along with *internal goal setting*, another component in the internal process, is the locus for initiating the *knowledge-transforming* process as claimed by Scardamalia and Bereiter (1987). Namely, when one's cognitive process and actions for writing, as depicted in the previous section, do not work effectively, the metacognitive process will activate necessary metacognitive strategies that can orchestrate and engage all the related components in one's internal cognitive process for writing in repair strategies. To sum up, in writing, as well as other cognitive activities, it involves not only cognitive strategies of writing but also metacognitive strategies of monitoring and regulating. A mature writer undergoes the process of *knowledge-transforming* with the metacognitive awareness functioning, which coordinates the available knowledge and strategies, allocate time and resources according to task demands and writing goals, and activate necessary repair strategies so that he can effectively and strategically perform a writing task.

1.3 The characteristics of L2 writing and EFL writers

When it comes to L2 writing, in addition to all the factors and components above, L2 learners' native language and the literacy skills acquired in L1 have great and complicated impacts on their L2 learning. As noted by the researchers (e.g., Edelsky 1982, Johns 1990, Silva 1990), L1 writing theories, as well as other learning strategies, are applied to L2 writing research and instruction after they are developed and tested in the L1 context. The researcher, thus, caution the needs of taking the L2 context into accounts such as the cultural background, rhetorical structures and conventions, writing instruction of L2. Moreover, as emphasized by the researchers in the framework of

transfer theory, when L2 learners, especially adult learners, are learning the target language, they bring their native language and the L1 literacy skills into the L2 learning setting. Consequently, the native language and the acquired literacy skills inevitably influence their learning of the target language.

In the 1980s and more recently, the researchers in the framework of contrastive rhetoric compared the written texts of NNES (non-native English speaker) writers with those of NES (native English speaker). The research findings conclude that NNES writers tend to apply the writing conventions and rhetoric structures of their native languages to English writing, resulting in the written products considered incoherent or violating English writing conventions (e.g. Chi 2004, Connor 1996, 2002, 2003, Friendlander 1990, Hinds 1987, 1990, Kaplan 1987, Kobayashi and Rinnert 1992, Kubota 1998, You 2000, 2001). As early as 1966, Kaplan's controversial study had argued that oriental writing is spiral, while western writing is straight and direct. Even though his study is considered over-generalized, the subsequent studies provide supports to the claim that different language indeed prefers and employs different rhetoric patterns. Carrell's (1987) study suggested that the application of L1 writing conventions and rhetoric structures in L2 writing can, at least, be partly accounted for by the notion of schema. Since NNES writers' schema of writing is rooted in their L1, it is very likely that they would apply the stored knowledge when they write in L2. Therefore, she argued that it is necessary for NNES writers to learn about the writing conventions and rhetoric structures of the target language and add the newly learned information into their existing schemata.

In addition to discourse transfer as discussed above, according to the transfer theory it is likely that the literacy skills NNES writers acquired in their native language can be transferred when they learn to write in the target language. In fact, this assumption is supported by the claim made by many writing researcher, which is the difference lies between skilled writers and unskilled writers, but not between NES writers and NNES writers (e.g. Leki 1992, Raimes 1985, Zamel 1983). In other words, NNES experienced writers in effect compose in the same way as NES experienced writers do, and both NNES and NES inexperienced writers encounter similar writing difficulties and share similar characteristics. For instance, both NES and NNES experienced writers are found to plan globally for the writing task they are performing forming task representation and setting up writing goals for the task. Moreover, they also tend to review the written products more globally focusing on the coherence, logical reasoning and argumentation developing of the text. Both NES and NNES inexperienced writers, on the other hand, are more likely to start to write immediately after the task is assigned with limited or no planning. In addition, they usually concentrate on spelling and grammatical errors when they check their written products.

In the two lines of research studies, as summarized above, the researchers compared the L2 written products of the NNES writers with the L1 written products of the NES writers, and compared the L2 writing process of NNES writers with the L1 writing process of NES writers. Namely, they did not compare the L2 written products of the NNES writers with their own L1 written products, neither did they compare the L2 writing process of the NNES writers with the writing process they undergo when they write in their L1. Nevertheless, it is argued that it is necessary to compare NNES writers' L2 writing process with their own process of composing in L1, if researchers aim to investigate whether NNES writers' writing knowledge and strategies acquired in L1 writing are transferred when they write in the target language or not.

1.4 The current study and research questions

To understand how NNES writers write in their native language and thus compare their L1 writing process with their L2 writing process, and to further investigate if experienced NNES writers compose differently from inexperienced NNES writers in L1 as well as in L2, the following research questions are addressed in this current study:

(1) What are the cognitive strategies NNES subjects employ when they write in Chinese[1] and English?
(2) What are the metacognitive strategies NNES subjects employ when they write in Chinese and English?
(3) What are the differences between the writing process and strategy use of the EFL experienced and inexperienced writers?

The main purpose of this current study is firstly to investigate and compare how the NNES experienced and inexperienced writers compose in their native language, Mandarin Chinese, and the target language, English, in order to further explore whether NNES writers compose identically or distinctively when they undertake the cognitive tasks of writing in L1 and L2. Moreover, the findings of this study can provide further supports to the previous L2 writing research by means of calculating the percentage of total composing time spent on strategy use. It is believed mature ESL/EFL writers plan more and review more often and globally than immature ESL/EFL writers, but few studies have ever provided statistical evidence to show the differences between the two groups of writers and the consistency between each member's strategy use within each group. By investigating how NNES writers compose in L1 as well as in L2, this study

[1] In this study, Chinese is used to refer to Mandarin Chinese despite that there are different dialects in the language family.

aims to explore further if NNES writers' L2 writing performance and learning is influenced by the native language and the literacy skills acquired in the L1. Thus, the results of this current study can assist EFL writing instructors to design proper curriculum to meet their students' needs, and assist EFL learners to perform a writing task in the target language effectively.

2. Methodology

2.1 Subjects

The NNES writers in this study included three experienced EFL writers and three inexperienced EFL writers. Mandarin Chinese is their native language, but all of them are bilinguals of Mandarin and Taiwanese; they learned English as a foreign language in Taiwan. They were all purposefully selected as subjects mainly because of their good verbal ability and willingness of participation. They were paid for the experiments, and told so before the experiments were conducted. The experienced writers, Subjects A, B, and C, and inexperienced writers', Subjects D, E, and F, learning backgrounds of writing in English were described as follows.

Subject A, B were female and Subject C was male. They were graduate students majoring in Teaching English as a Foreign Language, attending the same graduate program in central Taiwan. While the experiments were conducted, Subject B had completed her master's thesis, and Subjects A and C were writing their master's theses. They were considered as experienced EFL writers firstly because they had learned English for more than ten years since junior high school, and more importantly because they had abundant writing experiences in English. As English-majored undergraduates, they had taken a series of Basic English writing, Intermediate English writing, and Advanced English writing courses. Moreover, in the graduate program they were required to take the course, Academic Writing, and they had written quite a few research reports for the graduate courses they were taking and either had completed the thesis proposals or the master's thesis.

Subjects D, E, and F, were on the other hand regarded as inexperienced EFL writers. Firstly, they were English-majored sophomores attending the same English department in central Taiwan, as the experienced writers. They had taken the required course, Basic English Writing, for two semesters in freshman year, learning how to write an English paragraph. Secondly, they were business-majored graduates from vocational high schools. They had English classes for two hours per week in the high schools, and did not get a chance to write in English until they were freshmen in the university. Accordingly, they were considered as inexperienced EFL writers because of their limited English writing experiences.

2.2 Instruments

In order to investigate the NNES writers' both Chinese and English writing processes, the subjects were required to compose on the same writing topic in both L1 and L2. Their cognitive processes of writing were reported by the method of think-aloud. In the following, the writing task and the think-aloud protocols were explicated.

2.2.1 The writing task

In order to compare the NNES writers' processes of writing in L2, i.e. English, with their own processes of writing in L1, i.e. Chinese, both the experienced and inexperienced writers were required to compose on the same topic in both Chinese and English. The English topic of the writing task was as follows:

> English is the global language, the world's lingua franca. Accordingly, people in different fields such as politics, technology, and international business depend on it to communicate with people in foreign countries to promote their expertise or to broaden their views. Thus, the overwhelming desire to master English has permeated Taiwan society. In order to foster children's English proficiency, English education in Taiwan has started from the third grade in the elementary school. What's your opinion toward this policy? Please state your opinion.

The Chinese version of the topic was as follows:

> 基於英文是世界通行的語言，各行各業例如貿易、政治、科技等得仰賴英文才能與國外接軌。目前台灣正處於英語學習狂熱中。為了讓學童們早點熟悉英語，國內英語教學更提早自國小三年級開始實施。你對這項政策有什麼樣的看法？請就這點加以論述。

The topic was chosen for two reasons. Firstly, both the experienced and inexperienced EFL writers were English-majored so that they were quite familiar with the issue due to their personal experiences and the classes they had taken. Secondly, both groups of subjects were familiar with the genre, i.e. expository writing, in English as well as Chinese writings. The experienced writers were familiar with the type of expository writing in English because they had learned about the format in the writing courses they had taken, and had practiced the type extensively. As for the inexperienced writers, in the two Basic English Writing courses they took as freshman, they were

taught how to write an expository paragraph in English. Moreover, all the subjects had learned to write an expository essay in Chinese given that it is common in Chinese textbooks and is practiced often in junior and senior high schools.

The subjects performed the English writing task *before* the Chinese writing task in order to avoid the effect of memorization, for it was assumed the subjects might be more likely to remember what they wrote down when they composed in Chinese first. Accordingly, the Chinese writing task was performed at the interval of at least four weeks after the English writing task was completed.

As shown in the English and Chinese topics, the subjects were instructed to write expository essays or paragraphs. The inexperienced writers were allowed to write a paragraph instead of an essay in the English task since they had learned only how to write an English paragraph but not an essay in the English writing courses they had taken. No time limitation was set for both writing tasks and the writers were allowed to take breaks when they were undertaking the tasks so that the tasks could simulate the genuine writing context. It was assumed that the subjects could perform as they usually did when the tasks were not assigned as experimental instrument. During the writing process, no reference books such as dictionary were provided.

2.2.2 The think-aloud protocols

In order to investigate and compare the NNES writers' English and Chinese writing processes, this study adopted the method of thinking aloud to record the subjects' composing processes. The method of thinking aloud has been criticized for the following defects. Firstly, verbalizing the ongoing mental activities while performing a cognitive task might interrupt the ongoing cognitive activities. The critics argued that thinking-aloud could distract one's concentration on the ongoing cognitive task and occupy his working memory. Secondly, the method could not possibly reveal all of the cognitive activities one performed. Some cognitive actions would still remain unknown since the mental activities might be too fast to be reported. Despite the criticisms and the potential defects, the method of thinking aloud has been used extensively in the writing research that investigates one's cognitive process of writing (e.g. Flower and Hayes 1981, Hayes 1996, Kuo & Tseng 1986, Liu 1997, 1999, Raimes 1985, Zamel 1983), since it provides direct information about one's cognitive activities and observable data, which can be analyzed.

In this study, the subjects were requested to compose aloud while performing both the Chinese and English writing tasks. Before they started to compose aloud for the first time when undertaking the English writing task, they were trained to think aloud their mental activities. The topic for the training session was as follows:

> Some people prefer to live in a big city, while others prefer to live in the countryside. Which one do you prefer? Provide explanations and give examples to support your choice.

The training topic also belonged to the type of expository writing. During the process, the subjects tried out the method, and when they forgot to compose aloud and fell into silence, the researcher reminded and guided them to report their ongoing mental activities while they were composing. The sections continued till the subjects and the researcher agreed that they were ready to undertake the writing tasks by thinking-aloud.

Note that the subjects were allowed to report their mental activities in either Chinese or English. The subjects for certain verbally reported their cognitive activities mostly in Chinese when writing in their native language, Chinese. They were encouraged to report their cognitive activities in whichever language they feel comfortable with when they composed in English. The first purpose was to reduce the load on their working memory. It was assumed that verbally reporting in English during writing might increase their cognitive loads resulting in interrupting the writing process. Moreover, when they were allowed to report in Chinese, it was likely to collect more verbal data.

The think aloud processes of six subjects writing in both English and Chinese were recorded by digital video and tape recorder. The audio tapes were transcribed for further analysis, and the digital images were converted into computer files so that the processes could be replayed on computer later when the transcriptions were analyzed in detail.

2.3 Data analysis

The coding scheme adopted in this study was developed on the basis of related research studies of L1 and L2 writing, and the metacognitive theory (e.g., Flower and Hayes 1981, Grabe and Kaplan 1996, Hayes 1996, Jacob and Paris 1987, Leki 1992, Lee I. C. 2005, Lee Y. H. 2005, Paris and Winograd 1990, Raimes 1985, Scardamalia and Bereiter 1987, Schraw 2001, Schraw and Moshman 1995, Yang 2005, You 2002, You and Joe 2004, Zamel 1983). There are 14 strategies: seven cognitive strategies and seven metacognitive strategies. The cognitive strategies are the cognitive actions one employs in order to undertake the cognitive task of writing; they are writing strategies to be performed repetitively throughout the process of writing. And the metacognitive strategies are the self-monitoring strategies that writers employ to monitor and regulate their writing processes and actions. The use of metacognitive strategies usually initiates the repetitive use of cognitive strategies, i.e., trigger continuous cycles of planning, writing, reviewing and revision. Descriptions of these strategies are as follows.

Cognitive Strategies:

1. Searching for information: A writer uses note-making, clustering, outlining or brainstorming, etc. to generate ideas which are related to the writing topic.
2. Generating ideas by reviewing: A writer generates ideas by reviewing the ideas or the texts that have been produced.
3. Using L1 to develop ideas/Planning for the upcoming text: A writer forms the verbatim mental representations for the upcoming texts in their native language, L1, first before putting down the intended meaning into linguistic forms, in either Chinese or English.
4. Using L1 to review: An NNES writer use his or her native language to review the written English text. This strategy is used particularly in L2 writing.
5. Leaving problem for a while: A writer ignores them for the moment and returns to solve them later when lacking appropriate lexical expressions or ideas.
6. Applying discourse knowledge: A writer applies discourse knowledge during composing. The discourse knowledge involves as follows: "(1) knowledge of intrasentential and intersentential marking devices (cohesion, syntactic parallelism), (2) knowledge of semantic relations across clauses, (3) knowledge to recognize main topics, (4) knowledge of genre structure and genre constraints, (5) knowledge of organizing schemes (topic-level discourse structure), (6) knowledge of inferencing (bridging, elaborating), (7) awareness of differences in features of discourse structuring across languages and cultures, (8) awareness of different proficiency levels of discourse skills in different languages" (Grabe and Kaplan 1996:220-221).
7. Taking audience into account: A writer considers the role of the readers, infers the background knowledge of the readers and guesses the readers' interest in order to figure out the content of the writing product, to produce readable sentences and to revise sentences which may confuse readers during the writing process.

Metacognitive Strategies:

8. Setting goals: A writer takes task demands, the context, the topic, genre, and the limitation of time into consideration to meet the requirements of the writing assignments when encountering a writing topic.
9. Selecting appropriate ideas: A writer selects and organizes the appropriate ideas which match the goals set by the writer, the logical requirements and his or her intended meaning.
10. Selecting lexical expressions: A writer selects the lexical expression by rehearsing the words or sentences to examine whether they are suitable or not and to achieve the rhetoric purpose in order to express their intents correctly.
11. Reviewing local text: A writer reviews the text within sentence to check spelling or grammatical errors and to evaluate the appropriateness of lexicon.

12. Making local revision: A writer deletes or changes lexical expressions on sentence level.
13. Reviewing global text: A writer reviews the text beyond sentence level to check coherence and logic flow of writing, and to evaluate whether the intended meanings are expressed properly, whether the generated ideas are appropriate, and whether the goals are achieved.
14. Making global revision: A writer changes or paraphrases ideas, reassesses goals, clarifies ideas, reorders (reorganizes) ideas beyond sentence level.

The audiotapes of all six subjects' think-aloud writing processes were transferred to digital files that can be played on computer and transcribed for further analysis. The think-aloud protocols were examined carefully and repeatedly in every detail in order to identify the subjects' writing process and cognitive and metacognitive strategies they employed in both Chinese and English writing tasks. Different from the previous studies, thanks to the digitalized files each strategy employed by the subjects in both tasks was tracked and calculated.[2]

Based on the aforementioned coding scheme, the subjects' Chinese and English think-aloud protocols were coded according to the following procedures. The parts that were considered as indicating the strategies were marked at the first time. Secondly, the six pieces of transcriptions with marking were given to three research assistants who were trained to analyze think-aloud protocols. Then, the coding results from the researchers and assistants were compared and discussed. If the results showed differences, the researcher and assistants would discuss over them till agreement was reached.

The time each of the subjects spent on the cognitive strategies and metacognitive strategies was counted first, and then the ratio of time spent on each strategy to total writing time was also calculated. The ratio was calculated because the total writing time spent by each subject on the different writing tasks was different. Thus the ratio was calculated to compare each subject's strategy use in both writing tasks.

