中央研究院歷史語言研究所會議論文集之二

中國境內語言

第四輯　語言類型

鄭秋豫　編輯

中華民國　臺北

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出版說明

中央研究院歷史語言研究所語言組自民國七十九（1990）年夏季起舉辦「第一屆中國境內語言暨語言學國際研討會」，得到國內外中國語言學界熱烈的支持，進而繼續於民國八十（1991）年舉辦第二屆。至民國八十一（1992）年時，承國立清華大學語言學研究所共襄盛舉，接辦第三屆，至此又開啓與國內其他相關單位接力合作的新局面，也希望自此都能維持這種中央研究院歷史語言研究所與國內其他單位交替舉辦的形式。當時亦決定改爲隔年舉辦的方式，一方面是有鑑於語言學學門在近二十年來生氣蓬勃，各種國際會議甚多，本會自始便採規模小、有重點之方式，似不需以年會方式舉辦；另一方面亦考慮到承辦是項會議在籌備過程中事務性作業的負擔，因此自第四屆會議開始便改爲每兩年舉辦一次，在民國八十三（1994）年夏季召開，並再度由中央研究院歷史語言研究所語言組主辦。

這項會議的特色，有下列數點：一、每屆會議皆有主題，如第一屆會議的主題是漢語方言，第二屆會議的主題是歷史語言學，第三屆會議的主題是詞法與詞彙，本屆（第四屆）的主題是語言類型。二、所有送交會議的摘要，都經過匿名審查的作業，每篇摘要送交二位專家審查，再經會議聘請的議程委員會議決錄取的論文。所有錄取在會議中發表的論文，都需要在會前由作者將論文全文提交大會，由主辦單位彙整，印製成會前論文集，在會議時提供與會人士。三、會後論文集都由中央研究院歷史語言研究所出版專輯，定名爲「中央研究院歷史語言研究所會議論文集之二」(Symposium Series of the Institute of History and Philology, Academia Sinica, Number 2)，採序號制，成爲一個系列。並自第三屆會議後開始，採責任編輯制。論文修訂稿於會後交予主辦單位所組成的編輯小組，每篇論文都比照有審查制度的學術刊物的審查程序，至少由二位審查人匿名審查。編輯小組於完成集稿與送審之程序後，送交中央研究院歷史語言研究所出版品編輯委員會審核，通過後出版。本論文集在完成上述手續後，正式定名爲：「中央研究院歷史語言研究所會議論文集之二，中國境內語言暨語言學第四輯：語言類型」(Symposium Series of the Institute of His-

tory and Philology, Academia Sinica, Number 2, Chinese Languages and Linguistics IV: Typological Studies of Languages in China)。

本屆（第四屆）會議共收到一一四篇摘要，經審查後錄取二十篇，錄取率爲百分之十七點五，爲歷屆之最低，足證本會在語言學同行間所受到之重視與肯定。在會前有一位作者因故撤回論文，因此大會論文自二十篇變爲十九篇。加上專題演講論文五篇，及原不需附論文之特約討論人熱心提供論文二篇，會前論文集共收入二十六篇論文。會後有一位作者撤回修訂稿，一位在會前未附文稿的特約討論人再加送論文一篇，因此編輯小組一共收到二十六篇修訂文稿送審，經審查後錄取二十二篇。這一輯內容的安排，循往例把專題演講及特約討論的文稿七篇按作者姓氏放在前面，以下再按作者姓氏排列會議論文，並在目錄中將每位作者的中文與英文姓名並列，以便讀者辨認及引用。

在這本論文集即將付梓之際，首先要感謝中央研究院歷史語言研究所及行政院國家科學委員會的贊助，給予我們經費上的支持。個人特別要感謝所有的作者和審查人，以及在不同階段參與編輯工作的同仁們。自開始籌備會議一直到這本論文集的編輯過程，都使個人深深感到語言學就一個獨立學門而言，眞是充滿活力，同行們不但熱心，也已有相當水準的學術倫理和學術紀律。我們這個學門的前景，應是充滿希望的。盼望有更多的同好，投入語言學的行列。個人在籌備會議以來，受到同行們的諸多鼓勵與肯定，除始料未及外，更要在此特別致上謝意。此外我也要感謝史語所語言組的同仁們對整項工作的投入，尤其是何大安先生在各方面的支持與協助。另外也要感謝李壬癸先生和龔煌城先生在編輯作業過程中的協助。最後要感謝先後參與工作的助理林佳如、余姮、曾麗玉、徐明玲及任淑華小姐，她們的配合和敬業，使得從會議的籌畫到這本集子出版的工作過程，像一首美好的交響樂章，爲大家留下團隊精神的範例。

