The sociolinguistics of rhotacization in the Beijing speech community
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To my parents and sister

致我的父母和姐姐

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Chapter 1 Introduction

This introductory chapter will set the stage for the investigation of changes in form, frequency, and use of rhotacization in the Beijing speech community. It offers an introduction to the topic and context of this dissertation, as well as its focus and scope. Section 1.1 gives an overview of the dissertation. The social and phonetic framework of this study is introduced in Section 1.2. Section 1.3 presents the general and methodological research questions that will be answered in this study. Section 1.4 presents a chapter-by-chapter overview of this dissertation.

1.1   Overview

This dissertation reveals the social, attitudinal, and linguistic mechanisms behind language choices and change in postmodern urban China. More specifically, it investigates pronunciation norm formation in Beijing, the country's capital city. This can be distinguished in a mixed group of speakers under four normative forces: urbanization, Standard Chinese, native dialects, and the expression of belonging. First, since the 1980s, Beijing has been experiencing rapid urbanization and an increased influx of internal migrants. This massive population movement brings speakers with different dialect backgrounds and linguistic practices into daily contact. Second, Standard Chinese plays an increasingly important role in urban language life, due to the nationwide language policy of promoting Standard Chinese, as well as the intelligibility needs in social and economic life. Third, for both local Beijing native speakers and migrants, there is the added effect of, as well as possible allegiance to, their local urban or non-urban dialect or regiolect. Fourth, it turns out that the urban speakers are also subject to normative forces of a more personal nature, which are sometimes at odds with the national norm. Not only does the importance of speaking Standard Chinese prompt its widespread use, speakers at the same time also have the desire to fit into the local urban community and build their own linguistic identity.

To shed light on the impact of the various normative forces on pronunciation norms, the postvocalic *r* in Mandarin Chinese (the branch of the Sinitic language family that Standard Chinese belongs to), known as a salient sociolinguistic marker, is taken as the linguistic focus in this dissertation. The frequency, variation, and change of this *r* by local native Beijingers as well as migrants from various regions in China is described, and the social and linguistic constraints, as well as attitudinal effects, on its use and change are also investigated. Through examining the sociolinguistics of postvocalic *r,* this dissertation aims to reveal the linguistic outcome of the interplay between mass migration, Standard Chinese, native dialect, and individual language choices.

1.2   Social and phonetic framework

1.2.1   Urbanization, migration, and language change

Urbanization is a pervasive and rapidly growing process in which a population massively shifts from rural areas to urban areas, and towns and cities form or increase in size. For most of human history, the majority of people across the world lived in rural areas. However, this situation has shifted dramatically, particularly in recent decades. In the 1950s, no more than 30% of the world's population lived in cities. In 2007, the urban population overtook that in rural settings, for the first time in human history. Today, urban growth has accelerated dramatically, especially in developing countries. It is estimated that more than 55% of world's population now lives in urban areas (Ritchie & Roser, 2018; United Nations, 2018).

      China, one of the biggest developing countries, has been undergoing rapid urbanization and dramatic social changes since the Open Door Policy and economic reforms of the 1980s. The proportion of the population that is urbanized has been steadily increasing over the past decades. The total urban population in China rose from 36% in 2000 to around 63.9% in 2019, according to the 7th Population Census conducted in 2020. The city of Beijing has also been experiencing rapid urban growth and an influx of internal migrants since the 1980s. Beijing is the second largest city in China. In 2020, the total population in Beijing was estimated at about 21.9 million, of which 8.4 million consists of the permanent migrant population; the proportion of Beijing's population that is urbanized is about 87.5%.

      Since late 20th century, Western cities have been experiencing the social trend of postmodernity, paralleling the process of globalization, urbanization, and migration; cities in the East, including in China, are also experiencing developments that resemble and parallel those in any other nation in the world (Dirlik & Zhang, 2000; Lim, 2013). It is suggested that a postmodern society typically develops in a very large urban setting, where millions of people from different ethnic, linguistic, and cultural backgrounds live together. Moreover, postmodern societies are highly individualistic, and thus the concerns of the individual are more important than before (Lim, 2013; tutor2u, 2020). Specifically, there is an increased diversity of personal identities; specifically, there is an increased diversity of personal identities, as well as culture and language choices. It is believed that China and its rapid social and economic development, as well as the individuals and communities in its urban settings, are exposed to postmodernity and have inevitably been influenced (Dirlik & Zhang, 2000; Horner, 2015; Lim, 2013; Ning, 1997). Since the 1980s, more than ever before in the country's history, Chinese urbanization has brought people from different ethnicities, cultures, and language backgrounds into close social contact. Moreover, China has been playing a central role in the increasing globalization of the last decades. For this reason, post-modernists argue that these massive social changes lead to increased "decentralization," "cultural

diversity," and "some emerging or renewed sense of locality, individuality, and diversity" in China (Dirlik & Zhang, 2000).

Sociolinguistically, cities have been spectacular places where social and linguistic innovations originate and develop (Smakman & Heinrich, 2017), as language change usually occurs as a consequence of social changes and social contact between people. It is suggested that the establishment of Western sociolinguistics in the 1960s was inspired by the language of the cities, especially variationist sociolinguistics, which studies language variation and change in the urban communities of the United States and Europe (Smakman & Heinrich, 2017). The theory and approach of variationist sociolinguistics were subsequently extended to numerous other urban communities across the world.

In the past two decades, sociolinguistics and phonetics have jointly contributed to some variationist sociolinguistic studies, in which modern phonetic methods and instrumental techniques are employed in the quantitative analysis of language variation and change. The notion of sociophonetics has emerged as a new linguistic field. In addition, due to the rapid urbanization and dramatic social changes, language life in urban settings, in particular in developing countries, has been very different from that in the 19th century, when urbanization occurred in Western countries. The city is more diverse than it used to be, with people coming into contact on a daily basis with both local people and migrants with different ethnic beliefs, cultural backgrounds, behavioral norms, and language practices. In response to the new changes in large urban areas, urban sociolinguistics and the sociolinguistics of globalization are developing into important research paradigms, aiming to examine language life in cities and to adapt sociolinguistic approaches to language life in large urban settings (Smakman & Heinrich, 2017).

1.2.2   The *r*-sounds

The class of *r*-sounds is known by the term rhotics (Lindau, 1985). Rhotics are a common feature in the world languages. One or more forms of the *r*-sounds can be found in 75% of all human languages (Maddieson, 1984). For example, in some European languages, such as Dutch, German, Danish, and Swedish, two, three, or more rhotic sounds can be identified and distinguished from each other (Van de Velde & van Hout, 2001). Rhotic sounds have always intrigued linguists, due to their diversity in articulation, their effect on the adjacent vowel, their salience in perception, and their sensitivity to various types of prestige.

Phonetically, rhotics cover a wide range of places and manners of articulation, and almost all parts of the mouth are used in their articulation. The class comprises many variants, such as trills, taps, and flaps, fricatives, approximants, and vocalic realizations. In the International Phonetic Alphabet (IPA), symbols comprised of different forms of the letter 'r' are employed to represent the members of r-sound class, namely, r, ɾ, ɹ, ɻ, ɽ, ʀ, ʁ, and ɭ. The *r*-sounds bear many common phonetic characteristics. For example, most of them are voiced, and the dental-alveolar area is the most used place of articulation

(Lindau, 1985). Phonologically, the *r*-sounds form a heterogeneous group, as they behave similarly and act as a class in phonological rules. For example, they usually occupy the same place in the consonant system and in the syllable structure of different languages. Above all, the rhotics are defined by their phonological uniformity, rather than their "articulatory or auditory property" (Lindau, 1985; Maddieson & Ladefoged, 1996; Sebregts, 2015).

Many studies on rhotics in Western languages have been conducted in the fields of phonetics and sociolinguistics. For example, the voiced approximant /ɹ/ in American English is the most prevalent form, the tongue shapes of which range between the "bunched" and "retroflex" (Alwan et al., 1997). In Standard British English, the final schwa can be believed to be an *r*-vocalization. In Standard Dutch, both the place and manner of articulation of rhotics are so diverse that almost all variants of rhotics in the world languages can be observed in the urban accents of Dutch (Sebregts, 2015; Smakman, 2006; van de Velde & van Hout, 1999). Russian rhotics and laterals are classified as the liquids, since they have similar articulatory and phonetic features and have similar positions in syllables. The two contrastive rhotic consonants, namely the non-palatalized trill /r/ and the palatalized trill/rj/, as well as two laterals, are contrastive in word-initial, intervocalic, heterogenic medial coda, and word-final contexts. In Spanish, the allophonic variants of rhotics, alveolar trill /r/ and alveolar tap /ɾ/, can be found, while there is a wide range of variants of the syllable-initial trill /r/, which differ in articulation and the number of lingual contacts (Bradley & Willis, 2012). In the domain of sociolinguistics and sociophonetics, especially variationist sociolinguistics, variation and change in rhotics is also investigated. For example, one of the most well-known sociolinguistic studies—Labov's (1963) study on the social stratification of *r* in New York—looked at the variation of *r* in that city. Schützler (2010) studied the coda-*r* in Scottish Standard English using sociophonetic methods. Sankoff & Blondeau (2007, 2010) investigated the change in the two canonical variants—[r] and [R]—in different phonological contexts in Montreal French. Sebregts (2015) investigated all the variants of /r/ in Dutch.

In Mandarin, postvocalic *r*, rhotics or rhoticity, is called *ér-huà* in previous studies of Standard Chinese and Beijing Mandarin. Though rhotacization in Mandarin shows some phonetic similarities with the *r* sounds in Western languages, functionally, rhotacization in Mandarin has a number of interesting properties. First, unlike similar sounds in other languages, rhotacization in Mandarin usually functions as *r*-suffixation, which has morphological and lexicological functions. For example, in certain words, the *r*-suffix functions as a diminutive suffix. In other contexts, it can distinguish lexical meanings, and in yet others, it has stylistic effects. Second, rhotacization is realized by raising the tongue tip towards the backside of the upper teeth while pronouncing the syllable rime, on the position of the syllable coda. In addition, instead of co-existing with one or more different *r*-sounds, the rhotacization in Standard Chinese and Beijing Mandarin has only one recognized member, which is the voiced approximant /ɹ/. Thus, the variants of rhotacization are usually not distinct from each other, though speakers may show articulation differences

when pronouncing rhotacization. Finally, rhotacization is interesting from a sociolinguistic perspective, because of its association with the speech of the capital city of Beijing, with repercussions for how it is perceived by others. As a result of all this, rhotacization in Mandarin, unlike the *r*-sounds in many other languages, should be studied from several different angles at the same time, namely, from the phonetic, lexical, morphological, and sociolinguistic/sociophonetic perspective.

Overall, this dissertation is conducted in the social context of rapid urban growth and the influx of internal migrants to Beijing. As mentioned earlier on, three other normative forces—Standard Chinese, native dialects, and the expression of belonging—are also considered to be important social factors. This dissertation adopts the approach of sociolinguistics and phonetics to explore the sociolinguistic mechanism in language choices and language change, as well as the language attitudes of postmodern individuals in larger urban areas. The linguistic focus of this study is postvocalic *r* or rhotacization in Mandarin in the Beijing speech community.

1.3   Research questions

In order to reveal the effects of normative forces on language choices and change in postmodern China, I investigate the formation of pronunciation norms for rhotacization and address the interplay of language varieties, language users, and language attitudes in Beijing. I present naturalistic and spontaneous speech data collected from both native Beijing speakers and migrants from rhotic areas as well as from non-rhotic areas in China, across different age groups. Moreover, by means of semi-structured interviews, I also investigate the language attitude towards the use and users of rhotacization, its users, and the relevant language varieties.

I address three key issues in the study of language choice and language attitude. The first is the interplay of language varieties, language users, and language attitudes. The second is the social stratification of rhotacization in the speech community of Beijing. The third is constituted by the linguistic and social constraints on the variants of rhotacization.

The main research questions addressed in this dissertation are:

(1) What are the urban speakers' attitudes towards rhotacization, Beijing Mandarin, Standard Chinese, and the users of these varieties in Beijing, under the constraints of normative forces?

(2) How is rhotacization socially stratified in the urban speakers' naturalistic and spontaneous speech?

(3) How do linguistic and social constraints affect the variation, variants, and change of rhotacization?

In addition to these three general issues, two methodological issues are investigated in this study: (1) the collection and analysis of naturalistic and spontaneous speech by both native and migrant speakers; and (2) the pre-categorization of the target rhotacized rime according to its own linguistic features. The three general research questions and the two methodological issues will be briefly introduced in the following subsections.

1.3.1 The interplay of language varieties, language users, and language attitudes

The first research question mentioned above underlines the first goal of this dissertation: to reveal the interplay between language varieties, language users in the case of rhotacization, and language attitudes.

"Sociolinguists use a range of methods to analyze patterns of language in use and attitudes towards language in use" (Meyerhoff, 2011). Language attitude and language variation cannot be treated separately, as they are related to each other (Giles & Coupland, 1991). Language attitude is considered to be one of the "consequences of language variation" (Giles & Rakić, 2014) and thus plays an important role in language variation and change (Garrett, 2010; Garrett et al., 2003; Labov, 1984; Smakman, 2018). People's attitudes towards language in use are usually formed by assessing the use and users of certain language varieties and accents, and this could in return influence their own use of language. Both social and linguistic factors have an effect on the construction of language attitudes. For example, nonstandard accents, comprehensibility, and (non)standardization are believed to play a role (Giles & Rakić, 2014). However, previous studies have usually focused either on language choice, on language variation and change, or on the attitude towards language variants and its users. Though language attitude, as the main focus of study, can be found in many sociolinguistic studies in which language attitude is examined in different respects (Smakman & Heinrich, 2017), not many studies have examined speakers' attitudes towards the use and users of linguistic variants while investigating the variation and change of the linguistic variable in question.

The focus of the current attitudinal study lies on the lay viewpoints of and attitudes towards language varieties and users in postmodern Beijing. More specifically, it examines the interplay of language variables (rhotacization), language varieties (Beijing Mandarin and Standard Chinese), Beijing inhabitants (the users of the varieties: local Beijingers and migrants), and social changes (urbanization and migration). The phonetic system of Standard Chinese is based on that of Beijing Mandarin but lacks some of its features, such as the extensive use of rhotacization, which is a salient characteristic of Beijing Mandarin. Due to the promotion of Standard Chinese in China, the use of dialect, as well as the use of dialect features, such as rhotacization, is becoming increasingly limited. Moreover, internal migrants with different dialect backgrounds establish daily social and language contact with each other in Beijing. These urban speakers establish their local identity and at the same time also generate opinions on and

judgments concerning each other and their language. Through this attitudinal study, we hope to gain a better understanding of language choice and language variation, what the different speakers are thinking, why they think that way, and what kind of language outcome their attitudes may bring. In particular, it provides us insight into the interplay between language choice and change in rhotacization, as well as the formation of pronunciation norms, which are investigated in Chapters 4, 5, 6, and 7 of this dissertation.

1.3.2   The social stratification of rhotacization

The second research question mentioned above highlights one of the main goals of this dissertation: to identify the effects of social factors on language choice and language change in Beijing. More specifically, we will examine the social stratification of rhotacization in the Beijing speech community and its change in quantity and quality. This issue is also closely related to an important methodological issue: what types of data from what speakers in the community should be examined? These are important issues that will be explored in this study.

Language choice, language variation, and change in rhotacization in Mandarin is under-researched in the fields of dialectology, phonetics, and sociolinguistics. Before the notion of sociolinguistics was for the first time officially introduced in China in the 1980s (Y. Chen, 1980, 1983), it was mostly the linguists' job in the field of traditional dialectology and Chinese phonology to record and study regional varieties and their changes (M. Zhou, 2009). Though sociolinguistics as an independent subject was later established in China, the methodology and paradigms of Chinese traditional dialectology are still playing a part in the sociolinguistic studies of Chinese languages (M. Zhou, 2009). For example, fieldworkers tend to enter a speech community and look for participants who are mostly (old) local native speakers, the materials used are usually pre-selected single words, and the studies usually aim at recording speech in order to determine the phonemes and other phonetic properties.

Due to the dramatic social changes in Beijing since the 1980s, Chinese linguists noticed that the rhotacization in Beijing Mandarin was undergoing change. The early stage of so-called sociolinguistic studies on rhotacization focused mostly on the use or non-use of the *r* sound in a number of specific words usually rhotacized by Beijing native speakers (Y. Hu, 1987) and on the sound/phonemes of some controversial rhotacized rimes among elderly Beijingers (T. Lin, 1982; T. Lin & Shen, 1995; D. Sun, 1991). The "by-product" of such studies showed that the frequency of rhotacization was decreasing. In these studies, some social factors, such as the gender, age, and ethnicity of the speakers, were considered. However, although these studies employed some methods of Western sociolinguistics, they were conducted without an explicit sociolinguistic framework or methodology (M. Zhou, 2009). Although a few more recent studies on change in rhotacization (e.g., Peng 2002, 2003, 2004) claim the adoption of (variationist) sociolinguistic theory, rhotacization data were mostly elicited

from written materials, namely Beijing-flavored literature and Beijing local newspapers and magazines across different times. This raises the question as to whether rhotacization that appears in written materials can be considered to reliably reflect its variation and change, as well as speakers' choices. It is unclear how in this approach one can investigate how the sound of rhotacization actually changes in the community and how social and linguistic factors affect it.

There are a handful of sociolinguistic studies examining rhotacization in the speech of Beijing native speakers. For example, the rhotacization used by anchors in Beijing local TV programs (Peng, 2003) and the frequency of rhotacization and its trends based on a Beijing speech database established in the 1980s (C. Zhou, 2005, 2006). In Jing (2005) and Wang (2010), speakers were asked to read aloud a number of chosen words or other materials provided, to examine the presence or absence of rhotacization of particular words and possible differences across the speakers. However, studying rhotacization in the media or in read-out material is unlikely to lead to worthwhile results, as rhotacization is usually identified as an oral, informal, and changeable speech phenomenon (Cao, 2004; Qian, 1995; L. Wang, 2005), rather than a written and formal linguistic object, especially in Beijing Mandarin.

The general conclusion is therefore that in previous sociolinguistic studies on rhotacization and its change, the naturalistic and spontaneous speech of Beijing native speakers was not properly examined. What is more, only the speech of Beijing native speakers was investigated. Obtaining naturalistic speech and eliciting the targeted variable in it is an important goal in sociolinguistics (Meyerhoff et al., 2011; Schilling, 2013). That is, obtaining everyday colloquial speech in ordinary and informal interaction is necessary to maximally collect the variants of the variable examined. Such naturalistic data have been employed in variationist studies in particular. Thus, in the case of rhotacization in Mandarin, which is a particularly informal feature of speech and one that is subject to change, as mentioned above, eliciting it in natural speech would yield the full range of variability. Furthermore, in the context of urbanization and migration, people in Beijing are in constant contact with both local people and migrants. Thus, observing the use of rhotacization by migrants and non-native speakers in everyday interactions is as important as its use by native speakers. After all, they are all members of the Beijing speech community, and their language behavior affects the way the other members of the speech community use and change rhotacization. Thus, in this dissertation, rhotacization will be examined in naturalistic and spontaneous speech of both Beijing native speakers (of different ages) and migrants, both quantitatively and qualitatively.

1.3.3 Linguistic and social constraints on rhotacization

The third research question mentioned at the beginning of this section foregrounds another important goal in this study: to identify the social and linguistic constraints on the formation of pronunciation norms. This issue is also related to an important methodological question: How should these linguistic

and social constraints be investigated? Concerning the linguistic constraints in particular, apart from the common internal factors like vowel height, vowel type, stress, syllable context, and so forth, are there other internal linguistic factors constraining the variation of rhotacization?

A main empirical task of variationist studies is to correlate linguistic variation as the dependent variable with the independent linguistic factors (Chambers, 2008). Tagliamonte (2012) suggests that variationist sociolinguistics presumes both the constraints of possible social factors and the presence of linguistic factors that constrain language use. Linguistic factors can be categorized into different types based on linguistic characteristics. The three main categories are phonetic and phonological, lexical, and grammatical. Examining the linguistic constraints and their effects on the language variable under consideration is usually taken as a critical component in the study of language variation and change (Cheshire & Fox, 2009; Tagliamonte, 2012; J. Zhang, 2014).

This study intends to investigate the effect of linguistic (e.g., segmental, suprasegmental, and lexical) constraints, as well as social constraints on language choices and on variation in rhotacization in Mandarin.

Above all, this dissertation investigates speakers' attitudes towards both the use and users of rhotacization, Beijing Mandarin, and Standard Chinese in Beijing. Together with the quantitative and qualitative analysis of speakers, language choices and change in rhotacization, this study intends to present a picture of speakers' attitudes toward a salient sociolinguistic marker and how pronunciation norms are formed, under the constraints of normative forces in postmodern Beijing. It also aims to provide a context in which one can "compare what people think they are doing with what they actually are doing" (Meyerhoff, 2011).

1.4   Chapter-by-chapter overview

This dissertation consists of eight chapters. This current chapter, Chapter 1, presents an introduction to the research topics, the social and phonetic framework, and the research questions addressed in this study.

Chapter 2 introduces the linguistic and social background for the present research in detail, namely, rhotacization in general, in Beijing Mandarin, and in Standard Chinese; the Beijing speech community, urbanization, and migration are also further elaborated upon. In addition, it looks at previous studies about rhotacization in Beijing Mandarin and Standard Chinese, especially in the domains of phonetics, sociolinguistics, and dialectology. The nationwide language standardization policy of promoting Standard Chinese is also introduced. The goal of this literature study is to draw a picture of what phonetic and grammatical features rhotacization have, how rhotacization, Beijing Mandarin, and Standard Chinese are related, and in what social context the changes in rhotacization occur.

Chapter 3 describes the methods employed to collect the data. It introduces the research design with respect to data collection, including the criteria for selecting the participants, the procedures for recruiting them, speech recording and other procedures, and the methods used to collect natural speech. Furthermore, some related issues in data collection are also clarified.

Chapter 4 investigates the language attitudes of the urban speakers in Beijing towards the use and users of rhotacization, Beijing Mandarin, and Standard Chinese, in particular towards the use and imitation of rhotacization and the advantages/disadvantages of using and imitating it.

Chapter 5 and Chapter 6 investigate speakers' language choices concerning rhotacization in terms of frequency, from two different perspectives. These two chapters are structured in the same way. Chapter 5 presents the results of the rhotacization frequency in general and analyzes the differences that were found across speakers from different social groups. In Chapter 6, the frequency of rhotacization types is further examined, and the differences between the groups are also statistically tested.

Based on the results of Chapter 5 and 6, Chapter 7 examines the most frequently used rhotacized rime acoustically, obtains its variants across groups of speakers and presents the linguistic and social constraints on the formation of pronunciation norms for the rhotacized rime.

Chapter 8 discusses the results and presents the conclusions of the present research, its significance, and the direction of future work.

Chapter 2   General background

This chapter introduces the linguistic and social background for the present study. Section 2.1 offers a general description of rhotacization in Mandarin, including the two types of rhotacization, its position in a syllable, its phonetic and grammatical function, and previous studies about it. Section 2.2 introduces Beijing Mandarin and Standard Chinese, namely their relation, the promotion of Standard Chinese, and its impact on other varieties of Chinese and on rhotacization. Section 2.3 presents the social context of this study, including the Beijing speech community and urbanization, migration, and social and language contact in Beijing.

2.1   Rhotacization in general

The term "rhotacized vowel" can refer to the rhotacized vowel *er* in the vowel system of Standard Chinese and some other varieties of Mandarin or to the rhotacized rimes in rhotacized syllables. In the Pinyin romanization convention, the former is represented as *er*, while rhotacized syllables are generally marked by simply adding an *r* to the end of the syllable (e.g., *wánr* 'play') (Duanmu, 2007; Y.-H. Lin, 2007a). Though both instantiations are called rhotacized vowels, it should be noted that they are very different phonetically and grammatically. Below, the two different rhotacized vowels are introduced in detail.

Rhotacized vowel er[1]

Phonetically, the rhotacized vowel *er* is described as an unrounded rhotacized mid-central vowel, or it is said to be a central vowel [ə] carrying an *r*-coloring (Y. Hu, 2011; B. Huang & Liao, 2017; W.-S. Lee & Zee, 2003). In IPA, it can be transcribed in several different ways, such as [ɚ], [əɹ], [ər], [ə˞], [ɻ̩], [ɭ̩], [ɚɹ], [aɚ], and [ə˞ɹ]] (Duanmu, 2007; Y.-H. Lin, 2007a), depending on how broad or narrow the phonetic transcription is, as well as on the personal preference of the individual linguist. For simplicity and ease of presentation, we shall use [ɚ] as the phonetic transcription of the vowel *er*. In the Pinyin conventions, as mentioned above, it is written as *er*, while the letter *r* is not a consonant phoneme but is just a symbol used to indicate the retroflex motion of the tongue.

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[1] Linguists have different opinions on the category of the rhotacized vowel *er* in the Mandarin vowel system. Lee & Zee (2003) think that when the plain mid-central schwa [ə] occurs in an open syllable, it is rhotacized, namely the rhotacized vowel *er*. Duanmu (2007) calls it a 'retroflex vowel' and believes that it only occurs in the syllable [ɚ]. Lin (2007) suggests that it occurs in the rime [ɚ]. B. Huang & Liao (2017) believe that it is one of the seven Mandarin monophthongs [a, o, e, ê, i, u, ü, er]. However, as this rhotacized vowel *er* is not our research object, we will not talk about it further.

The vowel *er* can by itself form monosyllabic word, but the number of such monosyllabic *er* words in Mandarin is limited. In spoken Mandarin, there is just one, *èr* 二 'two', while in formal written Mandarin or classical (or classically colored) texts, we may encounter a few more, such as *ér* 儿 'son' *ér* 而 'and, but', *ěr* 尔 'you', and ěr 耳 'ear'.

Table 2.1 Examples of er as monosyllabic words and their lexical meanings.

Word	Pinyin	IPA	Meaning
儿	*ér*	[ɚ³⁵]	son
耳	*ěr*	[ɚ²¹⁴]	ear
二	*èr*	[ɚ⁵¹]	two

Rhotacization

The process of rhotacization of the rime in a syllable is the result of "suffixation of a sound *er* to a rime" (W.-S. Lee & Zee, 2003). Rhotacization is not a purely phonetic phenomenon; it also has morphological and lexical functions (M. Li, 1980).

Phonetically, rhotacization can be applied to all rimes in Standard Chinese. Articulatorily, rhotacization is realized by raising the tongue tip towards the post-alveolar region or by retracting the tongue body backwards when the rhotacized rime is pronounced (Y.-H. Lin, 2007a). We will go into this in more detail in Section 2.3.

From the perspective of suffixation, rhotacization has four different main functions. First, in some words suffixed with *r*, the suffix is a diminutive suffix (sometimes with the usual connotations of endearment or contempt). Second, it can function as a nominative suffix that can convert verbs or adjectives, for example, into a noun. Third, it can be lexically distinctive. Finally, rhotacized rimes can produce certain stylistic effects (B. Huang & Liao, 2017; C. T. J. Huang et al., 2014; Y.-H. Lin, 2007a). Consider the following examples.

Table 2.2 Examples of *r*-suffixed words.

	Unsuffixed			Suffixed		
a	*chē*	[tʂʼə^{55}]	'car'	*chēr*	[tʂʼəɹ^{55}]	'car' (dim.)
	lán	[lan^{35}]	'basket'	*lánr*	[laɹ^{35}]	'basket' (dim.)
b	gài	[kai^{51}]	'to cover' (verb)	gàir	[kaɹ^{51}]	'lid,cover' (noun)
	jiān	[tɕjan^{55}]	'sharp' (adjective)	jiānr	[tɕjaɹ^{55}]	'tip' (noun)
c	yǎn	[jan^{214}]	'eye'	yǎnr	[jaɹ^{214}]	'small hole'
	tóu	[tʼou^{35}]	'head'	tóur	[tʼouɹ^{35}]	'leader'
d				shàngbānr	[ʂaŋ^{51} pɑɹ^{55}]	'go to work'
				dàyuànr	[tɑ^{51} yɑɹ^{51}]	'courtyard'
e	hutong	[xu^{35} tʼuŋ^{0}]		hútongr	[xu^{35} tʼũɹ^{0}]	'narrow alleys in Beijing[2]'

In Table 2.2, (a) illustrates the fact that the *r*-suffix sometimes functions as a diminutive. The examples in (b) illustrate the working of *r*-suffixation as nominalization: *kài* [kai^{51}] is a verb and *qiān* [tɕjan^{55}] is an adjective, while their *r*-suffixed counterparts are nouns. The examples in (c) show that the *r*-suffixation can change the lexical meaning of a word, as in *tóu* [tʼou^{35}], which means 'head (body part)', while its *r*-suffixed form means 'leader'.

However, it must be noted that not all *r*-suffixed words fall into one of the categories above. As illustrated in (d), some words are usually used in their rhotacized form, without any special function or meaning (B. Huang & Liao, 2017; M. Li, 1980; Y.-H. Lin, 2007a). Furthermore, some words in Mandarin and in Beijing Mandarin can be used in both *r*-suffixed form and unsuffixed form with virtually no difference between the two forms. The forms hútong [xu^{35} tʼuŋ^{0}] and hútongr [xu^{35} tʼũɹ^{0}] in (e) illustrate this. However, this does not mean that these forms are in free variation. Which form is used is determined by sociolinguistic factors, and this is the topic of the current study.

2.2   Rhotacization in a syllable

As introduced above, rhotacization occurs on the syllable coda; the *r*-suffix merges with the syllable rime and becomes part of it. Thus, rhotacization leads to a series of segmental and suprasegmental changes on the syllable rime. In this section, the phonetics and phonology of rhotacization in a syllable will be briefly

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[2] Same meaning unsuffixed and suffixed.

introduced, but before that, we will first introduce the Mandarin syllable structure and the glide affiliation and clarify different views towards them.

2.2.1   Syllable structure

In Chinese linguistics, it is generally agreed that the Chinese syllable consists of (C)(G)V(X). The maximal size of a Standard Chinese syllable is either four segments CGVV or CGVC and the minimal size is one segment V or C, where C refers to a consonant, G to a glide, single V to a vowel, and VV to either a long vowel or a diphthong (Duanmu, 2007; B. Huang & Liao, 2017; Y.-H. Lin, 2007a).

However, Chinese linguists hold different opinions towards how to structure those components within a syllable. In general, there are mainly two main different approaches, namely the traditional Chinese linguistic approach and the Western linguistic approach. According to the traditional Chinese view, a syllable consists of two main parts: the INITIAL and the FINAL. The syllable INITIAL is an initial non-glide consonant. The FINAL is the remaining portion of the syllable, which can in turn, in the relevant cases, be further divided into the medial and the rime. The medial is a glide before the main nuclear vowel, while the rime contains the nucleus and the ending. The syllable nucleus is the nuclear vowel, and the ending can be either a post-nuclear vowel or a consonant. This syllable structure is shown in (1).

(1) Standard Chinese syllable structure: traditional Chinese linguistic analysis
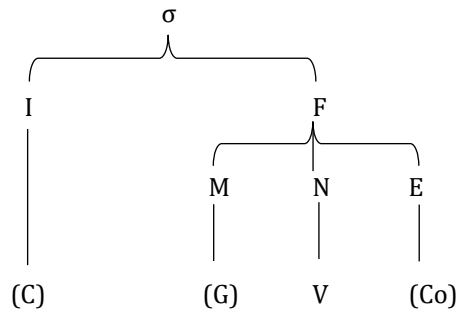
σ=syllable   I=initial   F=final
M=medial   N=nucleus   E=ending
C = onset consonant   G = glide
V =nuclear vowel   Co =coda

This traditional analysis of the Chinese syllabic structure has been adopted by linguists in Chinese phonetics and phonology for a long time (e.g., Hu 2011; Huang and Liao 2017), but in many recent studies, the Standard Chinese syllable structure is reanalyzed from a more contemporary perspective following the

Western linguistic tradition (e.g., Bao 1990, 1996; Duanmu 1990, 2007; Lin 2007). In this analysis, the Standard Chinese syllable contains an ONSET and a RIME. The onset consists of the onset consonant and the prenuclear glide. A rime can be further divided into the NUCLEUS and the CODA. The Western analysis of the syllabic structure is illustrated in (2).[3]

(2) Standard Chinese syllable structure: a common Western linguistic analysis
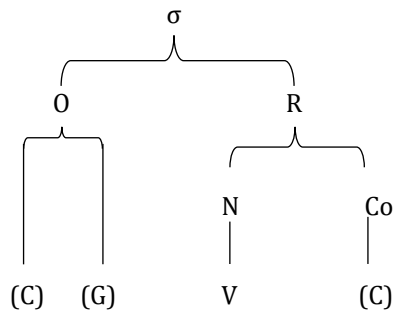
σ=syllable	O=onset	R=rime	N=nucleus
C = onset consonant	G = glide	V =nuclear vowel	Co =coda

It can be seen that regardless of the difference in component names, one of the biggest differences between the two analyses is the affiliation of prenuclear glide (PG) in the syllable, which is still under debate. According to Yang (2006), in the domain of Chinese phonology, there are about five different claims about the affiliation of prenuclear glides, which are: 1) PG belongs to the onset, 2) PG belongs to the rime, 3) the status of PG in a syllable is not clear, 4) its status is unknown and constitutes 'dissymmetry', and 5) PG is an independent segment. Each claim can presumably be supported with evidence. Since the status of the prenuclear glide is irrelevant to the current study, we will leave this controversial issue undecided. For convenience and simplicity, we will use the terms 'onset' and 'rime' in this study to address the onset consonant and the rest of a Standard Chinese syllable, respectively.

2.2.2   Rhotacization and segmental changes

The rhotic *r* is a suffix. It is appended to the syllable coda:

(3) (C)(G)V(Co) *r*

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[3] But some linguists argue that the second vowel component of the diphthong is not part of the coda or the ending; rather the whole diphthong is the nucleus.