3. Results

Table 1 summarized the time each of the experienced and inexperienced EFL writers spent on completing the English and Chinese tasks. As shown in the table, the individual difference is quite observable, especially given the limited size of subjects. However, in general, it revealed that the subjects tended to spend longer time on the

[2] Only the time spent on strategy use was calculated, but the time spent on writing down ideas in words on the paper was not tracked and calculated.

English task than the Chinese task, with the exception of Subject E, and that it took the experienced EFL writers quite longer time to write the English compositions than the inexperienced EFL writers. In addition, as shown in the table, the experienced EFL writers tend to spend longer time than the EFL inexperienced writers to compose either in their native language or in the target language.

Table 1: The total writing time of English and Chinese tasks

Subjects	Tasks	
	English	Chinese
A	3 40’27”	2 02’02”
B	2 15’05”	2 05’07”
C	1 42’02”	1 21’05”
D	1 00’26”	0 41’32”
E	1 11’42”	2 01’15”
F	1 14’25”	1 06’02”

Table 2 summarized the cognitive strategies and metacognitive strategies performed by the subjects in both English and Chinese tasks, and the time, including ratio, spent on each of the cognitive and metacognitive strategies. Take Subject A performing the English task for example. As shown in Table 2, she spent 35 minutes and 41 seconds on the strategy of *searching for information*, and the ratio of the time spent on this strategy to the total writing time she spent on the English task, i.e. three hours, 40 minutes and 27 seconds, was 17.8%. In other words, she made use of the strategy of *searching for information* for 17.8% of the total writing time of the English task. The statistical results shown in Table 2 are summarized as follows.

3.1 The cognitive strategies employed in the English and Chinese tasks

As shown in Table 2, among the cognitive writing strategies, the strategy of *searching for information* and the strategy of *generating ideas by reviewing* are the most often used strategies in both English and Chinese tasks. Despite individual differences, the subjects spent more time on the strategy of *search for information* when writing in English, but more time on the strategy of *generating ideas by reviewing* when performing the Chinese writing task.

As for the strategy of *using L1 to develop ideas*, except Subject D in the Chinese task, the other five subjects spent a few seconds to a few minutes firstly forming verbatim mental representations for the upcoming texts in their native language before

putting down the intended meanings into linguistic forms, in either Chinese or English. The strategy of *using L1 to review* was particularly used only by the inexperienced EFL writers in the English task. Instead of reviewing or checking their English written products in English, they adopted the strategy and reviewed the English texts by means of their native language.

When writing in both English and Chinese, the subjects sometimes made use of the strategy of *leaving the problem for a while* when they encountered such problems as running out of ideas, not certain about the spelling or appropriateness of ideas. Concerning the other two cognitive strategies, *applying discourse knowledge* and *taking audience into consideration*, the subjects spent rather small amount of writing time on them. Except for Subject F in the Chinese writing task, the subjects applied the strategy of *applying discourse knowledge* from time to time when they were composing. Only Subject A and Subject C used the strategy of *taking the audience into consideration* in the English task for a few seconds.

3.2 The metacognitive strategies employed in the English and Chinese tasks

As shown by the statistical results in Table 2, the subjects spent longer time on setting goals for the English task than the Chinese task in that the strategy of *setting goals* took up more writing time when they composed in English than in Chinese. In addition, the subjects also spent more time considering the appropriateness of ideas when they wrote in English than in Chinese as shown in that the time spent on the strategy of *selecting appropriate ideas* was more in the English task than in the Chinese task. Note that Subject D and Subject F did not adopt this strategy when they performed the Chinese writing task. Nevertheless, there seemed no difference in the use of the strategy of *selecting lexical expressions* in both English and Chinese tasks.

As for the reviewing and revision strategies employed by the subjects in the English and Chinese tasks, in general, the subjects spent more time on the strategy of *reviewing local text* in the English task than the Chinese task, but longer time on the strategy of *making local revision* in the Chinese task than the English task. And in general, the subjects spent longer time on the strategies of *reviewing global text* and *making global revision* when they composed in English than in Chinese. When comparing the use of local reviewing and revision strategies with that of global reviewing and revision, the latter was used more often than the former in both English and Chinese tasks.

3.3 The strategies employed by the EFL experienced and inexperienced writers

When undertaking the English writing task, the EFL experienced writers and EFL inexperienced writers performed more differently with respect to the use of metacognitive strategy than to the use of cognitive strategy. Concerning the use of cognitive strategy, the EFL experienced writers spent less time using the strategy of *searching for information* than the EFL inexperienced writers, but the former appeared to use the strategy of *generating ideas by reviewing* more often than the latter. Both experienced and inexperienced writers sometimes used the strategy of *using L1 to develop ideas*, but only the latter employed the strategy of *using L1 to review*, as pointed above. When encountering problems during writing, the experienced writers more often made use of the strategy of *leaving the problem for a while* than the inexperienced writers. Moreover, the experienced writers appeared to apply the discourse knowledge more often than the inexperienced writers as shown in that the former spent more time using the strategy of *applying discourse knowledge*. Finally, only Subject A was found to perform the strategy of *taking audience into consideration*.

The differences between the EFL experienced writers and inexperienced writers are noticeable in term of the strategy use of the metacognitive strategy. First of all, all the experienced writers employed the strategy of *setting goals*, while none of the inexperienced writers adopted the strategy when undertaking the task of English writing. Moreover, the EFL experienced writers spent quite longer time than the inexperienced writers applying the strategy of *selecting appropriate ideas* and *selecting lexical expressions*. Secondly, the EFL experienced writers spent much more time on globally reviewing their written products and making global revisions in comparison with the inexperienced writers. As shown in Table 2, the EFL experienced writers, Subjects A, B, and C, spent 16.47%, 13.14%, and 56.92% of the total writing time, respectively, on the strategies of *reviewing global text* and *making global revision*, whereas the inexperienced writers, Subjects D, E, and F, only spent 10.56%, 5.41%, and 4.55% of the total writing time, respectively, on the two strategies.

The EFL experienced and inexperienced writers actually made use of the cognitive and metacognitive strategies similarly when they performed the Chinese writing task to the ways they employed the strategies in the English writing task. When writing the Chinese compositions the EFL experienced writers spent less time using the strategy of *searching for information*, but more time on the strategy of *generating ideas by reviewing* than the EFL inexperienced writers, as they did when composing in English. When writing in Chinese, both EFL experienced and inexperienced writers adopted the strategy of *using L1 to develop ideas*, and there seemed to exist no differences between

the experienced writers' use of this strategy and the inexperienced writers'. As for the use of the strategies of *leaving the problem for a while* and *applying discourse knowledge*, the time spent by the EFL experienced writers on these two strategies were slightly more than that by the EFL inexperienced writers, but the differences were not as noticeable as they were in the English task. And when writing in Chinese, only Subject C applied the strategy of *taking audience into consideration* briefly.

As they did when performing the English writing task, the EFL experienced writers spent more time planning for the Chinese writing task than the inexperienced writers, as shown in that all the experienced writers adopted the strategy of *setting goals*, while only one EFL inexperienced writer, Subject E, used the strategy for a short period of 42 seconds. Alike, all the EFL experienced writers employed the strategy of *selecting appropriate ideas*, whereas only Subject E used the strategy very briefly. As for the strategy of *selecting lexical expression*, both the EFL experienced and inexperienced writers employed the strategy during the process of writing Chinese compositions. As for the strategies of reviewing and revision, as in the English task, there appeared not much differences between the EFL experienced writers' and inexperienced writers' use of the strategies of *reviewing local text* and *making local revision*. Nevertheless, the subjects' use of the strategies of *reviewing global text* and *making global revision* were different in the Chinese task as well as in the English task. The EFL experienced writers were found, in general, to spend more time on global reviewing and revision than the inexperienced writers when they composed in Chinese.

Table 2: The time spent on the cognitive and metacognitive strategies performed by the subjects in both English and Chinese tasks

Strategy	The English writing task						The Chinese writing task					
	Subject A	Subject B	Subject C	Subject D	Subject E	Subject F	Subject A	Subject B	Subject C	Subject D	Subject E	Subject F
	Percentage (Duration)						Percentage (Duration)					
Searching for information	17.80 (35’41”)	13.65 (18’26”)	2.94 (3’)	17.48 (10’34”)	27.13 (19’27”)	25.89 (19’16”)	11.13 (13’35”)	9.39 (11’45”)	5.12 (4’09”)	11.48 (4’46”)	24.55 (29’46”)	21.05 13’54”)
Generating ideas by reviewing	4.86 (9’44”)	6.29 (8’30”)	5.23 (5’20”)	0.41 (15”)	6.30 (4’31”)	1.95 (1’27”)	15.19 (18’32”)	7.93 (9’55”)	7.81 (6’20”)	2.49 (1’2”)	6.23 (7’33”)	5.10 (3’22”)
Using L1 to develop ideas	1.01 (2’02”)	2.43 (3’17”)	0.33 (20”)	1.51 (55”)	1.19 (51”)	2.11 (1’34”)	1.13 (1’13”)	3.72 (4’39”)	1.71 (1’29”)	-	3.26 (3’57”)	1.06 (42”)
Using L1 to review	-	-	-	1.88 (1’8”)	0.46 (20”)	1.14 (51”)	-	-	-	-	-	-
Leaving the problem for a while	0.42 (51”)	0.91 (1’14”)	0.28 (17”)	-	0.12 (5”)	0.85 (38”)	0.01 (1”)	0.40 (30”)	0.25 (12”)	-	0.23 (17”)	0.15 (6”)
Applying discourse knowledge	1.70 (3’43”)	1.54 (2’05”)	0.41 (25”)	0.06 (2”)	0.28 (12”)	0.22 (10”)	0.33 (24”)	1.01 (1’16”)	0.35 (17”)	0.52 (13”)	0.32 (23”)	-
Taking audience into consideration	0.14 (17”)	-	-	-	-	-	-	-	0.12 (6”)	-	-	-
Setting goals	0.72 (1’27”)	1.12 (1’31”)	1.57 (1’36”)	-	-	-	0.23 (17”)	0.35 (26”)	1.17 (57”)	-	0.58 (42”)	-
Selecting appropriate ideas	7.21 (14’27”)	9.13 (12’20”)	1.85 (1’53”)	1.80 (1’5”)	0.95 (41”)	1.32 (59”)	4.33 (5’17”)	7.55 (9’27”)	1.99 (1’37”)	-	0.15 (11”)	-
Selecting lexical expressions	2.92 (5’51”)	2.69 (3’38”)	0.36 (22”)	-	1.12 (48”)	0.36 (16”)	2.83 (3’27”)	3.96 (4’57”)	3.27 (2’39”)	1.16 (29”)	1.54 (1’52”)	0.58 (23”)
Reviewing local text	1.50 (3’)	1.67 (2’15”)	0.05 (3”)	0.17 (6”)	0.58 (25”)	5.17 (3’51”)	0.16 (12”)	0.03 (2”)	2.65 (2’09”)	-	0.95 (1’9”)	0.38 (15”)
Making local revision	1.85 (3’43”)	1.91 (2’35”)	2.37 (2’25”)	1.46 (53”)	0.72 (31”)	1.59 (1’11”)	1.17 (1’26”)	2.49 (3’07”)	4.13 (3’21”)	1.80 (45”)	2.63 (3’11”)	2.85 (1’53”)
Reviewing global text	14.44 (28’57”)	11.07 (14’57”)	28.81 (29’24”)	5.38 (3’15”)	4.83 (3’28”)	3.47 (2’35”)	9.30 (11’21”)	8.17 (10’13”)	26.37 (21’23”)	11.16 (4’38”)	4.80 (5’49”)	6.34 (4’11”)
Making global revision	2.03 (4’04”)	2.07 (2’48”)	28.11 (28’41”)	5.18 (3’8”)	0.58 (24”)	1.08 (48”)	0.12 (9”)	1.43 (1’47”)	3.08 (2’30”)	2.41 (1’)	0.63 (46”)	1.56 (1’2”)

4. Discussions

4.1 The strategy use in the English task and the Chinese task

The subjects, who were EFL experienced and inexperienced writers, were found to compose differently in English and Chinese. Their strategy use when writing in English was different from that when they performed the Chinese writing task. First of all, the subjects, both EFL experienced and inexperienced writers, appeared to undergo the writing process of *knowledge-telling* when they were writing the Chinese compositions, as shown in that five of the subjects, spent more time on the strategy of *generating ideas by reviewing* when they wrote in Chinese than in English. Reviewing what has previously been written down is one strategy that is often adopted when a writer runs out of ideas while he is writing. Closer analysis of the subjects' strategy use in the English and Chinese writing tasks revealed that the subject not only tended to spend more time on the strategy of *generating ideas by reviewing*, but also reviewed more often and smaller chunks of texts when they were writing the Chinese compositions than the English ones. Moreover, the closer analysis of the subjects' protocols showed that the use of the strategy of *generating ideas by reviewing* was more likely to be followed by another cycle of planning, writing, and reviewing and revising in the English writing task. On the other hand, in the Chinese writing task, the use of the strategy tended to lead to immediately writing down the generated ideas. The above findings, thus, suggest that the subjects, including the EFL experienced writers as well as the EFL inexperienced writers, performed the Chinese writing task more in the way depicted in the *knowledge-telling* model (cf. Scardamalia and Bereiter 1987), though the EFL experienced writers usually underwent the process of *knowledge-transforming* when composing in English.

In addition to the different strategy use of the cognitive strategies discussed above, the subjects also employed the metacognitive strategies of *setting goals* and *selecting appropriate ideas* differently when they performed the Chinese and English writing tasks. As shown in the data, the EFL experienced writers[3] spent more time on the strategy of *setting goals*, and both groups of the subjects spent longer time on the strategy of *selecting appropriate ideas* when they were composing in English. Even though the time spent on the strategy of *setting goals* in the English writing task and the Chinese writing task does not seem to differ much, yet the difference is considered significant since the percentage of writing time spent on the strategy does not usually take up much proportion of the total writing time. In addition, the fact that not only the EFL

[3] One inexperienced writer, Subject E, in fact adopted the strategy of setting goal in the Chinese writing task, but very briefly for 42 seconds only.

experienced writers but also the EFL inexperienced writers, in general, spent longer time on checking the appropriateness of ideas in order to select the proper ones provides further supports to the claim that the subjects employ the metacognitive strategies differently when writing in English and in Chinese, and accordingly that they monitor and regulate their English and Chinese writing processes in different ways.

By employing the metacognitive strategies of *setting goals* and *selecting appropriate ideas*, the subjects exert metacognitive control over their writing processes. As summarized in the introduction, there are three types of metacognitive strategies that one employs to monitor and control his own cognitive activities and processes: planning, monitoring, evaluating and regulating (cf. Hacker 1998, Paris and Winograd 1990, Schraw 2001, Schraw and Moshman 1995). When the strategy of *setting goals* is employed, one can then set the writing goals in accordance with the task demands so that he can allocate the time, resources and strategies available. Thus, the subjects' use of the strategy of *setting goals* indicates that they *planned* for the writing task they were undertaking. That both the EFL experienced writers and inexperienced writers spent more time on the strategy of *setting goals* in the English writing task than the Chinese writing task, therefore, suggests that they tend to *plan* more and therefore *regulate* their writing processes and activities more when performing the English writing task, especially the EFL experienced writers.

In addition to *planning*, both groups of subjects seem to *monitor* and *evaluate* their cognitive writing activities more when writing English compositions than Chinese compositions in that they employed the strategy of *selecting appropriate ideas* more often in the English writing task than in the Chinese writing task. In order to select the proper ideas that match the writing goals set by the writer and the requirement of task, and coherence and logic, writers need to not only review and check the generated ideas but also evaluate the appropriateness of them. In other words, they *regulate* their cognitive writing activities by *monitoring* their own cognitive processes and actions and *evaluating* the outcomes of the cognitive actions. This result, thus, suggests that the subjects tend to *metacognitively regulate* their cognitive processes and actions more often when they undertake the English writing task than the Chinese writing task.

Moreover, that the EFL experienced writers spent larger portions of composing time on the strategies of *reviewing global text*, and *making global revision* in the English task also provides supports to the above claim that the subjects seem to *metacognitively regulate* their cognitive writing processes and actions more when composing in the English task than in the Chinese task. When globally reviewing the previously written texts and making global revisions accordingly, a writer needs to adopt the metacognitive strategies of *checking* and *evaluating* so as to determine if the written products are logically sound, coherent with regard to the entire text and theme, conveying the writer's

intended meanings, and fulfilling the task demands and achieving the writing goals. He evaluates the written products, and then decides the following writing actions and strategies and if more cycles of planning, writing, reviewing and revising need to be initiated.

Nevertheless, it needs to be pointed out that the EFL inexperienced writers spent longer time on the two strategies in the Chinese task than in the English task. As shown above, the EFL experienced writers appeared to employ more metacognitive strategies and regulate their writing processes more often in the English writing task than the Chinese task as shown in that they spent longer time on the metacognitive strategies of *setting goal*, *selecting appropriate ideas*, *reviewing global text*, and *making global revision* when they composed in English than in Chinese. The EFL inexperienced writers, on the other hand, did not always metacognitively regulate their cognitive processes more in the English writing task than in the Chinese writing task. They might spent more time on setting goals and checking the appropriateness of ideas in the English task, but they were more likely to monitor and evaluate their writing processes and written texts on the discourse level in the Chinese writing task.