鄭秋豫

1997年早春

於中研院史語所

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《中國境內語言暨語言學》
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On Rule Effect and Dialect Classification

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Abstract

In the literature, language behavior is considered rule-governed. It is therefore appropriate to carry out linguistic analysis in terms of rules. However, in dialect comparisons, listing of shared rules simply reiterates dialect features and does not seem to produce a synthetic picture of similarity or difference. To achieve such an overall measurement of similarity, we need to study dialects in terms of "rule-effect". Some rules affect a large amount of linguistic entities such as words, while others worm their way through a very small portion of the lexicon. Quantitative information of this sort is the basis for measuring rule effects. Specifically, two effect-comparison models are presented. One is the measurement of dialect similarity, and the other is the calculation of mutual intelligibility. The similarity model mainly tabulates the ratio of shared items over all items of concern. The mutual intelligibility model incorporates a weighting hierarchy that takes into consideration communication signal enhancement and noise interference. The goal of this research is to provide a principled way to present rule effects. Language typology may be studied in terms of the numerical measurements these effect-theoretic models produce. Thus linguistics can provide description of language phenomena, explain them with rules, and give a synthetic account of rule effects.

1. Rules and Rule Effects

We conventionally analyze language change in terms of rules. For

example, 心 and 新 belonged respectively to -m ending and -n ending rimes in Middle Chinese but are now homophones in Beijing dialect. The phonological merger of this pair and of other words warrants the following rule with respect to the syllable ending:

(1) -m > -n

This rule can account for the change. And in the past we were satisfied with such a representation of language evolution. In fact, rules have been the main means for describing dialectal differences and for establishing dialect classification. For example, Ting (1982) lists 16 criteria for classification as variously discussed in Li (1937), Forrest (1948), Tung (1953), Yuan (1960), and Zhan (1981). As presented by Ting, most of the criteria relate to historical rules. These publications span half a century. They show the dominance and persistence of the concept of rules. Only a small number of the criteria concern dialect characteristics. We recast Ting's listing of those regarding initials as follows, adding "characteristics" to highlight the criteria that are not strictly derivation oriented:

(2) a. Change of Middle Chinese voiced stop initials
b. Change of Middle Chinese bilabial stops
c. Merger of f- and xu- -- characteristics
d. Change of Middle Chinese 知徹澄 initials
e. Merger of n- and l- -- characteristics
f. Change of Middle Chinese 照穿床審禪 initials
g. Palatalization of Middle Chinese velar initials
h. Loss of nasality of Middle Chinese nasal initials
i. Presence of voiced sibilants -- characteristics

Of these nine criteria, three pertain to dialect characteristics. Of course, these characteristics can be attributed to some historical rules. For example, in Wuhan and Chengdu the Middle Chinese n- and l- initials changed to an alveolar nasal that has a variant l-, hence the merger or

free variation of n- and l- (Beijing University 1962, 1989, henceforth the *Hanyu Fangyin Zihui*). Thus this characteristics criterion reflects the effects of the change of these initials. However, in the past our predominant interest in analytical mechanisms such as rule format, rule ordering, and rule interaction somehow blurred the picture of language as an integral living thing. Rule effects have not been the focus of linguistic inquiries. As we reviewed the historical rules implicit or explicit in the criteria above and in Chen (1976), Hashimoto (1979), and Tsai-fa Cheng (1985), we became more curious about what could be said regarding the consequences of those changes.