In articulation, when the *r* sound is merged with the syllable rime, the retroflex feature of the sound *r* must be realized, and thus the incompatible features of the original syllable rime have to be eliminated, while the quality of the onset consonant and that of prenuclear glide are usually not affected. In this process, segmental processes, such as segment deletion, schwa insertion, and/or nasalization of the syllable rime may occur, depending on the height, frontness, roundness, and nasality of the syllable rime/coda. Such segmental changes occurring in the rhotacization process can be summarized using the following categories. A complete list of the Standard Chinese rimes and their rhotacized form in IPA is provided in Appendix A.

(1) Adding [ɹ] to the vowel
(2) Adding [əɹ] to the vowel
(3) Changing the rime [-ɻ] and [ɨ] into [əɹ]
(4) Dropping the coda [-i] or [-n] and adding [ɹ] or [əɹ]
(5) Nasalizing the vowel and adding [ɹ] or [əɹ]

2.3 Beijing Mandarin, Standard Chinese, and rhotacization

2.3.1 Chinese languages in general

Officially, there are in total 56 ethnic groups in the People's Republic of China, and it is said that more than a hundred languages are being used in the country. The largest languages in terms of number of speakers are the Sinitic languages, a branch of the Sino-Tibetan super family. The Sinitic language family is commonly categorized into seven main groups, each with its own dialects and subdialects (P. Chen, 1999; Duanmu, 2007; B. Huang & Liao, 2017; Ramsey, 1987). These groups are the following: Mandarin (北方方言, Běifāng fāngyán , also known as Guānhuà; spoken in northern and western parts of China), Wu (吴语, Wúyǔ, spoken mainly in the city of Shanghai, Jiangsu province and Zhejiang province), Xiang (湘语, Xiāngyǔ, spoken in Hunan province), Min (闽语, Mǐnyǔ, also known as Hokkien, spoken mainly in Fujian province), Gan (赣语, Gànyǔ, spoken in Jiangxi province), Kejia (客家话, Kèjiāhuà, also known as Hakka, spoken mainly in Guangdong, Guangxi, Fujian, and Sichuan province) and Cantonese (粤语, Yuèyǔ, spoken mainly in the provinces of Guangdong and Guangxi). In terms of geographical area and number of speakers, the Mandarin group is by far the largest of the seven dialect groups. It is estimated that over 70% of Chinese citizen speak (a variety of) Mandarin as their first language. As the varieties belonging to the other six groups are spoken in southern China (areas south of the Yangtze River), they are also called "southern dialects/languages."

In practice, the varieties belonging to the seven branches of the Sinitic language family introduced above are like different languages from the

perspective of mutual intelligibility (Norman, 2003). The varieties of the different branches are not mutually intelligible, and even speakers of different regional dialects from the same dialect groups can have great difficulties communicating with each other.

2.3.2   Standard Chinese and language standardization in China

Standard Chinese, also known as *Pǔtōnghuà* (普通话 'common language'), is the national lingua franca of mainland China. In the 1955 National Language Reform Conference and Symposium on the Standardization of Modern Chinese, the national spoken standard, *Putonghua*, was officially defined as follows (W. Chen, 1955; X. Zhang, 1955): "[It] is the common language of China, being based on the Northern (Mandarin) dialects, with the phonological system of Beijing Mandarin as its norm of pronunciation. Its written grammar is derived from works written in the contemporary vernacular literary language (Baihuawen) but exclude specific local expressions including those used in Beijing Mandarin." In this study, I use the term "Standard Chinese" to refer to *Putonghua*.

Legal basis for promoting Standard Chinese

The promotion of the standard language is determined to be the primary task in the language management on language and script in the 21st century. In 2000, the *Law of the People's Republic of China on the Standard Spoken and Written Chinese Language* was enacted by the State Council. This is the first national law on language use in China, which is "enacted in accordance with the Constitution for the purpose of promoting the normalization and standardization of the spoken and written Chinese language." It establishes the prominent status of Standard Chinese and standardized Chinese characters. According to this law, Standard Chinese must be used as the language in schools and other educational institutes, in broadcasting on radio and TV, in publications and in public places, except where otherwise specified by law. Local dialects as well as the original complex and other variant forms of Chinese characters can only be used under limited circumstances or if it is "approved by the relevant departments under the State Council."

Measures taken in Standard Chinese promotion campaign

Several measures were taken for the promotion of Standard Chinese nationwide. One key measure is the annual National Putonghua Promotion Publicity Week, which has been organized by the Ministry of Education of the PRC since 1998 and implemented by governments of various levels, including administrative, educational, and even military organizations. It usually takes place in the third

week in September, and each year there is a particular theme and slogan about the significance and advantages of speaking Standard Chinese. The publicity week is aimed at the masses, aiming to propagate the significance of Standard Chinese in social development and national unity and cohesion, raising the general awareness of standardized language and its use and to advocate the active participation by everyone in the promotion of Standard Chinese. There are many activities during the promotion week, such as making exhibition stands and hanging banners in public places, organizing Standard Chinese speech contests in schools and universities, and establishing more Standard Chinese proficiency test centers.

The Putonghua Proficiency Test (Putonghua Shuiping Ceshi) is believed to be another crucial measure to implement the national Standard Chinese promotion in the domains of government, education, and the mass media. It was proposed in 1994 by the State Language Council. In 2000, this test was included in the National Law of Standard Spoken and Written Language, which provided the legal force for its implementation. The law requires that all government departments, public institutions, schools, including individuals, primarily use Standard Chinese when engaging in public affairs. People in the mentioned domains must take the test to evaluate their level in Standard Chinese, and only with a proper level can they be admitted to a job. For example, college students are obliged to take the Putonghua Proficiency Test, and achieving a specific level is one of the graduation requirements. Those who study in a teachers college and intend to work as a teacher have to reach a higher level of Standard Chinese proficiency.

Disappearance and maintenance of dialects and minor languages

Significant progress on promoting Standard Chinese across the country has been made. According to the Survey of China's Language Use issued in 2015, 73% of the total population can communicate in (accented) Standard Chinese, and 95% of the literate population can use standardized characters. The promotion is believed to contribute to "promoting economic and cultural exchange among all the Chinese nationalities and regions."

However, the promotion of Standard Chinese leads to the marginalization and extinction of the non-standard Sinitic varieties and the minority languages. Since everyone is supposed to use Standard Chinese in public places and school, local varieties and minority languages have been restricted to use among family members and within local communities. As a result, local dialects and minority languages have lost their vitality among the young generation (H. Wang & Yuan, 2013).

The drive towards standardization also affects rhotacization. As we have seen, rhotics and rhotacization are not unique to Beijing Mandarin; they occur in other varieties of Mandarin as well (X. Sun, 1992; L. Wang, 2005). At the 1955 Symposium on the Standardization of Modern Chinese, it was proposed that a number of rhotacized words be adopted in the lexicon of Standard Chinese. In

1988, guidelines were drafted to limit the number of rhotacized words in Standard Chinese. In 2011, *The vocabulary of common rhotacized words in Standard Chinese* was approved by Ministry of Education of China (Department of Language Application and Administration of MOE, 2011). Only a small number of rhotacized words were incorporated into Standard Chinese.

2.3.3   Beijing Mandarin and rhotacization

Beijing Mandarin, the regional dialect spoken in the urban area of Beijing, is a subdialect of Mandarin. Since the Yuan Dynasty (1271–1368 CE), Beijing, which is situated in the north, close to areas inhabited by non-Chinese peoples, gradually became the political, economic, and cultural center of the Middle Kingdom. By the time the Manchu-speaking Qing Dynasty took over Beijing as its capital city in the 1640s, the language spoken in Beijing had been influenced for many centuries by both non-Chinese languages and other Mandarin and non-Mandarin Sinitic dialects. Since that time, the Beijing dialect gradually developed into what is now called Modern Beijing Mandarin, and this is this dialect that is the focus of the current study.

Although Beijing Mandarin is the phonological and phonetic basis of Standard Chinese, there are two main differences between the two varieties. The first primary difference is that Standard Chinese, unlike Beijing Mandarin, is not a natural regional dialect: it is the product of language planning. The second is that Standard Chinese has integrated into its lexicon vocabulary from other northern and southern Sinitic varieties, while some local expressions from Beijing Mandarin were excluded. The words adopted are usually adapted to the Beijing pronunciation; thus, the adoption does not affect the pronunciation system of Standard Chinese. However, due to the exclusion of some words, Standard Chinese has a slightly smaller syllable inventory than Beijing Mandarin. Therefore, although the pronunciation of Standard Chinese is based on that of Beijing Mandarin, as mentioned, the two varieties do not have identical phonetic and phonological systems. Also, as we have seen, rhotacization, the *r*-suffix, is a typical feature of Beijing Mandarin. Local Beijingers use rhotacized words extensively in their speech. As just mentioned, in Standard Chinese, there are only limited number of rhotacized words. As we have already seen, other Mandarin dialects do not use rhotacization as much as Beijing Mandarin, and the southern dialects (such as Wu and Yue) do not use it at all.

2.4   Speech communities of Beijing

2.4.1   General introduction

Beijing is located in the north of China. Its area is about 16,410 km^2 and, as mentioned earlier on, government statistics shows that at the end of 2020, the

city's population amounted to 21.9 million people. Beijing is the center of politics, economy, culture, education, and technology in China. With only a few interruptions, it has had the status of capital city since at least the 10th century.

According to the latest administrative divisions, there are 16 county level districts, namely Dongcheng (东城区), Xicheng (西城区), Haidian (海淀区), Chaoyang (朝阳区), Fengtai (丰台区), Shijingshan (石景山区), Mentougou (门头沟区), Fangshan (房山区), Tongzhou (通州区), Shunyi (顺义区), Changping (昌平区), Daxing (大兴区), Huairou (怀柔区), Pinggu (平谷区), Yanqing (延庆区), and Miyun (密云区). Figure 2.1 shows a map of Beijing with these administrative districts. On the basis of urban and rural properties and topographical features, these districts are classified into four parts: (1) the core functional zone, that is, the downtown area of the city, comprising the Dongcheng and Xicheng Districts; (2) the extended urban function zone, consisting of the Haidian, Chaoyang, Fengtai, and Shijingshan Districts; (3) the new urban development zone, with the Changping, Shunyi, Fangshan, Tongzhou, and Daxing Districts; and (4) the ecological conservation zone, consisting of the Miyun, Yanqing, Huairou, Pinggu, and Mentougou Districts. The core functional zone is the traditional inner city, featuring the political and cultural functions of Beijing. The urban function zone, which is often identified as part of the city center, is home to high technology industries, universities, and other educational institutions. The new urban development zones are characterized by the modern manufacturing and agricultural industries, while the ecological conservation zone is Beijing's ecological barrier and water source, which plays a significant role in sustainable development.
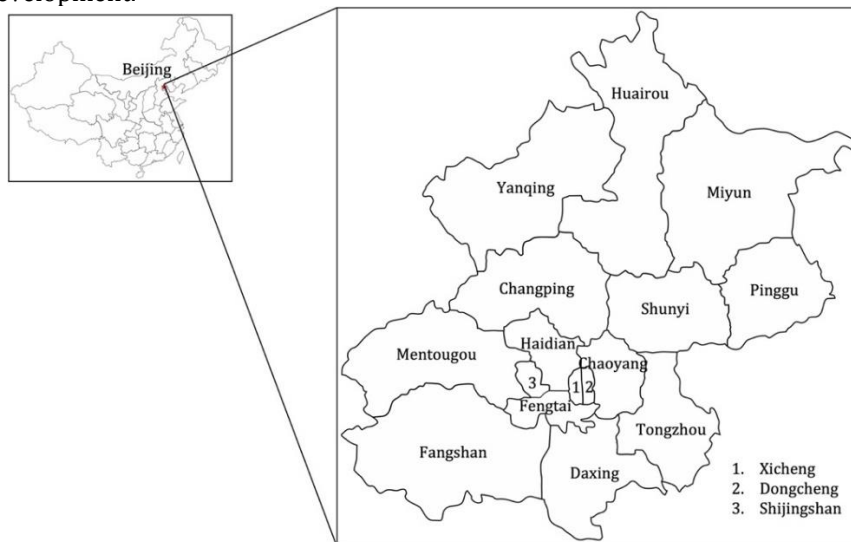
Figure 2.1 Administrative districts of Beijing city.[4]

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[4] This map is modified based on the maps on https://d-maps.com/

As of 2019, the permanent population[5] living in the capital core functional area, the extended urban function zone, and the new area of urban development amounted to about 19.8 million people, accounting for 91.2% of the total population in Beijing. Among them, the permanent migrant population[6] in these three areas is about 7.9 million, comprising 96.2% of the total permanent migrant population in Beijing. Thus, the three areas are the place where intensive social and linguistic contacts occur among Beijing natives and non-natives/migrants. In this dissertation, we will focus on language use and language contact, focusing on rhotacization and how it changes in these three areas.

2.4.2 Urbanization and migration

Urbanization, rural–urban migration, and the hukou system

Urbanization is a pervasive and rapidly growing process in which population massively shifts to urban areas. It is a common phenomenon, particularly in many developing countries. China, one of the biggest developing countries in the world and a country in transmission, is undergoing significant economic and urban growth and massive migration. Rural–urban migration, or internal migration, in China has been going on since the reform and Open Door policies launched by the central government in 1978. The reform caused millions of people to migrate from rural to urban areas, transforming the Chinese urban manufacturing and services industries.

When it comes to migration and population mobility in China, as well as their effects on people's identity and language use, it is important to mention the household registration system (*hukou*). This system is believed to have a huge impact on the population mobility, social equality, and integration since it was implemented (Feng et al., 2002; Z. Liang, 2001; Shen, 2013). The *hukou* policy was formally introduced in 1958 and was used for the purposes of registering the population and restraining its movement. People are grouped by their household into one of the two *hukou* statuses—*rural* or *urban*[7]—and the *hukou* is tied to a specific location; one's *houku* designation takes place at birth and is trans-generational, as the children's *hukou* status always follows that of their parents (Dong & Blommaert, 2009). Thus, a person having a *hukou* at a certain

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[5] Beijing Municipal Bureau of Statistics (2020) defines permanent population as "persons actually living at a place for more than half a year."

[6] Beijing Municipal Bureau of Statistics (2020) defines permanent migrant population as "persons who have no permanent residence registration in Beijing, come from other provinces, autonomous regions and direct-administered municipalities, and have stayed in Beijing for more than half a year."

[7] The official terms are *agricultural* and *non-agricultural houku*, respectively.

place can only access the local social services—such as health care, education, and subsidized housing—in the location specified in their *hukou*. Furthermore, changing the location of one's *hukou* or the status from *rural* to *urban* is strictly controlled by the state and is very difficult (W. Li, 2013; Shen, 2013). Before the reforms of the 1980s, population movement and registration in China was tightly controlled by the *hukou* policy. Since the early 1980s, following the thriving manufacturing industries and the increasing demand for laborers in cities, the enforcement of migration restrictions was gradually relaxed, which is believed to be a main driving factor behind urbanization (P. Zhao & Howden-Chapman, 2010). Migrants were enabled to "temporarily" seek jobs and be employed in a place other than their *hukou*-registered residence. Since the 1990s onwards, more *hukou* reforms were implemented, leading to further relaxation of the institutional control of the *hukou* system on population movement (Zhu, 2007; Zhu & Chen, 2010). However, those reforms did not change the *hukou*-related uneven distribution of social welfare and resources in cities. Migrants and their accompanying family members without a local urban *hukou* are still barred from equal access to essential local urban services, such as housing subsidized by local governments, health care services, and schools (Chan 1994, 1996; Fang 2018; Zhao & Howden-Chapman 2010).

It is believed that in the process of urbanization, many reasons, such as radical social changes, social inequality, and institutional constraints, can cause social unrest and conflicts among people. In the case of China, the *hukou* system is believed to be one of the most critical causes of these problems, as it further widens the urban–rural gap in China (W. Li, 2013; Shen, 2013; P. Zhao & Howden-Chapman, 2010), creates institutional barriers to migrants, results in unequal distribution of social resources between urban local residents (local *hukou* holders) and rural migrants (B. Hu & Zhang, 2018), and causes social conflicts between them (B. Hu & Zhang, 2018; W. Li, 2013; Shen, 2013; P. Zhao & Howden-Chapman, 2010).

Beijing and social and language contact

Beijing has experienced rapid urban growth and an increased flow of internal migrants since the reform and Open Door Policy of the 1980s. Like in other cities in China and in many other countries, urbanization has created numerous job opportunities in urban areas, where migrants seek better employment opportunities and higher income. Over the past three decades, Beijing has witnessed an increase of its permanent population of 10.86 million in 1990 to 21.9 million in 2020. In particular, the permanent migrant population increased dramatically from 0.54 million in 1990 to 8.42 million in 2020. Furthermore, over the same period, the proportion of the urbanized population in Beijing, increased from 55% to 87.5% (Beijing Municipal Bureau of Statistics, 2021). It should be noted that in 2020 the permanent migrant population accounted for 40% of the city's total population. The permanent migrant population in Beijing originally comes from all over China, but more than half of them come from five

provinces, namely, Hebei (24.6%), Henan (12.3%), Shandong (8.8%), Heilongjiang (6.3%), and Anhui (5.6%), as shown in a census study in 2015 (Beijing Municipal Bureau of Statistics, 2015). Except for Anhui, all of these provinces are in northern China.

Massive migration usually leads to massive social and language contact between the locals and the migrants, as well as among the migrants themselves. It is widely believed that social changes and social contact lead to language contact and can also influence people's (language) identity, factors that have an impact on the language choices and change (Ball, 2010; Bayley, 2013; Meyerhoff, 2011). Migrants enter the city and come into daily contact with the locals and other migrants having different behavioral norms, sociocultural knowledge, and language practices, and they must somehow learn to accommodate themselves or to adhere to certain practices to adapt to the city. Moreover, social conflicts and social unrest also emerge, including income disparity, high prices for housing, educational inequality, and migrants' feeling of relative deprivation[8] (National Bureau of Statistics, 2004). These issues have attracted much attention from various fields of research. For example, there are studies in sociology, sociolinguistics, and sociopsychology devoting attention to issues such as the floating population's place affiliation and their identity formation and re-formation, as well as the second generation migrants' education and identity construction and social stratification in Beijing (Dong & Blommaert, 2009; Kwong, 2011; W. O. Lee & Qi, 2021; Y. Wang et al., 2019; M. Zhang, 2016), as well as the impact of institutional *hukou* restrictions and other factors on their identity and integration (Li W., 2013; W. Li, 2013).

This concludes this chapter, which has introduced the linguistic phenomenon we will investigate (rhotacization) as well as the environment in which we will study it, the lively capital city of Beijing , with its mix of people who have lived in the city for generations and others who have newly arrived from all over the country. How does this situation affect the phenomenon of rhotacization? Will new migrants use it in an effort to blend in? Will Beijingers use it more to emphasize their naiveness or will their speech be affected by the migrants and the government policies aiming to stimulate the use of Standard Chinese.

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[8] According to Schulze & Krätschmer-Hahn (2014), "Someone is labeled as deprived if he/she is underprivileged in a material or immaterial way. A person will be relatively deprived if he/she feels anger or dissatisfaction because of his/her discrimination in relation to the better situated others. Relative deprivation is, in short, the perceived discrepancy between personal status and the status of some relevant other(s). Without using the concept of quality of life explicitly, the concept of relative deprivation is described from the beginning in terms of quality of life substantially."

Chapter 3   Methodology

This chapter presents the general methods and research design used for the collection, processing, and analysis of the data in this dissertation. The details concerning data manipulation and the statistical methods employed in different experiments will be introduced in the corresponding chapters.

Section 3.1 introduces the social variables of the participants examined and the actual number of participants in this study. Section 3.2 discusses the theoretical methods and practical considerations in participant recruitment for the fieldwork. The details of the recording procedures, including devices and equipment utilized in fieldwork, sample rate, and so forth, will be presented in Section 3.3. Section 3.4 introduces the two methods of sociolinguistic data collection in this study and discusses circumstances that may influence the data quality and objectivity in data collection.

3.1   Participants

3.1.1   Age

One of the primary tasks of variationist sociolinguistics is to understand language change that occurs over time. Apparently, older people do not talk the same as younger people. Therefore, "establishing that a pattern of variation represents a change in progress typically requires the consideration of speakers of different generations" (Milroy & Gordon, 2003).

Variationist sociolinguists, thus, utilize two important methods of analysis to study language change in progress: (1) the real time method, conducting a longitudinal study to collect the speech of the same people in different life stages, by revisiting the same speech community in different periods; (2) the apparent time method, sampling speakers of different generations at a single point in time, and simulating and modeling real time change by using synchronic data (Meyerhoff, 2011). Age differences are believed to be able to reflect historical stages of language change in progress (Tagliamonte, 2012). The apparent time method is a more time-efficient and practical approach, because the diachronic data are usually not available to researchers and because time and money is usually insufficient to construct a real time corpus.

There are a few of studies about the effects of age on rhotacization in Mandarin. In the study of the speech dispersion of rhotacization in Beijing Mandarin, age is found to be an important factor (T. Lin & Shen, 1995; D. Sun, 1991). L. Wang's (2014) study on the use of rhotacization by people of different generations finds that older people have more knowledge of the lexical and emotional connotations of rhotacization than younger people and also use more rhotacization in their speech, while some young people tend to have little knowledge of these aspects and thus use less rhotacization in spoken Mandarin.

In this study, the effects of generational change will be measured among three age groups, namely the Young (18 up to and including 27 years old), the Middle (38 up to and including 47 years old), and the Old (58 years old and older)

of both native and non-native speakers of Beijing Mandarin in the speech community of Beijing.

3.1.2   Gender

Gender has been proven to be an important social variable in sociolinguistic research. It has been found to have an effect on the preference of variation in many variationist studies.

The findings of stratification studies (Labov, 1963; Trudgill, 1972) on this variable suggest that there is generally a link between women and standard language use. Specifically, women tend to use more "prestige" or high-status language features, while males tend to use more vernacular language features. A number of explanations have been proposed to explain gender effects on language, including biology, cultural patterns, covert prestige, the social position of women, and societal norms and practices.

Gender differences have been proven to affect language use in different linguistic phases, an example of which is their effects on rhotacization in many languages. However, the opinions on the relationship of gender effects and language varieties are quite varied and are to some extent underestimated in sociolinguistic studies on Mandarin rhotacization. Lin & Shen's (1995) study finds that there is no gender difference regarding the convergence of rhotacization among Beijing local people. Jing's (2005) sociolinguistic study on variation and change in rhotacization doesn't consider gender as a variable.

In the present study, we take gender as a social variable and try to determine if gender affects the use of rhotacization in the speech community of Beijing.

3.1.3   Dialect background

In this study, region of origin also plays a role, in view of language variation in China, especially in as far as it concerns rhotacization. Generally speaking, varieties of Chinese spoken in northern China tend to be rhotic, while southern varieties tend to be non-rhotic (B. Huang & Liao, 2017). The participants to our study belong to three different dialect background groups, namely, "Beijing native speakers," "Rhotic speakers" and "Non-rhotic speakers". The "Beijing native speakers" were born and raised in Beijing and still live there; crucially, their parents were also born and raised in Beijing. "Rhotic speakers" and "Non-rhotic speakers" were not born and raised in Beijing. They moved there from elsewhere in China, at the time of the fieldwork, they were working or studying in Beijing. Rhotic speakers come from areas in China where rhotacization is used in the regional dialect. These include speakers whose native dialect is, for example, Tianjin Mandarin, Harbin Mandarin (in Heilongjiang), or Shijiazhuang Mandarin (in Hebei). Non-rhotic speakers are originally from non-rhotic areas,

that is, areas in which rhotacization is not part of the regional varieties of Chinese. They hail from areas such as Jiujiang (in Jiangxi) (where they speak a variety of Mandarin), Guangzhou in Guangdong (Cantonese), and Fuzhou in Fujian (Northern Min).

It should be noted that in previous studies of Beijing Mandarin, Beijing native speakers were divided into two groups, "Old Beijingers" and "New Beijingers," based on differences in their family language backgrounds (Y. Hu, 2011). Hu investigated social influences on the use of rhotacization in the speech of Beijingers, discovering that family language background is an important factor. In his study, Old Beijingers are native speakers who were born and raised in the urban area of the city. They are considered to be "real" Beijing natives, and the Mandarin they speak is taken as the "proper" native Beijing Mandarin. New Beijingers are Beijingers who were born and raised in Beijing, but whose parents were not born and raised there. In our study, Beijing native speakers are defined as Hu's Old Beijingers, except that we don't specify that they have to come from the urban center of Beijing. Due to the urbanization in past twenty years in Beijing, the urban area has expanded, and new city settlements continue to be developed. Local Beijingers have often moved from their original urban areas to newly developed areas in the city, where they were joined by native speakers and people who arrived in the city more recently.

3.1.4   Ethnicity

The demographic census in 2018 shows that the permanent resident population of Beijing is about 19.6 million. Among them, 18.8 million are Han people, accounting for about 96% of the total population. In this study, we will not consider ethnicity as a social variable, due to the dominance of the Han ethnicity and Mandarin in Beijing.

3.1.5   Summary[9]

The intended number of participants was four in each Dialect–Gender–Age subgroup, which means there should be 72 participants in total. However, it was

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[9] Other variables, like ethnicity, are less relevant, as mentioned in Section 3.1.4. Level of education should be an important variable as well. However, the problem is that there is an overlap among the variables age, social status, and level of education. Cao (1991) observes that in China, there is a relation between level of education and age. Younger people are usually more educated than older people. Furthermore, those who have high social status are always highly educated. For this reason, level of education is not considered as a separate variable here.

not equally easy to get access to the intended number of participants for each group.

The speech data used in this study were collected during two fieldwork trips to Beijing, in October and November 2015 and September and October 2017. During these periods, 121 participants were recorded in total. However, not all the recordings could be used in data processing and analysis, due to practical and technical reasons. For example, in some cases, social factors of the participants, such as age and dialect background, turned out not correspond to the categories we needed in this project. In other cases, the recording quality of some two-participant conversations ("pair talking," explained in Section 3.4.1) was not good enough to conduct an acoustic analysis, due to factors such as a noisy recording environment and interruptions. As a result, in the end the recordings of 76 participants were subjected to analysis in this study. Of these 76 participants, 31 are Beijing native speakers and 45 are migrants. They are all Han Chinese. On the basis of age and dialect background, the actual number of participants in each group is given in Table 3.1.

Table 3.1 Actual number of participants.

Gender	Age	Beijing Mandarin	Rhotic dialect	Non-rhotic dialect
Male	Young	8	4	4
	Middle	4	4	4
	Old	4	4	2
Female	Young	7	4	5
	Middle	4	4	3
	Old	4	2	5
	Total	31	22	23

Based on the aspects of the sociological information of these participants listed above, three independent variables were set up for the testing of social conditioning effects on the use of rhotacization. In what follows, predictor names are presented in uppercase, and levels of categorical predictors are in italics. In our analyses, the social predictors include:

(1) AGE (Young, Middle, and Old)
(2) GENDER (Male and Female)
(3) DIALECT BACKGROUND (Beijing, Rhotic, and Non-rhotic)

3.2 Participant recruitment

Three methods of participant recruitment were involved in this study: (1) random searching by the author, (2) using her social networks in the community,

and (3) the top-down method. Most participants were approached through the latter two methods.

When the author made her way into the community, she tried to simply apply a random sampling methodology to this study. "Participant recruitment leaflets" were posted on the bulletin boards on the campus of several universities, as well as in several residential areas in Beijing. The leaflets outlined the requirements of intended participants, payment, the general purpose of this research, and so forth. The leaflets were worded using general terms understandable to lay readers. It was stated that the object of this study is to observe the everyday languages spoken by residents of Beijing, while the real intent of studying rhotacization was not mentioned in the leaflets, lest people become overly self-conscious about pronouncing rhotacization in recordings.

However, this random sampling method turned out be an inefficient way to generate contacts, due to the constraints of low trust between strangers in Chinese society. University students did contact the author, from which some people who met the experiment criteria were randomly chosen. However, although several people in residential areas got in touch with the author via the contact information on leaflets, they showed strong distrust towards the survey. The author constantly found herself having to explain what she was doing there in the community. After further explaining the purpose and motives of this study, only a couple of people were willing to participate.

Later, a "snowball sample" or "friend of a friend," the well-known sociolinguistic method, proved to be an excellent way to find participants. The "friend of a friend" is "a community member with whom the researcher shares a common friend or acquaintance" (Bayley & Lucas, 2007; Meyerhoff et al., 2011; Milroy, 1980). This method enables fieldworkers to obtain more naturalistic and spontaneous speech than if they are viewed chiefly as researchers (Bayley & Lucas, 2007). Moreover, participants have higher motivation because they are helping their friends. The author thus turned to her personal networks that have ties to the community, such as previous classmates, friends, relatives, and family. These people were asked to contact their friends and acquaintances who fit into the required categories.

3.3   Data collection

The data collection was conducted during the two fieldwork visits in Beijing in 2015 and 2017. Both of the visits were planned for the autumn, the most comfortable season of the year (in the summer, temperatures can reach 40 degrees or more, while in the winter minus 10 is not unusual). In the autumn, people do not need air conditioners to keep cool or heaters to stay warm. In this way, we avoided the noise from air conditioners or heaters. Speakers also tended to be more patient and cooperative in the experiments under these conditions.

Speakers were interviewed in their own neighborhood. Their speech was recorded in a quiet room, which they were very familiar with (for more details,

see below), and the doors and windows were closed during the recording to reduce background noise.

The topics for participants to discuss were presented on two Microsoft PowerPoint slides on a 13.3-inch laptop screen. The font size was 50 points, easier for older participants to read when they sit about one meter away from the screen. The display laptop was a MacBook Air, whose weight was 1.35 kg with battery. It had up to 12 hours of battery life, which was more than enough for one-day use of PowerPoint displays. In view of the fanless design of the MacBook Air, there would be no loud fan noise as may have been the case with fan-equipped laptops.

The speech of the participants was recorded on digital audio tape using a portable TASCAM DR-07 recorder. The recordings were sampled at 48 kHz (24 bits).

The author of the present study was the interviewer, and she had two fieldwork assistants who were both native speakers of Mandarin. They were all graduate students of phonetics and had experience in dialectological fieldwork.

3.4 Research design

3.4.1 Pair talking

The data collection methods of sociolinguistic fieldwork, such as group recordings, "target where one variant shows up by whom, what it is and how it changes" (Schilling, 2013). Furthermore, recording speakers in small group interactions is a way of obtaining more naturalistic, spontaneous speech and can address the observer's paradox. Some of the awkwardness associated with overt recording can be reduced, because the speakers are allowed to talk about daily topics and self-select who speaks when. Speakers may also feel more relaxed with familiar faces (Meyerhoff et al., 2011; Schilling, 2013). Pair talking is a form of such group recording for data collection in sociolinguistic fieldwork. Two speakers who are familiar with each other conduct a conversation on familiar topics in a familiar place (Schilling, 2013).

Data collection in this study was intended to obtain naturally occurring rhotacization from both native speakers and migrants in the speech community of Beijing. In the data collection, every time one person willing to participate was recruited, he/she was asked to self-select a partner to attend the pair talking, usually a friend, a member of their family, a roommate, a colleague, or a neighbor. They could also freely choose a quiet place that they were familiar with. Places such as one participant's study room at home, a office, or a conference room were usually chosen. The topics designed were all related to their everyday life in Beijing or memories of their childhood or hometown, such as "your experiences

with or opinions on the air and traffic in Beijing"[10] or "your experience with full marks/low marks on an exam when you were/your (grand)child was a student". The complete list of given topics can be found in Appendix B.

3.4.2   Sociolinguistic survey

The sociolinguistic survey complements the pair talking and "allows for greater breadth of coverage" (Schilling, 2013). It can help to target features that may or may not be present in conversational settings and can also help the researcher glean detailed information on respondents' characteristics, their identification of variants, varieties, and their attitudes toward the speakers who use them. The information elicited from sociolinguistic surveys can help to test if they are correlative with language variation. The information on perceptions and attitudes can be used to complement and explain production-based studies.

3.4.3   Respondents

The sociolinguistic survey was conducted immediately after each pair talk. The participants in the pair talks were, thus, the respondents of this sociolinguistic survey. Right after each pair talk, the author of this study interviewed one respondent while her fieldwork assistant interviewed the other respondent at the same time. However, instead of sitting face-to-face or next to each other as in pair talking (as introduced in Section 3.4.1), the two respondents were separated and interviewed in two different rooms. In this way, the respondent could not hear and thus was not influenced by the other parallel interview. All interviews were recorded with the respondents' permission.

3.5   Related issues

Overcoming the observer's paradox

One important goal in collecting sociolinguistic data is "to observe how people speak when they are not being observed" (Labov, 1972b), because only when speakers are unobserved can one collect the natural and spontaneous speech that they would use in daily life. However, the presence of a fieldworker, a

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[10] Beijing is notorious for its caustic air, caused by its rapid industrialization. People in Beijing have long suffered from the traffic congestion and hazardous air. Everyone in Beijing, rich and poor alike, both young and old, cannot ignore the effects of traffic and air quality. Therefore, this is a daily life topic that everyone can talk and complain about.

recording device, or the task in an interview can trigger the observer's paradox (Meyerhoff et al., 2011). The problem, faced by sociolinguists in particular, is that, in observing or interviewing people to find out about their habits of speech, investigators will, by their own presence and participation, tend to influence the forms that are used. For these reasons, sociolinguists utilize several methods to mitigate the effects of the observer's paradox in data collection. These include modifying the number of participants in an interview, topics discussed, and the task.

As mentioned in Section 3.4.1, group recordings, which record people in group interactions, is believed to be an effective method for mitigating the observer's paradox. Speakers may feel more relaxed with familiar interlocuters in a place familiar to them, leading them to produce naturalistic and spontaneous speech. The pair talking is one type of such group interaction, in which two people who are familiar with each other to talk about familiar topics. Moreover, such topics can often evoke participants' strong emotions connected with their past experience. This diverts participants' attention away from their speech and helps trigger their vernacular (Labov, 1972b).