The application of the strategies of *selecting appropriate ideas*, *reviewing global text*, and *making global revision* is of great importance in performing the cognitive activity of writing in that these metacognitive strategies can usually initiate recursive cycles of the three stages of writing, i.e., planning, writing, reviewing and revising. The recursive nature of writing, referred to as *knowledge-transforming* process by Scardamalia and Bereiter (1987), is what distinguishes mature writers from immature writers. The above findings, thus, provide further supports to one of the conclusions concerning the subjects' strategy use of cognitive strategies, which is the EFL experienced writers are more like *knowledge-teller* when they performed the Chinese writing task, whereas they are *knowledge-transformer* when they composed in English. As for the EFL inexperienced writers, they are regarded as *knowledge-teller* when they compose in Chinese, and are found to still undergo the process of *knowledge-telling* when they undertake the English writing task.

The above claim, thus, leads to the questions: what are the reasons that the EFL experienced writers compose more like *knowledge-transformer* in English but *knowledge-teller* in Chinese, and do the EFL experienced writers indeed compose differently in their native language and in the target language? The first question might find its answer in the developmental factor but needs further research. Mohan and Lo's (1985) study was probably among the first few to emphasize the importance of EFL/ESL writing instruction over the influence of rhetoric structures and conventions of EFL/ESL writers' native language. Theirs and the subsequent research findings (e.g. Kubota 1998, Sasaki 2000, Zhu 1997) show that EFL/ESL learners' language proficiency and received

writing instructions in the target language have greater effects on their English writing performance. With sufficient and proper trainings, EFL/ESL learners as well as the native English speaker (NES) writers can adopt efficient writing strategies and undergo the process of *knowledge-transforming* producing coherent written texts in accordance with the English writing conventions. However, the developmental factor might only be one of the complex factors involved in this phenomenon. In this study, the NNES writers' Chinese proficiency and writing ability are not taken into accounts. Thus, it is suggested future research involving NNES writers with different Chinese proficiency and writing ability should be included in order to further examine if other factors also contribute to the NNES writers' different performance when they write in their mother tongue and in the target language.

As for the second questions, this study can provide no valid answer and proposes that two possible factors are involved and need further investigation in the future studies. First, the EFL experienced writers in this study are considered as mature writers in English, but it is possible that they should be regarded as immature writers in Chinese. Since this study did not take the subjects' Chinese writing proficiency into accounts when the subjects were selected, it cannot be excluded that their language proficiency and writing ability of native language might indeed contribute to the EFL experienced writers' *knowledge-telling* performance in the Chinese writing task. Therefore, future research needs to be conducted concerning this phenomenon. Second, an NNES writer, in effect, composed in his native language differently from in the target language. If so, it is argued how an NNES writer write in his native language should be investigated. More importantly, the existing writing models, which are established on the data of NES writers, need to be examined for writers of different languages, probably, compose differently as they adopt different writing conventions.

4.2 The strategy use by the EFL experienced and inexperienced writers in both English and Chinese

One of the most noticeable findings of this study concerning the differences between the EFL experienced and inexperienced writers is that there exists consistency among the two groups of subjects in their strategy use when they perform the English writing task, lending further supports to the existing research studies by providing statistical results of the total amount of time the subjects spent on the cognitive and metacognitive strategies. First of all, the EFL experienced writers are indeed strategic writers while the EFL inexperienced writers less often employed the writing strategies effectively. As shown in Table 1, the EFL experienced writers, Subjects A, B, and C, spent 56.6%, 54.48%, and 72.31% of the total composing time on the strategies,

respectively; whereas the EFL inexperienced writers, Subjects D, E, and F, spent 35.33%, 44.26%, 45.15% of the total composing time on the strategies, respectively. Closer analysis of the above portions of strategy use time reveals that among the total time they spent on the strategies, Subjects A, B, and C spent 46%, 46%, and 13%, respectively, on the cognitive strategies, whereas Subjects D, E, and F spent much larger percentage of total strategy use time on the cognitive strategies, i.e., 60%, 80%, and 71%, respectively. The above findings, thus, lend further supports to the differences between EFL experienced and inexperienced writers as discussed and documented in the literature. That is, the experienced writers indeed perform a wide range of strategies effectively in accordance with the requirements of on-going cognitive writing process and actions. On the other hand, the inexperienced writers are, as discussed in the literature, less likely to monitor and regulate their writing processes and actions such as reviewing written text globally and making global revision.

And most importantly, the statistical results of this current study lend strong supports to the previous research findings on the characteristics of EFL experienced writers. It has been concluded that EFL experienced writers are more likely to make plans for the assigned writing task such as setting goals, making outlines, selecting and organizing ideas, etc. In addition, they globally review the written texts more and make more global revisions, and the reviewing and revision often initiate another cycle of planning, writing, and reviewing and revising. The statistical results of this study, thus, provide evidence for the above claims in that the three EFL experienced writers all spent more than 50% of the total composing time on the strategies and that more than 50% of the total strategy use time was spent on the metacognitive strategies[4]. The consistency of the amount of time spent on strategy use among the three EFL experienced writers, thus, lends strong supports to the assumptions and findings in the previous studies.

5. Conclusions, suggestions, and delimitations

This study investigates the cognitive and metacognitive strategies the EFL experienced and inexperienced writers employ when they compose both in Chinese and

[4] As shown in Table 1, Subject C actually employed the cognitive strategies and metacognitive strategies slightly differently from Subject A and Subject B. The total amount time Subjects A and B spent on the strategies are 56.6% and 54.48% of the total composing time, but 72.31 for Subject C. Moreover, Subject C spent much more time on the metacognitive strategies, 87% of total strategy use time, than Subjects A and B, 54% for both of them. The differences can be accounted for by categorizing Subject C as emergent writer; for the detailed discussions refer to Lee I. C. (2005).

English by asking them to write on the same topic in both languages. The purposes are firstly to compare how the NNES writers compose in both their native language and in the target language, and to provide further evidence to the differences between the EFL experienced and inexperienced writers reported in the prior research studies by calculating the amount of time they spend on the strategy use. The findings indicate that the NNES writers compose differently in their mother tongue and in Chinese. Concerning the subjects' strategy use in the English and Chinese writing tasks, both the EFL experienced and inexperienced writers spend larger proportions of total composing time on the cognitive and metacognitive strategies when they write in English than in Chinese. And what needs our attention and further research is the finding that the EFL experienced writers seem to undergo the process of *knowledge-transforming* when they write in English, but they are considered more like *knowledge-tellers* when they compose in their native language, Chinese. When writing in English, the EFL experienced writers spend more time on employing not only the cognitive strategies but also the metacognitive strategies, compared to the total amount of time spent on strategy use when they compose in Chinese. This result, thus, suggests that the EFL experienced writers are more like *knowledge-transformer* when they write in English since the metacognitive strategies usually initiate more and repetitive cycles of planning, writing, reviewing and revising, as depicted in the *knowledge-transforming* model.

In addition, by calculating the proportion of total writing time spent on strategy use, this study concludes that there exists consistency of the strategy use among the EFL experienced and inexperienced writers, and thus provides statistical evidence and supports to the previous research studies. Firstly, the experienced writers spent more time than the inexperienced writers on the strategies for planning, monitoring, and evaluating, as proposed in the previous studies that examined the differences of EFL experienced and inexperienced writers (e.g. Flower and Hayes 1981, Grabe and Kaplan 1996, Hayes 1996, Scardamalia and Bereiter 1987, Zamel 1983, etc.). Secondly, the strategy use in terms of the time spent is consistent among the experienced writers and among the inexperienced writers; the subjects in each group spend similar amount of time on the cognitive and metacognitive strategies.

There are a few delimitations of this study. Firstly, the number of subjects examined in this study is limited. Accordingly, the results of this qualitative study that analyzes the subjects' think-aloud protocols should not be over-generalized and must be applied carefully. Secondly, the NNES writers in this study are deemed as experienced and inexperienced writers with regard to their English proficiency and writing ability instead of Chinese proficiency and writing ability. As cautioned and discussed above, this criteria of selecting subject may be one contributing factor to the phenomenon that the EFL experienced writers composed more like *knowledge-teller* when they undertook

the Chinese writing task. In order to further explore the role an NNES writer's native language plays in his L2 writing learning and performance, more subjects with various Chinese as well as English proficiencies should be examined in future research. Thirdly, future study can further examine the transitions and interactions between the different strategies. The statistical results of this study can lend further supports to the previous L2 research concerning the different characteristics of EFL experienced and inexperienced writers. But future research can further compare the qualitative differences of the strategy use of the two groups by means of examining the sequential order of the strategies adopted, the strategies adopted to solve writing problems, etc. (cf. Lee I. C. 2005, Lee Y. H. 2005, Yang 2005). Finally, retrospective interview can be conducted in future study to further explore the factors determining the subjects' decision-making procedure regarding strategy use.

To conclude, investigating and comparing how the NNES writers compose in their native language and the target language, is considered of great significance, for they, unlike the NES writers, learn to write in the L2 after they have acquired the literacy skills in L1. Their mother tongue and the acquired L1 literacy skills are, consequently, believed to inevitably exert influence on their learning and performance in L2. By understanding how NNES writers compose in their native languages, ESL/EFL researchers and instructors can better assist their learners by providing appropriate writing curriculum to meet their needs given that the developmental factor appears to be important for an NNES writer to learn to write in the target language. Moreover, understanding the cognitive processes an NNES writer undergoes and the writing actions he performs in his native language as well as the target language, the researchers can then get further insights into how different peoples write in their own languages and how to become effective writers in different languages.

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Facilitating Chinese EFL Children's Vocabulary Acquisition and Reading Comprehension with Multimedia Annotations*

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Previous research has shown that multimedia annotations can facilitate L2 vocabulary acquisition. The vocabulary annotations being investigated include textual definition, still pictures, video clips, and auditory input. Based on Paivio's 1986 dual-coding theory, Mayer and Sims (1994) emphasized the interconnectedness of two distinct cognitive systems—visual and verbal. Although the two systems are independent, the interconnectedness of the two systems is the important determinant of conceptualization. Given that simultaneous verbal and visual input might facilitate the construction of referential connection, most previous studies have centered on exploring the effects of multimedia annotations on vocabulary learning of adult ESL/EFL learners (Bell & LeBlanc 2000, Chun & Plass 1996a, b, Jones 2004, Lomicka 1998, Yeh & Wang 2003). In contrast, this study aims to investigate the effects of three types of multimedia annotations: glossing, animations, and glossing plus animations on both vocabulary recognition and reading comprehension of four intact classes from an elementary school in central Taiwan. Subjects were given a pretest to establish the baseline of their vocabulary knowledge. Four different versions of a narrative story: no glossing, text glossing, Flash animations, and glossing plus Flash animations were implemented. Immediate and 2-week delayed posttests were administered to assess the efficacy of different modalities of multimedia annotations on vocabulary acquisition, reading comprehension and information retention. Posttests results showed that the version with glossing plus animations was the most effective. Implications and suggestions for further studies are also provided.

Key words: multimedia annotations, vocabulary acquisition, reading comprehension, dual-coding theory

1. Introduction

Many studies have been conducted to explore the effect of multimedia annotations on L2 vocabulary acquisition and/or reading comprehension, and positive effects have

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been found. Regarding subject population, most previous studies had focused on the effect of multimedia annotations on adult ESL/EFL learners instead of young learners (Aweiss 1994, Bell & LeBlanc 2000, Jones 2004, etc.). In addition, the subjects in most prior studies came from an alphabetical L1 language background. Learners from such a language background tend to rely more on audio channel to process language information. In contrast, Chinese EFL learners come from a logographic L1 language background. Huang and Hanley (1995), Kroonenberg (1995), Shih (1995), Chikamatsu (1996), and Chen (1999) found that Chinese EFL learners rely heavily on visual information to learn English vocabulary. Therefore, it remains to be shown whether young learners of English with a Chinese L1 background can benefit from glossing delivered through the computer. Furthermore, except for the studies conducted by Chun and Plass (1996a), Kost, Foss, and Lenzini (1999), and Jones (2004), most prior research had centered on exploring only the immediate effect of multimedia annotations instead of the delayed effect. This study thus aims to investigate both the immediate and delayed effectiveness of three types of multimedia annotations: glossing, Flash animations, and glossing plus Flash animations on vocabulary recognition and reading comprehension of EFL elementary school students in Taiwan. Two research questions will be answered:

1. Are multimedia annotations useful for second language vocabulary acquisition? If so, which type of multimedia annotation is more useful for Chinese EFL elementary school students' word recognition and retention?
2. Which type of multimedia annotation is more useful for Chinese EFL elementary school students' reading comprehension and retention?

2. Literature review

In this section, studies related to the theoretical foundations on benefits of dual channels of information processing will be discussed. Empirical findings of the effects of multimedia annotations on incidental vocabulary learning and reading comprehension will be reviewed. Recent studies concerning appropriate reading materials for children will also be presented. In the following sections, the findings for each area of studies will be presented.

2.1 Dual-coding theory

Paivio's (1986) dual-coding theory emphasized the interconnectedness of two distinct cognitive systems—visual and verbal. The verbal system contains word-like codes including visual, auditory, articulatory, and other modality-specific verbal codes.

In contrast, the nonverbal representations (the visual system) include modality-specific images for shapes, environmental sounds, actions, skeletal or visceral sensations related to emotion and other nonlinguistic objects and events. Based on the dual-coding theory, Mayer and Sims (1994) emphasized the interconnectedness of two distinct cognitive systems. Although the two systems are independent, the referential connection between them is the important determinant of conceptualization. Given that simultaneous verbal and visual input might enhance the construction of referential connection, most previous studies have focused on examining the effects of the combination of these two modes of multimedia annotations on vocabulary learning and/or reading comprehension of adult ESL/EFL learners (Bell, & LeBlanc 2000, Chun & Plass 1996a, Jones 2004, Kost, et al. 1999, Leutner & Plass 1998, Lomicka 1998, Yeh & Wang 2003). Chun and Plass (1996a), Leutner and Plass (1998), and Kost et al. (1999) also found that two modes of information result in better comprehension than only one.

On the other hand, mixed results have been found for different implementation of the combination of visual and verbal information. Chun and Plass (1996a) compared the effects of two types of two-modes presentations. Subjects of their study were 160 English speaking university students learning German as a second language. They were further categorized into 3 groups receiving text only, text plus pictures, and text plus video annotations, respectively. Better recall was found for the group receiving vocabulary annotation with pictures plus text than that with pictures plus video clips. Al-Seghayer (2001) conducted a similar study on a group of 30 ESL subjects of various L1 language backgrounds including Arabic, Japanese, Korean, Spanish, and Thai. According to the author, with TOEFL scores ranging from 450 to 500, these subjects had attained the intermediate level of general English proficiency. However, the results showed that the version with printed text definition and video clips produced significantly better results on both vocabulary recognition test and production test than the version implemented with printed text definition and still pictures. A possible factor affecting the results of the above studies might be the context or content relevancy of the visuals to the verbal (written) portion of the stimulus (Ginther 2002). A second potential explanation for the conflicting results might be that the language backgrounds and the language proficiency level of the participants of the two studies differ to some extent.

In Taiwan EFL context, Yeh and Wang (2003) compared the effects of three types of multimedia annotations for enhancing vocabulary acquisition: text only, text plus a static picture, and text plus a static picture and sound. The subjects participating in the study were 82 Chinese EFL university freshmen. It was found that the text plus a still picture version was the most effective for fostering L2 vocabulary acquisition. It seemed that these Chinese EFL learners were not able to make use of the authentic auditory input to aid comprehension while reading. Alternatively, it is possible that the

combinations of three modalities of multimedia annotations might have created an overload on information processing for these learners. Though the results of the afore-mentioned studies differed in terms of the image modalities or the numbers of annotation types, the findings consistently provided support for the dual-coding theory and the generative theory of multimedia learning (Mayer 1997, Paivio 1986). The interaction of textual source of information and graphic has led to a complementary effect which produces better comprehension and vocabulary learning outcome. However, it remains to be shown which type of visuals will produce the largest effect on vocabulary retention and facilitate reading comprehension.

2.2 Retention effects of multimedia annotations

Learning styles of learners have been shown to affect learning outcomes. Dunn, Dunn, and Price (1989) categorized secondary students in the United States into four sub-types of learners: auditory learners, visual learners, tactile learners, and kinesthetic learners. Among them, the auditory and visual learners comprised the majority at 70%, with only 30% for the other two types of learners. In another study, Wallace (1995) used the *Learning Style Inventory* developed by Dunn et al. (1989) to probe the learning styles of a group of 450 sixth and seventh graders in the Philippines. It was found that 8.4% of the students were classified as auditory learners, 41.4% as visual learners, 20.4% as tactile learners, and the remaining 29.8% as kinesthetic learners. Though the results of the two studies differ to a certain degree, both studies revealed that visual learners indeed comprised the majority of all learner types, and the researchers further suggested that students learn best when teaching method matches their learning styles.

