The Effect of Language Contact on Phonological Simplification: A Rapid and Anonymous Survey of Checked Vowel Merger in Shanghai Urban Dialect

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Abstract
This paper aims to investigate how different intensities of language contact affect the process of phonological simplification. We conducted a sociolinguistic rapid and anonymous survey in Shanghai to collect information on a bus route. The results show that area of residence has a significant effect on the merging result. The merger rate is higher in peripheral areas where language contact is more intensive than in central areas where language contact is less intensive. We therefore argue that the intensity of language contact affects the process of phonological simplification. The higher the intensity, the faster the phonological simplification.
The Effect of Language Contact on Phonological Simplification: A Rapid and Anonymous Survey of Checked Vowel Merger in Shanghai Urban Dialect

Xin Gao and Huan Tao*

1 Introduction

1.1 Language Contact and Simplification

Language contact among bilingual individuals serves as a significant driving force behind language change (Weinreich, 1968). It is proposed that there are two main processes of language contact: “conquest” and “immigration” (Sankoff, 2003). “Conquest” is the process by which a local language is replaced by the language of a group of newcomers who are demographically or socioeconomically advantaged. The rate of contact-induced language change that occurs in the native population is usually slow. On the other hand, “immigration” refers to situations where the newcomers are not demographically or socioeconomically dominant and their language does not shake up the existing local language. In such cases, the agent of language contact is often in the newcomers: their native language changes rapidly as a result of contact with the local language, and the replacement is usually completed within the next one or two generations.

While both major processes of language contact involve the dominant language exerting influence over or even displacing the other language, it is important to note that the influence in language contact is not unidirectional. Whenever language contact occurs, the languages of both sides will inevitably be influenced by each other. The influence of a relatively inferior language on a superior language is not entirely uncommon. For instance, it has been shown that the vowel merger of cot/caught in Western Pennsylvania English is initiated by large clusters of Polish and non-German immigrants (Herold, 1997); the phonetic realization of coda consonant clusters in Singaporean and Nigerian English is distinctly different from Standard English and is influenced by the local national language (Gut, 2007). Sankoff (2003) refers to this effect from the less dominant language on the more dominant language as substratum interference. The effect of substratum interference is limited, but exists.

The phenomenon known as koineization refers to the rapid and significant changes that a language undergoes as a result of language contact. Languages that emerge through koineization tend to exhibit simplification tendencies (Siegel, 1985; Trudgill, 1986; Kerswill, 2003). On the one hand, contact-induced languages, such as pidgins, typically have simpler structures than their progenitor languages (Romaine, 2017). On the other hand, language contact may induce a trend toward simplification. For example, research based on artificial language learning finds that adult L2 learners may simplify the structure of the language they learn; when two interlocutors communicate, they tend to use the simpler language if they have learned languages of different levels of complexity (Atkinson et al., 2018).

Phonological simplification is a form of language simplification that involves the loss of phonemic distinctions, commonly referred to as phonemic merger (Trudgill, 2004). Research has shown an important link between the rate of phonological simplification and its social context. Frequent language contact in a relatively short period of time, or a rapidly changing social environment can accelerate phonemic mergers (Santa Ana, 1991; Herold, 1997). In this study, we will focus on the effect of language contact on phonological simplification.

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1.2 Language Background

1.2.1 Language Contact Context

Shanghai is renowned as a city of immigrants. Over the course of a century following its opening (1852-1950), the population of the Shanghai area witnessed remarkable growth, expanding nearly ninefold with a net increase of nearly 5 million people (Zou, 1980). The fact that the population surged in less than a hundred years demonstrates the role of migration, which had a much greater impact than the geographical. The census also shows that the total population of Shanghai in 1946 was 3.76 million, of which the non-local population was over 2.99 million, accounting for nearly 80% of the total population (Shen, 1996).

