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This research project aims to examine the psychological validity of hierarchies and rankings in consonantal features based on analyses of naturally-occurring speech errors in Mandarin spoken in Taiwan and aphasic patients who suffered from left-hemesiphere brain damage. In the present study, a naturally-occurring corpus of 292 speech errors (all involving contextual single consonant substitution and exchange) and 103 aphasic speech are provided to examine the psychological validity of hierarchies and rank orders in consonantal features. Questions as to whether there is any evidence to support the independent existence of features and segments in Mandarin will be explored. This research also explored the question as to whether all of the contextual single-consonant substitution and exchange errors in Mandarin display any phonetic similarity between target and source segments. This research then further investigated whether or not the hierarchy and rank order of feature distribution in Mandarin have any psychological validity in comparison with cross-linguistic findings. The research also showed how the data provide evidence that bears on the question as to whether features or segments are the most fundamental phonological units in language processing.

Table 1: Speech error specifications for Mandarin consonants

	p	pʰ	t	tʰ	k	kʰ	ts	tsʰ	tʂ	tʂʰ	tɕ	tɕʰ	f	ɕ	x	s	ʂ	ʐ	m	n	ŋ
P	L	L	D	D	V	V	D	D	R	R	P	P	L	P	V	D	R	R	L	D	V
N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+
V	O	A	O	A	O	A	O	A	O	A	O	A	O	O	O	O	O	V	V	V	V
C	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+
F	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-

l	ɥ	j	w
D	L-P	P	L-V
-	-	-	-

V	V	V	V
+	+	+	+
-	-	-	-

In Table 1, there are five parameters for Mandarin in the feature system. They are *place of articulation, nasality, voice onset time, continuancy,* and *frication*.

1. *Place of articulation*: this non-binary feature is divided into seven places: labial (L), dental (D), retroflex (R), labio-palatal (L-P), palatal (P), labio-velar (L-V), and velar (V).

2. *Nasality*: the three nasals, labial, dental, and velar have a positive value in regard to this feature.

3. *Voice onset time*: the dimension is divided into voiceless aspirated (A), voiceless unaspirated (O), and voiced (V); in addition, there is a two-way contrast in Mandarin stops and affricates for aspiration, but voicing contrast for fricatives and sonorants are [+voice] non-contrastive.

4. *Continuancy*: all sonorants and fricatives are labeled [+continuant]. Affricates are distinguished from fricatives by being [-continuant]; stops are [-continuant].

5. *Frication*: all fricatives and affricates are labeled as [+frication], and all others are [-frication].

Table 2a: Percentage of consonant errors with number of features violated in normal subjects

Feature(s)	Number	Percentage
1	179	61
2	83	29
3	24	8
4	6	2
5	0	0
Total	292	100

Table 2b: Percentage of consonant errors with number of features violated in aphasic subjects

Feature(s)	Number	Percentage
1	52	50
2	21	20
3	17	17
4	12	12
5	1	1

Total	103	100

Table 2a shows that feature violations among consonant pairs in errors are not distributed evenly. The mean number of substitution errors involving a change of one feature is 179; of two features, 83; of three features, 24; and of four features, 6. Therefore, occurrences where only one feature is violated between the source and target pairs are by far the most common (61%), two feature violations are less common (29%), three feature violations are much less common (8%), four feature violations (2%) are the least common, and no errors violate all five features. There is a monotonic decrease as the number of feature differences increases. However, in Table 2b, the feature violations show that one feature violation is 50%, two-feature violation is 20%, three-feature violation is 17%, four-feature violation is 12%, and five-feature violation is 1%. Although the figure is close to the one found in normal subjects, the distribution in general has some problems. For example, normal speakers will never violate all five features in speech error data.

Table 3a: Percentages of consonant errors with specific features violated in speech errors

Features	Total
Place	222 (50%)
Continuancy	65 (15%)
VOT	56 (13%)
Frication	49 (11%)
Nasality	49 (11%)
Total features	441 (100%)

Table 3b: Percentages of consonant errors with specific features violated in aphasic speech

Features	Total
Place	58 (38%)
Continuancy	25 (16%)
VOT	60 (39%)
Frication	6 (4%)
Nasality	5 (3%)
Total features	154 (100%)

In Table 3a, the feature of place of articulation is by far the feature most often violated by speech errors, with the manner feature, continuancy, and voicing, being violated less often; the other manner features, frication and nasality, are violated least often. However, in Table 3b, the VOT feature is by far the feature most often violated by aphasic speakers, and the place of articulation is the next common violated feature, the constinunacy feature is the third, and the frication and nasality are the least

common features. The findings are different in the two subject groups. In cross-linguistic studies, there seem to be slightly higher rates for the features of place of articulation and of nasality in speech error data, and as for aphasic patients, so far there is no tendency but VOT feature is violated very often.

In summary, in speech errors, feature differences in consonant pairs which interacted in speech errors involve five features: place, voice onset time, continuancy, frication, and nasality, in different proportions. It is found that most errors involve consonant pairs which differ by only one feature, and there is a monotonic decrease as the number of feature differences increase. In aphasic speech, so far there is no fixed pattern, and that will need more data to work on. In speech errors, this suggests that the similarity of consonants, defined by the number of shared features, affects the frequency with which two segments are mutually involved in speech errors. Place of articulation is the feature most often violated in speech errors, and nasality is violated the least often. Such a hierarchy of feature distribution may have some cross-linguistic validity. However, we will need to get more data to look into the aphasic patients in Mandarin.

參加第二十屆北美漢語語言學會議年會報告

國立政治大學語言所
萬依萍

今年第二十屆北美漢語語言學會是在美國俄亥俄州立大學舉行。本次會議吸引了來自世界各地 100 位學者與會，宣讀論文共計 80 餘篇。此次會議主辦人為東亞語言系的教授陳潔雯女士，陳教授本著過去一貫的熱誠態度，親切的招待所有與會人員，在此之前，並一人獨立的完成所有的作業程序，讓許多人對她的辦事能力讚賞有加。

雖然這次與會學者發表論文與本人現代心理音韻領域相關的議題並不多，但是所發表的論文可說是相當具有國際水準。有一篇是偏向音韻理論的，內容為利用台語鼻音的分佈問題來探討台語的音節結構。另外也有學者利用優選理論來研究在台語中的借字聲調如何受到日語的影響。除了本篇論文是利用漢語失語症的病人因語言缺失所表現出語言成型的推測探討之外，有一篇較近似的為利用實驗設計，來檢視台語中的聲調在語言使用者的心理表徵。除了與當代理論有關的音韻論文之外，本人也參加了幾場非音韻學的 keynote speech，上了許多語言學多元化的課程，所以更覺得獲益良多。

雖然此次與本人領域有關的論文並不多，但是在諸位學者發表論文後，能夠跟他們一起討論，彌補到論文不足或有缺失的地方，可以說是參加學術會議最豐富也是最滿足的收穫了。尤其密西根大學的端木三教授、林燕慧教授提議可以追加一些音韻實驗，推演出是否也會與語誤有相近似的結果。另外，Mary Beckman 教授也提到了音節結構缺失等問題，種種建議都充分帶給本人諸多的收穫。本人覺得光獲得這些寶貴的建議，就是參加會議最值回票價的地方了。

這次本人非常開心能有機會參加這一年一度的學術盛會，並且發表論文。本人也在此向研發處致上最高敬意，感謝研發處能以最快的速度核准本人旅費補助的申請，而使得這次參加會議如此的圓滿成功順利。