Speech convergence between interlocutors

While overcoming the observer's paradox, we are also aware that there is the possibility of speech convergence and divergence between interlocutors in a conversation, which can affect participants' speech. Accommodation theory, proposed by Giles (1973) and Giles & Powesland (1975), suggests that speakers tend to adjust their speech toward or away from that of their interlocutors, although, conversely, they may also keep their speech uninfluenced. These phenomena are respectively called convergence, divergence, and maintenance. Whether the speaker accentuates the similarities or differences of his/her speech depends on the "psychological distance" they want to keep with their addressee and their attitudes towards him/her.

Speech convergence is found to be more frequent than divergence and maintenance, a phenomenon that is also known by the terms phonetic imitation, alignment, and entrainment.

Many studies have measured the influences of acoustic-phonetic factors on speech convergence. Data were collected in speech shadowing tasks and in conversational interaction. The measures of the AXB perceptual-similarity task and acoustic analysis are employed. In the perceptual task, listeners hear and then decide whether the pre-(A) or post-(B) exposure utterance sounds more similar to the middle utterance (X) in pronunciation (Babel et al., 2013, 2014; Goldinger & Azuma, 2004; Namy et al., 2002; Shockley et al., 2004). Acoustic attributes, such as vowel selection (Pardo, Gibbons, Suppes, & Krauss, 2012), duration (Gentilucci & Bernardis, 2007; Pardo et al., 2013), VOT(voice onset time) (Sanchez et al., 2010; Shockley et al., 2004; Yu et al., 2013), fundamental frequency (Babel, 2012; Garnier et al., 2013; Mantell & Pfordresher, 2013;

Postma-Nilsenová & Postma, 2013), F1 and F2 (Babel, 2010, 2012; Gentilucci & Bernardis, 2007; Pardo et al., 2013; Vallabha & Tuller, 2004; Walker & Campbell-Kibler, 2015), and the F1 × F2 vowel space, of converged utterances are also examined to see if there is a relation between perception and production in speech convergence. However, convergence was reported to be "subtle, variable, and inconsistent" (Pardo et al., 2017) due to the complexities of convergence itself and different methodologies in those studies.

Meanwhile, some studies also investigated the effects of factors related to the talkers themselves, such as gender, relationships between talkers, and attitudes towards model talkers (Pardo et al., 2012). Some found that the role of a talker affects the degree of phonetic convergence or convergence "moderately: relates to the relationship of the talkers (Pardo, 2006; Pardo et al., 2012).

Effects of other factors on phonetic convergence were also examined, including word frequency (Pardo, 2013; Pardo et al., 2017) and talkers' experience with the words being examined in the experiments, as well as voice types (Babel et al., 2014), social preferences, and liking (Babel, 2012).

Above all, many studies have examined phonetic convergence from different perspectives. It is agreed that the phenomenon of convergence is perceived to exist between interlocutors and that it is observed in a laboratory setting. However, results of those studies on the various dimensions of convergence are still inconsistent. Issues such as the degree and scope of convergence, its acoustic correspondence and attributes, the phonemes subjected, and talkers' effects are not commonly agreed upon.

We are aware of the phenomenon of rapid phonetic convergence in a conversational setting. However, in this present study, we would still utilize the speech data from pair talks, even if some participants do not share the same linguistic background. First, as mentioned above, those studies mentioned above concluded that the relation between perceptual and acoustic measures on convergence is holistic and variable. Furthermore, laboratory experiments on two previously unacquainted participants are different from a real social conversation. As mentioned above, in the present study, the pair-talk design is based on the principle of "people who know each other talking about familiar topics in a familiar place." When they recalled their childhood memories and interesting life experiences, the participants were quite relaxed and could converse with each other in a positive and natural manner. Their attention was diverted to recalling their story and telling it. Accordingly, this design could trigger the natural and spontaneous speech of participants, which is believed to be the ideal speech data in a socio-phonetic study.

When recruiting participants and before doing the pair talking, participants were informed to talk in the way they do in their daily life.

As mentioned above, according to accommodation theory, both convergence and divergence can occur in an interactional conversation. We should not take for granted that convergence will necessarily occur. Furthermore, the mechanism of convergence and divergence in the context of Chinese culture is quite complicated. Due to rapid social development in Beijing, people differ greatly regarding to what they think highly of.

Chapter 4   Sociolinguistic Survey

4.1   Introduction

In sociolinguistic research, language attitude is considered to be an important factor in language choices, variation, and change (Garrett, 2010; Garrett et al., 2003; Labov, 1984; Smakman, 2018). The present chapter seeks to reveal the lay viewpoints of and attitudes towards the use and users of rhotacization, as well as the use of Beijing Mandarin and Standard Chinese and their users, in the Beijing speech community. As mentioned in Chapter 2, rhotacization in Beijing Mandarin and Standard Chinese, as well as Beijing Mandarin and Standard Chinese more generally, share many characteristics, while not being entirely the same. While Beijing Mandarin (BM), the regional dialect of Beijing, is the pronunciation model for Standard Chinese (SC), one of the biggest differences between them is that rhotacization in SC is strictly limited (Duanmu, 2007; B. Huang & Liao, 2017; Y.-H. Lin, 2007a). In the view of lay people, BM is sometimes still regarded as SC itself and Beijing natives are considered to speak "correct" SC (Dong, 2009, 2010), but little research has been conducted on the general public's actual perception of the differences between BM and SC and of rhotacization in the two varieties. Furthermore, when Beijing natives and (accented) Standard Chinese-speaking migrants are in contact in the Beijing speech community, the use and change of rhotacization and that of Beijing Mandarin and Standard Chinese more generally, as well as the attitudes towards them, are inevitably bound together.

Moreover, due to the nationwide promotion of SC and the status of SC education in compulsory school education, language use in China and people's accents are strongly impacted (Dong, 2009, 2010; S. Liang, 2015; Xu, 2019; M. Zhou, 2001). As a consequence, if Beijing native speakers speak a more standardized variety, they will probably produce fewer rhotacized words. This would allow us to gain insight into their language use and change by examining issues, such as the self-reported opinions about which Mandarin variety they use, as well as the self-perception of the authenticity of their own BM. This result can help explain changes in the nature and the use of rhotacization. Furthermore, migrants come to Beijing and make contact with both Beijing natives and other migrants in the Beijing speech community. Their attitude towards SC, BM, and rhotacization can influence their language behavior. As is well known, linguistic forms, varieties, or styles can influence the prestige of a language variety and the linguistic forms, varieties, and styles that people use can lead to assumptions about the status and other characteristics of these users (Garrett, 2010; Giles & Rakić, 2014; Labov, 1972a; Meyerhoff, 2011; Smakman, 2018). The use of Beijing Mandarin and rhotacization or manifesting an accent explicitly or not are probably issues that are relevant to the attitude towards the different varieties in the larger Beijing speech community. The attitude of members of this community towards the different varieties spoken in Beijing and towards rhotacization more particularly constitute the focus of this chapter.

The investigation into language attitudes reported in the current chapter mainly focuses on the following questions:

1) What are the lay viewpoints of the differences between Beijing Mandarin and Standard Chinese? Which Mandarin variety do Beijing respondents themselves report that they use?
2) What is the respondents' opinion towards the imitation of Beijing Mandarin and rhotacization by migrants?
3) Are there any advantages and disadvantages to speaking Beijing Mandarin?

This chapter is structured as follows. The method is described in detail in Section 4.2. In Section 4.3.1, the results of Beijing native respondents are presented, while those of migrant respondents are presented in Section 4.3.2. Section 4.4 concludes the chapter.

4.2   Method

Survey questions

The sociolinguistic survey was conducted in the form of semi-structured interviews between the interviewer and the respondents. The interviewer simply asked respondents questions directly about their language attitude, perception, preference, and so forth. Such a "direct approach," together with word-of-mouth techniques, was applied in this survey.

The semi-structured interviews were conducted in a relaxing and unrestrained way. Before the interview, the respondents were told that there were no standard answers to the questions, and they were encouraged to freely give their answers, as well as their comments and opinions relevant to topics. Like the pair talking session, they were not told the exact research objects of this survey.

As shown in Appendix C and D, some of the questions are closed-ended questions,[11] which means respondents were presented with a limited number of simple options, such as "yes," "no," or "no opinion." Some of the questions were open-ended, and respondents could give their opinions and thoughts freely. The interviewers only interrupted them "inadvertently" by asking a question if the respondent wandered off onto other topics. The interviewers could also ask for clarification and ask follow-up questions. In addition, respondents sometimes talked about topics that were lower on the question list, as a result of which the interviewers needed to adjust the order of the questions, as well as the way they were asked.

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[11] A closed-ended question in a survey is a question that provides respondents with a fixed number of pre-defined and usually simple options to choose from as a response. An open-ended question is defined as a question type that respondents can answer in detail, elaborating on their opinions.

The focus of this survey study is to examine the respondents' attitude towards Beijing Mandarin, Standard Chinese, and the use of rhotacization by migrants. Opinions on the use of Beijing Mandarin and Standard Chinese were also involved. As can be seen in Appendices C and D, the surveys mainly involve five aspects, namely a) personal information, b) language background, c) language ability, d) language use, and e) language attitudes. The first four of these aspects are mainly aimed to obtain background information.

Depending on the dialect background of the respondents, two different versions of the sociolinguistic survey were used, as shown in Appendices C and D. One survey (Appendix C) was for Beijing native speakers, while the other (Appendix D) was intended for migrants. The questions in the two surveys are slightly different from each other, to align with the respondents' background as a local Beijinger or as a migrant (*Rhotic* or *Non-rhotic* dialect background). The two versions of the sociolinguistic survey were formatted and printed out on a sheet of A4 paper. The interviewers could refer to the questions on the printout in the interview.

Response categories and data process

As mentioned above, there were mainly two different types of questions in the interview: closed-ended questions and open-ended questions. For the closed-ended questions, the response categories were the limited options provided. Respondents could only choose one of the options as their answer. For the open-ended questions, no options were provided. Respondents could give their answers freely and openly, air their opinion, and talk more if they wanted to.

To be able to evaluate and compare the respondents' responses, they had to be grouped into measurable categories. The response categories were obtained by following the following steps:

a) We randomly chose the interviews with 36 respondents[12] as samples.
b) The author of this study listened to the interview recordings herself and grouped the answers to each question into different categories.
c) The author checked the categories she made with another four Ph.D. students in linguistics by listening to the interviews with the 36 respondents together, and the final response categories for each question were determined in the discussion with those four students.
d) As a final step, the author listened to the interviews with the remaining respondents and categorized their answers according to the categories that we established on the basis of the samples (see steps a–d at the

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[12] In this study, there are six Gender–Age groups per dialect background group and there are three dialect background groups. Thus, there are 18 Gender–Age groups in total. We randomly chose two respondents per Gender–Age group, resulting in 36 respondents as our sample.

beginning of this section). While listening to the recordings of the interviews, some of the spontaneous and emotional opinions relevant to topics were transcribed by the author.

Analysis

This research is primarily a qualitative study, combined with quantitative methods. There are mainly two types of attitude data in this research. Type I is the respondents' answers to the "language attitude" questions in the survey. Our focus is interpreting and analyzing these data. Type II is spontaneous and self-reported emotional attitudes from the respondents, triggered by the questions in the survey. It is used as complementary data, to supplement and support the analysis of the first type of data.

The number and percentage of responses to the categories of each question were calculated, and (stacked) bar charts were made using the ggplot2 (Wickham, 2016) package in R (R Core Team, 2020) to show the results of each question. Some representative excerpts were chosen and analyzed.

4.3   Results

4.3.1   Beijing native respondents

Differences between Beijing Mandarin and Standard Chinese

Beijing native respondents were asked about their opinions on the difference between Beijing Mandarin and Standard Chinese and their knowledge of the typical features of Beijing Mandarin. They indicated their opinions by answering two questions: "Do you think Beijing Mandarin and Standard Chinese are the same?" and "What do you think are the typical features of Beijing Mandarin?" The second question is an open-ended question and respondents could freely give their answers.

Q1. Do you think Beijing Mandarin and Standard Chinese are the same?

The respondents were presented with three options, YES, NO, OTHER, and NO OPINION. The results are shown in Figure 4.1.

Figure 4.1 Response to the question (31 responses from 31 Beijing native respondents).

More than half of the respondents believed that Beijing Mandarin and Standard Chinese were different from each other (NO). About 26% chose OTHER, all of whom thought that there were only SMALL DIFFERENCES between the two. About 20% believed that the two were the same thing, while 3.2% had NO OPINION.

Q2. What do you think are the typical features of Beijing Mandarin?

The respondents were allowed to name one or more features of Beijing Mandarin. Their answers were grouped into six categories, namely, RHOTACIZATION, DIALECT VOCABULARY, FAST SPEECH, SWALLOWING SOUNDS & SLURRING, TONE & INTONATION, and NO OPINION. The results are shown in Figure 4.2.

Figure 4.2 Response to the question (67 responses from 31 Beijing native respondents).

More than one third of the respondents reported that RHOTACIZATION is the typical feature of Beijing Mandarin which is the most reported feature. TONE & INTONATION (25.4%), DIALECT VOCABULARY (22.4%), FAST SPEECH (10.4%), and SWALLOWING SOUNDS & SLURRING (3.2%) were also believed to be typical. 3.2% of the respondents did not have an opinion (NO OPINION).

Variety being used

Beijing native respondents were asked to report their opinion on Beijing Mandarin and Standard Chinese used in the Beijing speech community and the authenticity of their Beijing Mandarin. Both questions are close-ended questions.

Q1. Which Mandarin variety do you think you usually speak: Beijing Mandarin, Standard Chinese, or something else?

The respondents were presented with three options, BEIJING MANDARIN, STANDARD CHINESE, and OTHER. The respondents could only select one option from the three. The responses to this question are in Figure 4.3. Respondents needed to clarify what the variety was if they chose OTHER. It turned out that the clarifications of OTHER came down to the same thing: 'I think I speak Standard Chinese, but it is Beijing-flavored'. Thus, in the figure, we replaced the response category OTHER with BEIJING-FLAVORED STANDARD CHINESE.

Figure 4.3 Response to the question (31 responses from 31 Beijing native respondents).

About two-thirds of the respondents believed that they spoke BEIJING MANDARIN. Almost 20% chose STANDARD CHINESE and about 13% specified that they spoke BEIJING-FLAVORED STANDARD CHINESE.

Q2. How authentic is your Beijing Mandarin compared to that of old Beijing native speakers?

The respondents self-evaluated the authenticity of their own Beijing Mandarin by answering this question. Four options were defined for the respondents to choose from: AS AUTHENTIC, SIMILAR,[13] NOT AS AUTHENTIC, and NO OPINION. The respondents gave one response only. Figure 4.4 shows the results.

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[13] The response category SIMILAR is an authenticity category between AS AUTHENTIC and NOT AS AUTHENTIC. For example, a respondent said: "I speak
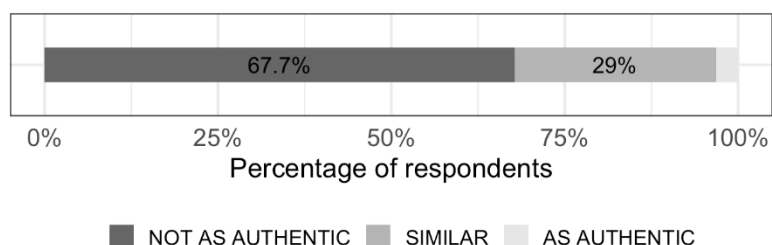
Figure 4.4 Response to the question (31 responses from 31 Beijing native respondents).

About 68% of the respondents believed that their Beijing Mandarin was NOT AS AUTHENTIC as that of the old Beijing native speakers. About 30% thought that their Beijing Mandarin was SIMILAR to that of the old native speakers, and only 3.2% of the respondents believed that they could speak AS AUTHENTIC a Beijing Mandarin as the old native speakers.

The two extracts below come from two native respondents' extra comments after they were asked about the four questions above.

> Extract 1: Respondent M33, Beijing native, male, young.
> **M33:** …I spoke Beijing Mandarin before. I was not aware of it until when I was just in college. (My) classmates said that my Beijing accent was very strong. Since then, I spoke Standard Chinese, and the Beijing flavor I had became weaker.
>
> Extract 2: Respondent M29, Beijing native, male, young.
> **M29:** …When I need this (Beijing) identity, I switch (to Beijing Mandarin). When talking to Beijingers, I emphasize my accent a little bit deliberately… like, rhotacization, intonation, etc… When taking a taxi, the driver might be friendly to locals, and he would not rip locals off. So, I show I have a stronger Beijing flavor than him, he can't fool me. So, when I need to let people know that I'm from Beijing, I just talk like that, but when I need to hide it, I hide it.

Respondent M33's response indicated that he was not aware that BM and SC were different until he had contact with non-native students and got comments from them on his accent. After having become aware of his accent, this respondent consciously avoided the Beijing flavor in his speech and chose to speak SC. It is not known when Respondent M29 found out that BM and SC were different, but in our fieldwork, he showed that he was very aware of the characteristic features of BM. As is clear from the quotation, he is aware of the

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in a way similar to the local old people, but there are some small differences. Like some words, I don't use them anymore, but I can understand them."

differences between BM and SC and he uses either the one or the other, depending on which variety suits him best at that particular time.

All in all, the answer provided by the Beijing native respondents to the four questions in 'Differences between BM and SC' and 'Variety being used', as well as in the excerpts provided, show that BM and SC were perceived to be different from each other and among others, rhotacization in BM was taken as its most typical feature. In addition, most native respondents reported that they no longer spoke as authentic BM as the old generation.

Migrants' imitation of Beijing Mandarin and rhotacization

Beijing native respondents were asked about their perception of migrants' imitation of BM and rhotacization and their attitudes towards the imitation. There are four sub-questions in this topic.

Q1. Did you notice that some migrants imitate Beijing Mandarin?

The native respondents were asked if they noticed migrants' imitation of Beijing Mandarin in the past. They could choose from three categories, YES, NO, and NO OPINION.
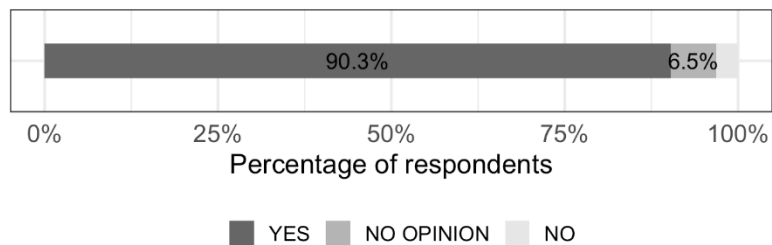
Figure 4.5 Response to the question (31 responses from 31 Beijing native respondents).

About 90% of the respondents reported that they noticed that migrants imitate Beijing Mandarin (YES). 6.5% of the respondents did not have an opinion (NO OPINION). Just about 3% of the respondent did not notice or hear the imitation by migrants (NO).

Q2. In what ways did they imitate Beijing Mandarin?

If the answer to Q1 was YES, respondents were asked to provide extra information about migrants' imitation strategies by answering this question. This was also an open-ended question, and respondents could indicate one or

more ways of imitating that they have perceived. Their answers to this question were grouped into five categories, namely, RHOTACIZATION, DIALECT VOCABULARY, TONE & INTONATION, NO OPINION, and NO IMITATION. The results are in Figure 4.6.
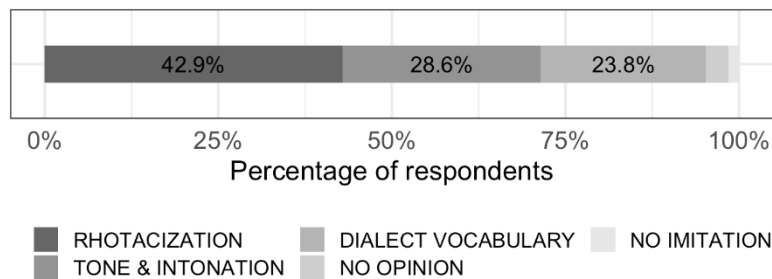
Figure 4.6 Response to the question [63 responses from 31 Beijing native respondents]

Almost 43% of the respondents reported that migrants noticeably imitated RHOTACIZATION in Beijing Mandarin. The second and third are TONE & INTONATION (about 30%) and DIALECT VOCABULARY (about 24%). The other respondent(s) reported either NO IMITATION or had NO OPINION (about 5% in total).

Above all, the results of the two questions show that most native respondents have noticed that migrants speak some Beijing-flavored Mandarin and that they frequently adopt rhotacization in their speech. Compared to other features in Beijing Mandarin, rhotacization imitation is probably more frequent and perceptually very salient. This may be because migrants may not produce sufficiently authentic rhotacizations, which may make them more easily noticed. Subsequently, native respondents were asked about their perception of what those imitated rhotacization sounded like and their attitudes towards the imitation.

Q3. What does the imitated rhotacization sound like?

This is an open-ended question, and respondents could give multiple answers. Their answers were grouped into six categories, namely, UNNATURAL, AWKWARD & STIFF, NOT LIKE, FUNNY, OTHER, NO OPINION, and NO R-IMITATION. The responses to this question are in Figure 4.7.
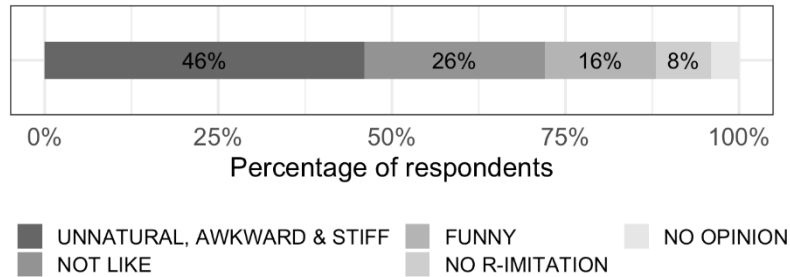
Figure 4.7 Response to the question (50 responses from 31 Beijing native respondents).

Almost half of the respondents reported that the migrants' rhotacization sounded UNNATURAL, AWKWARD & STIFF. About a quarter of the respondents reported it NOT LIKE, and about 16% said that it sounded FUNNY. 8% did not notice the rhotacization imitation (NO R-IMITATION), and the rest had NO OPINION.

      It is obvious that if an imitated rhotacization sounds UNNATURAL, AWKWARD & STIFF, it is also NOT LIKE. However, the latter sounds neutral while the former sounds like a quite negative comment. Also, respondents especially emphasized the former.

Q4. What is your attitude towards the adoption of rhotacization by migrants?

Respondents were asked whether they hold a POSITIVE, NEUTRAL, or NEGATIVE attitude towards the migrants' imitation of rhotacization, while NO OPINION was an additional option. They were only allowed to choose one option. The results are in Figure 4.8.
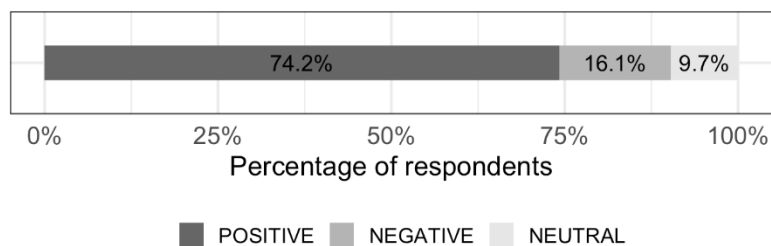
Figure 4.8 Response to the question (31 responses from 31 Beijing native respondents).

All respondents reported their general attitude towards the adoption of rhotacization in Beijing Mandarin by migrants. About three-quarters indicated that they had a POSITIVE attitude. About 16% did not support the adoption of

rhotacization (NEGATIVE), while about 10% were NEUTRAL towards it. None of the respondents chose the response category NO OPINION.

Here are two excerpts from two Beijing native respondents' extra comments after they were asked the questions about migrants' imitation of rhotacization and their attitudes towards it.

Extract 3: Respondent M37, Beijing native, male, young.
M37: …it sounds far-fetched to add *r* to words. Sometimes there is a strict distinction between words with *r* and without *r*. Rhotacization is a very natural thing, but they say it deliberately, especially southerners. …no need to learn Beijing Mandarin. Some migrants think that it's very important for them to learn Beijing Mandarin and acquire a Beijing identity. Actually, I don't think it's necessary.

Extract 4: Respondent F7, Beijing native, female, middle.
F7: … some people think they are Beijingers after some years in Beijing. …we can tell if the rhotacization is spoken by migrants or by native Beijingers. Their imitation is not like native speakers' speech. Especially southerners sound quite funny. … but I am very happy and welcome that they want to learn. Beijing is my home. You're a guest, and you want to learn our language. I'm very proud.

Both respondents gave negative comments concerning migrants' imitated rhotacization. According to them, they can easily recognize the non-native rhotacization, which sounds unnatural and farfetched and is used in the wrong words. They mentioned that southerners, who are migrants from Non-rhotic backgrounds, did especially badly. However, the two respondents had different attitudes towards the imitation of rhotacization by migrants. As a Beijinger, Respondent F7 took pride in it, while Respondent M37 thought it unnecessary because rhotacization is difficult to learn and having the accent would not bring them the Beijing identity anyway.

Above all, among all different means of imitating BM, the migrants' rhotacization imitation was reported to be the most noticeable, probably due to incomplete acquisition and the use of rhotacization in the wrong words. However, most respondents still thought it acceptable and had a positive attitude towards the imitation.

Advantages or disadvantages?

Q1. Do you think speaking Beijing Mandarin brings any advantages or disadvantages?

To answer this question, native respondents needed to choose whether Beijing Mandarin brought advantages (ADV.) or disadvantages (DISADV.) or brought no

advantages or disadvantages (NO ADV./DISADV.) to themselves. The NO OPINION category was also included. The results are in Figure 4.9.

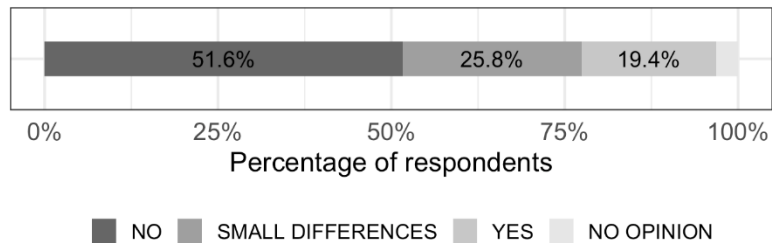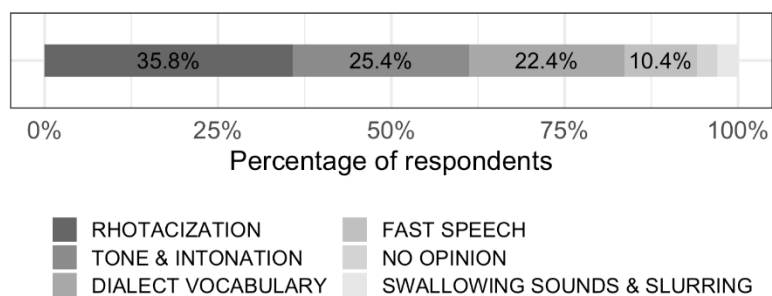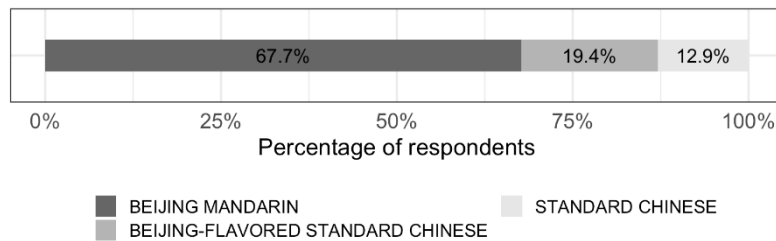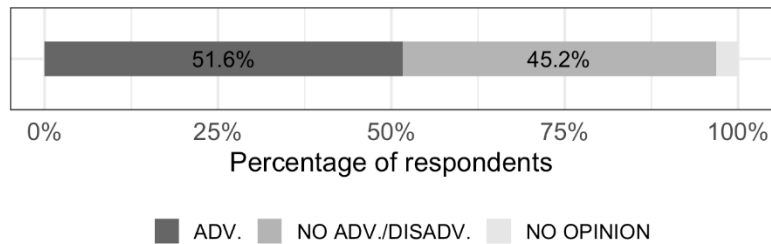**Figure 4.9** Response to the question (31 responses from 31 Beijing native respondents).

More than half of the respondents reported that they perceived that speaking Beijing Mandarin has at some point in time brought them advantages (ADV.). Almost half of the respondents believed that speaking Beijing Mandarin brought them no advantages or disadvantages (NO ADV./DISADV.). The rest had NO OPINION about this question. No respondent reported disadvantages (DISADV.) of speaking Beijing Mandarin.

It can be seen that the differences in the percentages of ADV. and NO ADV./DISADV. was small and that no respondent chose DISADV. However, when respondents supplemented their answers with their self-reported and emotional comments triggered by this question, a different story was told. The excerpts below come from four native respondents who chose the option NO ADV./DISADV.

Extract 5: Respondent F31, Beijing native, female, young.
F31: I don't think there are advantages. The characteristics of Beijing Mandarin are very similar to those of Beijingers, not being positive and upwards, but just muddling along, and doing so in the comfiest of ways.

Extract 6: Respondent F1, Beijing native, female, old.
F1: … We do admire migrants. You migrants work harder than Beijing kids. Beijing kids are quite lazy. However, some Beijingers hate and exclude migrants. Because … they put Beijingers under a lot of pressure.

Extract 7: Respondent M15, Beijing native, male, middle.
M15: No advantages or disadvantages. For quite a long time, I was reluctant to admit that I'm a Beijinger. Most people here are migrants, not Beijingers…. I was afraid that we would not be able to integrate into the group. … It's already great if we're not discriminated against. I don't think it's good to speak Beijing Mandarin anymore. I had that idea [i.e., that speaking BM is good] when I was in my 20s, but now in my 30s, I don't think so anymore.

Extract 8: Respondent M16, Beijing native, male, old.
M16: What advantages can Beijing Mandarin bring?! Beijingers are the least capable in this city, and all those who are capable are migrants.

It can be seen that neither the chosen option to the question or the extra comments directly indicated that speaking BM brought disadvantages to them. However, respondents intuitively connected BM or speaking BM with speakers' characteristics and capability and their social status. For instance, respondent F31 believed that BM carries the features of local Beijingers, such as enjoying being "comfy" and not being "upwardly mobile." Respondents F1 and M15 mentioned that migrants worked harder and were more capable, in contrast to "lazy" Beijingers. Respondent M15 used to feel good to speak BM but not anymore, due to the pressure from migrants. Though respondents did not explicitly declare disadvantages (DISADV.) of speaking BM, their supplemented comments showed that in their minds, speaking BM is not prestigious and brought them no advantages.

Q2. What are the advantages?

Respondents who chose ADV. to the question above were asked to clarify the advantages. This is an open-ended question, and respondents could also give further information regarding to this topic. Their answers were grouped into four categories, namely, EASIER TO COMMUNICATE, SENSE OF SUPERIORITY, OTHER, NO OPINION, and NO ADV./DISADV. The responses to this question are in Figure 4.10.
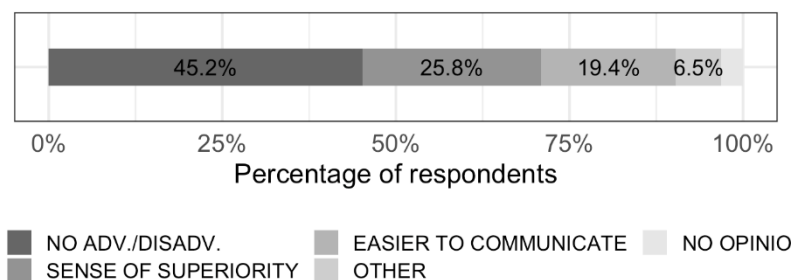
Figure 4.10 Response to the question (31 responses from 31 Beijing native respondents).

None of the respondents gave more than one response. Besides the 45.2% of the respondents who chose NO ADV./DISADV in the previous question and 3.2% who had NO OPINION, 25.8% reported that speaking BM gave them a SENSE OF SUPERIORITY, 19.4% reported that speaking BM made it EASIER TO COMMUNICATE with people, and 6.5% reported OTHER.

Below are excerpts from respondents' self-reported comments who reported SENSE OF SUPERIORITY and EASIER TO COMMUNICATE as their answer to this question.

Extract 9: Respondent F33, Beijing native, female, middle.
F33: My husband is a migrant. ... When we had parties with his old friends in his hometown, they recognized my speech immediately and then asked: "Is your wife a Beijinger?" They realize that I'm from Beijing, from the capital, not from some other place. I can feel that ... they think that's awesome. I do have a sense of superiority. ... I also feel pretty good being a Beijinger.

Extract 10: Respondent F15, Beijing native, female, middle.
F15: When I was serving in the army in Anhui, there were people from everywhere. They were not Beijingers. They had accents, but I didn't. They said, 'Wow, you're from Beijing, that's great!' Actually, outsiders really envy us Beijingers. That made me feel pretty good.

Extract 11: Respondent F16, Beijing native, female, middle.
F6: When we're on holiday in other places, people from everywhere can understand us, as long as they can speak SC.

It can be seen that the advantages of speaking BM reported by Beijing respondents were made mostly made manifest outside the Beijing speech community. Respondents F33 and F15 felt a SENSE OF SUPERIORITY when they had contact with non-Beijingers in a place other than Beijing. By reporting that speaking BM makes it EASIER TO COMMUNICATE, respondents mostly meant that due to the relatively small linguistic differences between BM and SC, they were intelligible and that they could easily understand other SC speakers.

4.3.2   Migrant respondents

Differences between Beijing Mandarin and Standard Chinese

Like Beijing native respondents, migrant respondents were also asked about their opinions about similarities/differences between Beijing Mandarin and Standard Chinese and the typical features of Beijing Mandarin. Both questions were open-ended.

Q1. Do you think Beijing Mandarin and Standard Chinese are the same?