The formation of the Shanghai Urban Dialect is closely related to the city’s history of migration. Pan (2009) proposes a “Shanghai model” to describe the formation of Shanghai Urban Dialect: immigrants entered Shanghai in different groups. Their native languages influenced the local dialects of Shanghai to varying degrees, giving rise to the Shanghai Urban Dialect, which later became a regional lingua-franca. The two most populous immigrant groups speak either Wu languages from the surrounding areas (such as Suzhou Wu and Ningbo Wu) or Lower Yangtze Mandarin (Zou, 1980; Goodman, 1990). However, the two language groups differ significantly in their impact on the regional lingua franca. While Wu languages wield substantial influence, the reach of Lower Yangtze Mandarin remains quite limited (e.g. Chao, 1956; Tao et al., 2017). You (2006) argues that Shanghai Urban Dialect is a mixture of Wu languages from immigrants and the local Shanghainese.

The varying degrees of influence that Wu languages and Lower Yangtze Mandarin have on the Shanghai Urban Dialect can be attributed to factors such as the time of entry and the socio-economic status of the respective immigrant groups. Specifically, the influx of Wu-speaking immigrants into Shanghai surged following the Opium War (Goodman, 1990). During that period, Suzhou held significant cultural and economic importance in southern China, while immigrants from Ningbo actively participated in commercial activities within Shanghai (Shen, 1996). With their demographic advantage, the dialects of the Wu-speaking immigrants swiftly established dominance in the language contact scenario. On the other hand, Mandarin-speaking immigrants started to pour into Shanghai in large numbers approximately 20 years later (Zou, 1980). Most of these individuals belonged to the working class. By that time, Shanghai Urban Dialect as a lingua-franca had already been firmly established and had acquired a certain level of social prestige. Consequently, the influence of the Lower Yangtze Mandarin remained restricted in comparison.

It is also noteworthy that upon entering Shanghai, immigrants from different regions tended to settle in different areas. Wu-speaking immigrants predominantly lived in the city center of Shanghai, while Mandarin-speaking immigrants mainly resided in the periphery (Goodman, 1990; Zou, 1980). The distinction between the central and peripheral areas not only influenced the process of language contact but also affected the intensity of such contact.

In the city center, Wu-speaking immigrants played a central role in shaping the regional lingua franca. Consequently, they exhibited a strong allegiance to the Shanghai Urban Dialect and predominantly used it in both public and familial settings, replacing their native Wu languages. On the other hand, Mandarin-speaking immigrants in the periphery were primarily adult learners of the established lingua franca. They would utilize the Shanghai Urban Dialect in public contexts while retaining the use of Lower Yangtze Mandarin within their households. As a result, the intensity of language contact was higher in the periphery compared to the city center.

1.2.2 Checked Vowels in Shanghai Urban Dialect

This study investigates the /a̯i̯/~/əi̯/ merger in Shanghai Urban Dialect. This merger is part of a series of check vowel mergers spanning the 19th and 20th centuries (Xu et al., 1982, 1988a; Chen, 1995; Tao et al., 2017). Table 1 lists the changes of /a̯i̯/~/əi̯/-related checked vowels in missionary records and early language documentations.
A sociolinguistic study conducted in the 1980s highlighted notable generational differences regarding the /aʔ~aʔ/ merger during that period: the older generation exhibited a strict distinction between /aʔ~aʔ/, whereas the middle-aged generation showed a less strict differentiation, with noticeable changes in vowel quality; in contrast, the adolescents of that time had largely merged /aʔ~aʔ/. According to the study, the overall proportion of the /aʔ~aʔ/ merger was found to be 23% (Shi and Jiang, 1987). A phonetic study focusing on vowel quality has revealed that the distinction between /aʔ~aʔ/ is converging and approaching merger (Gu, 2007). Our previous research also indicates that there is minimal phonetic differentiation between /aʔ~aʔ/ in monosyllabic word production; furthermore, in perception, /aʔ~aʔ/ has indeed merged (Gao and Tao, 2022).

### 1.3 Research Question

The research question addressed in this study focuses on how language contact impacts the process of phonological simplification, with a specific emphasis on examining the influence of the intensity of language contact on the rate of the checked vowel merger.