Regarding effects of retention, prior research mostly used an immediate posttest to measure the effectiveness of multimedia annotations on language learners' vocabulary acquisition or post-reading comprehension. The empirical findings of Rusted and Coltheart (1979a) revealed that pictures can provide a major cue for retrieving the meaning of words and thus foster recall. In a follow-up study, Rusted and Coltheart (1979b) further pointed out that visual aids have the largest effects on delayed task recall.

In recent studies, Chun and Plass (1996a), Kost et al. (1999), and Jones (2004) explored not only the immediate effects, but also the delayed effects of multimedia annotations on adult ESL/EFL learners' vocabulary acquisition. Chun and Plass (1996a) found that in both the immediate and 2-week delayed vocabulary production test the picture plus text group performed significantly better than the text only group and the video plus text group. However, the video plus text group was found to perform best in the immediate vocabulary recognition test while the picture plus text group performed

the best in the 1-week delayed vocabulary recognition posttest. Chun and Plass (1996a) attributed the results to the dual-coding effect since the learning of a vocabulary item is best achieved when both verbal and visual information are presented (Mayer & Sims 1994, Paivio 1986). Kost et al. (1999) compared the effects of three types of gloss conditions: text only, picture only, and text plus picture on incidental vocabulary growth. The results revealed that in the picture recognition task, the text plus picture group outperformed the text only group on both the immediate and the 2-week delayed posttest. In contrast, in the word recognition task, subjects under textual gloss condition significantly outperformed subjects utilizing pictorial gloss in the immediate posttest. In the delayed task, the textual group still performed better than the pictorial group though the difference was not statistically significant. The finding indicated that there is some correspondence effect between the gloss condition and the test format. However, in both the immediate and delayed posttest, there were no significant differences among the three groups on the production task. This seems to indicate that there might be some interactions among task types (recognition task or production task), test formats, and glossing conditions.

Furthermore, in contrast to other studies using written texts, Jones (2004) examined the influence of multimedia annotations on vocabulary learning using an aural text. The results of the study showed that in both the immediate posttest and the 3-week delayed posttest on written vocabulary recognition task and the pictorial vocabulary recognition task, the subjects in the three treatment groups receiving written, pictorial, or both written plus pictorial annotations outperformed the control group receiving no annotations during listening. However, in the vocabulary production task, it was found that subjects performed best when the mode of testing matched the treatment. In other words, the pictorial plus written annotations group and the written annotations group both performed well in the written vocabulary test whereas the pictorial plus written annotations group and the pictorial annotations group performed the best in the pictorial vocabulary test. Results of Jones's study provided partial support for the benefit of dual channels of information processing. Nevertheless, the results also pointed to an opposite direction in that the pictorial mode of information did not increase the efficiency of vocabulary learning, thereby contradicting the findings in Kost et al.'s (1999) study. According to Jones (2004), this might be attributed to the fact that images may have provided too much information compared to the more precise information provided by direct translations. This explanation is similar to the claim by Sakar and Ercetin (2005) who studied the effects of textual and extratextual annotations on 44 intermediate-level Turkish EFL learners' reading comprehension. In this latter study, the textual annotations included three subtypes of glossing: text, audio, and graphics. In the extratextual annotations, video is added as a fourth type of glossing. The effects of overall annotation use indicated

that performance on the reading comprehension test degraded as annotation use increased. Regarding the effect of the particular type of annotations on reading comprehension, it was further found that audio annotation and video annotation in fact had a deleterious impact on comprehension possibly due to overload on a single channel of information processing. However, Chun and Plass (1997) suggested that a second explanation might be that language proficiency level of the participants in Sakar and Ercetin's (2005) study was inadequate to take advantage of the information given in the various annotations to facilitate reading comprehension.

However, results of previous studies must be interpreted with caution since some studies focused on investigating the effects of annotations on vocabulary learning (Al-Seghayer 2001, Jones 2004, Kost et al. 1999, Yeh & Wang 2003, Yoshii 2006) or reading comprehension alone (Aweiss 1994, Bell & LeBlanc 2000, Lomicka 1998, Omaggio 1979), while others centered on exploring their effects on both vocabulary acquisition and reading comprehension (Chen 2002, Chun & Plass 1996a, b, Leutner & Plass 1998). For instance, Chen (2002) compared the effects of L1 and L2 glosses on reading comprehension and vocabulary retention of Chinese EFL learners. The results showed that L2 glosses had the largest effect on reading comprehension while L1 glosses had the best effect on vocabulary retention. On the other hand, Yoshii (2006) centered on examining the effect of L1 versus L2 glosses on incidental vocabulary learning of 195 Japanese EFL college students on definition-supply task and vocabulary recognition task. Subjects were categorized into four subgroups receiving L1 text only gloss, L2 text only gloss, L1 plus picture, and L2 plus picture, respectively. In the definition-supply task, statistical results of the study did not reveal a significant difference between the two types of language glosses. Nevertheless, the groups receiving glosses with pictures were found to perform significantly better than those without pictures. Post hoc comparisons further showed that the L1 plus picture group outperformed the L2 text only group in the immediate posttest, whereas the L2 plus picture group had significantly higher scores than the L2 text only group in the 2-week delayed posttest. This indicated that L2 glosses had better effect on vocabulary retention than L1 glosses. In contrast, in the recognition task, statistical analyses did not reveal any significant difference between L1 and L2 glosses, or between with and without picture groups. However, differing from the other three groups, the L1 text-only group was found to have stable performance over time. The results indicated that there was a significant interaction effect between types of language glosses and types of tasks.

In addition, measurements on the effect of annotation types on vocabulary acquisition and reading comprehension were found to vary across studies. For example, Omaggio (1979) used a recall and a vocabulary recognition test to measure the effects of visuals on reading comprehension. Aweiss (1994) used only recall protocol for

reading comprehension assessment. In contrast, Chun and Plass (1996a) used a vocabulary recognition test, a vocabulary production test as well as a recall protocol to measure the effects of multimedia annotations on vocabulary acquisition and reading comprehension, while Yoshii (2006) utilized a vocabulary recognition test and a vocabulary production test to explore the interactive effects of multimedia glossing and language types on vocabulary retention. Finally, the language backgrounds and general language proficiency levels of the subjects should be taken into considerations when comparisons were to be made.

2.3 Narrative stories as appropriate reading material for children

Prior research has shown that children, especially younger and lower proficiency learners, were found to rely more on visual aids to process information than adults (Bornens 1990, Goldstein & Underwood 1981, Paris & Paris 2003, Rusted & Coltheart 1979a, b). Paris and Paris (2003) found that in the past 10 years, studies conducted in the United States mostly focused on exploring children's decoding instead of their reading comprehension skills. Based on the story grammar framework of Mandler and Johnson (1977), Paris and Paris (2003) further emphasized that reading story books with illustrations can provide a vocabulary referent and a context, and can stimulate students' reading interest, and thus facilitate reading comprehension. Since story books contain the 5 major narrative elements: characters, setting, initiating event, problem/ episodes, and solution, and the words and sentences used in narratives are in a form of language commonly found in everyday interactions with others and in educational and recreational media, Paris and Paris (2003) considered them authentic experiences in young children's daily lives, and thus recommended them as suitable reading materials for children. In an L1 context, numerous studies have revealed that storytelling, as well as reading stories, can help develop the language skills of children and can motivate active learning (Cooper 1989, King & Ippolito 2001, Koki 1998, Wilson 1997). On the other hand, Bishop and Edmundson (1987) claimed that preschool narrative performance appears to predict children's later language development as well as reading comprehension. Results of these studies suggested that narrative stories are appropriate reading material for children.

In an EFL context, scholars have also constantly emphasized the importance of integrating story-reading into elementary English curriculum (Chang 2002, Chien & Huang 2000, Chuang 1999). However, only a few empirical studies have been conducted to evaluate the effectiveness of storytelling instruction on children (Hsieh 2006, Liao 2002, Tsou 2003, Tsou, Wang, & Tzeng 2006). In one study, by integrating story books into a whole language classroom in an elementary school in central Taiwan, Liao (2002)

showed that after 13 months of English instruction, the 37 fifth graders were found to have made improvements in phonics skills, vocabulary ability, and story-reading ability. Furthermore, the class became more homogeneous in their overall English ability. In another study, Tsou (2003) compared teacher's and students' behaviors in a storytelling classroom versus those in a non-storytelling English classroom. The subjects in her study were 29 fifth graders respectively from two intact classes in Southern Taiwan. Analysis of teacher talk showed that the teacher in the storytelling classroom used more open questions, prompts and student volunteers than the same teacher in the non-storytelling classroom. In terms of the students, it was found that the experimental subjects' oral participation was enhanced through storytelling. Furthermore, a more positive classroom atmosphere was promoted by storytelling. In addition, Hsieh (2006) compared the effectiveness of storytelling instruction and traditional dialogue instruction on two intact classes of 65 fourth graders in Southern Taiwan. The comparison was based on six post-measures: listening comprehension, vocabulary matching, unscrambling the story, reading comprehension, filling in the blanks, and completing the dialogue. The results revealed that the storytelling group performed significantly better than the dialogue group on the first four measures. On another dimension, Tsou et al. (2006) developed a multimedia Storytelling Website to demonstrate the effectiveness of web-based technology in facilitating teacher's storytelling and children's story recall processes. Posttest results showed that the Storytelling Website group outperformed the regular storytelling group (the control group received the same teaching procedures as the experimental group but without additional support from the Storytelling Website) in story sentence complexity and post-instructional language proficiency test. Though the two groups did not differ significantly regarding story comprehension, the Storytelling Website group was found to produce more details in story recall. Furthermore, questionnaire results indicated that subjects in the Storytelling Website group tended to be more confident and enjoyed the story recalling process more than their control counterparts.

In summary, prior studies have shown that two modes of information integrating both verbal and visual presentation results in better comprehension than only one. A survey of previous studies on the effects of multimedia annotations on vocabulary acquisition and reading comprehension of second language learners has further shown that subject population of most studies were adult learners. With the exceptions of Aweiss's (1994) study on native speakers of English learning Arabic as a foreign language, Sakar and Ercetin's (2005) study on native speakers of Turkish learning English as a foreign language, and Chen's (2002) and Yeh and Wang's (2003) study on Chinese subjects learning English as a foreign language, the subject population of prior researches were mostly native speakers of English with an alphabetical language background learning another alphabetical second language such as French, German, and

Spanish. Furthermore, multimedia annotations are found to have different effects on L2 vocabulary learning and reading comprehension. In addition, most of the previous research only centered on investigating the immediate effects of multimedia annotations. On the other hand, narrative stories are shown to be effective reading material for facilitating the development of children's language skills. Therefore, further research is needed to examine the immediate as well as delayed effectiveness of CALL-based annotations of narrative stories on Chinese EFL elementary school students' vocabulary learning and reading comprehension.

3. Method

3.1 Subjects

Ninety-one 5th graders, 54 boys and 37 girls, from 4 intact classes in one elementary school in central Taiwan voluntarily participated in the study during their self-study periods (between 7:30 and 8:30a.m.). Officially these students started learning English in 3rd grade. They received 1 hour of English instruction per week in 3rd and 4th grade, and they began to receive 2 hours of English instruction per week in 5th grade. The average age of these subjects was 11 years and 5 months old, and their average starting age for English learning was 7 years and 10 month old. This indicates that some of the subjects began studying English at the private sector before receiving formal English education at school. The control group receiving no special treatment was composed of 23 subjects. The first experimental group receiving textual annotations included 20 students; the second experimental group receiving pictorial (Flash) annotations consisted of 24 subjects; whereas the third experimental group receiving both textual and pictorial annotations contained 24 students. Before the experiment, both the control group and the treatment groups completed a 20-item vocabulary recognition pretest to determine their prior knowledge of the target vocabulary used in this study. The twenty unfamiliar words were first chosen by the first author, then verified by the students' English teacher and later marginally glossed. These 20 words are content words, including concrete nouns, adjectives, and verbs. As shown in Table 1, all the subjects were found to have low prior knowledge of the vocabulary, with an average score of 7.65, 10.10, 8.08, and 10.08, respectively out of a maximum score of 20. The ANOVA test results on the homogeneity of the 4 groups were found to be non-significant, $F(3, 87)=2.60$, $p>.05$.

Table 1: Mean group scores and standard deviations on the vocabulary recognition pretest results

Groups	*n*	*M*	*SD*
Control	23	7.65	3.34
Textual annotations	20	10.10	4.83
Pictorial (Flash) annotations	24	8.08	3.05
Textual plus pictorial annotations	24	10.08	3.40

Note: Maximal score=20

3.2 Materials

The narrative story used as the reading text was *The Outing*, a 24-page story book written by Hunt and Lui (1998), and was illustrated by Brychta, A. It tells the story of a group of children who first went to the zoo for an outing. Because of the rain, one of the boys suggested the whole class go to the museum instead. The children finally had a good time in the museum. The reason for selecting this book as the reading material was that it has a clear story line with an obvious sequence of events and contains the five main elements of stories suggested by Paris and Paris (2003). This narrative story was judged by the first author and the students' English teacher to be interesting and of approximately suitable level of difficulty for the subjects in the present study. An additional criterion for selecting this reading passage was that the book is designed to provide multiple exposures of target words to facilitate incidental vocabulary learning. A text analysis conducted by the second author revealed that there were a total of 512 words and 151 different words in the story. This leads to a low type-token ratio of 30%, thereby indicating it should be easily understood by young readers. Vocabulary difficulty analysis (checking against Jeng's (2001) CEEC SAET word list used frequently in elementary and secondary school level in Taiwan) further showed that most of the vocabulary were high frequency words, with 85% of them being Level 1 vocabulary and 7% of them being Level 2 vocabulary. Analysis of the content words of the text revealed that 15 of the words occurred more than 5 times in the selected text. There are another 35 lexical items which appeared between 2 to 4 times in the text. This is in line with Nation's (1990) suggestion that a range from five to sixteen exposures may be needed for vocabulary acquisition. Two bilingual girls studying in a junior high school and a senior high school respectively were recruited to narrate the story. They were asked to dramatically enunciate the lines of the characters as distinctly as possible. Their narration lasted about 6.5 minutes; thus their reading speed was around 80 words per minute. In addition, the words were articulated clearly with enough pauses at phrase and sentence boundary.

Four different multimedia versions of the same narrative were implemented: a text only version, a textual glossing version, a pictorial version (Flash animation), and a textual plus pictorial version (Flash animation). All four versions of the text were provided with the oral narration.

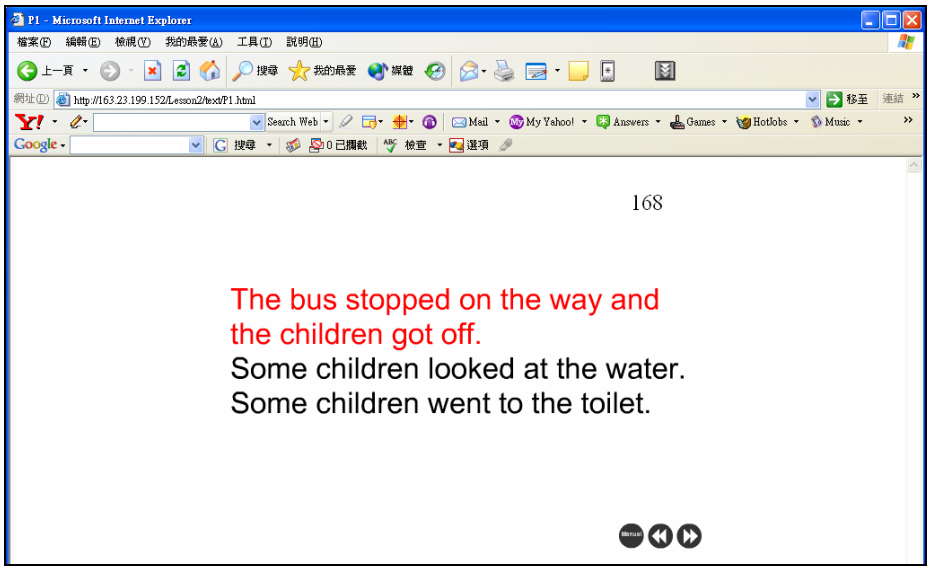

Figure 1: Screen shot of the no glossing version of the online narrative

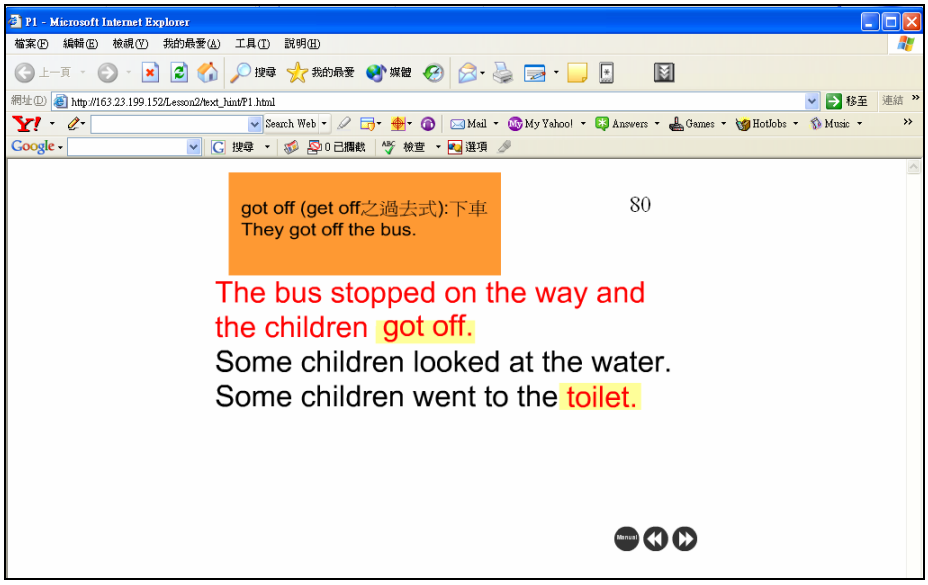

Figure 2: Screen shot of the textual glossing version of the online narrative

Figure 3: Screen shot of the pictorial glossing version of the online narrative

Figure 4: Screen shot of the textual plus pictorial glossing version of the online narrative