The respondents' answers to this question can be grouped into four categories, YES, NO, SMALL DIFFERENCES, and NO OPINION. The results show in Figure 4.11.
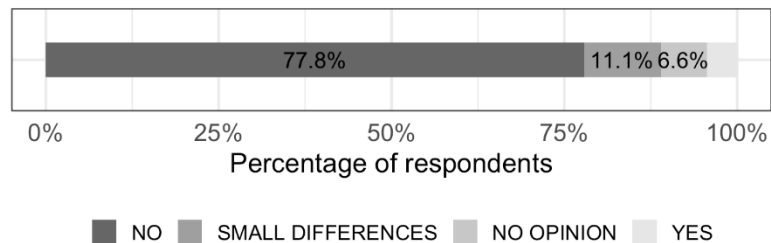
Figure 4.11 Response to the question (45 responses from 45 migrant respondents).

About 78% of migrant respondents believed that BM and SC were different from each other (NO). About 11.1% thought that there were only SMALL DIFFERENCES, and 6.6% had NO OPINION. 3.2% (who were from Non-rhotic dialect backgrounds) said that BM and SC are the same.

Q2. What do you think are the typical features of Beijing Mandarin?

Respondents were allowed to name one or more features of Beijing Mandarin. Their answers to this question were grouped into six categories, namely, RHOTACIZATION, DIALECT VOCABULARY, SWALLOWING SOUNDS & SLURRING, TONE & INTONATION, FAST SPEECH, OTHER, and NO OPINION. The results are shown in Figure 4.12.
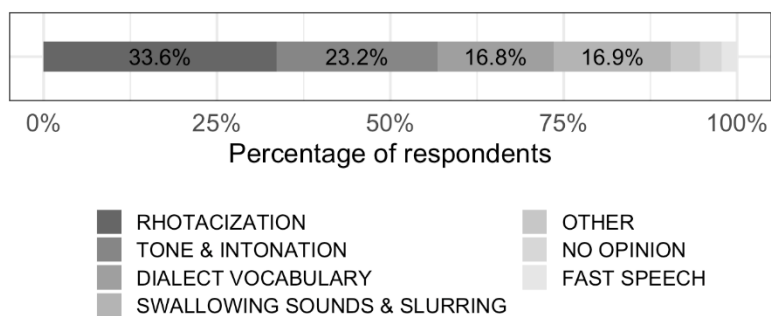
Figure 4.12 Response to the question (95 responses from 45 migrant respondents).

About a third of the respondents reported that RHOTACIZATION is the typical feature of BM. Features, like TONE & INTONATION (23.2%), DIALECT VOCABULARY (16.8%), SWALLOWING SOUNDS & SLURRING (16.9%), and FAST SPEECH (5%) were also believed to be typical. The rest reported OTHER features or did not have an opinion (NO OPINION).

The extract below is a migrant respondent's extra comment after she was asked what the typical features of BM are.

Extract 12: Respondent F6, rhotic speaker, female, young.
F6: ...Rhotacization. ... It seems to me that no word in Beijing Mandarin is not rhotacizable.

The comment of this respondent indicated that BM rhotacization is very salient in the perception of migrants. This comment may sound exaggerated—in actuality, not every word can be rhotacized—but in this way, the respondent showed that rhotacization in BM is used extensively.
Above all, most migrant respondents reported that BM and SC are different, and BM is characterized by its rhotacization.

Imitation of Beijing Mandarin and rhotacization

Q1. Did you adopt some Beijing Mandarin after you came to Beijing?

The respondents indicated whether they themselves imitated BM or not. They could choose one of three categories, YES, NO, and NO OPINION. The results are in Figure 4.13.
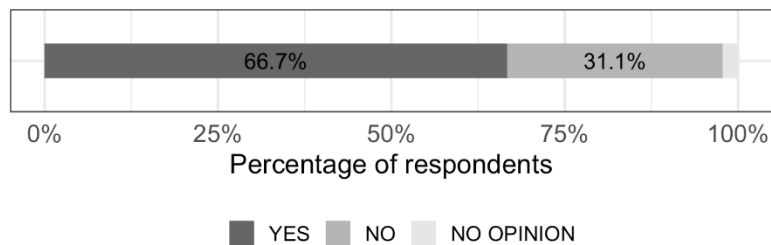
Figure 4.13 Response to the question (45 responses from 45 migrant respondents).

About 67% of the respondents reported that they noticed that they themselves imitated Beijing Mandarin (YES). About 31% did not notice or hear the imitation (NO). The rest did not have an opinion (NO OPINION).

Q2. Some people say that they rhotacize more words than before, and you?

As mentioned in Section 4.3.1, Beijing native respondents perceived different ways in which migrants imitate BM. Among them, imitation of rhotacization was reported to be the most salient way. Migrant respondents were asked if they

themselves imitated the rhotacization of BM. They were provided with three options: YES, NO, and NO OPINION. The results are presented in Figure 4.14.
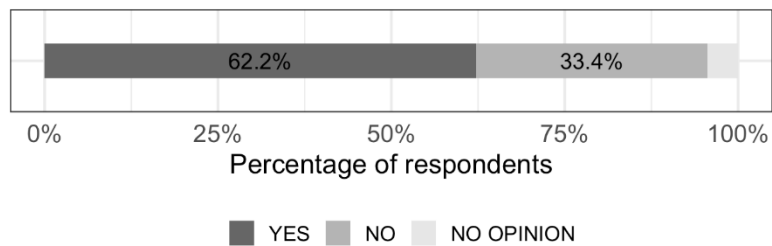
Figure 4.14 Response to the question (45 responses from 45 migrant respondents).

More than 60% of the respondents reported that they themselves rhotacized some words that they previously did not (YES). About 33% reported that they did not rhotacize more words in their speech (NO). The remaining respondents had NO OPINION.

Here are two excerpts obtained from the comments of two migrants after they were asked this survey question.

> Extract 13: Respondent F24, rhotic speaker, female, young.
> **F24:** 'Let's go to Xizhimenr!' sounds natural and smooth. In the beginning, rhotacization sounded annoying. However, after using it often, I feel the word is not natural, comfortable, and smooth until it is rhotacized. I use it when I feel it's smooth to use.
>
> Extract 14: Respondent M53, non-rhotic speaker, male, middle.
> **M53:** When I just started working, I wanted to imitate rhotacization. I practiced for quite a long time but found that I still couldn't get up to standard, then I gave up.

Both respondents reported that after they came to Beijing, they attempted to use (more) rhotacization. Respondent F24, a Rhotic speaker, had a negative perception of rhotacization in the beginning but then still used it more and found the rhotacized form of some words word "smoother." However, respondent M53, a Non-rhotic speaker, did endeavor to use it but gave up when he failed to master it.

Q3. How does the rhotacization by other migrants sound?

These respondents then indicated their opinions about the imitated rhotacization of other migrants. This is an open-ended question, and they could give more than one answer. Their answers were grouped into four categories,

namely, UNNATURAL, AWKWARD & STIFF, NOT LIKE, OTHER, and NO R-IMITATION. The responses to this question are presented in Figure 4.15.
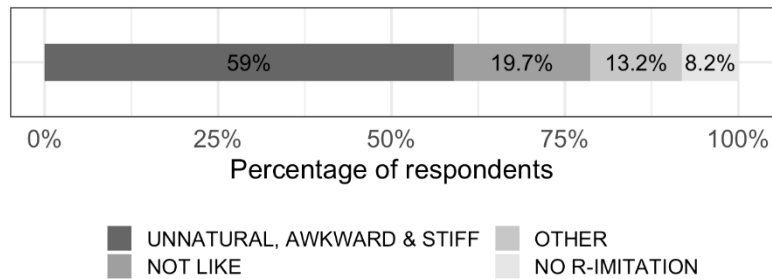
Figure 4.15 Response to the question [61 responses from 45 migrant respondents).

Almost 60% of the respondents reported that migrants' rhotacization usually sounds UNNATURAL, AWKWARD & STIFF. About 20% of the respondents felt it NOT LIKE and 13.2% named OTHER. 8.2% did not notice the rhotacization imitation (NO R-IMITATION).

Q4. What is your attitude towards the imitation of rhotacization by migrants?

Subsequently, respondents were asked whether they hold a POSITIVE, NEUTRAL, or NEGATIVE attitude towards migrants' imitation of rhotacization, and NO OPINION was another option. The results are in Figure 4.16.
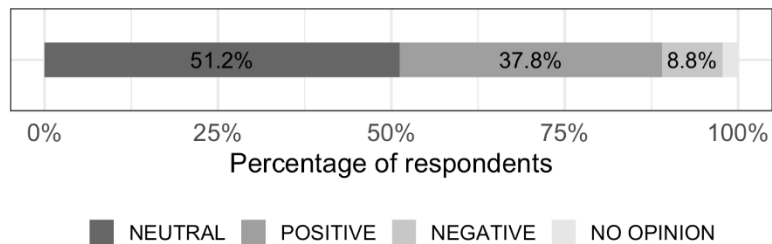
Figure 4.16 Response to the question (45 responses from 45 migrant respondents).

More than half of the respondents indicated that they had a NEUTRAL attitude. About 38% held a POSITIVE attitude towards the imitation. 8.8% had a NEGATIVE attitude and thus did not support the adoption. The remaining respondents had NO OPINION.

The excerpts below were taken from the comments of three migrant respondents. They represent different attitudes towards rhotacization imitation.

Extract 15: Respondent F26, non-rhotic speaker, female, young.
F26: If you want to use some rhotacization, it's OK and it's natural, but don't use it too much. Otherwise, you sound pretentious. It feels like you're not being yourself.

Extract 16: Respondent M5, rhotic speaker, male, young.
M5: I think it's natural to be influenced by Beijing Mandarin, and I'm proud of the change...

Extract 17: Respondent F6, rhotic speaker, female, young.
F6: ... some people want to abandon their identity as a migrant. I don't think it's necessary. However, if their accent is naturally influenced by Beijingers, then it's fine. Like, you know, the Dongbei dialect can easily change people's accent.

The migrants' responses indicate that they held different opinions towards rhotacization imitation. Deliberately imitating Beijing Mandarin and changing their original accent was mostly not acceptable. However, if their accent was influenced naturally and unconsciously, then it was not taken as a problem.

Above all, the answers to the three questions above suggest that producing more rhotacization is a primary strategy for migrants to accommodate their speech, even though such rhotacization usually sounds UNNATURAL, AWKWARD & STIFF, and NOT LIKE. In addition, the majority of the migrants does not hold a negative attitude towards the rhotacization imitation.

Advantages and disadvantages?

Q1. Do you think speaking (some) Beijing Mandarin could bring any advantages or disadvantages to migrants?

The migrant respondents were asked if speaking (some) BM could bring any advantages (ADV.) or disadvantages (DISADV.) or bring no advantages or disadvantages (NO ADV./DISADV.) to a speaker. The NO OPINION category was also included. Respondents can only select one option of the four. The results are in Figure 4.17.
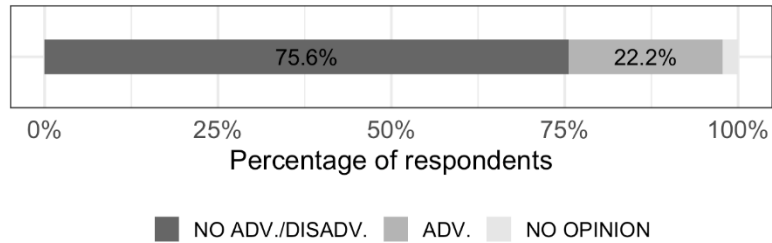
Figure 4.17 Response to the question (45 responses from 45 migrant respondents).

More than 75% of the respondents reported that speaking BM did not have any advantages or disadvantages (NO ADV./DISADV.). 22.2% of the respondents believed that speaking BM could bring advantages (ADV.), while 2.2% had NO OPINION about this question. No respondent reported there were disadvantages (DISADV.).

The extracts below were obtained from the self-reported comments of migrant respondents whose answer to this question was NO ADV./DISADV.

Extract 18: Respondent M3, rhotic speaker, male, young.
M3: No advantages or disadvantages. Beijing Mandarin is nothing more than a regional dialect. Big deal!

Extract 19: Respondent M55, rhotic speaker, male, middle.
M55: Beijing Mandarin sounds imperial-related and inherently arrogant. It sounds uncomfortable to me. There are no advantages or disadvantages. … Beijingers usually deliberately bring out their Beijing accent... just to show their status as a Beijinger. We all think it smacks of showing off. However, in fact, how many Beijingers are really capable?! … They probably feel that they're superior. Although some of them are nice people, I still have an aversion towards them.

Extract 20: Respondent F49, rhotic speaker, female, middle.
F49: No, speaking proper Standard Chinese is just good. Real Beijingers will not deliberately reveal their Beijing accent. My former boss is also a Beijinger, but he doesn't speak in that way. He doesn't deliberately show off his advantages as a Beijinger. However, some Beijingers are constantly saying that they're Beijingers. That's very annoying. Those Beijingers who are either loafers or seniors, often show off that they are native Beijingers. That's very annoying.

Extract 21: Respondent F8, rhotic speaker, female, old.
F8: No, I think a person who speaks Beijing Mandarin is at a lower level, while a Standard Chinese speaker sounds educated.

The comments of the respondents indicated that they had emotional and negative attitudes towards Beijing Mandarin and Beijingers, though none of them directly selected the option DISADV. as their answer.

Q2. What are the advantages?

Respondents who selected advantages (ADV.) to the question above needed to clarify what exactly the advantages were. This is an open-ended question, and they could name more than one advantage if applicable. The 10 respondents gave 12 advantages in total, the content of which was diverse and could not be grouped into a small number of categories. We then made a table, as shown below (Table 4.1). There were two main categories: Linguistic and Non-linguistic reasons. The social factors Dialect background and Age of the respondents are also shown.

Table 4.1 Responses to the question, 'What are the advantages of speaking Beijing Mandarin?' (12 responses from 10 migrant respondents)[14].

Category	*Speaking BM helps one to*	*Dialect background*	*Age*
Linguistic	Follow Beijingers' speech rate	Rhotic	Young
	Be intelligible	Non-rhotic	Old
Non-linguistic	Have high social status Integrate into Beijing society Gain new identity	Rhotic	Young
	Dispel stereotyping	Rhotic	Young[15] Middle
	Find a job	Rhotic	Young
	Not be excluded	Rhotic	Young Middle
	Show good upbringing	Rhotic Non-rhotic	Young Old
	Gain self-confidence Prevent one from getting ripped off	Non-rhotic	Young
	Shorten distance with Beijingers	Rhotic Non-rhotic	Young Old

[14]The three items from Old Non-rhotic respondents in this table were all from a single Old Non-rhotic respondent.
[15]This Young Rhotic respondent is also the one naming the advantage "Shorten distance with Beijingers."

Among the ten migrants, eight have a Rhotic dialect background and only two have a Non-rhotic background. Seven migrants are young, one is of middle age, and one is old. Also, seven out of nine young Rhotic speakers in this study believed that speaking BM has advantages for migrants.[16] Among the twelve reported advantages, eight are non-linguistic and only two are linguistic. The excerpts below are comments from three young migrant respondents who believed that speaking BM could bring advantages.

> Extract 22: Respondent M4, rhotic speaker, male, young.
> **M4:** ...with it I can acquire the Beijing identity, and it helps me integrate into Beijing society and helps to shorten the distance with Beijingers.

> Extract 23: Respondent F24, rhotic speaker, female, young.
> **F24:** ...it can shorten the distance with people and can dispel stereotyping. If you can use rhotacization, locals will think you're friendly, and their attitudes [towards you] will be different.

> Extract 24: Respondent F38, rhotic speaker, female, young.
> **F38:** Beijing natives tend to accept locals more, [so] speaking Beijing Mandarin would be better. If I can talk BM, taxi drivers won't rip me off. I also feel that I become confident when I talk like them.

Respondents' answers show that, for migrants, especially those newly arrived young migrants, speaking BM could bring various non-linguistic advantages. However, the older migrants who have been in Beijing for many years did not report such advantages. Furthermore, migrants from Rhotic background tend to approve of BM more than those from a Non-rhotic background.

4.4   Summary

The present study looked at the attitude of Beijing natives and migrants towards Beijing Mandarin (BM) and Standard Chinese (SC) in general and towards rhotacization more in particular. We looked at three aspects.

The results of *Differences between Beijing Mandarin and Standard Chinese* showed that rhotacization in BM is quite salient in the perception of both Beijing natives and migrants, as most of them agreed that BM and SC are different and that, compared to SC, rhotacization is a typical feature of BM. Thus, the common man's view is essentially identical to that of the linguist. The results of *Varieties*

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[16] As introduced in Chapter 3, there are in total 17 non-native Young speakers in present study, of which nine are from Rhotic areas and eight from Non-rhotic areas. They came to Beijing in the past one to two years to study or work at the moment of our fieldwork.

being used by Beijing native respondents showed that their BM is not as authentic as that spoken by elderly locals, though they still claim to speak BM.

The results of *Imitation of Beijing Mandarin and rhotacization* indicate that BM rhotacization imitation, among other ways to imitate speech, is salient in the perception of both Beijing natives and migrant respondents. Using more rhotacization is a primary method for migrants to accommodate their speech. In addition, most migrants hold a neutral or negative attitude towards rhotacization imitation of other migrants, while most Beijing natives have a positive attitude.

In *Advantages and disadvantages*, Beijing natives and migrants have mixed attitudes towards the advantages/disadvantages of speaking BM. They both reported linguistic and non-linguistic advantages of speaking BM. However, more than half of the respondents in the two groups reported that there are no advantages or disadvantages. However, in their explanatory comments, both groups made negative comments about the social status of Beijing natives, their incapability in work and life, and so forth. Thus, according to such comments, speaking BM could probably pose some disadvantages for the speakers.

Striking results

Interestingly, a majority of the young migrant respondents, especially those from Rhotic dialect background, believe that speaking some BM could bring them both linguistic and non-linguistic advantages, while almost all Middle and Old Rhotic and Non-rhotic migrants reported no advantages or disadvantages. As mentioned in Section 3.2, at the moment of our fieldwork these young Rhotic migrants had a one-to-two-year stay in Beijing. Compared to other migrants who had been living and working in Beijing for more than 10 years, that is quite a short period. As a result, the positive answers given by the young migrants can be related to the length of their time in Beijing, their knowledge of the city and its people, and their social status.

What is more, the acquired rhotacization by migrants is perceived as "unnatural, awkward & stiff, and not like" by both Beijing natives and migrant respondents. Adopting rhotacization is believed by both natives and migrants to be difficult, especially for southerners, whose rhotacization is often commented to be "funny" by Beijing native speakers. However, the general sentiment seems to be that it is not necessary to learn BM to be successful in the city.

Questions about acquiring BM and rhotacization and the advantages and disadvantages of speaking BM easily triggered emotions from Beijing and migrant respondents like. They all agree that migrants work very hard and manage to climb up the social ladder in Beijing, while local Beijingers tend to be "lazy," "resting on their laurels," and "muddling along." In any case, migrants are associated with upward social mobility. Importantly, some young Beijing native respondents, while being proud to be born and raised in the capital city, report that they switch between Beijing Mandarin and Standard Chinese, to hide their identity as Beijing natives if necessary or bring it out when it is advantageous.

The fact that there are circumstances under which it is wise to shy away from the local Beijing speech means that it is not in all respects a prestige variety.

        In the following chapters we will see that the Beijing speech community as a whole is de-rhotacizing: we found that there were fewer tokens and fewer types of rhotacization in the speech of the younger Beijing natives than in older generations. In this chapter, we have discovered why that is the case. BM is not a prestige variety. Even in Beijing itself, newcomers don't see any advantage in acquiring it and only a subset of the native BM speakers think that speaking BM is advantageous. In short, this finding must be seen as an important factor in the reduction of the use of rhotacization in the Beijing speech community that is taking place, as we report in the following chapters.

Chapter 5   Frequency of
Rhotacization Tokens

5.1   Introduction

Rhotacization is one of the most characteristic features of the Beijing Mandarin, and Beijing native speakers use rhotacization extensively in their speech (Duanmu, 1990; B. Huang & Liao, 2017; Y.-H. Lin, 2007b), as described in Chapter 2. Furthermore, rhotacization is mostly identified as an oral, informal, and changeable speech phenomenon (Cao, 2004; Qian, 1995; L. Wang, 2005), rather than a written and formal linguistic object, especially in Beijing Mandarin. Even those who don't speak Mandarin will recognize this salient element in certain syllables. Migrants, coming from all over China to Beijing, come into social and language contact with native Beijingers and with newcomers like themselves. They are on a daily basis made aware of their own language use and of the communicative habits of the people they interact with. Part of this experience is the frequent presence of the rather prominent rhotacization in Beijing Mandarin. Some newcomers to the city will be more likely and even more capable of producing rhotacization because rhotacization is part of their own native Chinese dialect. For speakers of Non-rhotic dialects, rhotacization is a relatively alien concept that they need to learn. Some other migrants simply need to produce more rhotacized rimes than they are used to.

   As pointed out in Section 1.2.1, previous sociolinguistic studies on rhotacization in Beijing Mandarin were mostly conducted by linguists in mainland China, where paradigms of Chinese traditional dialectology and phonology play a part in modern sociolinguistic studies on Chinese languages (M. Zhou, 2009). However, from the perspective of Western variationist sociolinguistics, some issues were not adequately addressed. First, the pronunciation norms for rhotacization were mostly examined among Beijing native speakers (T. Lin, 1982; T. Lin & Shen, 1995; D. Sun, 1991), while speakers from other dialect backgrounds in the Beijing community were excluded. Second, speech data were obtained variously from recordings in which speakers read aloud rhotacized words presented to them (Jing, 2005; Wang 2010), from the rhotacization used by anchors in Beijing local TV programs (Peng, 2003), or from a Beijing speech database established in the 1980s (C. Zhou, 2005, 2006). However, speakers of different dialect backgrounds are all members of the Beijing speech community, and their language use affects the use of and change in rhotacization of the other members in that community. Moreover, due to the oral and informal characteristics of rhotacization in Beijing Mandarin, it is unlikely that studying the change in rhotacization when speakers read aloud words with their full attention, and with the effects of social variables, could lead to convincing results.

   Therefore, to investigate whether there is a change in the amount of rhotacization used, in the present study, we will examine the rhotacization frequencies in the naturalistic and spontaneous speech of both Beijing native speakers and speakers of the various Rhotic and Non-rhotic dialects who have joined the Beijing speech community. Two research questions will be addressed. First, how is rhotacization overall distributed across different speaker groups, and what are the rhotacization frequencies of speakers in those groups in the

Beijing speech community? Second, what effects do the social variables of age, gender, and dialect background have on the number of rhotacizations found?

This chapter is structured as follows. In Section 5.2, the specific methods of this study are presented, supplementing the general description in Chapter 3. Section 5.3 shows the results of the general rhotacization frequencies and of the statistical tests on the frequency differences between speakers in different social groups. The last section presents the conclusion and discussion of this chapter.

5.2   Method

Data source

This study is based on the frequency counts of the number of rhotacized words per 1,000 words per person per social group. The outcome is termed "rhotacization frequency." The total number of words observed is 76,000 (76 participants times 1,000 words per participant). These count data were obtained from the recordings of the pair talking sessions in Beijing, described in Chapter 3. The detailed methods and explanation of data collection and data processing can be found in Section 3.2.

Statistical treatment

In order to compare the rhotacization frequency differences across different social groups statistically, both parametric and nonparametric statistical tests were used. The normality tests were done with the combination of visual inspection and significance test in R (R Core Team, 2020). We used the ggpbur package (Kassambara, 2020) in R to perform a visual inspection and Shapiro-Wilk's test to do the significance tests. The data sets of Beijing native speakers were normally distributed, according to the Shapiro-Wilk's test in R. Differences among Beijing native speaker groups were thus mainly tested using parametric statistical tests—*t*-tests and one-way ANOVA. The total participant data set was tested but not normally distributed, and therefore nonparametric statistics were also used. The Kruskal-Wallis test and Wilcoxon test were applied to deal with the nonparametric data set in this study.[17]

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[17] In nonparametric statistics, data are not required to fit a normal distribution. The nonparametric methods usually apply to data sets in which the number and nature of the parameters are flexible and not fixed in advance. The Kruskal-Wallis test by rank is a non-parametric alternative to a one-way ANOVA, which extends the unpaired two-sample Wilcoxon test (also known as the Mann-Whitney *U* test) in the situation where there are more than two groups. It is used when the assumptions of a one-way ANOVA test are not met.

In addition, distributions were considered relevant, in addition to the average tendencies. For this reason, boxplots are used to present the distribution of the number of rhotacized words across the social variables, which could show the effects of the various social variables on rhotacization. The boxplots were made using the ggplot2 package (Wickham, 2016) in R and alpha value was shown on the boxplots as well.

5.3   Results

Overall rhotacization distribution

Among the total number of 76,000 words observed, 3,402 rhotacized words were encountered, accounting for 4.5% of the total. Table 5.1 shows the number of participants and the sum of rhotacizations per social group, as well as the average rhotacization frequency per participant per social group.

Table 5.1 Number of rhotacization tokens (*N*=3,402) per 1,000 words for various speaker groups (*N*=76).

Gender	Age	Beijing			Rhotic			Rhotic		
		p n	*r n*	*avg.*	*p n*	*r n*	*avg.*	*p n*	*r n*	*avg.*
	Young	8	466	58	4	139	35	4	13	3
Male	Middle	4	282	71	4	137	34	4	62	16
	Old	4	435	109	4	108	27	2	2	1
	Young	7	450	64	4	173	43	5	51	10
Female	Middle	4	376	94	4	134	34	3	57	19
	Old	4	394	99	2	74	37	5	49	10
	Total	31	2403	78	22	765	35	23	234	10

Note: p n refers to the number of participants per social group; *r n* refers to the total number of rhotacized words per 1,000 words by participants in each social group; *ave* is the number of rhotacized words per 1,000 words per participant per social group. *Beijing, Rhotic,* and *Non-rhotic* refer to the three dialect backgrounds of participants.

Figure 5.1 shows the boxplots of the overall distribution of rhotacization across the social variables. The x-axis indicates speakers by the social variable, and the y-axis indicates the number of rhotacized words produced by each speaker group. The top and bottom ends of the box are the upper and lower quartiles, which means that the boxes as a whole span the interquartile range. The median is marked by the dark horizontal line inside the box. The "whiskers" extend to the highest and lowest observations. Outliers are represented by single dots. These outliers are not part of the statistical calculations.
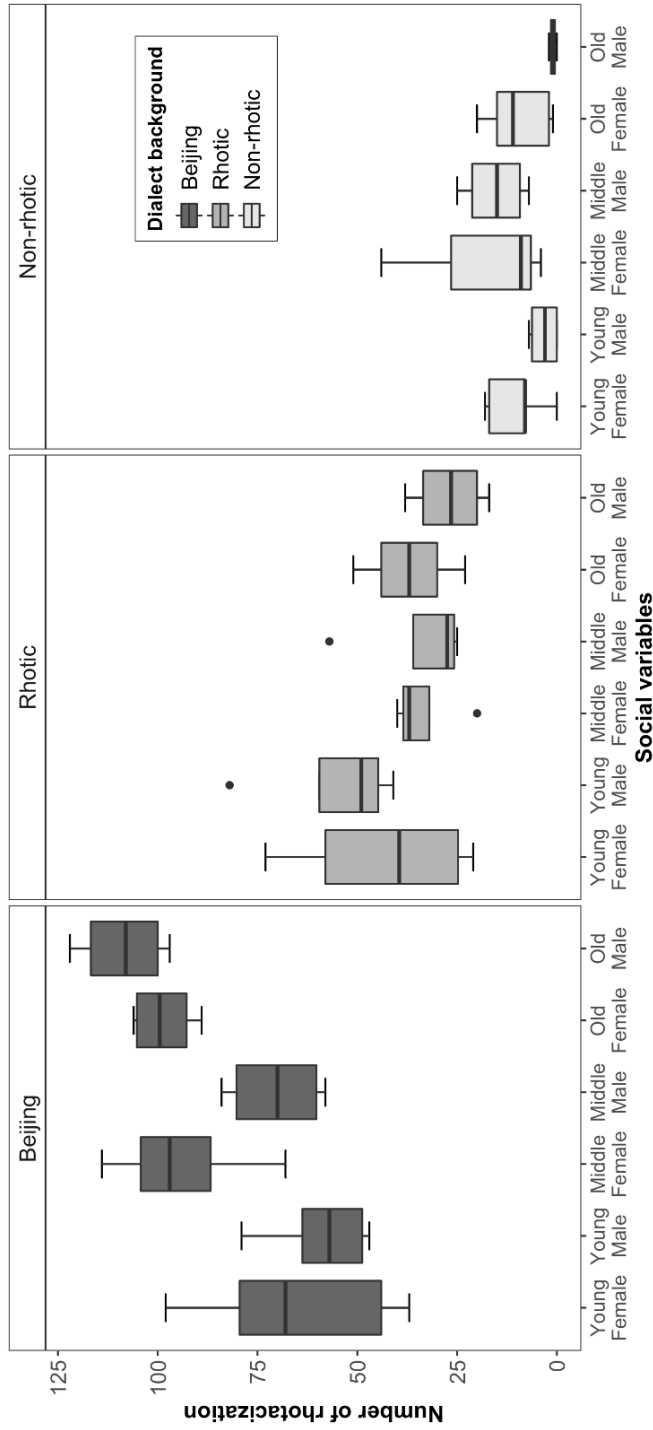
Figure 5.1 Distribution of rhotacization ($N=3,402$) across the speaker groups ($N=76$).

Table 5.1 and Figure 5.1 show that the average rhotacization frequencies and the overall distribution of rhotacization vary substantially among speakers in different social groups. Combined and independently, the three social variables affect the tendency of speakers towards rhotacization. The specific effects of these social variables are considered next, and the subsequent figures show the statistical results.

Gender

It should be noted that only the gender differences among the Beijing native speakers were examined and the gender differences among speakers with Rhotic and Non-rhotic dialect backgrounds were excluded in this study. This is because speakers with Rhotic and Non-rhotic dialect backgrounds usually come from a variety of towns and cities in various provinces in China. Their original accents and dialects, as well as their rhotacization use could be very different from each other. So, given that there is no comparability across those speakers, the results of comparison would not have provided insight into the gender differences, due to the heterogeneous nature of the group of non-native speakers.

An independent two-sample *t*-test was conducted to examine if the variable Gender is a factor among the Beijing native speakers. Figure 5.2 presents the boxplot of the number of rhotacizations of two gender groups and the alpha value. The big horizontal brackets above the boxplots indicate that the difference of the two groups is being tested and asterisks are used to show the *p*-value and significance level.[18]

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[18] 'ns' means that the comparisons are not significant. One asterisk means that .01<*p*<.05 and the significant level is .05. Two asterisks mean that .001<*p*<.01 and the significant level is .01. If the *p* value is smaller than .001, then three asterisks will be shown and its significant level is .001. Same below.
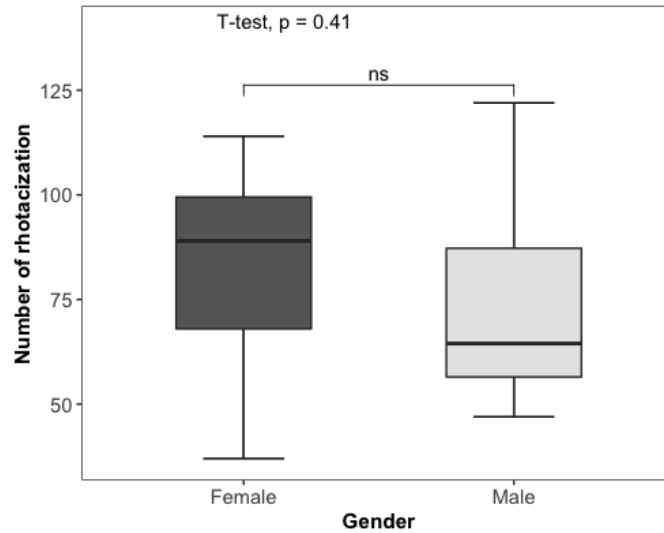
Figure 5.2 Number of rhotacization tokens (*N*=2,403) of each gender (*female, n*=15*; male, n*=16).

The statistical result shows that there was no significant difference in the number of rhotacizations for Female (*M* = 81.3, *SD* = 24.7) and Male native speakers (*M* = 73.9, *SD* = 24); *t*(29) = 0.84, *p* = .41. This suggests that the social variable Gender has no effect on the rhotacization frequency of Beijing native speakers. The detailed *t*-test results are summarized in Table 5.2.

Table 5.2 Summary of the independent *t*-test on rhotacization frequency of female and male Beijing native speakers.

Gender	N	Mean	SD	Se
Female	15	81.3	24.7	6.38
Male	16	73.9	24.0	6.01

When comparing the gender differences between Beijing speakers of the same Age group, we find no significant differences. The number of rhotacizations produced by both Female and Male Beijing speakers of the same Age group is not significantly different from each other (*Young*, *p* = .53; *Middle*, *p* = .09; *Old*, *p*= .204).

Age

As was the case for Gender, no statistical tests were conducted to examine the effects of Age among the group of Rhotic speakers and Non-rhotic speakers, due to the heterogeneous nature of the group of non-native speakers.