Let us return to the -m and -n merger. Historically that was what happened to Beijing and most other Northern Dialects. What effects can we describe? Naturally, the most obvious effect of this rule is that there are no more syllables ending in the bilabial nasal. That is one statement we can make to describe the dialect of Beijing. A more significant statement is to present the general phonological constraint that the bilabial nasal cannot occur in syllable-coda position. This constraint will then explain, for example, why the -m syllable-ending of loan words from another dialect or from transliteration of other languages has to be substituted by an alveolar or velar nasal.

Indeed, linguists have talked about constraints as language characteristics. Other characteristics such as word order, ergativity, case marking, and relative clauses have been the bases for making typological statements (Comrie 1989). In addition to those properties listed in (2), presence or absence of closed syllables, number of tones, etc. have been utilized to establish dialect classification. From the -m and -n merger we see that language characteristics may be introduced or changed by rules. However, characteristics are not the only type of effects we are interested in studying. As we look beyond the rules of a single language, cross-language comparisons in terms of rule effects can be discussed in several ways. Traditionally, typological studies investigate language differences and make statements on presence or absence of certain characteristics. Recently, we have ventured into the area of quantitative measurements,

hoping to answer some of the most frequently asked questions concerning Chinese: How different are Chinese dialects? Are they mutually intelligible? Our conventional answers to these questions usually reiterate the classification criteria. For example, we would say that in Northern Dialects the Middle Chinese -m ending has merged with -n while in the dialects in the south -m remains. That shows dialectal differences, indeed. But does that merger make northern dialects unintelligible to southern dialect speakers? Does that rule make northern and southern dialects very different? What is the degree of difference? Our quantitative studies of Chinese dialects have attempted to establish some methods for numerical measurements of dialect similarity and mutual intelligibility (Cheng 1982, 1992, 1994). We hope to be able to discuss rule effects quantitatively and therefore more definitively. We feel that the following are interesting and fertile areas to focus our attention and to raise new sets of linguistic questions.

(3) Rule effects on dialect

a. Characteristics -- qualitative-quantitative statements

b. Similarity -- quantitative measurements

c. Mutual intelligibility -- quantitative measurements

Typological studies of various languages in the past have provided abundant examples of how to compare language characteristics qualitatively. We have indicated above how rules change language constraints and other characteristics. Therefore we propose that both rules and rule effects be stated to give a fuller picture of a comparison. In (3) we label this comparison as a type of qualitative-quantitative investigation. In reality, quantitative information is often implicitly used. For example, to say that in Beijing the syllable coda cannot be -m means that all the syllables ending in -m earlier in history have been changed to end in -n. "All", "none", and "some" are quantifiers. Thus judgments on language characteristics often take quantity into consideration. This type of quantification, however, has been used inconsistently, with varying de-

grees of precision and verifiability. The discussion above has shown that rule effects should be an important part of a rule analysis. In the remainder of this paper we will examine the possibilities of quantifying rule effects on dialect similarity and mutual intelligibility.

2. Rule Effects on Dialect Similarity

We will examine the effects of the rule contained in criterion (2a) pertaining to the historical change of voiced stop initials. It is well known that the voiced stops have remained in Wu and some Xiang dialects as voiced but have become devoiced in other dialects. To see the effects of devoicing, we will specifically study Beijing, a Northern Dialect, and Suzhou, a Wu variety.

To see the extent the change of voiced stops affects the similarity between Beijing and Suzhou, we need to define the carriers of the change. A phonological change such as this one is carried by words. In Chinese a word is normally coterminous with a syllable. Thus we may use "word", "syllable", and "lexical item" interchangeably. We have tabulated the occurrences of the items derived from these Middle Chinese initials. In the following listing the first consonant in each line is for Middle Chinese. The modern reflexes are given after the colon. The number of items affected are given under Beijing and Suzhou separately. The database is the DOC (Dictionary on Computer) file that has been partially updated according to the second edition of the *Hanyu Fangyin Zihui*.