Figure 1 shows the screen shot of the no glossing version of the narrative. As shown in Figure 2, the textual glossing version provides learners with an equivalent Chinese translation as well as a sample English sentence containing the target vocabulary. The design is in line with the suggestion of Chapelle (1998) that L2 learners 'should

receive help in comprehending semantic and syntactic aspects of linguistic input' (Chapelle 1998:24). Furthermore, according to the two models of lexical and semantic presentations in bilingual learners' minds proposed by Potter, So, Eckardt, and Feldman (1984) that L2 learners relied more on word-to-word links in early stages of their language development, the study thus provides L1 glosses, instead of the L2 glosses for textual annotations. In contrast, the pictorial version shown in Figure 3 was implemented using the multimedia authoring program Macromedia Flash MX 2004. This type of annotation provides learners with animations which may directly or indirectly contain the target vocabulary (content visuals) and provides the context visuals (Ginther 2002). On the other hand, Figure 4 shows the screen shot of the textual plus pictorial version, including both the verbal information provided in the textual glossing version and the visual information provided in the pictorial (Flash) version. The four multimedia treatments were presented to the four groups of students respectively using a 40-station personal computer lab. The participants were asked to listen to the story content through headsets and view the reading text from their own computer screens. In addition, they were allowed to go back and forth the web pages according to their own pace. In a similar vein, this design follows the suggestion of Chapelle (2001) that learner characteristics should be taken into consideration. After completing the story reading, the subjects were given the immediate posttest without accessing the story web pages.

3.3 Instruments

The instruments administered to the subjects in the present study were a background questionnaire, a pretest, an immediate posttest, and a 2-week delayed posttest. The pretest is a 20-item multiple choice test of vocabulary recognition knowledge. The maximum score for this test was 20. In contrast, the immediate posttest contains a 6-item multiple choice test of reading comprehension in addition to the 20-item test of vocabulary recognition knowledge. The maximum score for the immediate posttest was 26. Items included in the delayed posttest are exactly the same as those in the immediate posttest.

3.4 Procedures

A pre/posttest control group design was used to observe the effects of multimedia annotations on 4 groups of elementary school students' L2 vocabulary learning and reading comprehension. All activities were completed in two self-study sessions. During the first self-study period, students were allowed 10 minutes to complete the written vocabulary recognition pretest to measure their initial knowledge of the 20 unfamiliar

words. Then each of the four groups was randomly assigned to read one of the 4 different versions of the story. All the students were given a maximum of 10 minutes to read the story while the three experimental groups were allowed to access the prescribed annotations respectively. After reading the story, the subjects were allowed up to 10 minutes to take the immediate posttest. Next, the subjects were given a questionnaire in order to understand their English learning experience. Two weeks later, without any additional experience with the reading text and without any prior notice, the subjects followed the same test procedure as the immediate posttest to take the delayed posttest during the second self-study period.

4. Results and discussion

In order to answer the first research question, in the first analysis, paired *t*-tests were used to compare the gain of each group between the immediate posttest and the pretest. It was found that the control group receiving no glossing annotations did not gain any improvement in the immediate vocabulary recognition posttest, $t=2.04$, $p>.05$. In contrast, all three experimental groups performed significantly better in the immediate vocabulary post measure. The results showed that the textual glossing group performed significantly better in the immediate vocabulary recognition posttest, $t=6.37$, $p<.001$; the pictorial annotations group also had significant performance, $t=2.95$, $p<.01$; while the textual plus pictorial annotations group made significant improvement, $t=8.33$, $p<.001$.

In the second analysis, the correct answers on the immediate posttest among the four groups were then compared. The descriptive statistics are presented in Table 2. The ANOVA test results for the immediate vocabulary recognition posttest were found to be significant, $F(3, 87)=25.80$, $p<.001$. Scheffe multiple group comparisons showed that the textual and textual plus pictorial annotations group alike outperformed the control group and the pictorial annotations group. However, the two latter groups did not differ significantly from each other. Similarly, there was no difference in the performance between the textual and the textual plus pictorial annotations group. This supports Jones' (2004) finding that textual glossing provides precise information through direct translation, and thus aids vocabulary learning.

Table 2: Mean group scores and standard deviations on the vocabulary recognition immediate posttest results

Groups	*n*	*M*	*SD*
Control	23	8.57	3.33
Textual annotations	20	15.95	4.17
Pictorial (Flash) annotations	24	9.71	4.27
Textual plus pictorial annotations	24	15.96	2.30

Note: Maximal score=20

In the third analysis, the correct answers on the 2-week delayed posttest among the four groups were compared. The descriptive statistics are presented in Table 3. Similar to the results of the immediate posttest on vocabulary recognition, a one-way ANOVA yielded a significant F-statistic for the delayed vocabulary recognition posttest, $F(3, 87) = 11.10$, $p < .001$.

Table 3: Mean group scores and standard deviations on the vocabulary recognition delayed posttest results

Groups	*n*	*M*	*SD*
Control	23	8.52	3.63
Textual annotations	20	13.65	4.60
Pictorial (Flash) annotations	24	10.33	4.05
Textual plus pictorial annotations	24	14.38	3.62

Note: Maximal score=20

Scheffe multiple group comparisons revealed that the textual and textual plus pictorial annotations group outperformed the control group. Similar to the results of the immediate vocabulary posttest, the performance of the pictorial annotations group and the control group did not differ significantly. Nevertheless, differing from the immediate posttest results, only the textual plus pictorial annotations group, but not the textual annotations group, was found to perform significantly better than the pictorial annotations group. Although the textual annotations group had higher scoring on the delayed vocabulary test, the textual glossing group did not outperform the pictorial annotations group ($t=3.32$, $p=.06$). Paired t-test results further indicated that the performance of the textual annotations group indeed degraded significantly on vocabulary recognition in the delayed posttest ($t=3.52$, $p<.005$). This provides partial support for the findings of Rusted and Coltheart (1979b) that visual aids, but not verbal aids, have the largest effects on delayed task recall. In contrast, the results strongly complied with the findings

of earlier studies on dual-coding theory in that the combination of two modes of information led to better comprehension than only one mode of information (Chun & Plass 1996a, Leutner & Plass 1998, Kost et al. 1999). Similar to the findings of the immediate posttest, there was no difference on the performance between the textual and the textual plus pictorial annotations group. This seemed to comply with the findings of Shohamy and Inbar (1991) that "local" information on factual details and the meaning of lexical items were easier to answer than "global" questions on main ideas and inferences. The results again support the finding of Jones (2004) that textual glossing provides precise information through direct translation and thus fosters vocabulary acquisition. Though the latter two groups performed equally well, paired *t*-test results showed that the performance of the textual plus pictorial annotations group also degraded significantly on vocabulary recognition in the delayed posttest (t=2.45, p<.05). Comparison of the results of the immediate posttest and the delayed posttest seemed to suggest that vocabulary annotations provided more "local" information on factual details and the meaning of lexical items, thus making it easier to correctly answer the test questions in the immediate posttest. However, the retention effects in the delayed task were not as clear as those found in the immediate posttest. A possible explanation is that too many textual annotations might create an overload on a single channel of information processing (e.g., Sakar & Ercetin 2005). According to Kost et al. (1999) and Jones (2003), a second possible explanation is that pictures demanded deeper processing than did L1 verbal translation, and therefore subjects receiving both textual and pictorial annotations demonstrated greatest incidental vocabulary retention.

In order to answer the second research question, in the fourth analysis, the correct immediate posttest answers for the reading comprehension among the four groups were computed. Mean group scores and standard deviations are presented in Table 4. The ANOVA test results for the reading comprehension immediate posttest were found to be significant, $F(3, 87)=4.53$, $p<.005$.

Table 4: Mean group scores and standard deviations on the reading comprehension immediate posttest results

Groups	*n*	*M*	*SD*
Control	23	2.17	1.40
Textual annotations	20	3.40	1.88
Pictorial (Flash) annotations	24	3.38	1.74
Textual plus pictorial annotations	24	3.92	1.67

Note: Maximal score=6

Scheffe multiple group comparisons showed that only the textual plus pictorial

annotations group significantly outperformed the control group. However, there were no significant differences among the other three groups. In comparing the results of the vocabulary test and the reading comprehension test, this seemed to support the findings of Shohamy and Inbar (1991) that "global" comprehension questions on main ideas and inferences were harder to answer than vocabulary tests related to "local" information on factual details and the meaning of lexical items. It also further complies with the findings of the dual-coding theory that two modes of information processing are more effective for enhancing L2 reading comprehension.

In the last analysis, the correct delayed posttest answers for the reading comprehension among the four groups were computed. Mean group scores and standard deviations are presented in Table 5. The ANOVA test results for the reading comprehension delayed posttest were found to be significant, $F(3, 87)=8.28$, $p<.001$.

Table 5: Mean group scores and standard deviations on the reading comprehension delayed posttest results

Groups	*n*	*M*	*SD*
Control	23	1.74	1.32
Textual annotations	20	2.80	1.70
Pictorial (Flash) annotations	24	3.42	1.67
Textual plus pictorial annotations	24	4.00	1.77

Note: Maximal score=6

Differing from the results of the immediate posttest, Scheffe multiple group comparisons revealed that both the pictorial group and the textual plus pictorial annotations group significantly outperformed the control group. However, there were no significant differences among the other groups. It was found that the performance of the control group and the textual glossing group degraded in the 2-week delayed posttest. In contrast, the performance of the pictorial group and the textual plus pictorial annotations group remained stable. The results further extend the finding of Kost et al. (1999) and Yoshii (2006) in that there are some interactions between test formats and glossing conditions. In other words, textual glossing and textual plus pictorial annotations are more effective for answering vocabulary recognition test whereas pictorial annotations and textual plus pictorial annotations are more effective for answering reading comprehension test. This seemed to indicate that visuals can facilitate children's understanding of the story and promote information retention. This further extends the finding of Kost et al. (1999) and Jones (2003) in that pictures demanded deeper processing than did L1 verbal translation and therefore subjects receiving both textual and pictorial annotations not only demonstrated greater incidental vocabulary learning but also exhibited deeper

reading comprehension than those receiving other types of annotations. The results are partially consistent with the findings of Rusted and Coltheart (1979b) in that visual aids have the largest effects on delayed task recall. Unlike the short retention effect found in the delayed posttest on vocabulary recognition, the retention effect of visuals on reading comprehension seemed to be stronger, as shown in the results of delayed posttest. Nevertheless, the combination of two modes of information processing was found to be better than just the single mode of information processing.

5. Conclusion and future studies

The results of the present study extend the finding of Jones (2004) in that textual annotations as well as textual plus pictorial annotations can facilitate L2 vocabulary acquisition since direct translation provides precise information for a particular vocabulary. Regarding reading comprehension, it was found that only the textual plus pictorial annotations group outperformed the control group in the immediate posttest. In contrast, both the pictorial annotations group and the textual plus pictorial annotations group performed significantly better than the other control group in the delayed task. This further extends the finding of Kost et al. (1999) and Jones (2003) in that pictures demanded deeper processing than did L1 verbal translation and therefore subjects receiving pictorial annotations and textual plus pictorial annotations demonstrated better performance in delayed tasks requiring global understanding of the text than those receiving other types of annotations. On both vocabulary recognition and reading comprehension task, the textual plus pictorial annotations group was found to perform the best among the four groups. The results also provide strong support for the dual-coding theory (Paivio 1986) which proposed that the combination of verbal and visual information is most effective for enhancing L2 development. In future studies, the efficacy of multimedia annotations on Chinese EFL young learners' productive vocabulary knowledge should be investigated. Likewise, other test formats such as pictorial testing should also be examined (Jones 2004, Kost et al. 1999). Further comparative studies on the effectiveness between L1 and L2 glosses on vocabulary acquisition and reading comprehension of EFL children should be conducted (Chen 2002, Yoshii 2006). Last but not least, the performance of Chinese EFL children with different language proficiency levels should be explored.

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Dharmagupta's Translation of the Diamond Sutra (Vajracchedikā Prajñāpāramitā-sūtra)*

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The Diamond Sutra (*Vajracchedikā-prajñāpāṛamitā-sūtra*) is one of the most popular and important Buddhist scriptures which has been translated by six different translators. Among them, Dharmagupta's translation of the Diamond Sutra is a word-for-word literal translation, without paying attention to the Chinese morphology and sytax. Zacchetti (1996) called Dharmagupta's translation "unfinished". In this paper we have discussed the various rendition techniques used specifically by Dharmgupta to demonstrate that his translation of the Diamond Sutra is a superliteral translation with every single word of the Sanskrit text translated into Chinese. Sanskrit is a highly inflected language while Chinese is an analytic language in that each word consists of a single morpheme. Dharmagupta translated the Sanskrit suffixes using Chinese characters as if they were suffixes. In Section 2, three kinds of nominal inflections are illustrated: the masculine/feminine singular accusative suffix -*am* is translated using the Chinese character 邊 /*pen*/ 'border, boundary'; the dative plural suffix -*bhyas* is translated by the Chinese character 等 /*tong*/ 'a plural indicator; grade, rank'; and the locative suffixes are translated by the Chinese character 中 /*trjuwng*/ 'in; center, middle'. In Section 3, four different verbal inflections are shown: the first person singular present suffix -*mi* is translated as 我 /*nga*/ 'I, me'; the gerund (or absolutive) suffixes -*ya* and -*tvā* are translated as 已 /*yi*/ 'stop, cease, end; already'; the gerundive suffix -*tavya* is translated as 應 /*ʔing*/ 'should, ought to'; and the simple future suffixes -*sya* and -*iṣya* are translated as 當 /*tang*/ 'ought to, should, must'. The suffixes are translated into separate Chinese characters which, unlike Sanskrit suffixes, are independent morphemes. That is why many readers can not comprehend Dharmagupta's translation of the Diamond Sutra, and why some scholars even punctuate their translations into wrong phrases.

Key words: Diamond Sutra, Dharmagupta, literal translation, Sanskrit nominal inflections, Sanskrit verbal inflections

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1. Introduction

The Diamond Sutra (*Vajracchedikā-prajñāpāɾamitā-sūtra*), "The Perfection of Wisdom Sutra that Cuts like a Thunderbolt", has maintained a high degree of popularity in the Mahāyāna Buddhist tradition for over a millennium. It teaches the practice of the avoidance of abiding in extremes of mental attachment. It is one of the most important holy books of Buddhism and is the oldest known dated, printed book in the world, printed in the 9th year of Xiantong Era of the Tang Dynasty (唐咸通九年), i.e. 868 C.E. The Diamond Sutra has been translated by six different translators: Kumārajīva 鳩摩羅什 (344-413 C.E.), Bodhiruci 菩提流支 (508-534 C.E.), Paramārtha 真諦 (499-569 C.E.), Dharmagupta 達摩笈多 (590-619 C.E.), Xuan-Zang 玄奘 (602-664 C.E.) and Yi-Jing 義淨 (635-713 C.E.), respectively.

Among them, Dharmagupta's translation of the Diamond Sutra is a word-for-word literal translation, without paying attention to the Chinese word or sentence structures. Zacchetti (1996) called Dharmagupta's translation "unfinished". In the following sections the author will show how Dharmagupta translated some grammatical suffixes into Chinese. In Section 2, three kinds of noun declensions will be discussed, namely accusatives, dative plurals, and locatives. In Section 3, verb conjugations will be explored to demonstrate Dharmagupta's literal translation of the verbal suffixes, including the first person singular present suffix, gerunds, gerundives, and simple future suffixes. Finally, a summary will be given in Section 4.

2. Noun declension

Sanskrit is a highly inflected language with three genders (masculine, feminine, neuter) and three numbers (singular, dual, plural). It has eight cases: nominative (N.), accusative (Ac.), instrumental (I.), dative (D.), ablative (Ab.), genitive (G.), locative (L.) and vocative (V.). The different case endings are shown in (1):

(1) Case-endings added to the noun stems:

	singular		dual.		plural	
	m/f.	n.	m./f.	n.	m./f.	n.
Nominative	s	—[1]	au	ī	as	i
Vocative	—	—	au	ī	as	i

[1] The nominative, vocative, accusative singular neuter has the bare stem excepting the words in -a, which add -m.