A one-way ANOVA test was conducted to examine if the variable Age is an effective factor. Figure 5.3 presents the boxplot of the number of rhotacizations produced by three age groups and the alpha value.
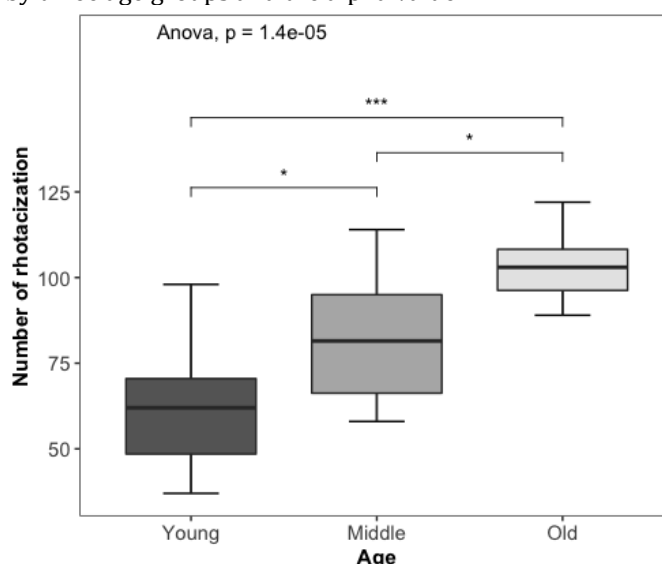
Figure 5.3 Number of rhotacization tokens (N=2,403) of each age group of Beijing Speakers (*Young=15, Middle=8, Old =8*).

The results of the one-way ANOVA test show that Age had a significant effect on the number of rhotacizations at the $p < .01$ level for the three conditions [F (2, 28) = 17.07, p = .000]. Post hoc comparisons using the Tukey HSD test indicate that the Young Beijing native speakers ($M = 61.1$, $SD = 17.7$) produced significantly fewer rhotacizations than the Middle ($M = 82.2$, $SD = 19.8$) and *Old* ($M = 104$, $SD = 10.9$) speakers. Middle Beijing native speakers ($M = 82.2$, $SD = 19.8$) also produced significantly fewer rhotacizations than Old Beijing native speakers ($M = 104$, $SD = 10.9$). Table 5.3 lists the summary of the results.

Table 5.3 Summary of the independent *t*-test on the number of rhotacizations produced by Young, Middle, and Old Beijing native speakers (N=31).

Age	N	Mean	SD	Se
Young	15	61.1	17.7	4.57
Middle	8	82.2	19.8	6.98
Old	8	104	10.9	3.85

As Age turned out to be an effective variable, an independent *t*-test was conducted to test the generational difference among Female and Male Beijing native speakers among the three age groups. The results are shown in Table 5.4 (females) and Table 5.5 (males).

Table 5.4 *p*-values of pairwise comparisons of three age groups of female Beijing native speakers (*N*=15)*.*

Young Beijing Female speakers	Middle Beijing Female speakers	Old Beijing Female speakers
Young Beijing Female speakers	.063	.023
	Middle Beijing Female speakers	.685
		Old Beijing Female speakers

Table 5.5 *p*-values of pairwise comparisons of three age groups of male Beijing native speakers (*N*=16)*.*

Young Beijing Male speakers	Middle Beijing Male speakers	Old Beijing Male speakers
Young Beijing Male speakers	.12	.000
	Middle Beijing Male speakers	.004
		Old Beijing Male speakers

Young Beijing Female native speakers and the Old Beijing Female speakers had significantly different rhotacization productions: $t(9) = 2.74$, $p = .023$. The difference between the Young and Middle Beijing Female speakers is not significant, $t(9) = 2.12$, $p = .063$, nor was the difference between Middle and Old Beijing Female $t(6) = -0.43$, $p = .685$. The number of rhotacizations of Young and Middle Male Beijing native speakers respectively were significantly different from that of Old Beijing Male speakers, $t(10)=1.7$, $p = .000$; $t(6)= -4.38$, $p = .004$, while there was no significant difference between Young and Middle Beijing Male speakers; $t(10)=1.7$, $p = .12$.

Dialect background

Next, the nonparametric Kruskal-Wallis test and Wilcoxon test were conducted due to the non-normal distribution of the total data set. The results are shown in Figure 5.4.
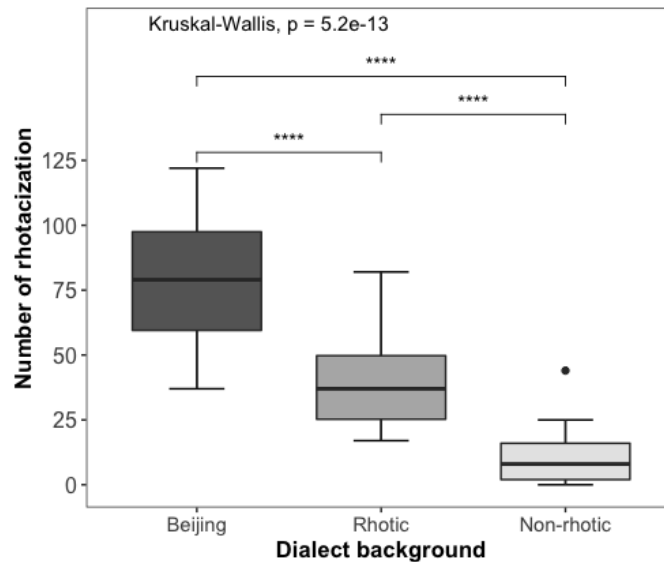
Figure 5.4 Number of rhotacization tokens (*N*=2,403) of each dialect background group (*N*=76).

The results reveal a significant difference on at least one non-paired comparison (Kruskal-Wallis chi-squared = 56.554, df = 2, *p* = .000). This shows Dialect Background is a crucial social variable. Wilcoxon tests were conducted to test which pairs were significantly different. The figure (the horizontal lines with asterisks) shows that all pairs of groups are significantly different. The number of rhotacizations is greater for Beijing native speakers (n=31) than for Rhotic dialect speakers (*n*=22), *U* = 199, *p* = .01, and Non-rhotic Dialect speakers (*n*=7), *U* = 771, p = .000. Rhotic dialect speakers (*n*=22) also produce significantly more rhotacization than Non-rhotic Dialect speakers (*n*=23), *U* = 25, *p* = .000. Thus, speakers with a Beijing dialect background produced the greatest number of rhotacized words in their natural speech, while the Non-rhotic speakers produced the fewest.

Wilcoxon tests were conducted to test the rhotacization difference between Beijing native speakers and speakers from Rhotic areas of the same generation. The difference of the number of rhotacized words produced by the Young, Middle, and Old speakers in these two dialect groups were tested and the *p*-values are shown in Table 5.6.

Table 5.6 *p*-values of pairwise comparisons of Beijing native speakers (*N*=31) and Rhotic speakers (*N*=22) of three generations.

Young Rhotic speakers	Middle Rhotic speakers	Old Rhotic speakers
.258	.000	.000
Young Beijing speakers	Middle Beijing speakers	Old Beijing speakers

There exists a significant difference in the number of rhotacized words between Middle Beijing native speakers (*n*=8) and Middle Rhotic speakers (*n*=8), *U*= 64, *p* = .000, and between Old Beijing native speakers (*n*=8) and Old Rhotic speakers (*n*=6), *U*= 48, *p* = .000. The number of rhotacized words produced by Young Beijing native speakers (*n*=15) was not significantly different from that of Young Rhotic speakers (*n*=8), *U*=78, *p* =.258.

5.4   Discussion and conclusion

Methodological discussion

This investigation is reminiscent of Labov's famous New York City department store study, which also focused on the frequency of postvocalic r produced by various groups of speakers (Labov, 2006), in which his rapid and anonymous survey gave the answer to this question. In Beijing, this approach was never likely to lead to any such clear-cut answers. One reason is that an anonymous survey would fail to provide information on speaker-specific social factors. Estimates as to speakers' gender and age could be made, but because so many Beijingers are migrants, the most important determinant of accent—dialect background—would remain unknown. The situation in New York City was such that predictions as to the speakers' geographical background were predictable, but this is quite the opposite in Beijing nowadays (and difficult in New York City nowadays too, for that matter). Class distinctions in Beijing are also less predictable than they were in 1960s New York and even less relevant. An alternative to Labov's approach is the frequency counts as presented in this chapter, which provide more reliable information in several ways.

Another difference that warrants a different approach is the likely frequency of postvocalic r. Not only would a predictable answer to a fixed question (Labov's approach) probably not yield a natural postvocalic r that was directly reflective of the dialect background of the speaker, the natural number of rhotacized words in Beijing Mandarin is also naturally lower. This determines the degree of markedness of the feature. In the speech of all Rhotic speakers in this experiment, including Beijing native speakers and speakers from other Rhotic areas, it turned out that the rhotacized words constituted less than 4.5% of the words. We did a quick calculation of the number of rhotacizations in an online discourse by two native English (rhotic) speakers, and it showed that more than 15% of their words were rhotacized. This means that the salience of this feature is different in the two places, at least from a frequency point of view.

Results and discussion

In the present study, there are three main findings. First, among the three variables, Gender has no effect on the number of rhotacizations among Beijing

native speakers. In Zhang (2008) rhotacization is called the Beijing Smooth Operator which is a "gendered character type consisting of a set of male urban Beijing social personae." However, with respect to rhotacization frequency, no statistical difference is found between male and female speakers in our study. Even in the same age group, the rhotacization frequency is not significantly different between the two genders.

Second, there was a significant difference across Beijing native age groups: the Young native speakers produced significantly fewer rhotacized words than their Middle counterparts, while the Middle generation also produced significantly fewer rhotacized words than the Old speakers did. Briefly, the younger the speakers are, the fewer rhotacized words they tend to produce. The result shows that a generation change occurs on the number of rhotacizations among Beijing native speakers.

Third, a striking factor regarding Dialect Background was that three dialect groups were significantly different from each other in rhotacization frequency. This result can be interpreted in three ways: (1) Beijing native speakers produce more rhotacized words in their spontaneous speech than speakers with other dialect backgrounds. This result provides statistical evidence that the extensive occurrence of rhotacized words is characteristic of Beijing Mandarin. (2) Speakers from a Non-rhotic dialect background produce the lowest number of rhotacized words in their natural speech, but they do appear to adopt this feature that is not natural to them. (3) In addition, though Beijing and Rhotic speakers are significantly different from each other in general, there is no statistical difference among the Young Beijing speakers and the Young Rhotic speakers. Combined with the result of Age differences, this result suggests that a sound change in the natural speech of the Young generation of Beijing native speakers may be taking place. That is, a process of de-rhotacization. The promotion of Standard Chinese, the long-term and profound social and language link between Beijing natives and migrants, as well as the population superiority of migrants are all possible causes of the observed de-rhotacization. However, it can also be that Young Rhotic speakers are actively affected by Beijing Mandarin and rhotacization, with the effect that they produce as many rhotacized words as Young native speakers. We will continue to study the issue from different angles in the remaining chapters.

Chapter 6   Frequency of Rhotacization Types

6.1   Introduction

In Standard Chinese, rhotacization is a limited phenomenon, but in Beijing Mandarin, the phonetic basis of Standard Chinese, the extensive application of rhotacization on nouns, verbs, and adjectives is widely considered to be one of its typical features (B. Huang & Liao, 2017; Y.-H. Lin, 2007b). However, in previous sociolinguistic studies, the rhotacization frequency in the naturalistic speech of speakers is under-explored, as are the effects of social factors on the frequency, as mentioned in Section 1.2.1. Furthermore, hardly any studies could be found examining the rhotacization use of migrants who have different dialect backgrounds in the Beijing speech community. Therefore, in Chapter 5, we examined the rhotacization frequency of speakers in the Beijing speech community, and social variables were shown to have an effect on the rhotacization frequency. Meanwhile, we noticed that, although the rhotacization frequencies differ between native and non-native speakers, speakers tend to use rhotacized words multiple times in their speech, making the number of rhotacized words they produced quite large. So, this raises the question of whether the high frequency is simply due to the high occurrence rate of rhotacized tokens or whether high frequency rhotic speakers also use more diverse rhotacized words (types)[19] than the speakers with lower overall (token) frequencies. In addition, in relation to this, it would be also interesting to look at the number of rhotacization types being used by Beijing native speakers and in particular its change across different social groups, due to the growing influence of Standard Chinese.

This chapter is a further study on the rhotacization frequency, based on Chapter 5. The main concern of this chapter is to investigate the frequency of rhotacization types being used in spontaneous speech and the effects of the social variables on the frequency in the Beijing speech community. Therefore, based on the findings of existing studies and those presented in Chapter 5, the following questions will be addressed in this chapter. First, how many rhotacization types are actually used by the speakers in the different social groups? Second, how are they distributed across the different speaker groups? Third, what effects do the social variables, age, gender, and dialect background have on the frequency of rhotacization types? Fourth, do we see any changes with respect to rhotacization in the speech community?

Section 6.2 introduces the data source, the methods employed to judge and obtain the rhotacization types, and the statistical treatment. Section 6.3 presents the results of the overall distribution of the rhotacized words and the statistical results of the frequency differences between speakers in different

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[19] For convenience and simplicity, we will use the terms "types" or "rhotacization types" in this study to address different rhotacized words. The criteria of judging rhotacized words as being the same type or different types are introduced in detail in the section *Judgment of repetition* in Section 6.3.

social groups. In the last section, we compare and discuss the results of Chapters 5 and 6 and draw conclusions.

6.2   Method

Data source and data type

This investigation is based on the frequency counts of the number of different rhotacized words per 1,000 words per person per social group. The outcome is defined as "the frequency of different rhotacization types." The total number of words observed is 76,000, and the total number of observed rhotacized tokens is 3,402, as presented in Chapter 5, based on which the number of rhotacization types will be obtained. The relevant detailed methods and information about data collection and data processing can be found in Sections 3.2 and 5.2.

Judgment of repetition

The aim of the judgment is to obtain the rhotacization types and their number of each speaker in each social group. Attention was paid not only to the phonological form, but also to meaning and grammatical status. Thus, even though the phonological form is the same, the instances of *menr* in the Table 6.1 are recognized as different types based on grammatical and lexical criteria.

Table 6.1 Examples of different rhotacized words.

	Rhotacization	Meaning	Word category	Examples
1	-边儿 -biānr	-side	Noun	上边儿 shàng bianr/above, 路边儿 lù biānr/roadside
2	-人儿 -rénr	people, person	Noun	老人儿 lǎo rénr/old people, 小人儿书 xiǎo rénr shū/picture-story book
3	-玩儿 -wánr	play	Verb	好玩儿 hǎo wánr/amusing
4	邪门儿 xiéménr	odd	Adjective	
5	专门儿 zhuānménr	specially	Adverb	
6	-门儿 -ménr	(city) gate	Proper noun	西便儿门 Xībiàn Ménr/Xibian Menr Gate
7	-门儿 -ménr	door	Noun	小门儿 xiǎo ménr/ small door
8	-门儿 -ménr	(for study subject)	Measure word	一门儿课 yì ménr kè/ one subject

On the other hand, all instances of the suffix *bianr* 'side' represent a single type, regardless of what precedes it. Similarly, the position of the rhotacized syllable in a word does not influence the judgment. For example, rhotacized *-renr* 'person' is the last syllable in *lao renr* 'old person' and in the middle position in the word *xiao renr shu* 'children's book', but all instances of *renr* 'person' count as one type.

Statistical treatment

Similar to Chapter 5, to compare the differences of the rhotacization types of frequency across different social groups statistically, both parametric and nonparametric statistical tests were used. We performed the normality tests with the combination of visual inspection and significance test in R (R Core Team, 2020). The ggpbur package (Kassambara, 2020) was used in R to do the visual inspection and Shapiro-Wilk's test to do the normality significance tests. The data sets of Beijing native speakers were normally distributed, according to the result of Shapiro-Wilk's test. For this reason, parametric statistical tests—*t*-tests and one-way ANOVA—were used for testing the differences among Beijing native speaker groups. The total data set was tested as well but not normally distributed. So, nonparametric statistics was also used. The Kruskal-Wallis test and Wilcoxon test were applied to deal with the nonparametric data set in this study.

In addition, distributions were also considered relevant, in addition to the average tendencies. Therefore, boxplots are used to present the distribution of the number of rhotacized words across the social variables, which could show the effects of the various social variables on rhotacization. The boxplots were made using the ggplot2 package (Wickham, 2016) in R, and the alpha value was shown on the boxplots as well.

6.3   Results

Overall rhotacization distribution

An overview of the number of participants and the sum of rhotacization types per social group and the average rhotacization frequency per participant per social group is shown in Table 6.2.

Table 6.2 Number of rhotacization types (*N*=1,452) per 1,000 words for various speaker groups (*N*=76)*.*

	Age	Beijing			Rhotic			Non-r		
		p n	r n	avg.	p n	r n	avg.	p n	r n	avg.
Male	Young	8	235	29	4	53	14	4	12	3
	Middle	4	134	34	4	72	18	4	31	8
	Old	4	171	43	4	83	21	2	2	1
Female	Young	7	191	27	4	58	15	5	33	7
	Middle	4	160	40	4	74	19	3	15	5
	Old	4	155	39	2	39	20	5	10	2
	Total	31	1046	34	22	379	17	23	103	5

Note: p n refers to the number of participants; *r* refers to the total number of rhotacization types per 1,000 words by participants in each social group; *avg.* is the number of rhotacization types per 1,000 words per participant in each social group. *Beijing*, *Rhotic,* and *Non-rhotic* refer to the three dialect backgrounds of the participants.

As seen in Table 5.1 and Table 6.2, among the 3,402 rhotacized words, there are in total 1,528 types (non-repeated rhotacized words), accounting for 45% of the total. So, in general, more than half of the produced rhotacized words were repetitions.

Figure 6.1 shows the boxplots of the overall distribution of rhotacization types across social variables. The x-axis indicates Age–Gender social groups, and the y-axis indicates the number of rhotacization types produced by each group.
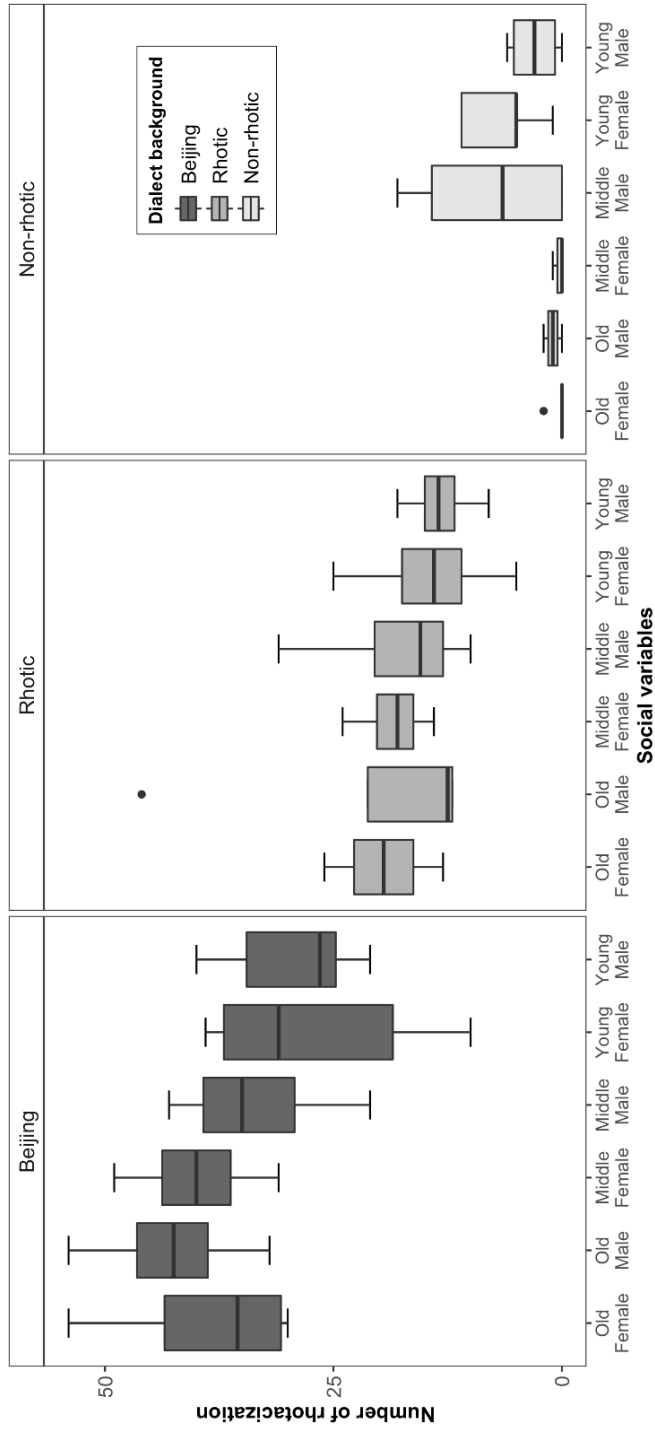
Figure 6.1 Distribution of the rhotacization types across the speaker groups (N=76).

As shown in Table 6.2 and Figure 6.1, the frequencies of average rhotacization types and the overall distribution of rhotacization types vary among speakers in different social groups. It seems that the three social variables have an effect on how many different rhotic words speakers produce in spontaneous speech. The specific effects are examined statistically next, and the subsequent figures show the results.

Gender[20]

An independent two-sample t-test was conducted to test whether the variable Gender is a factor among the Beijing native speakers. Figure 6.2 shows the boxplot of the number of different rhotacizations produced by the two gender groups and the alpha value.
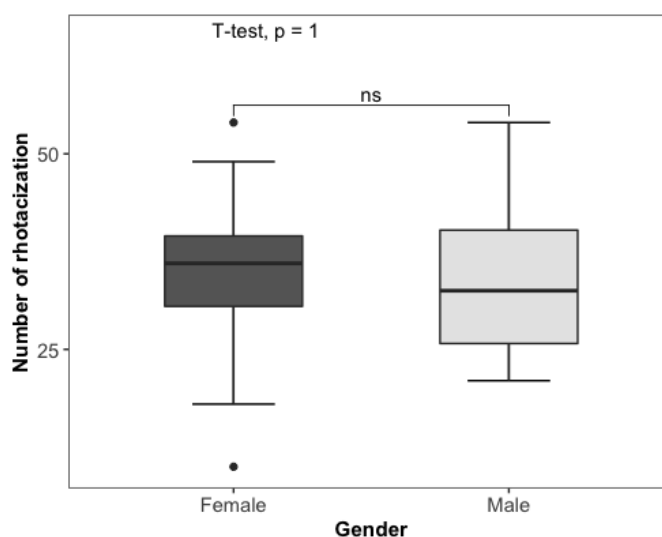
Figure 6.2 Number of rhotacization types (*N*= 991) of each gender (female, n= 15; male, n=16).

The statistical result shows that there was no significant difference in the number of rhotacization types for female (*M* = 33.67, *SD* = 11.3) and male Beijing native speakers (*M* = 33.38, *SD* = 9.24); *t*(29) = 0.08, *p* = .94. This suggests that the social variable Gender has no effect on the frequencies of the rhotacization

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[20] For Gender, only the gender difference among the Beijing native speakers were studied. *Dialect* Background was not analyzed. The reasons can be found in Section 5.3.

types of Beijing native speakers. The detailed *t*-test results are summarized in Table 6.3.

Table 6.3 Summary of the independent *t*-test on the number of the rhotacization types of female and male Beijing native speakers.

Gender	N	Mean	SD	Se
Female	15	33.7	11.3	2.93
Male	16	33.4	9.24	2.31

We then conducted *t*-tests to test if the rhotacization frequencies of female and male Beijing speakers are different from each other in the same age group. Table 6.4 shows the results.

Table 6.4 *p*-values of pairwise comparisons of two genders of Beijing native speakers.

Young Beijing Male speakers	Middle Beijing Male speakers	Old Beijing Male speakers
.714	.352	.667
Young Beijing Female speakers	Middle Beijing Female speakers	Old Beijing Female speakers

The results show that the number of rhotacizations produced by both Male and Female Beijing speakers in the same age group is not significantly different from each other ($p = .714$, $p = .352$, $p= .667$).

In short, the social variable Gender is shown not to have any effect on rhotacization types produced by the Beijing native speakers.

Age

We conducted a one-way ANOVA test to measure the effect of Age on the number of rhotacization types. Figure 6.3 shows the boxplots of the number of rhotacization types produced by different age groups, as well as the alpha value.
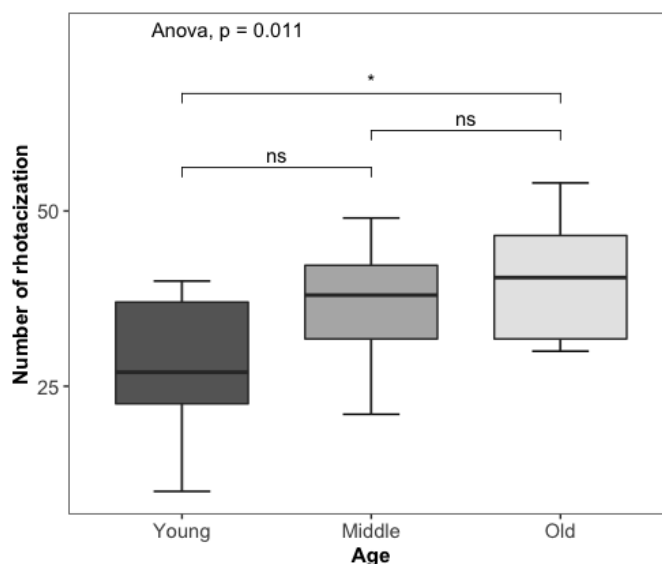
Figure 6.3 Number of the rhotacization types (*N*=333) of each Age group (*Young, n*=15*; Middle*, *n*=8; *Old*, *n*=8).

The results of the one-way ANOVA test show that Age had a significant effect on the number of rhotacizations at the *p* < .05 level for the three conditions [F (2, 28) = 6.243, *p* = .001]. Post hoc comparisons using the Tukey HSD test indicate that the Young Beijing native speakers (*M*=27.93, *SD=8.75*) produced significantly fewer rhotacizations than the *Old* (*M*=40.75, *SD*=8.83). However, there were no significant differences between the Young and Middle Beijing native speakers (*M*=36.75, *SD*=8.41) and between the Middle and Old Beijing native speakers (*M*=40.75, *SD*=8.83). Table 6.5 summarizes the results.

Table 6.5 Summary of the independent *t*-test on the number of rhotacization types produced by Young, Middle, and Old Beijing native speakers (*N*=31).

Age	N	Mean	SD	Se
Young	15	27.93	8.75	2.26
Middle	8	36.75	8.41	2.97
Old	8	40.75	8.83	3.12

An independent *t*-test was conducted to test the generational difference in each gender group. The results are presented in Table 6.6 (females) and Table 6.7 (males).

Table 6.6 p-values of pairwise comparisons of three age groups of female Beijing native speakers (N=15).

Young Beijing Female speakers	Middle Beijing Female speakers	Old Beijing Female speakers
Young Beijing Female speakers	.07	.111
	Middle Beijing Female speakers	.938
		Old Beijing Female speakers

As shown in Table 6.6, the Young and Middle Beijing Female speakers had significantly different rhotacization frequencies at the $p < .1$ level, $t(9) = 2.06$, $p = .07$. The difference of rhotacization frequencies between the Young and Old Beijing Female speakers is not significant, $t(9) = 1.77$, $p = .11$, and the same is true of that between Middle and Old Beijing Females $t(6) = 0.08$, $p = .94$.

Table 6.7 p-values of pairwise comparisons of three age groups of male Beijing native speakers (N=16).

Young Beijing Male speakers	Middle Beijing Male speakers	Old Beijing Male speakers
Young Beijing Male speakers	.318	.01
	Middle Beijing Male speakers	.232
		Old Beijing Male speakers

As shown in Table 6.7, the number of rhotacizations produced by the Young Beijing Male speakers was significantly different from that of the Old Beijing Male speakers. There were no significant differences between the Young and Middle Beijing Male speakers, $t(10)=1.05$, $p = .32$, and between the Middle and Old Beijing Male speakers, $t(6)=-1.33$, $p = .23$.

In sum, the social variable Age has an effect on the rhotacization frequencies by Beijing native speakers. The Young produced fewer different rhotacized words than the Old. However, female speakers in the same age group showed barely any differences.

Dialect background

We conducted two nonparametric tests, the Kruskal-Wallis test and the Mann-Whitney U test, to examine the effects of Dialect background, as the total data set of this study is not normally distributed, as mentioned above.

A Kruskal-Wallis test was conducted to test the effect of Dialect background on the number of rhotacizations. The results are shown in Figure 6.4.
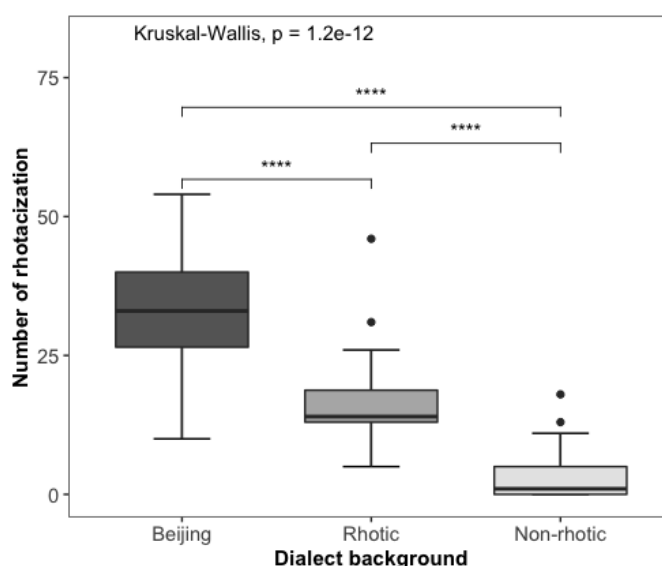
Figure 6.4 Number of rhotacization types (*N*=333) of each dialect background group (*N*=76).

The results reveal that Dialect Background has a significant effect on the number of rhotacization types (Kruskal-Wallis chi-squared = 54.85, df = 2, *p* = .000). Thus, *Dialect Background* is a crucial social variable.

The results also mean that there is a significant difference in at least one non-paired comparison. Mann-Whitney *U* tests were conducted to check which pair(s) of groups is (are) significantly different. Figure 6.4 (the horizontal lines with asterisks) shows that all pairs of groups are significantly different from each other. The number of rhotacizations is higher for Beijing native speakers (*Mdn* = 33) than for Rhotic speakers (*Mdn* = 14), *U* = 606, *p* = .000, and Non-rhotic speakers (*Mdn* = 2), *U* = 709, *p* = .000. Rhotic speakers (*Mdn* = 14) also produce significantly more rhotacization types than Non-rhotic *speakers* (*Mdn* = 2), *U* = 32, *p* = .000. Thus, speakers with a Beijing Mandarin dialect background produced the greatest number of rhotacization types in their natural speech, while the Non-rhotic speakers produced the least. Table 6.8 shows a summary of the Mann-Whitney *U* tests.

Table 6.8 Summary of the Mann-Whitney *U* tests on the number of the rhotacization types produced by speakers in three dialect groups.

Dialect groups	N	Mean	Mdn	SD	Se
Beijing	31	33.5	13.5	10.1	1.82
Rhotic	23	17.1	6.75	8.97	0.99
Non-rhotic	22	3.91	5.5	4.74	1.91

Mann-Whitney *U* tests were conducted to test the frequency differences of the Beijing and Rhotic speakers in the age group. The *p*-values are shown in Table 6.9.

Table 6.9 *p*-values of non-pairwise comparisons of Beijing native speakers (*N*=31) and Rhotic speakers (*N*=22) of three generations.

Young Rhotic speakers	Middle Rhotic speakers	Old Rhotic speakers
.002	.002	.024
Young Beijing speakers	Middle Beijing speakers	Old Beijing speakers

The results shown in Table 6.9 reveal that the number of rhotacizations in each comparison is significantly different from each other. The number of rhotacizations was greater for the Young Beijing speakers (*Mdn*=26) than for the Young Rhotic speakers (*Mdn*=13.5), *U*= 108, *p* = .002. The number of rhotacized words was greater for the Middle Beijing speakers (*Mdn*=38.5) than for the Middle Rhotic speakers (*Mdn*=17), *U*=62, *p*=.002. The Old Beijing speakers (*Mdn*=40) also significantly produced a greater number of rhotacized words than for the Old Rhotic speakers (*Mdn*=12.5), *U*=42, *p*=.002.

In short, Dialect background is an effective social variable. There are significant differences on the rhotacization frequency in all three comparisons. Beijing and Rhotic speakers in the same age group all have significant differences with each other.

6.4   Discussion and conclusion

The present study about the frequency of rhotacization types has three main findings. First, the social variable Gender showed no effect on the number of rhotacization types among Beijing native speakers. As the result in Chapter 5 showed, Gender also did not affect the rhotacization frequency among Beijing native speakers more generally. Previous studies (Q. Zhang, 2008; H. Zhao, 2017) have suggested that rhotacization in Beijing Mandarin is associated with masculinity, but this is not confirmed in our data as reported in this chapter and the previous one.

Second, the social variable Age was shown to be an effective factor among Beijing native speakers. There was a significant difference between the young

and the old native speakers, while there was no significant difference between the young and the middle, and the middle and the old speakers. However, as shown in Chapter 5, there were significant differences in the general rhotacization frequency in all three comparisons. Therefore, from the old to the young, the young generation produced fewer rhotacized words (tokens) than the middle and the old generation (as we saw in Chapter 5), and (as we saw in the current chapter) they produced fewer different rhotacized words (types). The middle generation produced fewer rhotacizations than the old generation, as presented in Chapter 5, but the number of rhotacization types they produced showed no significant difference with what we observed with the young and the old generation. We can, thus, conclude that a generational change in the rhotacization frequency can be observed, both in terms of tokens and in terms of types, among Beijing native speakers. The change in the former (tokens) can be seen across the three generations, while the change in the latter (types) was observed mainly in the young generation.