(4)

		Beijing	Suzhou
a.	b : b		82
b.	b : p	38	
c.	b : p^h	39	
d.	b : f	2	
e.	d : d		107
f.	d : t	56	1
g.	d : t^h	53	2

h.	g	:	g		6
i.	g	:	dz		55
j.	g	:	tɕ	27	2
k.	g	:	$tɕ^h$	29	
l.	g	:	k	3	
m.	g	:	k^h	2	
n.	Total			249	255

First, the two total numbers are different because alternative readings for individual words are included. The devoicing in Beijing actually involves two features. The voiced stops became voiceless aspirated in Even tone and voiceless unaspirated in Oblique tones. All the items involved are uniformly voiceless and thus the rule has created the phonotactic that there are no voiced stops in modern Beijing. The aspiration part of the change is not without exception, for example, 特 and 突, which were in an Oblique tone and are now pronounced with an aspirated alveolar stop. Furthermore, in both Beijing and Suzhou, palatalization of the velar initials has occurred. The Beijing f- initial occurrences are the two readings of the word 埠, in low tone and in high falling tone.

The five items pronounced with voiceless initials t-, t^h-, and tɕ- in Suzhou are shared by Beijing. However, they perhaps should be excluded from this table. In Suzhou the item 跌 pronounced with a voiceless unaspirated alveolar stop and 挺 艇 both with a voiceless aspirated alveolar stop might not have been derived from the voiced alveolar stop. The words 菌 and 窘 both with a voiceless palatal affricate appeared in the first edition of the *Hanyu Fangyin Zihui* but have been deleted in the second edition. If we omit these five items from consideration, then regarding the evolution of the Middle Chinese voiced stops, Beijing and Suzhou do not share any items. They are entirely dissimilar.

The total dissimilarity here is obvious by inspection of the disjunctive occurrence of the items. But when the items involved are numerous and the occurrence patterns are complex, we need to have a method to

calculate the degree of similarity. Similarity measurements are mostly based on the ratio of shared items to the total number of items considered. The tabulation of the "total number of items considered" is somewhat tricky. As we compare several dialects, say dialects A, B, C, and D at the same time, the items that occur in dialect C or D but do not occur in dialects A and B, might be counted in the total number of items considered when we compare dialects A and B. Ma (1989), Tu and Cheng (1991), Wang and Shen (1992), and Tu (1994) have reviewed various correlation methods and have pointed out such inflation of coefficient values in Cheng (1982). Now we have come to favor Jaccard's coefficient, which excludes the non-occurring items in the computation:

(5) $a/(a+b+c)$

where a: number of items shared by both dialects

b: number of items occurring in one dialect only

c: number of items occurring in the other dialect only.

The calculation of similarity based on the numbers given in (4) for the effects of the change of the Middle Chinese voiced stops is either (6a) if we exclude or (6b) if we include those five items:

(6) a. $0/(0+244+250)=0$

b. $5/(5+244+250)=0.010$

By definition, this similarity index ranges from 0 to 1.Thus the historical devoicing rule contributes no or extremely small value of similarity between Beijing and Suzhou. An overall similarity comparison will have to consider more cases. In Cheng (1991) 3,373 cases of initials, finals, and tones were used to calculate a phonological similarity matrix for 17 Chinese dialects. In the literature, presentation of the number of instances attesting to historical correspondences is quite common. For example, just to be critical of ourselves, Cheng and Wang (1971), Chen (1976), and Wang and Cheng(1987) have extensive lists of numbers variously show-

ing correspondences for initials, finals, and tones between Middle Chinese and modern dialects. But those numbers are simply numbers of instances; no principled ways of synthesis are given in those studies. Here in this paper we are using devoicing as an example to show how to quantify rule effects.

The use of the DOC database for quantification of similarity, affinity, and mutual intelligibility deserves some comments. The items in the database were collected from the first edition of the *Hanyu Fangyin Zihui* and partially updated on the basis of the second edition. The *Hanyu Fangyin Zihui* contains phonological information for over 2,700 common words. Those words were not selected according to some sampling principles. Consequently one could question the validity of the data as a fair sample for prediction of the nature of the dialects. Selection of linguistic data for quantification has always been a substantive as well as methodological issue. The "basic" lexicon in glottochronology limiting the size to a couple hundred items would not be a good representative for our purposes. We maintain that the larger lexicon of the *Hanyu Fangyin Zihui* would allow us to make various sorts of inquiries. Much as we wish to claim the predictive power of our quantification, a moderate view of taking this research as a population study of this particular collection of data would help us jump over the hurdle of statistical sampling and allow us to venture into different modes of linguistic inquiry.