Accusative	am	—	au	ī	as	i
Instrumental	ā		bhyām		bhis	
Dative	e		bhyām		bhyas	
Ablative	as		bhyām		bhyas	
Genitive	as		os		ām	
Locative	i		os		su	

Sanskrit has a very complex case ending system while Chinese uses no suffixes to mark the different cases. Most of the above translators simply ignored the case endings, and readjusted them to the Chinese syntax. However, Dharmagupta translated the noun declension with a suffix-like segment into Chinese. In section 2.1, we will see that the Sanskrit accusative singular suffix -(*a*)*m* is translated into Chinese as 邊 /*pen*/[2] 'border, boundary'; in section 2.2 the Sanskrit dative plural suffix -*bhyas* is translated into Chinese as 等 /*tong*/ 'a plural indicator; grade, rank'; and in section 2.3 the Sanskrit locative suffixes are translated into Chinese as 中 /*trjuwng*/ 'center, middle'.

2.1 Accusative singular as 邊 /*pen*/

Throughout the Diamond Sutra, Dharmagupta systematically translated the Sanskrit accusative singulars (no matter what gender the noun was) as the Chinese 邊 /*pen*/ 'border, boundary'. The other five translators simply translated or transliterated the names without adding any suffixes to the accusative nouns. The Diamond Sutra is arranged as a dialogue between the Buddha and Subhūti, one of the senior monks. In (2a) *Bhagavant* 'the Lord; the world-honored one' is the subject of the sentence, and *Subhūti*, the object. Xuan-Zang simply translated the object *Subhūti* into 善現 /*dzyen hen*/, the translation of the meaning of the name *Subhūti*, without any object marker. However, Dharmagupta translated the accusative singular suffix -(*a*)*m* as 邊 /*pen*/ 'border, boundary'. Thus, the accusative *Subhūti**m*** is translated as 善實**邊** /*dzyen zyit **pen***/ with the object marker 邊 /*pen*/. It is not clear though why the Chinese character 邊 /*pen*/ was chosen by Dharmagupta. Likewise, in (2b) the subject is *Subhūti*, and the object is *Bhagavant* 'the Lord, the world-honored one'. Again Dharmagupta added the object marker 邊 /*pen*/ to the object, and translated the accusative *Bhagavanta**m*** 'the Lord' as 世尊**邊** /*syej tswon **pen***/.

[2] Throughout the paper, the Middle Chinese transcriptions are taken from William H. Baxter, "An Etymological Dictionary of Common Chinese Characters" (Manuscript, 2000).

(2) a. Bhagavān āyuṣmantaṃ **Subhūtim** etad avocat.[3]
the world-honored one (N.) venerable (Ac.) Subhūti (Ac.) this said
'The Lord said this to the Venerable Subhūti.'

Xuan-Zang's translation: 世尊告具壽**善現**曰。
Dharmagupta's translation: 世尊命者**善實邊**如是言。

b. āyuṣman Subhūtir **Bhagavantam** etad avocat.
venerable (N.) Subhūti (N.) the world-honored one (Ac.) this said
'Subhūti said this to the Lord.'

Xuan-Zang's translation: 具壽善現復白**佛**言。
Dharmagupta's translation: 命者善實**世尊邊**如是言。

In (3a) the accusative *Subhūtim* occurs seven times in various chapters and in (3b) the accusative *Bhagavatam*, nine times. In (3c) we find that the accusative *samyaksaṃbodhim* 'perfect universal enlightenment, knowledge, or understanding; omniscience' appears three times in Chapter 17; all of them were translated with the object marker 邊 /*pen*/.

(3)

No.	Sanskrit	Dharmagupta's Translation	Chapter (frequency of occurrence)	Grammar
a.	Subhūtim	善實邊 /dzyen zyit pen/	2(1), 5(1), 7(1), 13(1), 14(1)	m. sg. Ac.
b.	Bhagavatam	世尊邊 /syej tswon pen/	1(2), 2(1), 6(1), 13(1), 14(1), 17(2), 21(1), 26(1)	m. sg. Ac.
c.	samyaksaṃbodhim	正遍知邊 /tsyeng pen trje pen/	17(3)	f. sg. Ac.

There is also one word with the object marker 邊 /*pen*/ found in Dharmagupta's translation which is not an accusative noun, but an ablative noun, as shown in (4).

(4)
evaṃ Bhagavann ity āyuṣmān Subhūtir **Bhagavataḥ**[4] pratyaśrauṣīt.
in this way, so the world-honored one (V.) thus venerable (N.) Subhūti (N.) the world-honored one (Ab.) delighted to listen
"So be it, O Lord", replied the Venerable Subhūti, delighted to listen to the Lord.

[3] All the Sanskrit texts are taken from Conze (1974).
[4] The original form is *Bhagavatas* (m. sg. Ab.) which undergoes a sandhi rule, changing *s* to a *visarga ḥ*.

Due to Dharmargupta's bizarre use of the object marker 邊 /*pen*/, Lin (1995) has divided the sentence incorrectly. Lin (1995) simply divided the Chinese term 世尊邊 /*syej tswon pen*/ into 世尊 /*syej tswon*/ and 邊 /*pen*/, as shown in (5).

(5) evaṃ Bhagavann ity āyuṣmān Subhūtir **Bhagavataḥ** pratyaśrauṣīt.
「如是，世尊！」命者善實：「**世尊**！**邊**願欲聞。」(Lin 1995:383)

As a result, we can find that if one is unfamiliar with Dharmagupta's unique translation technique, one cannot read his translation correctly. That is why Lin (1995) punctuated many sentences inappropriately. However, he is not the only one who had difficulty with Dharmagupta's translation.

2.2 Dative plural as 等 /*tong*/

It is found that in Dharmagupta's translation, the dative plural nouns are translated with the Chinese character 等 /*tong*/ 'a plural indicator; grade, rank'. In Dharmagupta's eyes, the Sanskrit dative plural suffix -*bhyas* seems to be equivalent to the Chinese 等 /*tong*/. Examples are shown in (6):

(6)

No.	Sanskrit	Dharmagupta's Translation	Chapter (frequency of occurrence)	Grammar
a.	Tathāgate**bhyas**	如來**等** /nyo loj tong/	8(2), 11(2), 32(1)	m. pl. D.
b.	arhad**bhyas**	應**等** /ʔing tong/	8(2), 11(2), 24(1), 32(1)	m. pl. D.
c.	sambuddhe**bhyas**	正遍知**等** /tsyeng pen trje tong/	8(2), 11(2), 32(1)	ppp. m. pl. D.
d.	pare**bhyas**	爲他**等** /hjwe tha tong/	8(1), 11(1), 12(2), 13(1), 14(1), 15(2), 16(2), 24(1), 32(1)	m. pl. D.
e.	pare**bhyas**	他**等** /tha tong/	14(1)	m. pl. D.

The Sanskrit terms in examples (6d) and (6e) are actually the same; however, the Chinese translations are a bit different. In (6d) it is translated as 爲他**等** /*hjwe tha tong*/ 'for them + 等 /*tong*/', and in (6e), as 他**等** /*tha tong*/ 'them'. In fact, the Chinese word 爲 /*hjwe*/ 'for' is more like a preposition like the English preposition *for* and has already demonstrated the function of the dative voice. Thus, in (6d) the word 等 /*tong*/ denotes mostly the plural meaning, not the function of a dative voice. In fact, *parebhyas* 'for others' was translated twelve times as 爲他等 /*hjwe tha tong*/ and only one time as 他等 /*tha tong*/. One might argue that maybe 等 /*tong*/ only denotes the function of

plural, not the function of a dative case. However, the author find that the plurals in other cases are not translated with 等 /*tong*/. As we can see examples (7a-c) are nominative plurals (including masculine, feminine and neuter plural nouns); examples (7d-f) are accusative plurals; examples (7g-i) are instrumental plurals; examples (7j-l) are genitive plurals, and examples (7m-n) are locative plurals.[5]

(7)

No.	Sanskrit	Dharmagupta's Translation		Chapter (frequency of occurrence)	Grammar
a.	sattvas	眾生	/tsyuwng/	3(1), 6(2), 14(4)	m. pl. N.
b.	valukas	沙	/sræ/	11(4)	f. pl. N.
c.	laksanani	相	/sjang/	12(2)	n. pl. N.
d.	sattvan	眾生	/tsyuwng/	3(1)	m. pl. Ac.
e.	dharman	法	/pjop/	9(1)	m. pl. Ac.
f.	rupani	色	/srik/	14(1)	n. pl. Ac.
g.	trayodaśabhis	三十	/sam dzyip/	1(1)	num. m. pl. I.
h.	śirobhis	頂	/teng/	1(1)	n. pl. I.
i.	ājānadbhis	解	/kɛɨ/	6(1)	ppr. P. m. pl. I.
j.	bodhisattvānām	菩薩	/bu sat/	6(3), 14(1)	m. pl. G.
k.	viharinam	行	/hæng/	9(1)	m. pl. G.
l.	sattvanam	眾生	/tsyuwng/	14(1)	m. pl. G.
m.	dikṣu	方	/pjang/	4(1)	f. pl. L.
n.	vidikṣu	順不正方	/zywin pjuw tsyeng pjang/	4(1)	f. pl. L.

However, it is also found that the Sanskrit genitive plural *teṣām* was translated nine times as 彼等 /*pje tong*/ as show in (8a).

(8)

No.	Sanskrit	Dharmagupta's Translation		Chapter (frequency of occurrence)	Grammar
a.	teṣām	彼等	/pje tong/	6(6), 14(1), 16(1), 18(1)	m. pl. G.

The reason why the third person plural genitive pronoun *teṣām* was translated as 彼等 /*pje tong*/ might be that the Chinese 彼等 /*pje tong*/ was also used in Middle Chinese and even Modern Mandarin. The Chinese character 彼 /*pje*/ means 'that, those, the other, another' and 彼等 /*pje tong*/ means 'they'.[6] The singular demonstrative pronoun has a very complicated declension as the table given in (9):

[5] The locatives will be further discussed in Section 2.3.

[6] In Chinese 我等 /*nga tong*/ means 'we', and 他等 /*tha tong*/ means 'they'.

(9)

	s.			du.			pl.		
	m.	n.	f.	m.	n.	f.	m.	n.	f.
N.	sas	tat	sā	tau	te	te	te	tāni	tās
Ac.	tam	tat	tām	tau	te	te	tān	tāni	tās
I.	tena		tayā	tābhyām			tais		tābhis
D.	tasmai		tasyai	tābhyām			tebhyas		tābhyas
Ab.	tasmāt		tasyās	tābhyām			tebhyas		tābhyas
G.	tasya		tasyās	tayos			teṣām		tāsām
L.	tasmin		tasyām	tayos			teṣu		tāsu

Almost all of the declensions of the demonstrative pronouns found in Dharmagupta's translation were translated with the word 彼 /*pje*/ as examples shown in (10).

(10)

No.	Sanskrit	Dharmagupta's Translation	Chapter (frequency of occurrence)	Grammar
a.	so (sas)[7]	彼 /pje/	7(1), 14(1)	m. sg. N.
b.	sa (sas)[8]	彼 /pje/	5(1), 6(2), 7(1), 8(3), 9(2), 10(1), 12(1)	m. sg. N.
c.	sā	(a) 若 /nyak/ (b) 彼 /pje/	5(1) 11(1), 13(1), 14(2)	f. sg. N.
d.	tat	彼 /pje/	2(1), 3(2), 4(2), 5(2), 6(3), 7(3), 8(5), 9(10), 10(4), 11(2), 13(8), 22(1), 30(2), 31(3)	n. sg. N.
e.	tām	彼 /pje/	14(1)	f. sg. Ac.
f.	tena	(a) 彼 /pje/ (b) 彼故 /pje ku/	2(1) 10(1), 13(4), 14(1)	m. sg. I.
g.	tasmāt	彼故 /pje ku/	6(1), 10(1), 14(3)	m. sg. Ab.
h.	tasya	彼所 /pje srjo/	4(2), 9(1), 14(1)	m. sg. G.
i.	tasmin	彼中 /pje trjuwng/	14(3)	m. sg. L.
j.	tasyām	彼所 /pje srjo/	2(1)	f. sg. L.
k.	te	彼 /pje/	3(1), 6(5), 8(1), 10(1), 12(1), 14(9)	m. pl. N.

[7] The word in parenthesis is the root form. A sandhi rule states, "Final अस् *as*, before any sonant consonant and before short अ *a*, is changed to ओ *o*—and the अ *a* after it is lost." (Whitney 1993, §175a).

[8] The original form *sas* becomes *sa* undergoing a sandhi rule which says, "The nominative masculine pronouns **sas** and **eṣas** and (Vedic) **syas** lose their **s** before any consonant." (Whitney 1993, §176a).

No.	Sanskrit	Dharmagupta's Translation	Chapter (frequency of occurrence)	Grammar
l.	tā (tās)[9]	彼 /pje/	11(2)	f. pl. N.
m.	tāni	所有 /srjo hjuw/	13(1)	n. pl. N.
n.	tān	所有 /srjo hjuw/	13(1)	m. pl. Ac.
o.	tāsu	彼中 /pie trjuwng/	11(3)	f. pl. L.

Examples (10a-j) are singular demonstrative pronouns, and examples (10k-o) are plurals. However, even the plurals are not translated with 等 /*tong*/. Only the masculine genitive plural *teṣām* are translated with 等 /*tong*/. Therefore, one can conclude that the Chinese character 等 /*tong*/ is used to translate the Sanskrit dative plurals in Dharmagupta's work, and the reason why the third person plural genitive pronoun *teṣām* was translated as 彼等 /*pje tong*/ is that the terms like 彼等 /*pje tong*/ 'they', 我等 /*nga tong*/ 'we' and 他等 /*tha tong*/ 'they' are frequently used in Chinese.

2.3 Locatives as 中 /*trjuwng*/

Almost all the locatives in the Diamond Sutra are translated with the Chinese character 中 /*trjuwng*/ 'in; center, middle' by Dharmagupta. Examples are given in (11).

(11)

No.	Sanskrit	Dharmagupta's Translation	Chapter (frequency of occurrence)	Grammar
a.	ārāme	與園中 /yo hjwon trjuwng/	1(1)	m. sg. L.
b.	kāle	時中 /dzyi trjuwng/	6(1)	m. sg. L.
c.	vipralope	破壞時中 /pha hwɛj dzyi trjuwng/	6(2), 16(1), 21(1)	m. sg. L.
d.	jetavane	勝林中 /sying lim trjuwng/	1(1)	n. sg. L.
e.	āsane	座中 /dzwa trjuwng/	1(1)	n. sg. L.
f.	sūtre	經中 /keng trjuwng/	14(2)	n. sg. L.
g.	padeṣu	經句中 /keng kju trjuwng/	6(1)	m. pl. L.
h.	rūpeṣu	色類中 /srik lwij trjuwng/	6(1)	m. pl. L.
i.	lokadhātuṣu	世界中 /syej kɛj trjuwng/	18(1)	m. pl. L.
j.	dharmeṣu	法中 /pjop trjuwng/	4(1), 16(1), 28(1)	m. pl. L.
k.	nadīṣu	河中 /ha trjuwng/	11(1)	f. pl. L.
l.	yasmin	此中 /tshje trjuwng/	12(1)	m. sg. L.
m.	tasmin	此中 /tshje trjuwng/	12(1), 14(4)	m. sg. L.
n.	tatra	彼中 /pje trjuwng/	14(2), 17(1), 22(1)	n. sg. L.
o.	teṣu	彼中 /pje trjuwng/	18(1)	m. pl. L.

[9] A sandhi rule says: "Final आस् **ās** before any sonant, whether vowel or consonant, loses its स् **s**, becoming simple आ **ā**." (Whitney 1993, §177).

p.	tāsu	彼中	/pje trjuwng/	11(3)	f. pl. L.
q.	bhāṣyamāṇeṣu	說中	/sywej trjuwng/	6(3)	pass. ppr. A. m. pl. L.
r.	bhāṣyamāṇe	說中	/sywej trjuwng/	14(2)	pass. ppr. A. m. sg. L.
s.	vartamāne	轉時中	/trjwen dzyi trjuwng/	6(3), 16(1), 21(1)	ppr. A. m. sg. L.
t.	anutpattikeṣu	無生中	/mju sræng trjuwng/	28(1)	adj. m. pl. L.

Examples (11a-f) are locative singular nouns and examples (11g-k) are locative plural nouns. Examples (11 l-p) are demonstrative pronouns in locative case; examples (11q-s) are present participle used as locative nouns. The final example (11t) is an adjective in locative case. Almost all the locatives are translated with 中 /*trjuwng*/ which is sometimes quite awkward. Compare the following two paragraphs which were translated by Dharmagupta and Xuan-Zang.