It has been demonstrated in previous research that language contact can trigger sound changes (e.g. Herold, 1997; Yao and Chang, 2016). Furthermore, the intensity of language contact has been identified as an important social factor in predicting the consequences of language contact (Thomason, 2020).

The checked vowel merger observed in the Shanghai urban dialect serves as a compelling case study to examine the impact of the intensity of language contact on phonological simplification. Over a span of less than two centuries, the checked vowel system in Shanghai urban district dialects has undergone rapid simplification. Given the unusually accelerated rate of this sound change, it is reasonable to assume that this rapid process is influenced or accelerated by language contact. The intensity of language contact varies between the central and peripheral areas of Shanghai. Notably, the peripheral area experiences a higher intensity of language contact compared to the central area.

As the checked vowel merger in the Shanghai Urban Dialect is in its last step, i.e., the merger of /aʔ~aʔ/, if the hypothesis holds that the greater the intensity of language contact, the faster the phonological simplification, we expect quicker /aʔ~aʔ/ merger in the peripheral area than that in the central area.

### 2 Methods

#### 2.1 Target Word

The rapid and anonymous survey is an important survey technique in sociolinguistic research. It has the advantage of avoiding to a large extent the “observer paradox” and help to obtain linguistic information in less formal situations (Labov, 1972). This method is also useful because it is suitable for surveys in public places, such as streets and department stores (e.g. Labov, 1986; Durian, 2004; Starks and Allan, 2003; Dinkin, 2018).

The current study uses the rapid and anonymous survey method. We obtain the information about their /aʔ~aʔ/ merger by inducing pedestrians to say a target word. The target word is zoʔ-
paʔ-lu, which means “(Bus) Route 18” in Shanghai Urban Dialect.

There are three main benefits to using this target word. First, the first and second syllables of the target word are /aʔ/ and /aʔ/, respectively. This facilitates the investigator to determine whether /aʔ~aʔ/ still have the same vowel quality or not. If the first two syllables of the target word have the same vowel quality, it reflects that /aʔ~aʔ/ has been merged for that speaker. A second advantage of this target word is that it is the name of a bus route, which makes it easy to elicit in scenarios such as asking for directions on the street. The purpose of using the rapid and anonymous survey method is to minimize the observer paradox. It is therefore important to set a target word that can be naturally induced at a convenient situation. In addition, the target word – Bus Route 18 – helps us to filter out specific participants: local residents along this bus route. Since the elicitation asks for the bus route to a specific location, participants need to be familiar with the neighborhood to be able to answer accurately, which ensures that they live near the survey site to some extent. In this way, by surveying near the bus stations in the central and peripheral area, we can collect and compare the merging of /aʔ~aʔ/ among them.

2.2 Process

The survey is conducted near bus stations along Bus Route 18. Bus route 18 is a north-south bus route in downtown Shanghai. It spans the central and peripheral areas of downtown Shanghai, with the northern part going through the peripheral area and the southern part going through the central area (see Figure 1, Jiu Shi Gong Jiao, 2020). The southern and northern parts are bounded by the Suzhou River, which is shown on the map as an east-west river that runs through the bus route. The northern end of route 18 is Lu Xun Park (in the peripheral district) and its southern end is People’s Square (in the central district), both of which are famous landmarks in Shanghai.

Figure 1: Map of Shanghai bus route 18.

The trigger\(^1\) is as follows:

(1) noŋhɔ vudziŋ fix sa tshotsi ʰɔ tə zɔŋmɨŋkuⁿzaŋ/hucynkoŋfiŋ
    “Hello, is there a bus nearby that goes to People’s Square/Lu Xun Park?”

\(^1\)The trigger is transcribed based on Xu et al. (1988b), omitting the tone numbers.
if the response does not contain the target word, the sample is considered invalid and is not recorded. If a participant understands the question and answers the target word in Shanghai Urban Dialect, it is considered a valid sample and is recorded. The investigator records the linguistic information (i.e., whether /a?~a?/ has merged or not), the gender and estimated birth generation information of the participant, and the survey location (near which station the sample is collected). The survey was conducted in January 2018.