Third, Dialect background also proved to be a critical factor. The frequencies of the rhotacization types of speakers from the three different dialect backgrounds were significantly different from each other. We can make the following comments. First, as we saw here and in Chapter 5, Beijing native speakers produced more rhotacizations, both qua tokens and qua types, than speakers with other dialect backgrounds. Secondly, although speakers with a Non-rhotic dialect background appeared to adopt rhotacization, which was not natural to them, they produced a small number of rhotacizations, both in tokens and in types. Therefore, despite the social and language contact situation in the Beijing speech community, and the impact of Standard Chinese promotion, the influence on the rhotacized frequency and its variety was limited. Next, in this study, it is found that young Beijing native speakers used significantly more different rhotic words (non-repeated rhotacizations) than the young Rhotic speakers, while there was no significant difference between them on general rhotacization frequency (that is, with respect to the tokens, as presented in Chapter 5). This reveals that the young Beijing native speakers produced more diverse rhotacized words, whereas the large number of rhotacized words produced by the young Rhotic speakers was achieved by repeating the same type. Young Rhotic speakers used more rhotacization than the middle and the old Rhotic speakers. This suggests that the young Rhotic speakers were actually actively affected by Beijing Mandarin and rhotacization and tend to use more rhotacization. However, to accommodate themselves to the Beijing speech community, they tended to use more repeated rhotacization, because they did not have a wide rhotacized vocabulary. Finally, in Chapter 5, we found that the younger the Beijing native speakers were, the fewer the number of rhotacizations we found. The result of this chapter shows that the young generation also used fewer different rhotic words than the old generation. We can conclude that the rhotacization vocabulary of Beijing native speakers was undergoing a change; the older the Beijing native speakers were, the more they produced diverse rhotacization. Thus, as we mentioned in Chapter 5, a de-rhotacization process was actually ongoing among Beijing native speakers, not

only in terms of the number of tokens, but also in terms of the number of types. The number of rhotacized words in the Beijing vocabulary was diminishing.

Chapter 7 The Acoustics of Rhotacization in Mandarin

7.1   Introduction

Through examining one or more linguistic variables in a speech community, studies of sociolinguistic variation arrive at an understanding of the social and linguistic constraints on the variation and reveal the ongoing change (Bayley, 2013; Bayley & Lucas, 2007; Meyerhoff, 2011). It is believed that speakers' choices among variable linguistic forms are systematically constrained by multiple linguistic as well as social factors. Those factors could reflect underlying grammatical systems and the social organization of the communities to which the speakers of the language belong. In sociophonetic studies, instrumental techniques, especially acoustic vowel analysis, have been used to analyze language variation and change quantitively (Baranowski, 2013; Kendall & Fridland, 2021).

The present chapter studies the variation and change in rhotacization in the Beijing speech community in order to reveal the social and linguistic constraints on rhotacization. As mentioned in Chapter 2, rhotacized syllables in Mandarin are not only auditorily salient, but, in some cases, they may express lexical meanings, such as diminutive, as well. As a consequence, a socio-phonetic study of rhotacization in Mandarin needs to take other linguistic factors into consideration as well.

The present chapter focuses on the following questions:

1) What are the most frequently used rhotacized rimes and what are their lexico-phonetic features? In the earlier chapters we looked at the frequency of tokens in general. Now we will focus on the individual rhotacization rimes themselves.
2) What are the variants of the rhotacized rimes most frequently used by speakers with different dialect backgrounds? How do social and linguistic constraints affect the variable?
3) Is there a duration difference in the realization of the rhotacized rime *ianr* across the groups? How do social and linguistic factors affect its duration?

In this chapter, we focus on the most frequent rhotacized rime *ianr* as the sociolinguistic variable. This chapter is structured as follows. After establishing that *ianr* is the most frequent rhotacized rime in our data in Section 7.2, we will, in Section 7.3, measure formant values of the rime *ianr* and compare the differences across groups, to obtain the variants of the rime *ianr* used by speakers with different dialect backgrounds. In Section 7.4, the duration of the rime *ianr* is measured, and we will compare the duration differences across the different groups to reveal the effects of linguistic and social factors on it. In the last section, we discuss and summarize the findings and results of the three experiments and draw conclusions.

7.2   Experiment 1: The occurrence of rhotacized rimes

This section about the occurrence of rhotacized rimes consists of three parts. First, we look at the frequency of the 37 Mandarin rhotacized rimes in our corpus to reveal the differences in instantiating rhotacization between rimes and between and within social groups. Then we determine which rime is the most frequently rhotacized across all social groups. Finally, we look at the lexical meanings of the morphemes and words that involve this most frequently rhotacized rime; the tonal realization of the rhotacized syllables will also be taken into consideration.

7.2.1   Results

The frequency of rhotacized rimes

Figure 7.1 shows the average of each rhotacized rime per dialect background.[21] The x-axis holds the categories, namely all (phonologically possible) 37 rhotacized rimes, and the y-axis holds the value of the average number of rhotacized rimes. There is a z-axis as well, which holds the three categories of dialect-background groups. The length of each column represents the average number of each rhotacized rime by a dialect group.
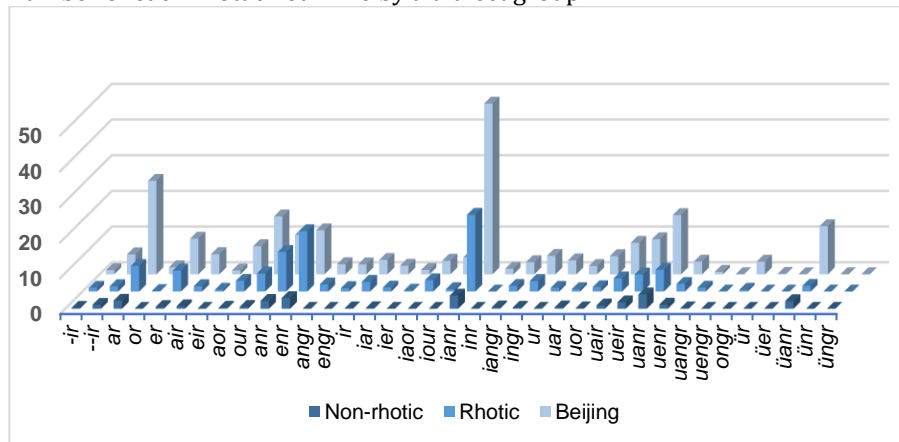
Figure 7.1 Overview of the average of each rhotacized rime used by three dialect groups.

As shown in Figure 7.1 (see also Appendix F), the occurrence of the 37 rhotacized rimes vary dramatically between and within dialect groups. The Beijing native

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[21] Appendix F provides an overview of the data in a table. Appendix G shows the complete lists of the total and average number of each rhotacized rime produced by three age groups of each dialect group.

speakers (*Pn*[22] = 31) used the highest number of different rhotacized rimes (*Rt-n*[23] = 33), more than the Rhotic speakers (*Rt-n* = 28) and the Non-rhotic speakers (*Rt-n* = 19). As can be seen in Appendix G, among the Beijing native speakers, the Old speakers (*Pn* = 8) used 33 different rimes in total, one more than the Middle-aged speakers (*Pn* = 8) and Young speakers (*Pn* = 16). In the Rhotic and Non-rhotic groups, the number of rhotacized rimes being used shows a slight downward tendency from Young to Old. Specifically, in the Rhotic group, we found that Young speakers used 28 different rhotacized rimes, while Middle and Old used 27 and 26 rimes, respectively. In the Non-rhotic group, Young speakers used 19 rimes, Middle-aged speakers used 18, and Old produced 7 in total.

Above all, in the three dialect groups, the Beijing native speakers used the largest number of rhotacized rimes, and for each rime, they also used it more frequently than the other two dialect groups, the Rhotic speakers in general finding themselves in the middle and the Non-rhotic speakers rhotacizing the least. In addition, there are also differences among the Age groups in each dialect group. In the Beijing native group, the number of rhotacized rimes decreased from the Old to the Young, while in the Rhotic and Non-rhotic groups, the number decreased from the Young to the Old, as we just saw.

Concerning the rhotacized rimes, in each dialect group, some of rhotacized rimes were used frequently, while others were barely used at all. For example, in the speech of the Beijing native speakers, some rimes, such as *ar, ianr*, and *uanr*, were used at least 15 times on average, while some rimes, like *uengr*, *ür*, *üer*, *ünr* and *üngr*, were not used at all.

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[22] *Pn* refers to the number of participants, same below.
[23] *Rt-n* refers to the number of rhotacized rime types; same below.

Most frequently used rhotacized rimes across groups

Table 7.1 The five most frequently rhotacized rimes used in natural speech of the three dialect groups.

	Beijing			Rhotic			Non-rhotic		
	rimes	*sum*	*avg.*	*rimes*	*sum*	*avg.*	*rimes*	*sum*	*avg.*
	ianr	221	15	enr	101	13	uanr	22	3
	enr	97	7	ianr	77	10	enr	17	2
Young	ar	65	4	anr	47	6	anr	12	2
	ueir	50	3	ar	34	4	ar	10	1
	anr	48	3	uenr	14	2	ianr	9	1
	ianr	126	16	ianr	47	6	ianr	14	2
	ar	78	10	er	28	4	ueir	10	1
Middle	our	68	9	anr	23	3	ar	7	1
	üanr	41	5	ar	22	3	uanr	6	1
	uanr	37	5	our	21	3	--ir	4	1
	ianr	139	17	ianr	36	6	ianr	4	1
	ar	97	12	uanr	17	3	uanr	3	0
Old	uanr	74	9	ueir	16	3	üanr	3	0
	üanr	44	6	anr	14	2	--ir	2	0
	er	41	5	er	12	2	anr	2	0

Note: '*rimes*' refers to five most frequently used rhotacized rimes in each group; '*sum*' and '*avg.*', respectively, refer to the total number of instances of a rime and its average per speaker in that Dialect–Age group. The *sum* and *avg.* of five rimes listed in each Dialect–Age group are arranged in descending order.

Table 7.1 shows the five most frequently used rhotacized rimes and the sum and average number of the rimes per Dialect–Age group (3 Dialect groups × 3 Age groups). It can be seen that the rime *ianr* is the most used in seven Dialect–Age groups, that is, all except the Rhotic-Young and Non-rhotic-Young groups. Nevertheless, in these two groups, *ianr* is still one of the five most frequently used rhotacized rimes. We also find that besides *ianr*, other rimes, belonging to the rhyming group *anr*, are also among the most frequently rhotacized rimes in several groups, such as *anr*, *uanr*, and *üanr*.

Table 7.2 The total number of *ianr* and the average number per speaker from different dialect backgrounds (*N* = 895).

Dialect Background	Sum	Participants	Average
Beijing	613	31	19.7
Rhotic	260	22	11.8
Non-rhotic	21	22	1.0

The total number of *ianr* rimes in the corpus is shown in Table 7.2. In total, there are 895 tokens with *ianr* rimes produced by 74 speakers in the three dialect groups. The Beijing native speakers produced the most *ianr* rimes (*Tn* = 613), and the Non-rhotic *speakers* produced the fewest (*Tn* = 22), with the Rhotic speakers in between (*Tn* = 260). On average, as illustrated in the table, the Beijing native speakers produced 19.7 *ianr* rimes per person, the Rhotic speakers 11.8 and for the Non-rhotic speakers it was 1.2 per person.

Syllable types, meanings, and tones

As mentioned before, rhotacization is a lexico-phonetic phenomenon in Mandarin, rather than a purely phonetic affair. To do justice to all aspects involved in the rhotacized *ianr* syllables, we further categorized them based on syllable type,[24] meaning, and tone.

The pattern that we found in the 895 *ianr* syllables is shown in Table 7.3. Rather than occurring in many different syllable types, about 95% of the 895 *ianr* syllables occurs in five syllable types, namely *bianr*, *dianr*, *mianr*, *pianr*, and *tianr*. Among them, about half of the total (*n=405*, *Pct=50.4%*) occurs in the syllable *bianr*.[25] The second and third most frequently occurring are *dianr*[26] (*n=266*, *Pct=29.7%*) and *mianr*[27] (*n=89*, *Pct=10%*). These three syllable types account for about 90% of the total. The occurrence of the syllables *pianr* (*n=26*, *Pct=3.9%*) and *tianr* (*n=16*, *Pct=1.8%*) is dramatically lower, despite the fact that they take fourth and fifth place. All the other syllable types (*Nt=47*) with the rime *ianr* combined account for only 5.3% of the total.

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[24] Syllable types here refer to different "onset consonant + *ianr*" combinations.

[25] The morphemic meaning of *bian* (边) as a noun: 1. the edge or margin of an object; 2. the border or boundary of a region or a country; 3. side, nearby; 4. simultaneously; 5. indicating locality; etc.

[26] The morphemic meaning of *dian* (点): 1. a little, a bit; 2. some; 3. at all (used in negative sentence).

[27] The morphemic meaning of *mian* (面) as noun: 1. face; 2. the surface of an object; 3. measure word for an object which has flat surfaces such as drums, mirrors; 4. powder, flour; 5. aspect; 6. side; 7. indicating locality; etc.

Table 7.3 The number and percentage of the rhotacized rime *ianr*s by their syllable types, morphemic meanings, and tone realizations (*N*=895).

Syllable Type		Morphemic Meaning	Example	Or Tone	Beijing	Rho.	Non-rh.	Ot Tone	Beijing	Rho.	Non-rh.	Sum	Pct.
bianr	bianr 1	to indicate location	里边儿 li bianr 'inside'	T1	91	50	1	T0	194	65	4	405	45.3%
	bianr 2	edge; margin	路 边 儿 lu bianr 'roadside'	T1	31	15	0	-	-	-	-	46	5.1%
dianr	dianr 1	some, a little bit (of), at all	一点儿 yi dianr 'a little bit'	T3	81	68	7	T0	80	18	1	255	28.5%
	dianr 2	decimal; defined time/place	三点五 san dianr wu 'three point five' 景点儿 jingdianr 'attractions'	T3	3	7	1	-	-	-	-	11	1.2%
mianr	mianr 1	to indicate location	前面儿 qian mianr 'in front of'	T4	14	3	0	T0	27	4	2	50	5.6%
	mianr 2	surface	桌面儿 zhuo mianr 'on the desk'	T4	25	8	0	-	-	-	-	33	3.7%
	mianr 3	powder; flour	白面儿 bai mianr 'heroin'	T4	4	2	0	-	-	-	-	6	0.7%
pianr	pianr 1	a thin and flat thing; photo	纸片儿 zhi pianr 'card' 照片儿 zhao pianr 'photo'	T4	10	4	1	T1	1	2	0	18	2.0%
	pianr 2	to indicate location	那片儿 na pianr 'that part'	T4	2	5	0	T0	1	-	-	8	0.9%
tianr	tianr	day	聊天儿 liao tianr 'talk day; chat'	T1	14	1	1	-	-	-	-	16	1.8%
other	-			-	36	7	4	-	-	-	-	47	5.3%
Sum												895	

Note: Syllable type refers to the "onset consonant + *ianr*" combination. The numbers *1, 2*, and *3* marked after some syllable types are used to number the meanings of a syllable, if it has more than one meaning. *Morphemic Meaning* indicates the meanings of each syllable. *Or Tone* represents the citation tone of the syllable. *Ot Tone* represents some other tone realization based on the syllable's original tone in natural speech. *Beijing*, *Rho.,* and *Non-rho.* refer to the number of the syllable with the specified meaning and with the original tone (*Or Tone*) or other tone (*Ot Tone*) used by speakers respectively from Beijing, Rhotic, and Non-rhotic groups. *Sum* and *Pct.* refer to the total number of each syllable type and its proportion.

The citation tones of the three most frequent syllables are, respectively, T1 (*biānr*), T3 (*diǎnr*), and T4 (*miànr*). As shown in Table 7.3, on both *bianr* and *mianr*, when indicating the meaning of "location," the tone is neutralized in all three dialect groups (the syllable is often reduced in other respects as well, as we will see). Among them, the Beijing native speakers use the neutralized tone twice as often as the full form when they use *bianr*. The tone on *dianr* 'a little bit, some, at all', was realized equally often in its full form as in its neutralized form by the *Beijing* native speakers, *Nt*=81 and *Nt*=80, respectively. Both the Rhotic and the Non-rhotic speakers used the neutral tone (*Nt*=68; *Nt*=7) less frequently than the fully realized tone (*Nt*=18; *Nt*=1).

7.2.2   Summary

We investigated the 37 rhotacized rimes in our natural speech corpus and calculated the number of each rhotacized rime produced by the speakers from each dialect group. We found that rhotacized rimes were not used evenly. Some rimes occurred very frequently, while other rimes were never or almost never used. For the frequent rimes, the rimes in the rhyming group *anr* occurred the most frequently, including four rimes, *anr*, *ianr*, *uanr*, and *üanr*. Among them, the rime *ianr* turned out to be the most frequently used rime across all the Dialect–Age groups.

Morphologically, one function of rhotacization in Mandarin is that of diminutive formation (Duanmu, 1990; B. Huang & Liao, 2017; Y.-H. Lin, 2007a). It should be noted that the results of this study show that the morphemic meanings of the most frequently used rhotacized syllables, *bianr* and *mianr,* have nothing to do with diminutive forms. Specifically, the syllables *bianr* and *mianr* usually occur in fixed words indicating location. The syllable *dianr* usually occurs in the fixed combination with *yi* 'one', *yi dianr* meaning 'a little bit'. As the focus of this study in not on revealing the grammatical or lexical function of rhotacization and possible changes in those respects, we will not discuss it further.

The most frequently used rhotacized rime *ianr* is to be the focus in our sociolinguistic study. In Experiment 2 and Experiment 3, we will focus on the phonetics and acoustics of the rime *ianr* across social groups, to examine the

social and linguistic constraints in language variation and pronunciation norm formation.

7.3   Experiment 2: Acoustics of the rhotacized rime *ianr*

In Experiment 1, we found that *ianr* is the most frequently used rhotacized rime in our natural speech database across all social groups, and we looked at syllables containing the rime *ianr*, in terms of syllable type, meaning, and tone realization of such syllables. In the present experiment, based on the pattern and categories we obtained in Experiment 1, we study the rime *ianr* acoustically by comparing the formant trajectories of their first, second, and third formant contours and F2–F1 formant charts. The focus of this study is to explore the variants of the rime *ianr* in different social groups and to reveal the effects of both linguistic (e.g., tonal, segmental, and morphemic) factors and social factors on the variation in a specific rime.

7.3.1   Method

Categorizing ianr

In this acoustic experiment, all *ianr* rimes were pre-categorized into three types, namely *ianr* with Original Tone (OT *ianr*), with Neutral tone with the glide [j] (NT *ianr*) and with Neutral tone without the glide [j] (NG *ianr*).

　　　This categorization was made based on the phonetic (segmental and tonal) and auditory features of syllables with *ianr* in our corpus. As we saw in Section 7.2, syllables with rime *ianr* are realized either with their original tone fully realized or with a neutral tone. In addition to losing their tone, *ianr* rimes occasionally also lose the glide [j].[28] So, *ianr* rimes carrying a neutral tone can be further divided into two subgroups, namely, Neutral tone with the glide [j] pronounced and Neutral tone without the glide [j] pronounced, according to the presence of the glide [j] or not.

　　　To test the feasibility of this pre-categorizing method, a phonetician who is a Beijing native speaker was asked to test it. He did a trial on categorizing *ianr* rimes with this method, which is believed to be able to categorize *ianr* rimes based on their linguistic and auditory characteristics. Then this phonetician also helped to check all the pre-categorization results and to improve them.

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[28] Phonetic studies (Duanmu, 1990, 2004, 2014; Y.-H. Lin, 2007a) suggested that a neutral tone could change the quality of the syllable rime it affiliates with, as discussed in Chapter 2.

Recording conditions and data inclusion

Of the 37 rhotacized rimes, the most frequently used rhotacized rime *ianr* was selected for the acoustic analysis, as mentioned in Section 7.2. However, as mentioned in Chapter 3, the recording occurred at places familiar to the participants rather than a sterile studio. As a consequence, the conditions were different for each pair of speakers and were not always optimal. It turned out that not all recordings of the rime *ianr* were appropriate for an acoustic analysis, due to poor and unreliable formant information. The most frequent causes are listed here:

- Unexpected noise. Though the recordings were conducted in quiet rooms, such as the participants' study rooms at home or meeting rooms at their workplaces, unexpected noises inside of the room still occurred, such as speakers' rocking chairs and speakers clearing their throat or repeatedly rubbing their hands when they or their interlocutors were talking.
- Speech overlapping. While one speaker was talking, sometimes his/her interlocutor interrupted him/her. So, the rhotacized words with the rime *ianr* produced by one speaker could be partially or completely overlapped by the other interlocuter's speech. Consequently, the formant values extracted from Praat are not accurate and the original formant information of the rime *ianr* could thus not be precisely obtained any more.
- Fast and weak *ianr.* Some words with the rime *ianr*, especially those with neutral tone, were spoken too fast and soft, leading to limited formant information being recorded.

As a result, many *ianr*s (about one half) were excluded from further acoustic analysis. Table 7.4 shows the number of OT, NT, and NG *ianr*s before and after exclusion. In Appendix H, the average number of OT, NT, and NG *ianr*s per speaker per social group after the exclusion, is given respectively in Tables C1, C2, and C3.

Table 7.4 The number of *ianr*s obtained in the corpus (*N*=895), the actual number of *ianr*s in the formant analysis (*N*=460), and the actual average number of *ianr*s per speaker per social group.

Gender	Age	Beijing			Rhotic			Non-rhotic		
		ianr	actl. ianr	actl. avg.	ianr	actl. ianr	actl. avg.	ian r	actl. ianr	actl. avg.
Male	Young	161	91	11	45	32	8	6	4	1
	Middle	65	33	8	53	31	8	3	3	1
	Old	65	24	6	50	18	5	3	2	1
Female	Young	126	73	10	36	26	7	3	3	1
	Middle	74	36	9	44	24	6	7	4	1
	Old	122	45	11	32	13	7	0	0	0
	Total	613	302	10	260	144	7	22	16	1

Note: ianr refers to the number of *ianr* rimes obtained from all the speakers of each social group; *actl. ianr* refers to the actual number of *ianr* rimes that could be used in acoustic analyses of each social group; a*ctl. avg.* refers to the actual average number of *ianr* rimes per speaker per social group in the acoustics analysis.

Formant analysis and normalization

The formant analysis of this experiment consists of two parts: formant trajectory analysis and F2–F1 vowel chart analysis. The formant trajectory illustrates the first formant (F1), second formant (F2), and third formant (F3) movement contours of OT, NT, and NG *ianr* produced by speakers of each Gender–Age group in each dialect group. The F2–F1 vowel charts show the frontness and height of the tongue position of the normalized rime *ianr*. These two formant analyses aim to reveal formant differences, that is, vowel differences, of the variable *ianr*s produced by speakers in different social groups and to obtain the variants of *ianr* in the Beijing speech community.

Formant trajectories

In the present study, we focus on the acoustics of the variable *ianr*. The surface form of *ianr* is phonetically a combination of the glide [j] + rhotacized vowel [ar]. Being different from the vowel analysis in other variation studies, the variable *ianr* is neither a monophthong nor a diphthong. The common way to get the normalized midpoints of F1 and F2 on the monophthong, or 30 percent of the diphthong duration, do not completely apply to this variable *ianr*. Besides, this variable is a rhotacized sound and thus has a lower F3. The vowel-intrinsic

normalization methods would not produce an accurate measurement (Baranowski, 2013; Thomas & Typler, 2007). Moreover, the presence and absence of the glide [j] in the variable *ianr* plays an important role in this study of language choices and variation, so the presence of and realization of the glide [j] should be studied. For this reason, the common normalization methods do not apply to this study and examining the general formant trajectory (F1, F2, and F3) is a proper way to compare the differences in the realization of *ianr* across different social groups.

We sampled ten equidistant points on each formant of each *ianr* rime. The formant trajectories were obtained by averaging the ten formant values of the same type *ianr* produced by speakers in each Gender–Age group. This can to some extent eliminate the effects of vocal tract differences of speakers of different ages and gender on the vowel comparison. In addition, we are aware that averaging the formant values of different speakers in the same Gender–Age group could eliminate some micro-differences in the rime *ianr* across those speakers. However, the focus of this formant study is to reveal the differences of formant movements macroscopically across different Gender–Age groups and to obtain the variants of the rime *ianr* in different social groups. Formant trajectories were shown in line charts that were grouped by Gender–Age group.

Trajectory differences can be compared with multilevel regression models, such as growth curve analysis (GCA) or generalized additive mixed modeling (GAM). However, as illustrated in Table 7.4 and Appendix H, the actual number of variable OT, NT, and NG *ianr*s in each Gender–Age group that is usable in the formant trajectory analysis is less than it ideally should be. If random effects, such as the onset consonant and the phonetic context of variable *ianr*, are involved, the actual data size is not appropriate for conducting statistical tests, which would be necessary for such comparisons.

F2–F1 vowel charts

The midpoint value of F2 and F1 of each *ianr* was sampled and normalized using the Lobanov method (Lobanov, 1971). The results obtained with the Lobanov method are not Hertz-like values, so the normalized results were converted to Hertz-like values, and we plotted them on a chart of F1 (on the y-axis) against F2 (on the x-axis). The Lobanov method is believed to be one of the best normalization formulas and could optimally eliminate physiologically caused differences in vowel formant values produced by speakers of different ages and genders while preserving sociolinguistic differences (Adank et al., 2004; Thomas

& Typler, 2007). The Lobanov vowel normalization[29] and scaling[30] in this study were done using the vowels package in R (R Core Team, 2020). The F2–F1 formants are shown per *ianr* type per Dialect–Age group.

Both format trajectory and F2–F1 vowel charts were made using the ggplot2 package (Wickham, 2016) in R (R Core Team, 2020).

7.3.2   Results

Formant trajectories of ianr

Beijing native speakers
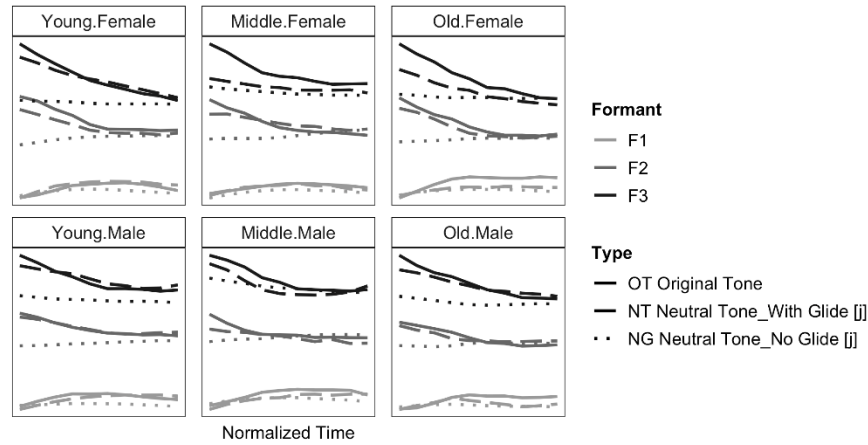
Figure 7.2 Averaged formant contours of rhotacized rime *ianr* produced by Beijing native speakers. F1, F2, F3 (bottom to top).
The x-axis represents the normalized time, and the scale of y-axis is in Hz. Three different line types— solid, dashed, and dotted lines—are used to differentiate the three types of the rime *ianr* with the Original tone or a Neutral tone with the glide [j] being pronounced or without the glide.

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[29] According to (Adank et al., 2004; Nearey, 1977; Thomas & Typler, 2007), the Lobanov formula is:

$$F_{n[V]}^{N} = (F_{n[V]} - MEAN_n)/S_n$$

[30] The NORM's formulas for the scaling algorithm are:

$$F'_1 = 250 + 500 \ (F^N_1 - F^N_{1MIN}) \ / \ (F^N_{1MAX} - F^N_{1MIN})$$

$$F'_2 = 850 + 1400 \ (F^N_2 - F^N_{2MIN}) \ / \ (F^N_{2MAX} - F^N_{2MIN})$$

where F^N_i is a normalized value for formant i and F^N_{iMIN} and F^N_{iMAX} are the minimum and maximum normalized formant values for formant i.

In Figure 7.2, the trajectories of the first three formants of the rime *ianr* produced by the Beijing native speakers in three different Age groups are shown. In total, there are six *Age–Gender* subgroups, and thus the six graphs in Figure 7.2 show the formant movements of *ianr* in each subgroup. The Beijing native speakers produced all three types of *ianr*.

As shown in Figure 7.2, there are four general findings. First, in all six *Age–Gender* groups, a steep fall of F2 and F3 and a slightly arched F1 are observed on the OT (solid line) and NT *ianr* (dashed line), though the fall of F3 contours of OT *ianr* is steeper than that of NT *ianr*. Second, the formant contours of NG *ianr* (dotted line) have a very different pattern. Instead of a falling F3, the F3 contours of NG *ianr* have a rather low onset and show only mild rising or falling, compared to the F3 of OT and NT *ianr*. Third, the F1 movement of three types of *ianr* in the same *Age–Gender* subgroup is quite similar. However, the F1 contours of NG *ianr* are less arched. Fourth, the three formants of the three types of *ianr* in all *Age–Gender* groups have a consistent ending target respectively, though their onsets are varied. Last but not the least, the formant endings of *ianr* usually keep the downward tendency.

Non-native speakers: Rhotic speakers
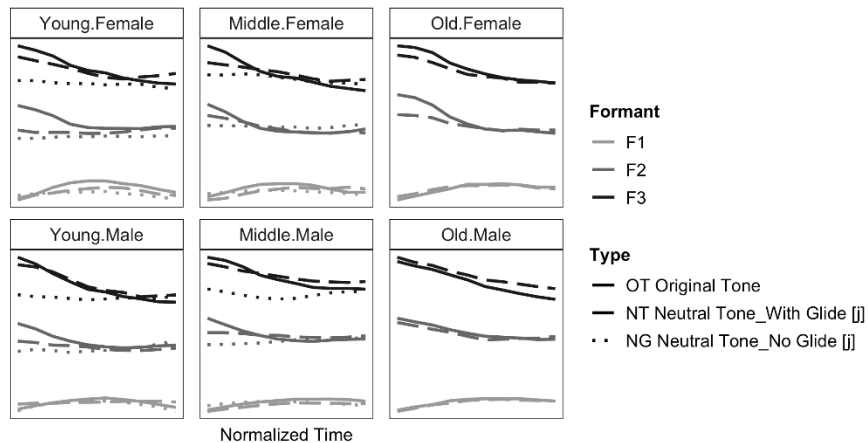
Figure 7.3 Averaged formant contours of the three types of rhotacized rime *ianr* produced by Rhotic speakers.[31]

With respect to the *Non-native:* Rhotic speakers, Figure 7.3 shows that, here too, there are four general findings. First, like Beijing native speakers, in the six *Age–Gender* groups, the formant movement of OT *ianr* and NT *ianr* shows a similar

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[31] The group of *Old* speakers produced few rhotic words/didn't produce NG *ianr*, so no contours of NG *ianr* can be shown in this figure.

appearance in general. That is, slightly arched F1 and falling F2 and F3; but the F3 contours of OT *ianr* start higher and fall more steeply, while the F3 onset of NT *ianr* is lower and its F3 fall is milder than that of NT *ianr*. Second, the formant contours of NG *ianr* have a very different pattern. Instead of falling, the F3 contours of NG *ianr* have a quite low onset and then show only mild rising or falling. Third, the three formants of the three types of *ianr* in all groups, in general, have consistent ending targets respectively but their onsets are varied, as can be seen. Fourth, the F1 contour movements of three types of *ianr* in each subgroup are quite similar, compared to the differences on F2 and F3 contours. In addition, the formant endings of *ianr* of different types produced by speakers from different groups are, to some extent, observed to go upwards, instead of keeping the tendency of going downwards.

Non-native speakers: Non-rhotic speakers
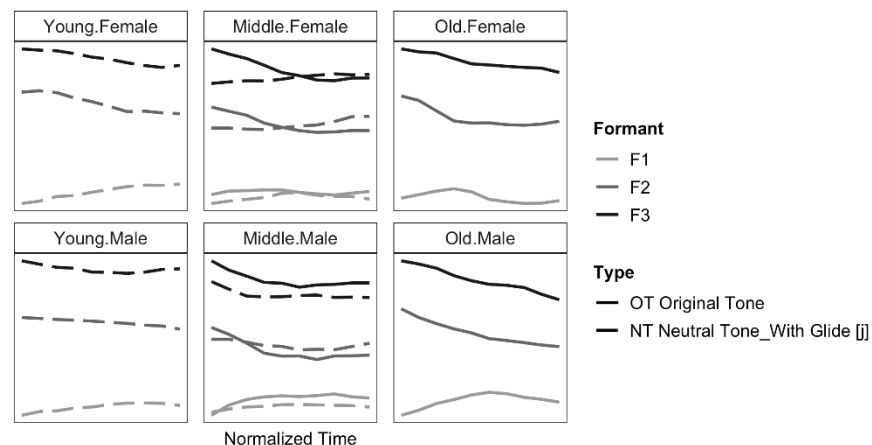
Figure 7.4 Averaged formant contours of two types (OT and NT) of rhotacized rime *ianr* produced by *Non-rhotic speakers*.[32]

Turning to the *Non-native:* Non-rhotic speakers, we see in Figure 7.4, that there are three general findings. First, *Young* speakers only produced one type of *ianr*, that is, NT *ianr*. The F3 and F2 contours produced by them show a slight decline and F1 is arched. F3 shows a slight rising at the end. Second, the *Middle-aged speakers* produced two types of *ianr*, OT and NT *ianr*. For the OT *ianr* time, F2 and F3 contours both show a fall followed by a slight rise. As for NT *ianr*,

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[32] Non-rhotic speakers didn't produce any NG *ianr* rime. Furthermore, none of the speakers in the six *Age–Gender* groups produced five tokens and not all subgroups produced both OT and NT *ianr*. Therefore, in this figure we show all concerned data we have in the corpus: the plotted contours are based on one to four *ianr* tokens produced by one or more speakers in each subgroup.

speakers show different patterns. The F2 and F3 contours produced by *Female* speakers have a lower onset and then rise, while the two contours produced by *Male* speakers show a decline. Third, the *Old* speakers only produced one type of *ianr* rime, namely OT *ianr*. The F2 and F3 contours show a decline for both *Female* and *Male* speakers. Moreover, like what we saw with respect to the Rhotic speakers, the formant endings of *ianr*, especially as produced by *Young* and *Middle* speakers, go upwards, instead of staying flat or going downwards.