(12) evam ukte āyuṣmān Subhūtir Bhagavantam etad avocat: asti Bhagavan kecit sattvā bhaviṣyanty anāgate 'dhvani paścime kāle paścime samaye paścimāyāṃ pañca-śatyāṃ saddharma-vipralopa-**kāle vartamāne**, ya **imeṣv** evaṃrūpeṣu sūtrānta-padeṣu **bhāṣyamāṇeṣu** bhūta-saṃjñām utpādayiṣyanti?

Subhuti asked: "Will there be any beings in the future period, in the last time, in the last epoch, in the last 500 years, at the time of the collapse of the good doctrine, who, when these words of the Sutra are being taught, will produce a true perception?" (Conze 1974:68)

Dharmagupta's translation:

命者善實世尊邊如是言：「雖然，世尊！頗有眾生，當有未來世，後時，後長時，後分五十，正法破壞**時中**，**轉時中**，若**此中**，如是色類**經中說中**，實想發生當有？」

Xuan-Zang's translation:

說是語已，具壽善現復白佛言：「世尊！頗有有情於當來世，後時、後分、後五百歲，正法將滅時分轉時，聞說如是色經典句，生實想不？」

In Dharmagupta's translation, he used five 中 /*trjuwng*/ to translate the Sanskrit locatives while Xuan-Zang did not use a single 中 /*trjuwng*/. However, it is quite evident that Xuan-Zang's translation is better than Dharmagupta's which strictly followed Sanskrit word structure and word order with no attention paid to the Chinese morphology.

3. Verb conjugation

Conjugation, or verbal inflection, in Sanskrit is very complicated as it involves the distinctions of voice, tense, mode, number and person. There are three voices: active, middle and passive; four modes: indicative, optative, imperative and subjunctive; and four tense system: the present-system (present, imperfect, imperative, optative), the perfect-system, the aroist-system and the future-systems (s-future and periphrastic future). They are distinguished by a difference in the personal endings.

3.1 The first person singular present suffix *-mi* as 我 */nga/*

In (13), the various conjugational endings for the first, second and third persons with active and middle voices along with singular, dual and plural numbers are shown. The active voice in Sanskrit is called *parasmāi padam* 'a word for another' 爲他 *Weita* (abbreviated as P.) while the middle voice is *ātmane padam* 'a word for one's self' 爲己 *Weiji* (abbreviated as A.).

(13)

Present Tense	Active			Middle		
	Singular	Dual	Plural	Singular	Dual	Plural
First Person	-mi	-vas	-mas	-e	-vahe	-mahe
Second Person	-si	-thas	-tha	-se	-ethe	-dhve
Third Person	-ti	-tas	-anti	-te	-ete	-ante

The first person singular active suffix is *-mi*, the second person singular active suffix is *-si*, and the third person singular active suffix is *-ti* (like English *-s*). Thus, in Sanskrit 'I understand' is '*ājānā**mi***'; 'you understand' is '*ājānā**si***'; 'he understands' is '*ājānā**ti***'. There is no need for the pronouns to be spelled out in the sentences, since the suffixes will carry the grammatical meanings of person, number and voice. The other five translators simply translated a verb with a suffix into a subject + verb construction; however, Dharmagupta translated the verb into a verb + subject construction which is not a typical Chinese sentence structure since Chinese is a SVO language. For example, in (14a) we find that Xuan-Zang did not translate the first person singular active suffix *-mi* into 我 */nga/* 'I, me' after the verb; instead he translated it into 吾 */ngu/* (another Chinese character meaning 'I'), and placed it in the subject position in the sentence. Likewise, in (14b) Xuan-Zang also translated the suffix *-mi* as the subject 我 */nga/* 'I'. However, in both (14a) and (14b) Dharmagupta followed the Sanskrit word formation and translated the Sanskrit V + suffix construction into Chinese without considering the typical Chinese sentence structure.

(14) a. **ārocayāmi** te Subhūte **prativedayāmi** te. (Chapter 11)
I announce you (D.) Subhūti (V.) I make known you (D.)
"This is what I announce to you, Subhūti, this is what I make known to you."

Xuan-Zang's translation: 吾今告汝，開覺於汝。
Dharmagupta's translation: 欲我汝，善實！知我汝。

b. katham ca enam **dhārayāmi**? (Chapter 13)
how and it I bear
"And how should I bear it in mind?"

Xuan-Zang's translation: 我當云何奉持？
Dharmagupta's translation: 云何及如此持我？

In (15) more examples of such constructions are shown to demonstrate that Dharmagupta did exactly follow the Sanskrit word formation without taking Chinese syntax into account. In (15a-g) Dharmagupta translated the first person singular active suffix *-mi* as 我 /*nga*/ 'I, me' and attached it right after the verbs; in (15h) he translated the first person singular middle suffix *-e* also as 我 /*nga*/ 'I, me'.

(15)

No.	Sanskrit	Dharmagupta's Translation	Chapter (frequency of occurrence)	Grammar
a.	ājānāmi	解我 /kɛɨ nga/	7(1)	pres. 1 sg. P.
b.	niṣpādayiṣyāmi	成就我 /dzyeng kzjuw nga/	10(1)	caus. fut. 1 sg. P.
c.	ārocayāmi	欲我 /yowk nga/	11(1)	caus. pres. 1 sg. P.
d.	prativedayāmi	知我 /trje nga/	11(1)	caus. pres. 1 sg. P.
e.	dhārayāmi	持我 /dri nga/	13(1)	caus. 1 sg. P.
f.	avakalpayāmi	信我 /sin nga/	14(1)	caus. pres. 1 sg. P.
g.	abhijānāmi	念知我 /nem trje nga/	14(1), 16(1)	pres. 1 sg. P.
h.	adhimucye	解我 /kɛɨ nga/	14(1)	pres. 1 sg. A.

Due to Dharmagupta's unique but awkward translation techniques, some modern interpreters can not understand Dharmagupta's translation, and thus mispunctuate some of the texts in the Diamond Sutra. For example, Lin (1995) added punctuation between the phrases in Dharmagupta's translation. In (16a) Lin (1995) put a common between 解 /*kɛɨ*/ 'understand' and 我 /*nga*/ 'I, me'. In fact, Dharmagupta used 解我 /*kɛɨ nga*/ to translate Sanskrit *ājānāmi* 'I understand'. In (16b) Lin also puts a period and a closed quotation mark between 成就 /*dzyeng dzjuw*/ 'achieve, create' and 我 /*nga*/ 'I, me'. There should not be any punctuation inbetween, and it should remain a whole term 成

就我 /*dzyeng dzjuw nga*/.

(16) a. 如我，世尊！世尊說義**解**，**我**無有一法，若如來無上正遍知證覺，無有一法若如來說。(Lin 1995:409)
b. 世尊言：「若有，善實！菩薩、摩訶薩如是語：『我國土莊嚴**成就**。』**我**者彼不如語。」(Lin 1995:433)

Moreover, the second person singular suffix -*si* occurs once in the Diamond Sutra and was translated as 汝 /*nyo*/ 'you' by Dharmagupta as shown in (17).

(17)

No.	Sanskrit	Dharmagupta's Translation	Chapter (frequency of occurrence)	Grammar
a.	vadasi	語汝 /ngjo nyo/	26(1)	pres. 2 sg. P.

The Chinese character 汝 /*nyo*/ 'you' was used by Dharmagupta to translate the second person singular pronoun. Some examples are shown in (18).

(18)

No.	Sanskrit	Dharmagupta's Translation	Chapter (frequency of occurrence)	Grammar
a.	tvam	汝 /nyo/	6(1), 14(1)	pers. 2 m. sg. N.
b.	te	汝 /nyo/	11(2)	pers. 2 m. sg. D.

Since all the first person singular present suffix -*mi* and the second person singular present suffix -*si* were translated as pronouns, attached to the verbs as shown in (15) and (17), one might also wonder whether the third person singular present suffix -*ti* would also be translated as a suffix-like segment. The answer is disappointingly negative. In fact, the suffix -*ti* occurs about 47 times in the Diamond Sutra; however, Dharmagupta simply did not translate the third person singular present suffix -*ti* at all.

3.2 Gerunds as 已 /*yi*/

"The so-called gerund is a stereotyped case (doubtless instrumental) of a verbal noun, used generally as adjunct to the logical subject of a clause, denoting an accompanying or (more often) a preceding action to that signified by the verb of the clause. It has thus the virtual value of an indeclinable participle, present or past, qualifying the actor whose action it describes." (Whitney 1993, §989). There are two kinds of suffixes denoting gerunds: one is त्वा *tvā* which is added to a simple root, and

the other is य *ya* which is added to roots with a prepositional prefix. All the gerunds (or absolutives) in the Diamond Sutra are translated with the Chinese character 已 /*yi*/ 'stop, cease, end; already'. Examples (19a-d) are simple roots with the gerund suffix त्वा *tvā* and examples (19e-i) are complex verbs with prepositional prefixes plus the gerund suffix य *ya*.

(19)

No.	Sanskrit	Dharmagupta's Translation	Chapter (frequency of occurrence)	Grammar
a.	caritvā	行已 /hæng yi/	1(1)	gerund
b.	kṛtvā	作已 /task yi/	2(1), 8(3), 11(1), 16(1), 19(1), 28(1), 32(1)	gerund
c.	śrutvā	聞已 /mjun yi/	15(1), 21(1)	gerund
d.	likhitvā	寫已 /sjæ yi/	15(1)	gerund
e.	ud-gṛhya	受已 /dzyuw yi/	8(1), 11(1), 13(1), 24(1)	gerund
f.	pra-mṛjya	拭已 /syik yi/	14(1)	gerund
g.	ā-rāgya	供養已 /kjowng yang yi/	16(2)	gerund
h.	ni-vāsya	著已 /trjo yi/	1(1)	caus. gerund
i.	pra-tiṣṭhāpya	著已 /trjo yi/	2(1)	caus. gerund

However, not only the gerunds are translated with the Chinese character 已 /*yi*/; some past passive participles (ended with त *ta*) are also translated with a 已 /*yi*/ character. In example (20a) the past passive participle is used as an adjective, and in examples (20b-c) the past passive participles are used as nouns. In example (20d) the present participle is also used as a noun, and is translated with 已 /*yi*/. Examples (20e-f) are verbs: one is causative passive and the other is optative active; both of them are also translated with 已 /*yi*/. There is no consistency regarding the use of 已 /*yi*/ in other cases, except for the gerunds.

(20)

No.	Sanskrit	Dharmagupta's Translation	Chapter (frequency of occurrence)	Grammar
a.	kṛta	作已 /tsak yi/	1(1)	ppp.
b.	samgṛhitas	攝已 /syep yi/	2(1)	ppp. m. pl. N.
c.	ukte	語已 /ngjo yi/	2(1), 5(2), 13(2), 17(2), 14(1)	ppp. n. sg. L.
d.	upasamkraman	詣到已 /ngej taw yi/	1(1)	ppr. P. m. sg. N.
e.	prajñapyate	施設已 /sye syet yi/	3(1)	caus. pass. 3 sg. A.
f.	kuryāt	作已 /task yi/	30(1)	opt. 3. sg. P.

3.3 Future passive participles (gerundives) as 應 /ʔing/

The Sanskrit gerundive is an adjective which declines with its preceding noun. As Hart (1996) states, "It is called by Apte, with justification, the potential passive participle, while Whitney erroneously calls it the future passive participle, a form which, as has been seen, can be made from the future stem in the middle, and therefore a quite separate form from the gerundives" (p.168). There are three gerundives ending in three different suffixes, namely, य *ya*, तव्य *tavya* and अनीय *anīya*. All the gerundives in the Diamond Sutra are ended with तव्य *tavya* which is translated with the Chinese character 應 /ʔing/ 'should, ought to' by Dharmagupta. "The gerundive can generally be translated literally by a 'to be --- ed' phrase --- simply 'to be --- ed,' or 'who is to be --- ed,' or, 'the man who is to be --- ed,' etc. It denotes that the action or the state expressed by the root or derivative base must or ought to be done or undergone." (Hart 1996:169) The use of 應 /ʔing/ seems to be appropriate to translate the meaning of gerudives; however, in Chinese 應 /ʔing/ is used in front of the verbs, instead of following the verbs, for example, 應當 /ʔing tang/ 'lit. ought to be; should, ought to', 應得 /ʔing tok/ 'lit. ought to obtain; well-deserved, due', 應有 /ʔing hjuw/ 'lit. ought to have; due, proper, deserved'. Examples (21a-o) are gerundives, and examples (21p-q) are causative gerundives; all of them are adjectives declining with their preceding nouns.

(21)

No.	Sanskrit	Dharmagupta's Translation	Chapter (frequency of occurrence)	Grammar
a.	vaktavyas	名說應 /mjieng sywej ʔing/	3(2), 17(4)	fpp. m. sg. N.
b.	draṣṭavyas	見應 /ken ʔing/	5(3), 13(2), 14(2), 20(4), 25(1), 26(8), 27(2)	fpp. m. sg. N.
c.	udgrahītavyas	取應 /tshju ʔing /	6(2), 28(1)	fpp. m. sg. N.
d.	kartavyas	捨施應 /syæ sye ʔing/	14(1)	fpp. m. sg. N.
e.	pratikāṇkṣtitavyaḥ	觀察應 /kwan tsrhɛt ʔing/	16(1)	fpp. m. sg. N.
f.	parigrahītavyas	取應 /tshju ʔing/	28(4)	fpp. m. sg. N.
g.	pratipattavyam	修行應 /sjuw hæng ʔing/	2(2), 17(1)	fpp. n. sg. N.
h.	pratigrahītavyam	降伏應 /kæwng bjuwk ʔing/	2(2)	fpp. n. sg. N.
i.	sthātavyam	住應 /drju ʔing/	2(1), 17(1)	fpp. n. sg. N.
j.	dātavyam	施與應 /sye yo ʔing/	4(6), 14(2)	fpp. n. sg. N.
k.	draṣṭavyās	見應 /ken ʔing/	31(1)	fpp. m. pl. N.
l.	draṣṭavyam	見應 /ken ʔing/	25(1), 27(2), 32(1)	fpp. m. pl. N.
m.	prahatavyas	捨應 /syæ ʔing/	6(1)	fpp. m. pl. N.
n.	jñātavyās	知應 /trje ʔing/	31(1)	fpp. m. pl. N.
o.	adhimoktavyās	信解應 /sin kɛɨ ʔing/	31(1)	fpp. m. pl. N.

p.	utpādayitavyam	發生應 /pjot sræng ʔing/	3(1), 10(4), 14(5), 17(1)	caus. fpp. n. sg. N.
q.	parinirvapayitavyas	滅度應 /mjiet du ʔing/	3(1), 17(1)	caus. fpp. m. pl. N.

The only exception is a Sanskrit sloka in Chapter 32 where the gerundive *draṣṭavyam* 'to be seen' was translated as 見 /*ken*/, instead of 見應 /*ken ʔing*/.

(22) tārakā timiraṃ dīpo
māyā-avaśyāya budbudaṃ.
supinaṃ vidyud abhraṃ ca
evaṃ **draṣṭavyaṃ** saṃskṛtam. (Conze 1974:62)

"As stars, a fault of vision, as a lamp,
A mock show, dew drops, or a bubble,
A dream, a lightning flash, or cloud,
So **should one view** what is conditioned." (Conze 1974:92)

Dharmagupta's translation: 星翳燈幻 露泡夢電 雲**見**如是 此有爲者

The reason why Dharmagupta simply translated *draṣṭavyaṃ* "to be seen" as 見 /*ken*/ is that he wanted to make a four-line stanza with four words in each line. Therefore, he sacrificed the consistency of using 應 /*ʔing*/ to translate the Sanskrit gerundives.

3.4 Simple future as 當 /*tang*/

There are two kinds of future tense in Sanskrit: one is called the simple future (s-future) which is formed by adding स्य *sya* or इष्य *iṣya* to the strengthened root; and the other is called the periphrastic future which denotes a remote future action and is formed by adding तृ *tṛ* (or तर् *tar*) or इतृ *itṛ* to the strengthened root. The latter is far less common than the former. All the future-tense verbs in the Diamond Sutra are in the simple future form. Examples (23a-o) are verbs in simple future tense, and examples (23p-v) are verbs in causative future tense. All of them are translated with the Chinese character 當 /*tang*/ 'ought, should, must'.