Now we return to the effect of the devoicing rule as calculated in (6). The zero similarity means that the rule made Beijing and Suzhou entirely dissimilar in the voicing contrast of initials. This dissimilarity, however, does not make us feel that Beijing and Suzhou are two totally different languages. Other elements are similar or identical in these dialects and contribute positively to similarity as discussed in Cheng (1991). Another reason that we consider Beijing and Suzhou, and for that matter all other varieties, as dialects of the Chinese language is that they have fairly regular corresponding elements. This point brings up correspondence patterns and dialect mutual intelligibility for investigation of rule effects.

3. Rule Effects on Dialect Mutual Intelligibility

Since Middle Chinese, historical rules have changed linguistic entities and patterns of the speech in various regions. Deterioration and enhancement of dialect mutual intelligibility are the most obvious effects of rules such as those given earlier in (2). Mutual intelligibility, in spite of its vague definition in the past, has been used as a criterion for language subgrouping by linguists. Social scientists and non-professionals often demand a definitive answer from linguists to their questions about mutual intelligibility. We have poked around for years; it is time for us to try to answer this challenge. The motivation, weight assignments of characteristics, and procedural details for calculating mutual intelligibility have been presented in Cheng (1992, 1994). In essence, we take the view that human pattern cognition is based on observation of repeated phenomena. That is, repetition lends its weight of numbers to pattern formation. In dialect communication, the recurrence of corresponding elements on the basis of cognates, such as Beijing initial p- to Jinan p- and Beijing n- to Jinan l-, forms correspondence patterns. Some correspondence patterns involve many members such as words while others contain only a small number of entities. It is therefore useful to divide patterns into major and minor ones. Major patterns give a sense of regularity and therefore are considered as communication enhancing signal. On theother hand, minor patterns are exceptions and can act as interfering noise.

Intuitively we feel that between a pair of dialects, say A and B, the intelligibility of dialect B for dialect A may not be identical to that of dialect A for dialect B. Hence we use the term "source dialect" and "target dialect" to refer to the way corresponding patterns are established. First we set up the patterns according to the elements in dialect A. We then calculate the one-way unidirectional intelligibility value. Then we collect the correspondence patterns according to the elements in dialect B and calculate the intelligibility. This differentiation thus recognizes the needs to derive unidirectional intelligibility as the first step of the calcula-

tion of mutual intelligibility. We take the mean of the two unidirectional intelligibility degrees to be the mutual intelligibility of the two dialects. A crucial issue of the calculation is the determination of importance or weight of various correspondence patterns. We have established a weight scale in Cheng (1992, 1994). The scale using a unitary 1 as the full value takes into account the type of correspondence patterns (signal or noise) and the nature of the corresponding items (same or different). When the dialects have the same items in a major pattern, the intelligibility is the highest, for example, Beijing p- corresponding to Jinan p-. If the target-dialect element is different from that of the source dialect and that element occurs elsewhere in non-cognate items in the source dialect, then the confusability is the highest. For example, the correspondence of Jinan l- to Beijing n- involving a single item might allow Beijing to wrongly take that item as an item in Beijing l-. Other situations obtain more moderate values. The weight scale is as follows:

(7)	Signal	Noise
For each item in a pattern, the target-dialect		
a. element is the same as that of the source dialect:	1.00	-0.25
b. element is different from that of the source dialect		
i. and does not occur in the source dialect:	0.50	-0.50
ii. and occurs elsewhere in the source dialect:	0.25	-1.00

In (2) we list the dialect subgrouping criteria concerning initials. In order to discuss some of them to show rule effects, we need to give proper weight to initial consonants. Since we use cognate syllable-words to establish correspondence patterns, we may assign one-fifth of the unitary value 1 to each of the five traditional segments of initial, medial, nuclear vowel, ending, and tone. Thus the weight scale for each of the segments is as follows:

(8)	Signal	Noise
For each item in a pattern, the target-dialect's phonological		
a. element is the same as that of the source dialect:	0.20	-0.05