F2–F1 formant chart of rime ianr

Beijing Native speakers
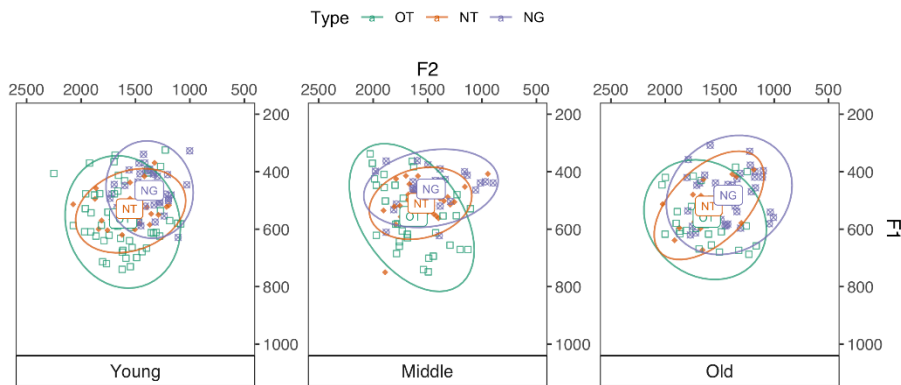
Figure 7.5 F2–F1 formant charts of OT, NT, and NG *ianr* produced by Beijing native speakers using the Lobanov method (scaled).
Note: The results are grouped into three graphs by three *Age* groups. The X-axis on each graph represents F2 in Hertz, and the y-axis represents F1 (same below).

Let's now turn to the F2–F1 formant chart of the rime *ianr*, considering the Beijing Native speakers first. As shown in Figure 7.5, compared to NT and NG *ianr*, the OT *ianr* covers the largest space in the charts and OT, NT, and NG *ianr* overlap mostly in the close-mid (height) and near-back (frontness) area. Specifically, in height, OT *ianr* takes the near-close, mid, and near-open position, NT *ianr* takes the space between the close-mid and the open-mid, and NG *ianr* takes the space between the near-close and the mid. In frontness/backness, OT, NT, and NG *ianr* usually occur in the area between the near-front and near-back.
    In addition, similarities and differences across *Age* groups are observed. The vowel spaces of OT, NT, and NG *ianr* go from a lower and central position to higher and more back position relatively, in all *Age* groups. OT, NT, and NG *ianr* in *Old* speakers overlap greatly with each other, while NT and NG *ianr* overlap with each other in the group of *Middle* speakers. *Young* speakers' OT, NT, and NG *ianr* occur in more specific areas and clearer clusters can be seen in the chart.

Non-native speakers: Rhotic speakers
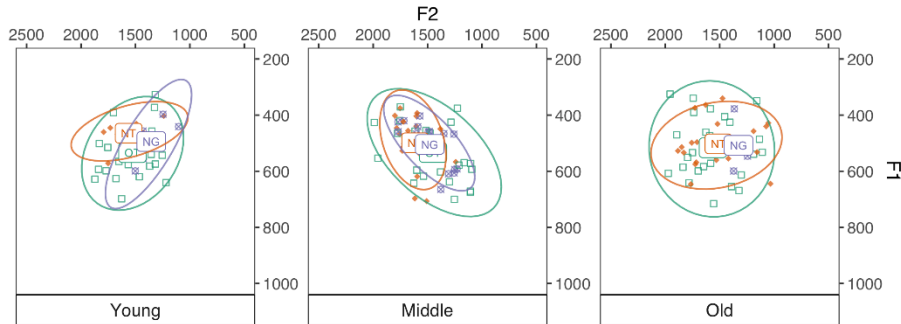
Figure 7.6 F2–F1 formant charts of OT, NT, and NG *ianr* produced by Rhotic speakers using the Lobanov method (scaled).

For *Non-native:* Rhotic speakers, as can be seen in Figure 7.6, like Beijing native speakers, the vowel space of OT *ianr* produced by Rhotic speakers, compared to NT and NG *ianr*, covers the largest space in the charts. Furthermore, OT, NT, and NG *ianr* usually overlap with each other between the near-close and mid area. Specifically, in height, OT *ianr* takes the area between the near-close and open-mid, and NT and NG *ianr* mostly occur in the near-close and mid position. In frontness/backness, OT, NT, and NG *ianr* occur between the near front and near back area. Across *Age* groups, no obvious differences are observed.

Moreover, compared to Beijing native speakers, the vowel space of OT *ianr* seems similar to that of Beijing speakers, while the vowel space of NT and NG *ianr* are less low and less back than with Beijing speakers.

Non-native speakers: Non-rhotic speakers
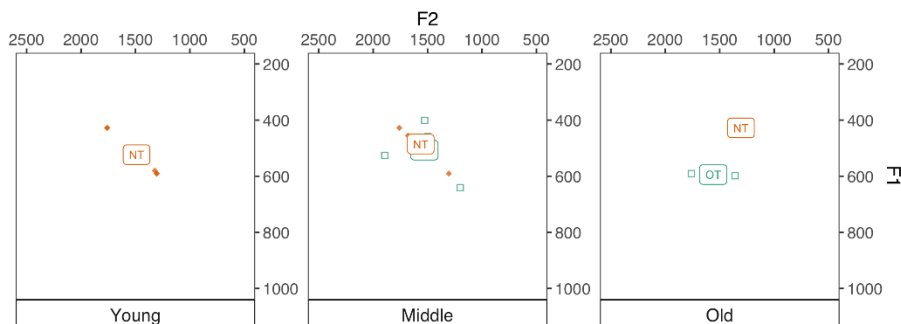
Figure 7.7 F2–F1 formant charts of *ianr*s produced by Non-rhotic speakers using the Lobanov method (scaled).

Turning our attention, finally, to the *Non-native:* Non-rhotic speakers, let's consider Figure 7.7, which shows the F2–F1 formant charts of OT and NT *ianr*s produced by Non-rhotic speakers; we also see that no NG *ianr* is produced. However, as mentioned above, Non-rhotic speakers produced few *ianr* tokens anyway. On the one hand, the small number of *ianr* tokens reveals that Non-rhotic speakers do not use rhotacized rimes as frequently as the other two dialect groups. On the other hand, the results based on such a small data set would not provide us with adequate information about the vowel space of *ianr* produced by Non-rhotic speakers. For this reason, it is not discussed here.

Variants of rime ianr

Beijing native speakers

Our next topic is the variants of *ianr*, and once again we start with the *ianr*s produced by the Beijing native speakers. As we have already seen in Figures 7.2 and 7.5, the rhotacized rime *ianr* produced by Beijing speakers comes in three different variants, Original tone (OT), Neutral tone with the glide [j] (NT), and Neutral tone without the glide [j] (NG). Let's look at the details of the categorical differences now.

   OT *ianr* The segmental elements of the rime are articulated approximately in its complete form, the acoustic evidence of which can be recognized on its formant trajectories (solid lines in Figure 7.2). The F1 contours of OT *ianr* have a low onset, the F2 contours have a high onset and fall steeply proceeding to a slight decline, and the F3 contours fall steeply. With such formant movements, the glide [j] is well pronounced. A low onset of F1 represents a high tongue position, and a high F2 onset indicates that the tongue is in the front of the mouth. A high F3 onset also indicates that the tongue is not curved yet. These are the acoustic features of the glide [j]. [33] The remaining part of the three formant contours indicates the realization of the rhotacized vowel [ar]. In addition, as shown in the F2–F1 vowel space charts in Figure 7.5, there exists a height difference of the midpoints of OT *ianr*, which covers the space from the close-mid to the near-open (height), and we can transcribe the vowels in this area as [ɘ-ə-ɛ-ɐ]. Therefore, the phonetic variants of OT *ianr* uttered by native Beijing speakers can be transcribed as [jɘɹ], [jəɹ], [jɛɹ], and [jɐɹ].

   NT *ianr* NT *ianr* bears a Neutral tone and the segment [j] is realized. As mentioned above, the Neutral tone can centralize the vowel to which it affiliates, and thus the segmental elements of *ianr* can also be neutralized. This can be seen in Figure 7.2, where the formant contours (dashed lines) of NT *ianr* become shrank in general, compared to that of OT *ianr*. To be specific, F2 and F3 contours of NT *ianr* have a lower onset and a smoother decline and the F2 value is lower,

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[33] Glide [j] is semi-vocalic equivalent of the close front unrounded vowel [i]. Thus, they have acoustic similarities.

which means that the glide [j] is articulated backwards and thus centralized than that of OT *ianr*. As shown in Figure 7.5, NT *ianr* take mostly the vowel space between the close-mid and open-mid in height (F1) and take the central position in front–backness (F2). Thus, the phonetic variants of NT *ianr* could be [jəɹ], [jəɹ], [jɛɹ].

      NG *ianr* NG *ianr* bears a Neutral tone and the glide [j] is completely absent. The tonal and segmental elements of such rimes are further neutralized, and the vowel quality is also changed. The evidence can be found in Figure 7.2 (dotted line). Different from the arched F1 contour and falling F2 and F3 contour of OT and NT *ianr*, its F1, F2, and F3 contours are quite flat. Besides, the F3 contour has a very low onset and stayed low through the whole rime. As shown in Figure 7.5, most *ianr*s in NG take the central and near-back position for F2 and the near-close and the mid position for F1. In short, the phonetic variants of NG *ianr* can be [ʊɹ], [əɹ], and [əɹ].

Non-native speakers: Rhotic speakers

As for the variants of *ianr* produced by Rhotic speakers, we saw earlier on (in Figures 7.3 and 6.6), that they display categorical differences as well.

      OT *ianr* As was the case with OT *ianr* produced by the Beijing native speakers, it is articulated in a complete form by the Rhotic speakers as well. The acoustic features of the segmental elements [j] and [ar] can be observed on the Figure 7.3 (solid line). The F1 contour has a low onset, the F2 contour has a quite high onset and then went down and the F3 contour falls dramatically. A low onset of F1 means a high tongue position, and a high F2 onset indicates that the tongue is in front of the mouth. A high F3 also indicates that the tongue is not curved yet. These are the acoustic features of the glide [j]. The remaining part of formant contours indicates the realization of the rhotacized part [anr]. As shown in the F2–F1 formant charts in Figure 7.6, OT *ianr* usually takes the near-close and open-mid position in height (F1) and takes the near-front and near-back position in front–backness (F2). Thus, the vowels of rime *ianr* in such space are [ɘ-ə-ɛ]. Therefore, the phonetic variables of OT *ianr* from Rhotic speakers are [jɘɹ], [jəɹ] or [jɛɹ].

      NT *ianr* Similar to what we saw above (Beijing native speakers), NT *ianr* produced by Rhotic speakers bears a Neutral tone and the glide [j] is present as well, but the segmental elements of rime *ianr* are neutralized. The acoustic evidence is shown on Figure 7.3 (dashed line). If the formant contours of OT *ianr* are set as a reference, the amplitude of the three formants in NT *ianr* shrank. Specifically, both F2 and F3 contours in NT have lower onsets and went down more mildly. The F2 value is in general lower than that of OT *ianr*, which means that the tongue position of the high-front glide [j] goes backwards and thus centralized. As shown in Figure 7.6, NT *ianr* takes the near-close and mid position in height (F1) and takes the near-front and near-back position in front–backness (F2). Therefore, the phonetic variants of NT *ianr*s are [jɘɹ] and [jəɹ].

NG *ianr*[34] NG *ianr* bears a Neutral tone and the glide [j] is absent. That is, the tonal and segmental elements are further neutralized. The corresponding evidence can be found on the formant trajectories in Figure 7.3 (dotted line). The F1, F2, and F3 contours are all quite flat, which are dramatically different from that of OT and NT *ianr*. The F2 onset surprisingly has lower values, compared to the remainder of the contours. This means that the tongue body is at the central position from the beginning of the rime while it is supposed to be the high-front position of semi-vocalic [j]. F3 contours also have very low onsets and stayed low through the whole rime. Thus, the appearance of formant contours is basically that of a rhotacized monophthong. As shown in Figure 7.6, the NG *ianr* takes mostly the near-close and mid position in height (F1) and takes the near-front and near-back position in front–backness (F2). Therefore, the phonetic variants of NG *ianr* can be represented with [ɘɹ] and [əɹ].

Non-native speakers: Non-rhotic speakers

Finally, when it comes to the Non-rhotic speakers, as mentioned in Section 7.3.1, there is only a small number of *ianr*s (*N*=22) produced by this group, and only two types, namely OT and NT. The phonetic variants summarized below are based on the results of the available data (*N*=16).

OT *ianr* Such *ianr* is articulated in a complete form, which can be recognized on the formant trajectories (solid lines in Figure 7.4). The arched F1 contours has a low onset, which represents a high tongue body position. The F2 and F3 contours start high and fall steeply. A high F2 onset indicates that the tongue is in the front of the month. A high F3 onset also indicates that the tongue is not curved yet. Thus, the glide [j] is present. The remainder part of formant contours is the realization of the rhotacized vowel. In addition, as shown in Figure 7.7, OT *ianr* take the mid position in height (F1) and central position in front–backness (F2). Thus, the variant is labeled as [jəɹ].

NT *ianr* The glide [j] of this *ianr* is present, and the rime bears a Neutral tone. However, compared to that of the Beijing native and the Rhotic speakers, the segmental elements of such *ianr* are further neutralized. The F1 contour is quite flat and F2 and F3 contours fall smoothly. However, we can still see the F1 contour has a lower onset, the F2 and F3 contours have a slight high onset, which indicates the acoustic features of glide [j]. As shown in Figure 7.7, the *ianr* rimes take the mid position in height (F1) and central position in front–backness (F2). Thus, the phonetic variant of this type is transcribed as [jəɹ].

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[34] Old speakers didn't produce enough tokens of NG *ianr*. So, the discussion here is based on the tokens produced by *Young* and *Middle* speakers.

Table 7.5 Phonetic variants of the rhotic rime *ianr* in three segmental–tonal types produced by Beijing, Rhotic, and Non-rhotic speakers.

Dialect Background	OT ianr	NT ianr	NG ianr
Beijing	[jəɹ], [jəɹ], [jɛɹ], [jɐɹ]	[jəɹ], [jəɹ], [jɛɹ]	[ʊɹ], [əɹ], [əɹ]
Rhotic	[jəɹ], [jəɹ], [jɛɹ]	[jəɹ], [jəɹ]	[əɹ], [əɹ]
Non-rhotic	[jəɹ]	[jəɹ]	-

With the results of the formant trajectory and F2–F1 vowel space, we obtain the phonetic variants of the variable *ianr* produced by speakers from three dialect backgrounds. The results are shown in Table 7.5. The Beijing native speakers produced the greatest number of phonetic variants, which are OT *ianr* [jəɹ], [jəɹ], [jɛɹ], and [jɐɹ], NT *ianr* [jəɹ], [jəɹ], and [jɛɹ], and NG *ianr* [ʊɹ], [əɹ], and [əɹ]. The Rhotic speakers used a smaller number of the phonetic variants, namely OT *ianr* [jəɹ], [jəɹ], and [jɛɹ], NT *ianr* [jəɹ] and [jəɹ], and NG *ianr* [əɹ] and [əɹ]. The Non-rhotic speakers produced the fewest phonetic variants, namely [jəɹ] with OT and with NT. The Beijing native speakers make use of the area from the near-close to the near-open, the Rhotic speakers the from near-close to the open-mid and the Non-rhotic speakers only use the mid.

7.3.3   Summary

In this study, we examined the effects of linguistic and social factors on the phonetic realization of rhotic rime *ianr*. Below we have summarized such effects on mainly two aspects, namely the formant trajectory of *ianr* and the vowel space of *ianr*.

Formant trajectories of ianr

In this experiment, we primarily compared the differences of *ianr* formant trajectories by different types and by speakers' dialect backgrounds. Different *ianr* types show different formant contours patterns. In general, OT *ianr* and NT *ianr* show similarities. However, OT *ianr* has a higher F2 and F3 onset, and the F2 and F3 contours fall more dramatically than that of NT *ianr*. Furthermore, NG *ianr* has three flat formant contours with very mild fluctuation, which are different from OT and NT *ianr*. This suggests that the *ianr* rime with OT and NT is articulated approximately in its complete form, namely, with the presence of both the glide [j] and the rhotacized vowel. However, due to the centralization effect of neutral tone on the *ianr* rime with which it affiliates, the glide [j] of NT *ianr* starts less front (lower F2 onset) and the speaker's tongue is probably curved earlier (lower F3 onset) than that of OT *ianr*. As for NG *ianr*, due to the further centralization effects of the neutral tone, it shows that no glide [j] but

only the rhotacized vowel is pronounced on its formant trajectories. In terms of the differences in trajectory according to dialect background, speakers with Beijing and *Rhotic dialect* backgrounds have similar formant movements for *ianr* in general, while that of Non-rhotic speakers shows different formant trajectory appearances (if we can say anything about them, in view of the small number of data available for this group) of the available rime *ianr* of the two types, namely OT *ianr* and NT *ianr*. Furthermore, we also observed a rise at *ianr* formants endings with the *Rhotic* and the Non-rhotic speakers. This suggests that non-native speakers do rhotacize the rime, but the rhotacization is probably not sufficiently realized and the speaker's tongue is de-retroflexed at the rime ending.

Vowel space of ianr

We also looked at the vowel space of *ianr* in three segmental–tonal types and that of speakers in different Dialect–Age groups. The *ianr* rimes of the same type are clustered, in general. OT *ianr* takes the largest space in the vowel charts, which covers the area between near-close and near-open. NT *ianr* and NG *ianr* take a smaller space, which is usually above the mid-central area. NG *ianr* can also take the near-close and near-back area.

     The factor Dialect background also shows an effect on the vowel space of the rime *ianr*. The Beijing speakers' *ianr*s gather into a cluster in each type. The OT *ianr* of the Beijing native speakers and Rhotic speakers take similar positions on the F2–F1 vowel charts. Concerning the effects of the social factor *Age*, it is more obvious among the Beijing speakers. The younger the speakers are, the clearer the clusters of three *ianr* types in different positions can be seen.

Based on the two analyses above, we obtained the variants of *ianr* of three types from speakers from three dialect backgrounds. Across dialect groups, we found that the Beijing native speakers have the largest number of variants of *ianr,* and the Non-rhotic speakers use the smallest number. Articulatorily, this difference mainly results from the differences in tongue height, that is, the vowel height of speakers from different dialect groups. Across age groups, all three types of *ianr* produced by the Beijing old speakers have the same tongue height span, while the young speakers show three obvious clusters of *ianr* in three types. The effect of age is not obvious among non-native speakers. In addition, the variants of *ianr* in three types are also constrained by linguistic factors, such as the segmental and suprasegmental realization of *ianr.*

7.4   Experiment 3: Duration of the rhotacized rime *ianr*

In this section, we will study the duration of the rhotacized rime *ianr* of three types produced by speakers in different social groups, to investigate the relationship of linguistic and social factors on the duration of the rhotacized rime.

In Section 7.4.1 we will first examine the duration of the rime *ianr* produced by speakers with different dialect backgrounds. Then a linear mixed-effects model will be fitted to the data from all speakers, to examine the effects of linguistic and social factors on the duration of the rime *ianr*. The results of Experiment 3 are summarized in Section 7.4.2.

7.4.1   Results

Beijing

Table 7.6 Duration (in ms) of the rhotacized rime *ianr* of three different types produced by Beijing native speakers (n=613). Number of speakers: 31.

ianr Type	n	mean	median	min	max	stddev
Original Tone	293	157	146	52	389	58
Neutral Tone_With glide [j]	236	114	106	48	275	39
Neutral Tone_Without glide [j]	84	106	94	48	287	48

Investigating the variation in duration in the realization of *ianr*, we start with the Beijing native speakers. Table 7.5 shows the duration of rhotacized rime *ianr* with Original Tone (OT) and Neutral Tone with the glide [j] (NT) and without glide the [j] (NG) uttered by the Beijing native speakers. The ranges of the rimes' duration in the three types mostly overlap with each other, and the differences of min and max durations are also quite large, due to their occurrence in natural and spontaneous speech. To give a better picture of the data distribution, both the mean and the median of the duration are shown in the table (same below).

The differences between the OT *ianr* and non-OT *ianr* are clear: the average length of *ianr*s with neutral tone (both NT and NG) is roughly 70% of that of *ianr*s with OT. As we can see in the table, the duration of OT *ianr* is the longest, that of NT *ianr* comes second, and that of NG *ianr* is the shortest. Phonetically, it is known that the length of a rime in its full tonal and complete segmental realization is greater than in its neutralized forms; the length of a rime with more segments is bigger than that with fewer segments. To test this interpretation, a linear mixed-effects model was run with *ianr* duration as its dependent variable. Speaker and item were included as random effects, while the fixed effects included were *ianr* Type (Original tone, Neutral tone with the glide [j], and Neutral tone without the glide [j]) and social factors, namely Age and Gender. An overview of the results is given in Table 7.7. Significant differences were tested for with Satterthwaite's method using the lmerTest Package (Kuznetsova et al., 2017); *p*-values from these are included in the final column of the table.

Table 7.7 Summary of a linear mixed-effects regression predicting *ianr* duration in different types in the Beijing subcorpus. The intercept corresponds to an OT *ianr* for a young female speaker. Number of observations = 613.

Random effects	Variance	Std Deviation	N	
speaker	167.6	12.95	31	
item	101.7	10.09	11	
Fixed effects	Estimate	Std Error	t	p
(intercept)	151.00	7.791	19.380	.000
type: NT	-37.06	4.523	-8.193	.000
type: NG	-42.62	6.636	-6.422	.000
gender: male	3.71	7.407	0.500	.620
age: middle	3.01	9.123	0.330	.744
age: old	6.70	8.961	0.748	.460

The model shows that there are significant differences in the duration between OT *ianr* (mean: 156 ms) and NT *ianr* (mean: 120 ms), as well as between OT *ianr* and NG *ianr* (mean: 110 ms). However, the difference between NT *ianr* and NG *ianr* is not significant (t=1.904, p=.057).[35] The social factors Gender and Age are not significant.

Rhotic

Table 7.8 Duration (in ms) of the rhotacized rime *ianr* in three different types produced by Rhotic speakers (n= 260). Number of speakers: 21.[36]

ianr Type	n	mean	median	min	max	stddev
Original Tone	164	129	125	53	336	45
Neutral Tone_With glide [j]	75	116	112	49	292	40
Neutral Tone_Without glide [j]	21	96	94	51	165	26

As for the Rhotic speakers, Table 7.8 shows the duration of the rime *ianr* of three different types produced by speakers with a *Rhotic dialect* background. Similar to that of the Beijing native speakers, the ranges of the rimes duration in the

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[35] Results from refitting the model such that the intercept corresponds with NG *ianr*.

[36] There were 22 speakers with a Rhotic background in total, but there was one speaker producing no syllables with the rime *ianr*. This is why there are 21 speakers in the calculation here.

three types mostly overlap with each other and the differences between min and max duration are quite large.

The duration differences of rime *ianr* in different types are obvious. OT *ianr* is the longest, NT *ianr* is in the middle, and NG *ianr* is the shortest. To predict the duration of *ianr* for the different types, such as that for the Beijing speakers, a linear mixed effects model was run with speaker and item as random effects, and *ianr* types and social factors (gender and age) as fixed effects.

Table 7.9 Summary of a linear mixed-effects regression predicting *ianr* duration in different types in the Rhotic subcorpus. The intercept corresponds to an OT *ianr* for a young female speaker. Number of observations = 260.

Random effects	Variance	Std Deviation	N	
speaker	71.71	8.468	23	
item	360.23	18.98	11	
Fixed effects	Estimate	Std Error	t	p
(intercept)	154.01	9.45	16.30	.000
type: NT	-3.02	6.26	-0.48	.630
type: NG	-21.93	9.58	-2.29	.023
gender: male	-23.26	6.29	-3.70	.002
age: middle	-10.98	7.85	-1.40	.185
age: old	5.56	7.78	0.72	.484

Table 7.9 shows the results from the linear mixed-effects model. It shows that there are significant differences in the duration between OT *ianr* (mean: 129 ms) and NG *ianr* (mean: 96 ms), as well as between NT *ianr* (mean: 116 ms) and NG *ianr* (t=1.969, p=.05)[37]. However, OT *ianr* and NT *ianr* (mean: 116 ms) shows no significant difference. The social factor Gender is significant. Female speakers produce significantly longer *ianr* than male speakers (t=3.07, p=.002). The social factor Age, however, is not significant.

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[37] Results from refitting the model such that the intercept corresponds with NG *ianr*.

Non-rhotic

Table 7.10 Duration (in ms) of the rhotacized rime *ianr* in three different types produced by speakers with Non-rhotic dialect background (n=22). Number of speakers: 16.[38]

ianr Type	*n*	*mean*	*median*	*min*	*max*	*stddev*
Original Tone	15	130	114	70	239	50
Neutral Tone_With glide [j]	6	99	90	64	162	37
Neutral Tone_Without glide [j]	1	105	105	105	105	NA

Finally, turning to the Non-rhotic speakers, Table 7.10 shows the duration of the rime *ianr* of three different types produced by Non-rhotic speakers. As can be seen in Table 7.10, the average duration of NT *ianr* is shorter than that of OT *ianr.* To test the observation, a linear mixed effects model was fitted with speaker and item as random effects, and *ianr* types and social factors (gender and age) as fixed effects.[39]

Table 7.11 Summary of a linear mixed-effects regression predicting *ianr* duration in different types [40] in the Non-rhotic subcorpus. The intercept corresponds to an OT *ianr* for a young female speaker. Number of observations = 260.

Random effects	Variance	Std Deviation	N	
speaker	0.00	0.03	22	
item	0.00	0.00	7	
Fixed effects	*Estimate*	*Std Error*	*t*	*p*
(intercept)	125.78	26.68	4.71	.000
type: NT	-31.70	25.47	-1.25	.227
gender: male	7.48	22.23	0.34	.740
age: middle	4.36	25.47	0.17	.866
age: old	11.39	37.64	0.30	.765

[38] There were 23 speakers with a Non-rhotic dialect background in total, but only 16 of them produced syllables with rime *ianr*.

[39] Only one NG *ianr* produced by a Non-rhotic speaker was observed in the subcorpus. For this reason, the NG *ianr* and its duration is excluded from in the linear mixed-effects model. Only the duration of OT *ianr* and NT *ianr* is considered.

[40] As seen in Table 6.8, the number of NG *ianr*s produced by Non-rhotic speakers is 1. This is a small sample size, and we excluded it when we ran a linear mixed-effects model.

As the linear mixed-effects model summarized in Table 7.11 shows, there are no significant differences between *ianr*s of the different types. Social factors also show no significant differences.

The effect of linguistic and social factors

Table 7.12 Duration (in ms) of the rhotacized rime *ianr* in three different types by all speakers from three dialect backgrounds (n= 895). Number of speakers: 68.[41]

ianr Type	n	mean	median	min	max	stddev
Original Tone	472	146	138	52	389	55
Neutral Tone_With glide [j]	317	114	107	48	302	39
Neutral Tone_Without glide [j]	106	104	94	48	287	45

Table 7.12 shows the average of the duration of *ianr* produced by all the speakers. As shown in this table, the mean and median together show categorical differences in the duration of *ianr* in the three different types. The length of OT *ianr* is the longest, NT *ianr* is in the middle, and NG *ianr* is the shortest. Lateral comparisons across dialect groups of the average durations and the ranges of *ianr* also show differences. As seen in Tables 7.6, 7.8, and 7.10, the ranges of *ianr* in three types overlap with each other. And the average length of *ianr* in the three types shows a similar pattern in the three different dialect backgrounds. That is, the length of OT *ianr* is the biggest, the NT *ianr* comes in second, and NG *ianr* is the smallest. However, both the mean and median of *ianr* rimes of the three types produced by the Beijing native speakers are somewhat larger than that produced by the Rhotic speakers; the range of each type of *ianr* uttered by Beijing native speakers is also larger. In addition, the mean and median of the duration of *ianr* of the three types uttered by the Non-rhotic speakers are somewhat smaller than that of both the Beijing and the Rhotic speakers; the range of *ianr* of the three types produced by the Non-rhotic speakers is the smallest. To test the observation, a linear mixed-effects model was fitted to the duration data from all speakers. The type of *ianr* rimes and social factors (dialect background, age, and gender) were considered for inclusion in the model. Adding the effect of age or gender of speakers did not improve the fit of the model, nor did the random slopes within speakers. The model is summarized in Table 7.13.

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[41] As explained in footnotes 2 and 4, one Rhotic speaker and seven Non-rhotic speakers produced no syllables with the rime *ianr.* It is for this reason that there are 68 speakers in total here.

Table 7.13 Summary of a linear mixed-effects regression predicting *ianr*. The intercept corresponds to an OT *ianr* for a young female Beijing native speaker. Number of observations = 895.

Random effects	Variance	Std Deviation	N	
speaker	282.3	16.80	68	
item	172.6	13.14	11	
Fixed effects	Estimate	Std Error	t	p
(intercept)	153.646	5.995	25.629	.000***
dialect background: Rhotic	-12.595	6.074	-2.074	.043*
dialect background: Non-rhotic	-17.639	11.036	-1.598	.110
type: NT	-27.022	3.745	-7.215	.000***
type: NG	-35.974	5.551	-6.481	.000***

What the model shows is that Dialect background and Type of rime *ianr* have major effects on the duration of *ianr*. The difference of *ianr* duration between the Beijing native speakers and the Rhotic speakers is significant ($t=-2.07$, $p=.043$). However, no significant difference was observed between the Beijing native speakers and the Non-rhotic speakers ($t=-1.60$, $p=.110$), as well as the Rhotic speakers and the Non-rhotic speakers ($t=-0.443$, $p=.658$). OT *ianr* is significantly longer than NT *ianr* ($t=-7.22$, $p=.000$) and NG *ianr* ($t=-6.48$, $p=.000$). However, there was no significant difference between NT *ianr* and NG *ianr* ($t=1.687$, $p=.092$). In sum, the duration of *ianr* is significantly influenced by its Type and by the Dialect background of speakers.

7.4.2   Summary

In this section, we first examined the average duration of OT, NT, and NG *ianr* within each Dialect background and the effects of social factors (Age and Gender) on it. We found that for the Beijing and the Rhotic speakers, only the Type of *ianr* has effects on the duration of *ianr*, and none of the social factors show effects on it. However, for Non-rhotic speakers, neither linguistic nor social factors show effects. Then we examined the average duration of *ianr* across all speakers. Social factors (Dialect background, Age, and Gender) and the one linguistic factor (Type) were included. It was found that Dialect background and Type of *ianr* do have effects on the duration of *ianr* in the speech community of Beijing.

7.5   Discussion and conclusion

An ongoing change in a rime

This sociolinguistic study on the rime *ianr* shows that both linguistic and social variables have an effect on the variation of the rime.

In terms of linguistic variables, we found that *ianr* of the three different types affects its variants. The *ianr* types were pre-categorized on the basis of its possible tone realization (original tone and neutral tone) in a syllable and the effect of neutral tone on rime neutralization.

The sociolinguistic factor of dialect background proves to be a very important variable. Speakers from different dialect backgrounds use different variants of rime *ianr*, which lies mostly in the area of the vowel height. Despite the mid height, the Beijing native speaker also produces *ianr* with near close and near-open tongue height, while non-native speakers, especially Non-rhotic speakers mostly use mid height. In the group of the Beijing native speakers, we found that there is a generational change among speakers. The old speakers show consistent tongue height, that is, vowel height with the three different *ianr* types, while the young speakers tend to produce *ianr* by using different tongue heights. In addition, the difference of variants of *ianr* across dialect groups lies mainly in the area of the vowel height.

New light on studying rhotacization in Mandarin

In the sociolinguistic variation and change studies on rhotics in Western languages, except common sociolinguistic variables, such as age, gender, and socioeconomical class, linguistic contexts and variables of the rhotics examined are also often specified. For example, stress and prepausal were specified as two related linguistic parameters in the sociophonetic study of coda-r in Scottish Standard English (Schützler, 2010); Sankoff & Blondeau (2007, 2010) investigated the change in the two canonical variants—[r] and [R]—in different phonological contexts in Montreal French; Schiller (1998) used Articulatory Phonology to describe the different variants uvular /r/ in German, in which targeted words of the same phonological structure were embedded in full sentences; the /r/ on the non-prevocalic position was specified in Dickson & Hall-Lew's (2017) study of *r* in Edinburgh Speech; /r/ in different base words and following segmental environments in New Zealand English were considered in data collection and analyses (Preston & Niedzielski, 2010); and the variants of /r/ in different contexts were examined for Dutch *r* (Sebregts, 2015). However, linguistically, Mandarin rhotacization is at the same time similar to and different from the rhotics in Western languages in many respects. As we have seen in this chapter, in a study on sociolinguistic variation and change in rhotacized rimes in Beijing Mandarin, the linguistic and non-linguistic constraints must both be taken into consideration. After all, as mentioned in Chapter 2, Mandarin

rhotacization is not only salient auditorily but can also have grammatical functions and lexical meaning. In addition, Mandarin syllable and word structure determines that rhotacization occurs together with other linguistic elements, such as tone and morphemic meanings, which could affect the realization of rhotacization and its variation. Therefore, possible linguistic elements should be considered when linguistic constraints/variables are determined.

In this study, we focused on the sociophonetics of the most frequently used rhotacized rime *ianr*. The word and syllable contexts where *ianr*s occur were first examined, including their lexical meanings and the segmental and suprasegmental information. Rime *ianr*s were pre-categorized into three types. The results of acoustic measurements proved that the phonetic variants of the rime *ianr* produced by speakers are varied in different linguistic contexts because the suprasegmental (tonal) and segmental realization of *ianr* have an influence on its variants.

Above all, in variationist studies on Mandarin rhotacization, the possible linguistic variables should be carefully sorted out, which could contribute to a better understanding of how it changes. In the case of rime *ianr*, linguistic variables, like the tone and segments, can affect its variation and change. However, indiscriminately applying the linguistic variables to other rhotacized rimes may not work, because other Mandarin rhotacizations may have their own linguistic features and be constrained by those linguistic factors.