(23)

No.	Sanskrit	Dharmagupta's Translation		Chapter (frequency of occurrence)	Grammar
a.	bhāṣiṣye	說當	/sywet tang/	2(1)	fut. 1 sg. A.
b.	bhaviṣyasi	有當	/hjuw tang/	17(2)	fut. 2 sg. P.
c.	pravartiṣyate	轉當	/trjwen tang/	14(2)	fut. 3 sg. A.
d.	bhaviṣyanti	有當	/hjuw tang/	14(4), 15(5), 16(1)	fut. 3 pl. P.
e.	bhaviṣyanti	當有	/tang hjuw/	6(5), 12(1), 21(1)	fut. 3 pl. P.
f.	prasaviṣyanti	生當	/sræng tang/	6(1), 14(1)	fut. 3 pl. P.
g.	pratigrahīṣyanti	取當	/tshju tang/	6(1), 14(1), 16(1)	fut. 3 pl. P.
h.	paryavāpsyanti	誦當	/zjowng tang/	12(1), 14(2), 15(1), 16(2)	fut. 3 pl. P.
i.	udgrahīṣyanti	受當	/dzyuw tang/	14(2), 15(1), 16(2)	fut. 3 pl. P.
j.	uttrasiṣyanti	驚當	/kjæng tang/	14(1)	fut. 3 pl. P.
k.	saṁtrasiṣyanti	怖當	/phu tang/	14(1)	fut. 3 pl. P.
l.	anuprāpsyanti	得當	/tok tang/	16(1)	fut. 3 pl. P.
m.	abhiśraddāsyanti	信當有	/sin tang hjuw/	21(1)	fut. 3. pl. P.
n.	pratilapsyante	得當	/tok tang/	6(1)	fut. 3 pl. A.
o.	saṃtrāsam āpatsyante	畏當	/ʔjwɨj tang/	14(1)	fut. 3 pl. A.
p.	utpādayiṣyanti bhaviṣyanti	發生當有	/pjot sræng tang hjuw/	6(2)	caus. fut. 3 pl. P.
q.	utpādayiṣyanti	發生當	/pjot sræng tang/	14(1)	caus. fut. 3 pl. P.
r.	dhārayiṣyanti	持當	/dri tang/	12(1), 14(2), 15(1), 16(2)	caus. fut. 3 pl. P.
s.	vācayiṣyanti	讀當	/duwk tang/	12(1), 14(2), 15(1), 16(2)	caus. fut. 3 pl. P.
t.	saṃprakāśayiṣyanti	廣說當	/kwang tang/	12(1), 14(2), 15(1), 16(2)	caus. fut. 3 pl. P.
u.	dhārayiṣyanti	持當有	/dri tang hjuw/	15(1)	caus. fut. 3 pl. P.
v.	kṣapayiṣyanti	盡當	/dzin tang/	16(1)	caus. fut. 3 pl. P.

4. Conclusion

In this paper we have discussed the various rendition techniques used specifically by Dharmgupta to demonstrate that his translation of the Diamond Sutra is a literal translation with little or no attention paid to the Chinese morphology and syntax. Sanskrit is a highly inflected language while Chinese is an analytic language in that each word consists of a single morpheme. Dharmagupta translated the Sanskrit suffixes using Chinese characters as if they were suffixes. First of all, three kinds of nominal inflections are illustrated in Section 2: the masculine/feminine singular accusative suffix *-am* is

translated using the Chinese character 邊 /*pen*/ 'border, boundary'; the dative plural suffix -*bhyas* is translated by the Chinese character 等 /*tong*/ 'a plural indicator; grade, rank'; and the locative suffixes are translated by the Chinese character 中 /*trjuwng*/ 'in; center, middle'. Further, four different verbal inflections are shown in Section 3: the first person singular present suffix -*mi* is translated as 我 /*nga*/ 'I, me'; the gerund (or absolutive) suffixes -*ya* and -*tvā* are translated as 已 /*yi*/ 'stop, cease, end; already'; the gerundive suffix -*tavya* is translated as 應 /*ʔing*/ 'should, ought to'; and the simple future suffixes -*sya* and -*iṣya* are translated as 當 /*tang*/ 'ought to, should, must'. The suffixes are translated into separate Chinese characters which, unlike Sanskrit suffixes, are independent morphemes. That is why many readers can not comprehend Dharmagupta's translation of the Diamond Sutra, and why some scholars like Lin (1995) even punctuate their translations into wrong phrases. With this study of Dharmagupta's particular method of rendition techniques, one may more easily understand Dharmagupta's text of the Diamond Sutra.

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Chuan-Shi Thesaurus: A Corpus Pioneer in Chinese-English Lexicography*

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The *Chuan-Shi Chinese-English English-Chinese Thesaurus* (Liu 2005, henceforth *Chuan-Shi*) and its earlier editions attempt to redress such inadequacies by starting with the collection of a written corpus of over 10,000 English sentences or paragraphs closely related to Chinese culture. This corpus was then used to extract some 65,000 Chinese-English interlingual equivalents, which can be looked up using either the Chinese or English index. The originality shown in *Chuan-Shi* has demonstrated the vital but long-neglected role which computer corpora may play in Chinese-English lexicography (Tseng 2001, 2004). Liu was a translator and copy-editor of Chinese and English publications for 30 years, after which he spent another 10 years on the compilation of this volume to resolve the difficulties he himself had encountered during the course of his work. Such an innovative approach could not only shed new light on Chinese-English lexicography, but also inspire bilingual lexicography in general.

Key words: *Chuan-Shi*, lexicography, bilingual dictionary, corpus driven

1. Introduction

Current Chinese-English dictionaries are inadequate in several ways. First, some of the frequently sought-after, culture-specific expressions in daily use are missing, inadvertently or purposely. Second, in cases where they are entered, the English equivalents offered are usually unidiomatic or even inaccurate, and many of these "equivalents" are just paraphrases or lengthy explanations at most. The absence of truly text-insertable translation equivalents is hardly helpful in translating from Chinese to English.

The *Chuan-Shi Chinese-English English-Chinese Thesaurus* (Liu 2005, henceforth *Chuan-Shi*) and its earlier editions attempt to redress such inadequacies by starting with the collection of a written corpus of over 10,000 English sentences or paragraphs

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closely related to Chinese culture. This corpus was then used to extract some 65,000 Chinese-English interlingual equivalents, which can be looked up using either the Chinese or English index. The originality shown in *Chuan-Shi* has demonstrated the vital but long-neglected role which computer corpora may play in Chinese-English lexicography (Tseng 2001, 2004). Liu was a translator and copy-editor of Chinese and English publications for 30 years, after which he spent another 10 years on the compilation of this volume to resolve the difficulties he himself had encountered during the course of his work. Such an innovative approach could not only shed new light on Chinese-English lexicography, but also inspire bilingual lexicography in general.

2. Contemporary Chinese-English lexicography: a quick overview

Two epoch-making dictionaries, *A New Practical Chinese-English Dictionary* (Liang 1971) and *Lin Yutang's Chinese-English Dictionary of Modern Usage* (Lin 1972), had dominated the scene outside the PRC for nearly a decade, mainly because of the intellectual hiatus caused by the Cultural Revolution. Revisions of Liang's and Lin's dictionaries appeared in 1992 and 1987 respectively under different titles by different authors, but these two lines of products essentially reflect the standard Chinese language from a more traditional, non-PRC perspective.

In the PRC, Chinese-English lexicography has flourished for a generation since the appearance of the landmark monolingual *Xiandai Hanyu Cidian* (*A Contemporary Chinese Dictionary*) in 1978. This medium-sized prescriptive dictionary served as a source language blueprint and sparked the publication of *A Chinese-English Dictionary* (Wu 1978), from which a multitude of other Chinese-English dictionaries mushroomed in the ensuing decade. The next decade of 1990's witnessed the emergence and growth of large-sized dictionaries. In 1993, the *Chinese-English Dictionary* in two big volumes (edited by Wu Guanghua) was published by Shanghai Jiaotong University Press, and was awarded Chinese Book Prize the following year. In 1995, the updated and revised edition of Wu (1978) was published by the Foreign Language Teaching and Research Press under the chief editorship of Wei Dongya, and won the first award in the 1997 biennial Chinese Lexicography Prize. In 2000, the Commercial Press produced the *New Age Chinese-English Dictionary* (co-edited by Wu Jingrong and Cheng Zhenqiu). It has since received considerable critical acclaim and earned the first award in the 2001 biennial Chinese Lexicography Prize. In late 2003, Hui Yu's *A New Century Chinese-English Dictionary* came out under the imprint of the Foreign Language Teaching and Research Press. The next salient tour de force in Chinese-English lexicography, *A Great Comprehensive Chinese-English Dictionary*, came out in early 2004 in three big volumes. Again edited by Wu Guanghua, this dictionary claims to be the largest ever. Its physical

size, lexical coverage, and number of definitions have surpassed all its predecessors.

Outside the Chinese-speaking world, the most conspicuous effort came from the *ABC Chinese-English Comprehensive Dictionary* (1996, 2003). Chief editor John DeFrancis is one of the most revered contemporary American linguists of Chinese. Macrostructurally, he placed sound (Pinyin) before form (of Chinese characters), adopting a strict, one-stop alphabetical Pinyin macrostructure. Microstructurally, he pioneered some morphological, pragmatic, and syntactic analyses of the 200,000 headwords.

In spite of all the prosperity on the Chinese-English lexicographical arena, there have been few innovations in the way these dictionaries were produced. With the only possible exception of DeFrancis (1996, 2003), the macrostructures and microstructures essentially remain the same. Head characters are alphabetically arranged according to Pinyin, the official romanization system for transliterating Chinese. Right under each head character, translations and/or explanations are given with possible illustrative examples, and further sub-entries of character combinations, left-justified in Pinyin order, are similarly treated. What these dictionaries have been competing for were little more than meeting some general expectations that make a good dictionary—lexical coverage, the inclusion of new words and senses, the number of illustrative examples, and the choice of equivalents or the wording of explanations.

The core task of a bilingual dictionary is to provide users with interlingual equivalents, which is an extremely tough job. The aforementioned award-winning Chinese-English dictionaries claim the accuracy and reliability of their English translations and/or explanations. However, the validity of their claim is open to question. The blurbs on the back covers and the prefatory remarks inside reveal that the entries and sub-entries have been examined and approved by local and/or native English experts. In the prefatory matters, Wu (1993, 2004) are reservedly candid in admitting that the contents do not solely rely on any particular dictionary, but are distilled from the best of all dictionaries. I take such statements as an euphemism for collating equivalents, explanations, and examples from multifarious reference books and packing them into his own work.

Apparently, the editors of these dictionaries still rely on personal introspection. They resort to their intuition, judging the validity of linguistic data by their linguistic competence. This approach has been widely adopted, and it does save time and money. However, even if the editors are recognized experts in the English language, they may be constrained by the scope of their knowledge, experience, memory, and preference. These experts in English may produce such run-on sentences as *After all he is a foreigner, he cannot use chopsticks well*. Likewise, sentence fragments may also be found in these experts' writings: *Whenever I talk to my adviser about my thesis.* Quasi-English expressions, such as *morning call* (for *wake-up call*) or *DM* (for *leaflet*), may be produced, or considered acceptable, by these experts. If these experts don't

drink coffee, *cappuccino* and *latte* may be totally incomprehensible to them. If they have little knowledge about Western food, *quiche* and *lasagna* will not be considered common vocabulary items. It is doubtful whether these "experts in English," when hired as editors or consultants of Chinese-English dictionaries, can perform a decent job in making linguistic judgments, although such an introspective approach has been practiced since time immemorial.

3. A Corpus for Chinese-English lexicography

Since 1980 when COBUILD (Collins Birmingham University International Language Database) started to run, the corpus has played a vital role in English lexicography. The traditional introspective approach has been challenged. This huge corpus, later known as the Bank of English, currently contains over 650 million words of running text. Its application in linguistic analyses and lexicography is revolutionary, so other multinational publishers, including OUP, Longman, CUP, and Macmillan, has all jumped on the corpus bandwagon.

By contrast, the application of corpora to the compilation of bilingual dictionaries with Chinese and English has lagged considerably. The scope of such application, if any, is much smaller. But the use of corpora in the compilation of dictionaries appears to be irresistible. The English-Chinese dictionaries have gradually sensed the trend, and started to gather their own corpora. However, the Chinese-English dictionaries, except for *Chuan-Shi*, have not made noticeable progress in this regard.

The most remarkable innovation of *Chuan-Shi* is to first systematically apply the corpus the author has collected to the compilation of a Chinese-English dictionary. Although the sources are limited in number, genre, and variety, this book is the fruit of painstaking labor of a dedicated individual without any support from academia, publishers, or governments. As far as the macrostructure is concerned, *Chuan-Shi* differs markedly from other Chinese-English dictionaries in that it is more like a thesaurus of citations, which are categorized under 1,281 head concepts and further to subordinate concepts. As far as the microstructure is concerned, the citations are grouped together with key expressions in bold-type font and immediately next to each, glossed in Chinese. Although looking up specific words is quite complex, the methodological innovations in *Chuan-Shi* presents a new form compared to the traditional Chinese-English lexicography. *Chuan-Shi*'s citation files, apparently inspired by the OED's Reading Program, contain English sentences and paragraphs on Chinese culture, from which authentic key expressions are extracted and translated back to Chinese. Take for instance a four-character idiom *hutoushewei* "tiger's head and snake's tail." Most Chinese-English dictionaries render it as "fine start and poor finish" or "do things by halves." But in stark contrast, *Chuan-Shi*

does the following:

> When the verdict finally came…it was almost an **anticlimax** 虎頭蛇尾. *Fox Butterfield, China Alive in the Bitter Sea, 1982, p. 359.*

By doing so, the author reverses the traditional lexicographical process of starting with the choice of Chinese headwords and ending with providing translations/explanations and illustrative examples. He gives the users authentic, idiomatic, corpus-evidenced, and text insertable equivalents, a goal which other lexicographers can hardly achieve by introspection.

Chinese-English dictionaries for Chinese speakers should be geared to encoding tasks, that is, helping dictionary users in expressing in the "code" of the English language what they have in mind in Chinese "code." Dictionary users do not want many explanatory equivalents; rather, they are almost always in need of idiomatic translation equivalents. On the other hand, of course, Chinese-English dictionaries for non-Chinese should give more help in "decoding" the Chinese expressions for the foreign language learner. Their need for explanatory equivalents is supposedly higher, because explanations facilitate comprehension. *Chuan-Shi*'s systematic extraction of authentic interlingual equivalents and illustrative examples from the corpus is a remarkable step forward in Chinese-English lexicography. The equivalents and illustrative examples thus culled are naturally more idiomatic and readily text insertable, meeting the requirements of encoding tasks to be performed by native Chinese users.

4. Corpus-driven—Future trend of Chinese-English lexicography

Unlike *Chuan-Shi*, however, Chinese-English dictionaries currently on the market tend to be ambivalent about their targeted group of users, or claim to serve both native and non-native Chinese speakers. In spite of their claims, the truth is that these dictionaries prioritize Chinese-speaking users, but the commercial strategy of killing two birds with one stone fails to please any party. These Chinese-English dictionaries resort to introspective explanations when the equivalents of culture-specific expressions are hard to come by. Lengthy and not text insertable, these explanations do not help language production—the most important task Chinese users wish to perform. Also, because the translation equivalents and illustrative examples provided in these traditional Chinese-English dictionaries are not corpus-based, but rather the product of editors' introspection, their authenticity and idiomaticity are open to question.

The innovative approach adopted by *Chuan-Shi* can be incorporated into the design of traditional Chinese-English dictionaries targeting Chinese users. One of the most

important strengths of these Chinese-English dictionaries is their clear macrostructure and easiness of information retrieval, both of which should stay. Their most prominent weakness, in comparison with *Chuan-Shi*, is the absence of corpus evidence. The optimal future for the Chinese-English dictionaries for the Chinese is an eclectic union of Pinyin macrostructure and corpus-based translation equivalents and illustrative examples.

Though building a bilingual corpus comparable in size and sophistication to the Bank of English is still a dream, it should be regarded as a must. The age of corpora has arrived, and we should do our utmost to catch up. At the early stage of corpus building, a team could gather English-language newspapers, magazines, books, Web pages, etc. that touch on Chinese culture and society, and have them stored electronically. After that, a bilingual reading program starts. A large number of Chinese-speaking people competent in English scan the raw materials, highlight the key expressions, translate them into idiomatic Chinese, and have them tagged for future analyses and retrieval. At a later stage, this corpus should be further expanded to include general, in addition to the Chinese culture-specific, materials. Only by this way can a fuller picture of interlingual equivalence be presented for a more detailed and comprehensive treatment.

The reason why the building of a bilingual corpus should proceed by stages is closely linked with the nature of interlingual equivalence. Snell-Hornby (1990:210) distinguishes five levels of interlingual equivalence, which are, from the simplest to the most complex, (1) terminology/nomenclature, (2) internationally known items and sets, (3) concrete objects, basic activities, stative adjectives, (4) words expressing perception and evaluation, often linked to sociocultural norms, and (5) culture-bound elements. This categorization is applicable to the prioritization of the building of a bilingual corpus, the emphasis of the reading program and the inclusion of equivalents and illustrative examples. The more complex the interlingual equivalence, the more urgent is such a program, and the more equivalents and examples should be included. The interlingual equivalence of the first two categories is simple and straightforward, so a valuable space could be reserved for the last two categories.

Chuan-Shi's application of a corpus points the way to the future of Chinese-English lexicography. Macrostructurally, such a prototypical dictionary enters its head characters alphabetically according to Pinyin, and under each head character, a certain number of Pinyin-ordered character-compound sub-entries are headed by the respective head character. All their English equivalents and illustrative examples are extracted from a huge bilingual corpus, which ensures that awkward translation equivalents and lengthy explanatory equivalents are eliminated. For possible entries and sub-entries not supported by the corpus, the corpus should eventually be expanded. But before this is complete, lexicographers should still have recourse to the old approach—making up translation equivalents for text insertion and supplement them with explanatory equivalents.

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