3 Results

Data from 151 participants were collected. 108/151 (72%) participants merge /a?~a?/. The meta data and the merging proportions are shown in Figure 2.

As is shown in Figure 2, the overall merged proportion of is higher for participants living in the peripheral area than for those living in the central area. Among female participants, there is a trend that the younger the age, the higher the proportion of /a?~a?/ merger, but this trend is not seen among male participants.

We fit a logistic regression model to examine the effects of social factors on /a?~a?/ merger. Whether /a?/ and a?/ are distinct or not was the dependent variable. Gender and survey location are categorical and sum-coded. Estimated birth generation is continuous and centralized. Each social factor, the interactions of each two social factors, and the three-way interaction are set as the predictors.

As is shown in Table 2, the main effect of survey location, the interaction effect of generation and survey location, and the interaction effect of generation and gender have significant effects. To be specific, /a?~a?/ merges faster in the peripheral area than that in the central area. The generation effect is not significant in general; however, the generational difference of /a?~a?/ merger is more prominent in the periphery than in the center. The gender effect is also not significant, although the generation effect is more prominent for females than males.

4 Discussion

4.1 Current Status of /a?~a?/ merger

Our survey shows that most speakers of contemporary Shanghai Urban Dialect have lost the /a?~a?/ contrast in the target word in conversational speech. Compared to Shi and Jiang (1987)’s merging rate of 23%, our survey shows a significantly higher merging rate of 72%. Such a dramatic increase
Table 2: Output of the logistic regression model for the /aʔ~əʔ/ merger. The fitting detail of the model is in the text. Significant effects are shown with bolded p-values (p<0.05).

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Estimation</th>
<th>SE</th>
<th>P-value</th>
</tr>
</thead>
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<td>0.499</td>
<td>0.281</td>
<td>0.076</td>
</tr>
<tr>
<td>Location (Center-grandmean)</td>
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<td>0.000</td>
</tr>
<tr>
<td>Gender (Male-grandmean)</td>
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<td>0.309</td>
<td>0.286</td>
</tr>
<tr>
<td>Generation:Location (Center-grandmean)</td>
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</tr>
<tr>
<td>Generation:Gender (Male-grandmean)</td>
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<td>0.010</td>
</tr>
<tr>
<td>Location (Center-grandmean): Gender</td>
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<td>0.309</td>
<td>0.313</td>
</tr>
<tr>
<td>Generation:Location (Center-grandmean): Gender</td>
<td>0.442</td>
<td>0.281</td>
<td>0.116</td>
</tr>
</tbody>
</table>

in the merging rate may indicate the actual sound change development over 30 years, or it may just reflect the stylistic differences between the two investigations (reading tasks vs. rapid and anonymous surveys), or both.

More notably, in contrast to the significant generational differences shown in Shi and Jiang (1987), generation is no longer a significant factor affecting /aʔ~əʔ/ merger in our study. This suggests that, today, about thirty years later, the /aʔ~əʔ/ merger has moved beyond the “in-progress” stage of sound change and has entered the “near-completion” stage.

There are two reasons for our belief that /aʔ~əʔ/ merger is at the “near-completion” stage rather than the “completion” stage. With an overall merger rate of 72%, there is still a small proportion of participants who are able to distinguish /aʔ~əʔ/ in production. In addition, our study observes within-group variation: /aʔ~əʔ/ merges more slowly in the center than in the periphery; intergenerational differences are still visible among females.

4.2 A Composite Model of Language contact

The results show a significant effect of survey location on the /aʔ~əʔ/ merger. Participants who were encountered in the peripheral area show higher rates of /aʔ~əʔ/ merger than those who were encountered in the central area. We argue that this difference is related to the different roles played by the central and peripheral areas in the formation and development of Shanghai Urban Dialect.

As previously mentioned in Section 1.2.1, the emergence of the Shanghai Urban Dialect can be attributed to language contact, with immigrants playing a pivotal role in its formation. During the early stages of Shanghai’s formation as a city, Wu-speaking immigrants from the surrounding areas migrated and established their settlements in the city center. Due to their demographic, economic, and cultural advantages over the local population, a pattern of language contact resembling a “conquest” emerged. The native languages of these Wu-speaking immigrants played a crucial role in shaping the development of the Shanghai Urban Dialect, surpassing the influence of the local Shanghainese language (You, 2006). Consequently, these immigrants and their descendants exhibit a high level of acceptance and adoption of the emerging regional lingua franca, the Shanghai Urban Dialect. They utilize this dialect extensively in both their social interactions and within their households.

In contrast, Mandarin-speaking immigrants did not arrive in significant numbers in Shanghai until approximately a decade or two later. By that time, the city center was already populated by a large number of Wu-speaking immigrants. As a result, the majority of these Mandarin-speaking immigrants, who belonged to the working class, concentrated in the peripheral areas of Shanghai. Due to their relatively lower socioeconomic status and the already established presence of the Shanghai Urban Dialect, Mandarin-speaking immigrants had limited influence on the development of the regional lingua franca. The language contact pattern observed can be characterized as an “immigrant” pattern. These Mandarin-speaking immigrants, as adult second-language learners of Shanghai Urban Dialect, used this language when interacting with immigrants from other backgrounds. However, within their own communities and families, they predominantly used their native language. As a consequence, language contact in the peripheral areas exhibited greater diversity and frequency.
This linguistic dynamic has continued across several generations.

In conclusion, a closer look at the historical background highlights that Shanghai Urban Dialect has undergone two processes of language contact. Initially, a “conquest” pattern was observed, followed by the emergence of an “immigration” pattern during later language development. The central and peripheral areas of Shanghai exhibit different dominant patterns and contrasting intensities of language contact, which subsequently accounts for the discrepancy in the speed of the checked vowel merger between the two regions. Specifically, the merger occurs at a faster rate in the peripheral area compared to the central area.

4.3 Contact-induced Phonological Simplification

The research question addressed in this study explores the impact of language contact on the process of phonological simplification. Our investigation of /aʔ∼ɔʔ/ merger in the Shanghai Urban Dialect reveals that the merger occurs at a faster rate in the peripheral area compared to the central area.

By considering the distinct language contact contexts in the central and peripheral areas, as well as the higher intensity of language contact observed in the periphery, we propose that greater intensity of language contact facilitates and promotes phonological simplification.

5 Conclusion

Our findings suggest that the process of /aʔ∼ɔʔ/ merger is currently in the near-completion stage. In comparison to the research conducted 30 years ago (i.e., Shi and Jiang, 1987), there has been a substantial increase of the /aʔ∼ɔʔ/ merger. Most speakers today do not distinguish between /aʔ/ and /ɔʔ/ in production. From the current study, the intergenerational effect is no longer significant, but the speakers’ (approximate) area of residence has a significant effect on the merger – the proportion of merging is higher in the periphery than in the center.

Our study focuses on investigating the impact of language contact on the process of phonological simplification, through an examination of the /aʔ∼ɔʔ/ merger in the Shanghai Urban Dialect. The findings of our study indicate that different patterns and intensities of language contact have a notable effect on the rate of phonological simplification. Significantly, our study reveals a notable discrepancy in the speed of the checked vowel merger between the peripheral and central areas of Shanghai. Specifically, we observe that the merger of checked vowels occurs at a faster pace in the peripheral area compared to the central area. This discrepancy can be attributed to the differing intensities of language contact between the two regions. Notably, the peripheral area experiences a higher intensity of language contact compared to the central area. This finding provides support for our initial hypothesis, which posits that the intensity of language contact influences the process of phonological simplification. It is evident that a higher intensity of language contact corresponds to a faster rate of simplification.

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