Chapter 8 Conclusions

Within the context of rapid urbanization and migration, migrants from different regions of China build intense social and language contact on a daily basis, both with local Beijingers and with other migrants. In addition to their own native variety of Chinese, both local Beijing native speakers and migrants are subject to the influence of the promotion of Standard Chinese as well as the establishment of an urban local linguistic identity in postmodern Beijing. Against such social backgrounds, this dissertation investigated how normative forces affect language choices and the formation of pronunciation norms, with special focus on rhotacization in the Beijing speech community. Specifically, it investigated the attitudes that speakers have towards the use and users of rhotacization and language varieties (Chapter 4), the effects of social factors on speakers' language choices concerning rhotacization, namely rhotacization frequency in their naturalistic speech (Chapters 5 and 6) and the variation and variants of the most frequently used rhotacized rime (Chapter 7).

Chapter 4 was concerned with attitudes towards the different language varieties spoken in Beijing and towards rhotacization more in particular. Despite the special relation between rhotacization, Beijing Mandarin, and Standard Chinese and the social context of urbanization and migration in Beijing (see Chapter 2), previous sociolinguistic studies on rhotacization did not pay much attention to lay viewpoints on the use and users of these linguistic forms and varieties and to using the attitude results to explain the quantitative results. In this chapter, respondents were asked their opinions on the differences between BM and SC, the imitation of BM by migrants and their rhotacization as well as the advantages and disadvantages of speaking BM and use rhotacization.

Results showed that most Beijing native and non-native respondents reported that BM and SC are different from each other and that BM is characterized by its rhotacization. Moreover, most of the respondents reported that the imitation of BM and rhotacization by migrants is noticeable. More non-native respondents also reported that they adopted Beijing Mandarin and rhotacization after they came to Beijing. However, although most respondents chose the option "speaking BM brings no advantages or disadvantages," the explanatory comments from the non-native respondents showed that speaking BM could probably bring some disadvantages to the speakers, due to the low social status of Beijingers. The reported advantages are mostly non-linguistic, and most of the respondents reporting advantages have a Rhotic dialect background and have not been in Beijing for a long time.

The results reported in Chapter 4 provide evidence that the use of certain linguistic forms used by migrants can be strongly influenced by their attitude towards the social status and characteristics of the native speakers and such influences change with the length of time in the community where the migrants stay. Furthermore, this chapter also extends our understanding of the relationship between people's language attitudes towards a specific linguistic salience and their users and their language practice.

Chapter 5 investigated the ongoing change in rhotacization in the Beijing speech community by comparing the general frequencies of rhotacization tokens in different speaker groups. The results showed that the social factor dialect

background plays a key role in determining the number of rhotacization tokens a speaker would produce. Furthermore, age is an important factor as well, as we found that the young native speakers used fewer rhotacized words than their old native counterparts. Moreover, the young Beijing and young Rhotic speakers used an equal number of rhotacized words. These results provide quantitative evidence for the change in the number of rhotacizations in speakers' naturalistic and spontaneous speech, across different social groups.

The results of this chapter are consistent with the findings for the change in rhotacization among Beijing native speakers. Previous studies assume that the number of rhotacized words actively used in the speech of Beijing native speakers is decreasing from the old generation to the young generation, but few studies have been conducted to measure this quantitatively in spontaneous speech. Furthermore, previous studies suggested an association of rhotacization in Beijing Mandarin with masculinity, while the results of this chapter provide no quantitative evidence that male and female Beijing native speakers use different numbers of rhotacized words in their speech. Chapter 5 therefore reveals the effects of social factors on speakers' language choices of rhotacization and provides strong evidence for the ongoing change in rhotacization in the Beijing speech community.

Chapter 6 further examined the effects of social factors on the frequency of rhotacization types across speaker groups. This chapter is based on the results of the general rhotacization frequencies in Chapter 5. Chapter 5 showed that different social factors affect the frequency of rhotacization tokens, but it does not show how many different lexical items were involved. In other words, Chapter 5 does not tell us whether the frequencies we found were caused by speakers repeating the same rhotacized words (counting the tokens) or whether different words were involved (counting the types). Chapter 6 sought an answer to this question. The answer is that the number of different rhotacization words is also diminishing along the age dimension within the group of native speakers. Together, Chapters 5 and 6 provide a complete picture of how the number of rhotacizations tokens in general and how the number of rhotacization types are changing in the Beijing speech community. The results reported in these two chapters extend our understanding of the effects of social variables on the frequency of a linguistic variable in a speech community and provide new evidence that the frequency study of a linguistic variable can be conducted in different ways that allow us to recognize the variable change dynamically.

Chapter 7 tapped into the social and linguistic constraints on the variation and change in rhotacization by examining the acoustics of the most used rhotacized rime. In this chapter, the occurrence of all rhotacized rimes in our data set was measured, and the most frequently used rhotacized rime across groups was identified. The results showed that *ianr* is the most frequently used rime. Consequently, the acoustics of this rhotacized rime was studied and both social and linguistic constraints (*ianr* in three different linguistic categories) were considered. In the acoustic analysis, the formant trajectories, vowel space, and duration of *ianr* were examined and its variants were identified. The results showed that both linguistic and social variables affected the variation of *ianr*. The

case of *ianr* revealed that its linguistic contexts, such as onset, glide, tone and lexical meanings, could somehow affect its realization and lead to variation. Especially when those linguistic variables interacted with social variables, the variants of the rhotacization could be varied.

The results reported in Chapter 7 provide clear evidence that in research on language choices and variation, such as in the present study of rhotacization in Mandarin, not only the social constraints but also the possible linguistic constraints should be carefully sorted out and categorized. In this way, the variants and the ongoing change in the linguistic variable in question can be comprehensively observed.

This present study on the language choices and change in rhotacization in the Beijing speech community contributes to urban sociolinguistic research on pronunciation norm formation. Furthermore, in previous studies, the internal language constraints themselves received little attention, whereas in this study, it was found that the linguistic constraints, such as the tonal context and the suprasegmental influence of a tone on a rime, have effects on the use and pronunciation of rhotacized syllables. The results suggest that future studies on language variables may have to carefully sort out the internal/linguistic constraints, as they can interact with social factors and jointly affect the formation of pronunciation norms for a language variable. Below we provide an overview of some areas of future interest.

First, previous studies on the language choices and change in rhotacization in Beijing Mandarin focused exclusively on the speech of native speakers. However, apart from examining the speech of native speakers, that of non-native speakers in the speech community should also be included in the study. In this study, we did examine the language use and language attitudes of non-native speakers. However, we are aware of the small number of participants, especially that of non-native speakers, due to the limited access to the non-native speakers during our fieldwork. Therefore, in future research, a larger sample size of both native and non-native speakers would definitely assist in increasing the statistical power and generalizing the research findings.

The second is the qualitative examination of the rhotacized words used by the speakers. Chapter 6 focused on comparing the single occurrence rhotacization frequencies produced by speaker groups, which somehow is an examination of language change in terms of quantity. Further work may involve the comparison of the word classes, lexical meanings and variation in the rhotacized words used by speakers from different groups. Such an investigation could enable us to better understand the qualitative changes in rhotacization, which, together with the present quantitative results, may shed light on the actual change in rhotacization in the Beijing speech community.

Third, in this study, we focused exclusively on the rhotacized forms of words in naturalistic speech. It could also be interesting to examine those words that could have been rhotacized but were not, or the switch between the rhotacized form and non-rhotacized form of a same word within the speech of one individual speaker. This phenomenon should be considered in the speech of both native speakers and non-native speakers, as this would likely contribute to

our understanding of the ongoing change in rhotacization across different speaker groups dynamically.

Fourth, Chapter 4 analyzed the lay attitudes towards the language use and users of rhotacization and language varieties. It would be instructive to conduct an analysis combining a study of language attitudes with a study quantitative language choices and change, by correlating the results of speakers' attitudes towards language varieties and users with that of speakers' actual rhotacization frequency. This could provide us with a better explanation of the frequency results and also help us better understand the relationship between language attitudes and language use.

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Appendix A

	Category	*Surface form in pinyin and IPA (broad transcription)*
1	Adding [ɹ] to the vowel	ar[aɹ], iar[jaɹ], uar[waɹ]
		or[oɹ], uor[uoɹ]
		er[ɤɹ]
		ur[uɛr]
		ier[jɛɹ]
		uer[yɛɹ]
		aor[auɹ], iaor[jauɹ]
		our[ouɹ], iur[jouɹ]
2	Adding [əɹ] to the vowel	ir [iəɹ]
		ür[yəɹ]
3	Changing the rime [-ɻ] and [ɭ] into [əɹ]	-ir[əɹ]], -ir[ɾəɹ]]
4	Dropping the coda [-i] or [-n] and adding [ɹ] or [əɹ]	air[aɹ], uair[uaɹ],
		eir[əɹ], ueir[uəɹ]
		anr[aɹ], ianr[jaɹ], uanr[waɹ], üanr[yaɹ]
		enr[əɹ], uenr[wəɹ]
		inr[iəɹ], ünr[yəɹ]
5	Nasalizing the vowel and adding [ɹ] or [əɹ]	angr[ãɹ], iangr[jãɹ], uangr[ãɹ]
		engr[ə̃ɹ], ongr[ũɹ]
		ingr[jə̃ɹ], iong[ỹɹ]

Appendix B

小组交谈

第一部分（大约 10 分钟）
1. 讨论你记忆中儿时的家乡/北京城，你在家乡/老北京的童年回忆等。
2. 讨论你经历的家乡/北京城的变化。
3. 讨论对北京交通、空气的看法。
4. 讨论你们对北京小吃的看法。

第二部分（大约 20 分钟）
1. 讨论你对北京前门/西直门的认识或你的经历。
2. 讨论你学生生涯当中一次得到满分/超低分的经历。
3. 学生生涯是否上过培训班，曾经有什么感受？
4. 讨论并描述小时候你家周围的都有哪些设施，环境如何？
5. 讨论记忆中小时候的玩具，或者好玩的东西。

English translation:

Pair talking

Part 1. (about 10 minutes)
1. Talk about your hometown/Beijing when you were a kid and your childhood memories in your hometown/old Beijing, etc.
2. Talk about the changes you have experienced in your hometown/Beijing city.
3. Talk about your views on Beijing's traffic and air.
4. Talk about your thoughts on Beijing snacks.

Part 2. (about 20 minutes)
1. Talk about what you know about or your experience at Beijing Qianmen, Xizhimen or other men.
2. Talk about one time in your student life when you got full marks/low marks.
3. Have you ever attended tutoring lessons in your student life, and how did you feel?
4. Talk about what facilities were around your home when you were a child and what was the environment like?
5. Talk about your memories of childhood toys, or fun things.

Appendix C

社会语言学访谈–北京人

个人信息   性别；年龄；职业；最高学历

语言背景
    1.你爸妈是北京人吗？爷爷奶奶呢？他们说北京话吗？你出生在北京吗？
    2.你是从小就开始说北京话，还是其它方言？谁教你的呢？

语言能力
    1.你觉得自己说的话跟老北京人的北京话比起来怎么样？
    2.说北京话的时候你会使用几个普通话的词吗？或者说普通话的时候会使用北京话的词或者说话方式吗？

语言使用
    1.你认为你说的是那种话，北京话、普通话还是其它？如果是其它，它是什么话？
    2.你会因为说话对象的不同而有选择地使用北京话和普通话吗？
    3.你会因为说话场合的不同而有选择地使用北京话和普通话吗？
    4.以下场景你更倾向于用北京话还是普通话？
        (1)问路；（2）政府机构办事；（3）学校上课/集体发言

语言态度
北京话/普通话
    1.你认为北京话和普通话一样吗？你觉得相比普通话，北京话有什么特别典型的特征？
    2.你认为说北京话/带有北京口音的话或者普通话有没有给你带来过什么好处或坏处？如果有，好处或坏处是什么？
    3.在你心目中，你认为北京话和普通话哪个 1）更友好，2）更亲切，3）更有用，4）更有权威，5）更有威望？

儿化音
    1.你是否注意到外地来北京的人模仿京腔京味儿的现象？如果有，你觉得他们是通过什么方法模仿的？
    2.你是否注意到外地来京的人模仿和使用北京话的儿化？如果有，他们的儿化听起来怎么样？
    3.你有没有注意到外来来京的人对儿化音的模仿和使用？你怎样看待这种现象？
    4.你对外地人学说儿化音持什么态度？

English translation:

Sociolinguistic Survey (for Beijing native speakers)

Personal information   Gender; Age; Occupation; Level of education

Language Background
1. Are your parents originally from Beijing? How about your grandparents? Were you born in Beijing?
2. Have you spoken Beijing Mandarin from childhood? Or other dialect? Who taught you the dialect?

Language Ability
1. How authentic is your Beijing Mandarin compared to that of old Beijing native speakers?
2. Do you use Standard Chinese words when you speak Beijing Mandarin? Or the other way around?

Language Use
1. Which Mandarin variety do you think you usually speak: Beijing Mandarin, Standard Chinese, or something else? If it is else, then what is it?
2. Do you selectively use Beijing Mandarin or Standard Chinese depending on to whom you speak?
3. Do you selectively use Beijing Mandarin or Standard Chinese depending on occasions?
4. Which one of the two do you prefer to speak when you are in the occasions below?
1. asking for road directions; (2) speaking to a government officer in a public counter; (3) speaking in a class/in a group.

Language Attitudes
Towards Beijing Mandarin/Standard Chinese
1. Do you think Beijing Mandarin and Standard Chinese are the same with each other? What do you think are the typical features of Beijing Mandarin, compared to Standard Chinese?
2. Do you think speaking Beijing Mandarin brings any advantages or disadvantages? What are the advantages or disadvantages?
3. Which one is 1) friendlier, 2) more cordial, 3）more useful, 4) more authorities, and 5) more prestigious, respectively?

Towards the imitation of rhotacization by migrants
1. Did you notice that some migrants imitate Beijing Mandarin? If yes, in what ways did they imitate Beijing Mandarin?
2. Did you notice that migrants imitate and use rhotacization in Beijing Mandarin? What does the imitated rhotacization sound like?
3. What is your attitude towards the adoption of rhotacization by migrants?

Appendix D

社会语言学访谈-非北京人

个人信息　　　　　性别；年龄；职业；最高学历；来京时间

方言背景
　　1. 你是从小就开始说本地方言吗？谁教你说的呢？
　　2. 你会说普通话吗？你从什么时候、在哪儿开始学习的？

语言能力
　　1. 你觉得自己说的方言跟你们本地的老人相比怎么样？你什么时候说方言？你通常和谁说方言？
　　2. 你说方言的时候你会混入几个普通话的词吗？或者说普通话的时候会使用方言的词吗？

语言使用
　　1. 你是否注意到随着在北京的生活时间变长，自己逐渐有了京腔京味儿？如果有，你觉得自己是有意学习，还是无意被感染的？如果没有，你平时讲什么话？
　　2. 如果你的口音中逐渐带上了北京味儿，你何时用北京口音，何时说普通话？
　　3. 你是否知道北京话中哪些词该儿化，哪些词不该？你说话的时候会注意吗？

语言态度
　　北京话，普通话及方言
　　1. 你认为北京话和普通话一样吗？相比普通话，北京话有什么特别典型的特征？
　　2. 你认为说北京话/带有北京口音的话可不可以给你带来好处或坏处？如果有，好处或坏处是什么？
　　3. 你认为方言、北京话、普通话哪个 1）更友好，2）更亲切，3）更有用，4）更有权威，5）更有威望？

　　北京话的儿化音
　　1. 你是否注意到北京话里儿化词的数量比较多？这跟你的方言差别大吗？
　　2. 北京话的儿化词给你什么感觉？
　　3. 来到北京后的，你觉得自己是否感觉自己说话儿有北京味儿了？
　　4. 有人说，在北京生活一段时间后，发现自己说的时候舌头变翘了，儿化一些之前原本不儿化的词，你呢？
　　5. 其他外地人所说的儿化音听起来怎么样？
　　6. 你对外地人学说儿化音持什么态度？

其它
　　1. 请你想一想你平时身边大致有几位关系较近的北京人？
　　2. 你在北京生活几年了？你觉得自己是否是北京人？

English translation:

Sociolinguistic Survey (for non-native speakers)

Personal information
  Sex; Age; Occupation; Level of education; When moved to Beijing

Language Background
1. Have you spoken your local dialect from childhood? Who taught you?
2. Can you speak Standard Chinese? When and where did you start to learn Standard Chinese?

Language Ability
1. How authentic is your dialect, compared to that of old local people? When do you speak your dialect? Usually with whom?
2. Do you use Standard Chinese words when you speak your dialect? Or the other way around?

Language Use
1. Did you notice yourself adopting some features in Beijing Mandarin after you came to Beijing? If yes, do you think you learn it consciously or unconsciously? If no, what Mandarin variety do you speak?
2. If you think you already carry some features in Beijing Mandarin, when do you use Beijing Mandarin? When do you use Standard Chinese?
3. Do you know which words should be rhotacized and which could not be? Did you pay attention when you spoke?

Language Attitudes
Towards Beijing Mandarin, Standard Chinese and/or your dialect
1. Do you think Beijing Mandarin and Standard Chinese are the same with each other? What do you think are the typical features of Beijing Mandarin, compared to Standard Chinese?
2. Do you think speaking (some) Beijing Mandarin could bring any advantages or disadvantages to migrants? If yes, what are the advantages or disadvantages?
3. Which one is 1) friendlier, 2) more cordial, 3) more useful, 4) more authoritative, and 5) more prestigious, respectively??

Towards rhotacization in Beijing Mandarin
1. Do you notice there are many rhotacized words in Beijing Mandarin? Is that a big difference with your dialect?
2. What impression does rhotacization bring to you?
3. Did you adopt some Beijing Mandarin after you come to Beijing?
4. Some people say that after a period of time in Beijing, they rhotacize more words than before, and you?
5. How does the rhotacization by other migrants sound?
6. What is your attitude towards the imitation of rhotacization by migrants?

Other
1. How many local Beijingers having frequent contact with you in your daily life?
2. How many years have you lived in Beijing? Do you think you are a Beijinger?

Appendix E

Extract 1: Respondent M33, Beijing native, male, young.
M33: 我以前说北京话，但是我以前没意识，刚上大学那会儿，别人说我的北京话味儿浓；从那以后我就跟同学们说普通话，北京味儿就淡了。

Extract 2: Respondent M29, Beijing native, male, young.
M29: 当我需要这种认同的时候，我就用过来；跟北京人说话的时候，我就会故意强调我的北京味儿……比如，儿化音，语音语调什么的。就不会收敛，比如打出租，我觉得司机可能对本地人会客气点儿，不会宰我。我就显出比他北京味更重，他骗不了我。所以，我想让他们知道我是北京的，我就显出来，但需要隐藏的时候，我就藏起来，

Extract 3: Respondent M37, Beijing native, male, young.
M15: ……外地人儿化音加的地方牵强。有的词加儿跟不加儿有严格的区分。儿化音是一个非常不刻意的东西，但是他们说的特别刻意，尤其是南方人。……没必要学说北京话， 有的外地人觉得来了北京，学说北京话、取得北京的身份，对他很重要。其实我觉得这个没必要。

Extract 4: Respondent F7, Beijing native, female, middle.
F7: 有的外地人，觉得在北京呆几年就是北京人了……我们一听就能听出来北京人说的儿化音和外地人说的儿化音。他们学得不像，尤其是南方人，挺逗的……但是我很高兴很欢迎他们想学，北京是我家，你上我们家里做客，又学我们家说话，很有自豪感。

Extract 5: Respondent F31, Beijing native, female, young.
F31: 我不觉得有什么好处，北京话的特征跟北京人的特征挺像的，不是那种积极向上的，就是得过且过，就是怎么舒服怎么来。

Extract 6: Respondent F1, Beijing native, female, old.
F1: … 我们确确实实佩服外地人，你们外地人比北京孩子更努力，北京孩子惰性高；但有的人仇恨外地人，排斥外地人，因为……外地人给北京人造成压力很大。

Extract 7: Respondent M15, Beijing native, male, middle.
M15: 没好处也没坏处吧。有一段时间，我不太愿意承认我是北京人，因为我们周围生活的大部分是外地人。都不是北京人。……我怕我们融入不进去。……不被歧视就不错了。我现在不认为说北京话有什么好处了。我 20 多岁的时候是那个想法，但现在 30 多岁了，就只能有这个想法。

Extract 8: Respondent M16, Beijing native, male, old.
M16: 说北京话有什么好处？！北京人最没本事了，这个城市有能耐的都是外地人。

Extract 9: Respondent F33, Beijing native, female, middle.
F33: 我身边有外地人。我老公本来是外地人……我跟我老公老家跟他朋友聚会的时候，他们一听就能听出，他们就问，你媳妇儿是不是北京人呀？哎呀，别人就觉得，你媳妇儿是北京人。是首都的，不是外地的。我就能体会到大家觉得你是北京人，真牛。我确实心里有这种优越感……我也觉得自己是北京人，挺好的。

Extract 10: Respondent F15, Beijing native, female, middle.

F15: 我在安徽当兵的时候，全国各地的都有，别人是外地的，他们说话有口音，我说话没有口音。"你真行，哎呀，你是北京的，你多好呀"。其实外地人特别羡慕咱们的，这让我觉得很好。

Extract 11: Respondent F16, Beijing native, female, middle.
F6: 我们在外地旅游的时候，不管是哪里来的人我们说话他们都能听懂，只要他们会说点儿普通话。

Extract 12: Respondent F6, rhotic speaker, female, young.
F6: ……儿化音……我觉得北京话里好像没有什么是不能儿化的。

Extract 13: Respondent F24, rhotic speaker, female, young.
F24: 我们去西直门儿吧，觉得顺口，刚开始觉得烦，但多了之后就觉得加上儿才觉得舒服，自然，顺口。我觉得顺口的时候都加儿化。

Extract 14: Respondent M53, Non-rhotic speaker, male, middle.
M53: 刚上班的时候想模仿，于是练习了很久，但是发现还是达不到那个水平，所以就放弃了。

Extract 15: Respondent F26, Non-rhotic speaker, female, young.
F26: 如果你想加一些儿化音，也可以，这很正常，但是不能太多啊，如果一个人加太多了，就觉得你好装啊，就好像违背了你的本性一样。

Extract 16: Respondent M5, rhotic speaker, male, young.
F24: 我觉得受到北京话的影响很正常，并为之感到骄傲……

Extract 17: Respondent F6, rhotic speaker, female, young.
F6: ……有的人想抛去自己外地人的身份，我觉得没有用必要。但如果是自然而然的受到影响，那也行。就像很多人都容易被东北话带跑一样。

Extract 18: Respondent M3, rhotic speaker, male, young.
M3: 没好处也没什么坏处，北京话不就是一门方言吗，有什么了不起的。

Extract 19: Respondent M55, rhotic speaker, male, middle.
M55: 有点天然的皇城根的骄傲的感觉，北京话感觉不是特别舒服。没好处也没坏处吧… 北京人他们会特意把自己的北京口音带出来，就是为了彰显自己北京人的这个身份。我们都觉得他们有显摆的色彩在，但其实北京人牛瓣的有几个呀？！……可能他们觉得自己很优越，虽然他们有些人是很好，我还是有抵触心理。

Extract 20: Respondent F49, rhotic speaker, female, middle.
F49: 没有。真正的北京人不会故意显露自己的北京味儿。我原来的那个老板也是北京人，他说话就没有那种音，他不刻意显示自己的北京人优势。你听到的那些北京人，要不就是痞了吧唧的那种人，要不就是很老的人，就经常显示自己是地道的北京人，特别烦人。

Extract 21: Respondent F8, rhotic speaker, female, old.
F8: 没有，我觉得一个人说北京话，层次比较低，普通话的人就觉得受过教育。

Extract 22: Respondent M4, rhotic speaker, male, young.
M4: ...说北京话我就能获得北京认同感，也能有助于我融入，缩短跟北京人的距离。

Extract 23: Respondent F24, rhotic speaker, female, young.
F24: ...它可以缩短跟别人的距离，消除成见。如果你多说一些儿化，本地人就觉得你很亲切，他的态度就会不一样。

Extract 24: Respondent F38, rhotic speaker, female, young.
F38: 北京人更容易接受本地人，说北京话就会好一点。如果我会说北京话，出租车司机就不会宰我。而且我像他们那样说话的时候觉得自己比较自信。

Appendix F

Table F. 1 The average number of rhotacized rimes by speakers from three dialect backgrounds.

Num	Rimes	Beijing	Rhotic	Non-rhotic
1	ianr	48	22	4
2	ar	26	7	2
3	uanr	17	6	4
4	our	16	5	1
5	üanr	13	2	2
6	enr	12	17	3
7	anr	11	11	2
8	er	10	6	1
9	ueir	10	5	2
10	uair	9	4	1
11	aor	8	3	0
12	air	6	2	1
13	--ir	6	2	1
14	ingr	5	3	0
15	uor	5	1	0
16	iour	5	1	0
17	ir	4	3	0
18	ur	4	1	0
19	iaor	4	3	0
20	uenr	4	2	1
21	ongr	4	1	0
22	iangr	3	2	0
23	angr	3	2	0
24	engr	3	1	0
25	iar	2	1	0
26	uar	2	1	0
27	or	2	0	0
28	inr	2	0	0
29	ier	1	0	0
30	-ir	1	1	0
31	eir	1	1	0
32	uangr	1	1	0
33	ür	0	0	0
34	uengr	0	0	0
35	üer	0	0	0
36	ünr	0	0	0
37	üngr	0	0	0

Appendix G

Table G. 1 The total and average number of rhotacized rimes by three age groups of Beijing native speakers.

	Young			Middle-aged			Old		
	Rime	*Total*	*Avg.*	*Rime*	*Total*	*Avg.*	*Rime*	*Total*	*Avg.*
1	ianr	221	15	ianr	126	16	ianr	139	17
2	enr	97	6	ar	78	10	ar	97	12
3	ar	65	4	our	68	9	uanr	74	9
4	ueir	50	3	üanr	41	5	üanr	44	6
5	anr	48	3	uanr	37	5	er	41	5
6	er	43	3	ueir	33	4	our	41	5
7	üanr	43	3	anr	32	4	uair	36	5
8	uanr	41	3	aor	23	3	aor	31	4
9	our	39	3	enr	18	2	anr	31	4
10	uair	37	2	er	16	2	iour	30	4
11	air	23	2	air	16	2	enr	29	4
12	iangr	23	2	engr	16	2	ingr	25	3
13	--ir	22	1	uair	15	2	uor	22	3
14	ir	19	1	ir	13	2	--ir	20	3
15	aor	17	1	--ir	13	2	ur	19	2
16	iaor	14	1	uor	13	2	ueir	19	2
17	uenr	14	1	ingr	11	1	air	17	2
18	uor	11	1	iangr	10	1	ongr	17	2
19	ingr	10	1	iaor	9	1	uenr	15	2
20	ongr	10	1	ur	8	1	iaor	14	2
21	iar	10	1	angr	8	1	angr	12	2
22	iour	9	1	iar	8	1	ir	9	1
23	ur	8	1	uar	7	1	uar	8	1
24	inr	8	1	or	6	1	or	7	1
25	uar	7	0	eir	6	1	iar	6	1
26	engr	6	0	uenr	6	1	inr	6	1
27	or	5	0	ongr	6	1	iangr	5	1
28	angr	5	0	ier	5	1	uangr	4	1
29	ier	5	0	-ir	4	1	-ir	3	0
30	-ir	4	0	iour	3	0	engr	3	0
31	eir	1	0	inr	2	0	eir	2	0
32	uangr	1	0	uangr	1	0	ier	2	0
33	ür	0	0	ür	0	0	ür	1	0
34	ünr	0	0	ünr	0	0	ünr	0	0
35	uengr	0	0	uengr	0	0	uengr	0	0
36	üngr	0	0	üngr	0	0	üngr	0	0
37	üer	0	0	üer	0	0	üer	0	0

Table G. 2 The total and average number of rhotacized rimes by three age groups of Rhotic speakers.

	Young			Middle-aged			Old		
	Rime	*Total*	*Avg.*	*Rime*	*Total*	*Avg.*	*Rime*	*Total*	*Avg.*
1	enr	101	13	ianr	47	6	ianr	36	6
2	ianr	77	10	er	28	4	uanr	17	3
3	anr	47	6	anr	23	3	ueir	16	3
4	ar	34	4	ar	22	3	anr	14	2
5	uenr	14	2	our	21	3	er	12	2
6	uair	13	2	enr	21	3	our	10	2
7	aor	13	2	uanr	16	2	enr	10	2
8	uanr	10	1	ueir	13	2	iangr	8	1
9	ingr	10	1	ir	12	2	ingr	8	1
10	iaor	9	1	uair	10	1	iaor	7	1
11	ir	7	1	aor	7	1	--ir	6	1
12	air	6	1	iaor	7	1	angr	6	1
13	our	6	1	uor	7	1	uair	5	1
14	iar	6	1	uangr	6	1	üanr	5	1
15	angr	5	1	engr	4	1	air	3	1
16	ur	4	1	ur	3	0	aor	3	1
17	-ir	4	1	-ir	3	0	ongr	3	1
18	eir	4	1	uenr	3	0	ir	2	0
19	ueir	4	1	angr	3	0	uangr	2	0
20	üanr	4	1	ingr	3	0	engr	2	0
21	er	3	0	iar	3	0	uor	2	0
22	--ir	3	0	air	2	0	ar	1	0
23	iour	3	0	üanr	2	0	ur	1	0
24	uar	2	0	uar	2	0	-ir	1	0
25	ier	2	0	--ir	1	0	iour	1	0
26	or	1	0	iour	1	0	uar	1	0
27	iangr	1	0	iangr	1	0	or	0	0
28	engr	1	0	or	0	0	ür	0	0
29	ür	0	0	ür	0	0	eir	0	0
30	ünr	0	0	eir	0	0	uenr	0	0
31	uangr	0	0	ünr	0	0	ünr	0	0
32	uengr	0	0	uengr	0	0	uengr	0	0
33	ongr	0	0	ongr	0	0	üngr	0	0
34	üngr	0	0	üngr	0	0	iar	0	0
35	uor	0	0	ier	0	0	ier	0	0
36	üer	0	0	üer	0	0	üer	0	0
37	inr	0	0	inr	0	0	inr	0	0

Table G. 3 The total and average number of rhotacized rimes by three age groups of Non-rhotic speakers.

	Young			Middle-aged			Old		
	Rime	*Total*	*Avg.*	*Rime*	*Total*	*Avg.*	*Rime*	*Total*	*Avg.*
1	uanr	22	3	ianr	14	2	ianr	4	1
2	enr	17	2	ueir	10	1	uanr	3	0
3	anr	12	2	ar	7	1	üanr	3	0
4	ar	10	1	uanr	6	1	--ir	2	0
5	ianr	9	1	--ir	4	1	anr	2	0
6	üanr	9	1	air	4	1	enr	2	0
7	uenr	6	1	üanr	4	1	our	1	0
8	er	4	1	enr	4	1	ar	0	0
9	uair	4	1	uair	3	0	or	0	0
10	ueir	3	0	anr	3	0	er	0	0
11	--ir	2	0	uenr	3	0	ir	0	0
12	our	2	0	aor	2	0	ur	0	0
13	iangr	2	0	ingr	2	0	ür	0	0
14	uar	2	0	-ir	1	0	-ir	0	0
15	ir	1	0	our	1	0	air	0	0
16	-ir	1	0	iangr	1	0	uair	0	0
17	air	1	0	iar	1	0	eir	0	0
18	uangr	1	0	uar	1	0	ueir	0	0
19	uor	1	0	or	0	0	aor	0	0
20	or	0	0	er	0	0	iaor	0	0
21	ur	0	0	ir	0	0	iour	0	0
22	ür	0	0	ur	0	0	uenr	0	0
23	eir	0	0	ür	0	0	ünr	0	0
24	aor	0	0	eir	0	0	angr	0	0
25	iaor	0	0	iaor	0	0	iangr	0	0
26	iour	0	0	iour	0	0	uangr	0	0
27	ünr	0	0	ünr	0	0	engr	0	0
28	angr	0	0	angr	0	0	ingr	0	0
29	engr	0	0	uangr	0	0	uengr	0	0
30	ingr	0	0	engr	0	0	ongr	0	0
31	uengr	0	0	uengr	0	0	üngr	0	0
32	ongr	0	0	ongr	0	0	iar	0	0
33	üngr	0	0	üngr	0	0	uar	0	0
34	iar	0	0	uor	0	0	uor	0	0
35	ier	0	0	ier	0	0	ier	0	0
36	üer	0	0	üer	0	0	üer	0	0
37	inr	0	0	inr	0	0	inr	0	0

Appendix H

Table H. 1 The number of OT *ianr* obtained in the corpus (*N*=613), the actual number of *ianr* in the formant analysis (*N*=302) and the actual average number of *ianr* per speaker per social group.

Gender	Age	Beijing			With-r			Non-r		
		ianr	*actl. ianr*	*actl. avg.*	*ianr*	*actl. ianr*	*actl. avg.*	*ianr*	*actl. ianr*	*actl. avg.*
Male	Young	79	45	6	30	21	5	4	3	1
	Middle	15	8	2	29	17	4	2	2	1
	Old	31	11	3	31	11	3	2	1	1
Female	Young	63	35	5	27	17	4	0	0	0
	Middle	46	22	6	19	9	2	7	4	1
	Old	59	19	5	28	12	6	0	0	0
	Total	293	140	5	164	87	4	15	10	0

Table H. 2 The number of NT *ianr* obtained in the corpus (*N*=260), the actual number of *ianr* in the formant analysis (*N*=114) and the actual average number of *ianr* per speaker per social group.

Gender	Age	Beijing			With-r			Non-r		
		ianr	*actl. ianr*	*actl. avg.*	*ianr*	*actl. ianr*	*actl. avg.*	*ianr*	*actl. ianr*	*actl. avg.*
Male	Young	63	34	4	9	6	2	2	1	0
	Middle	38	18	5	20	10	3	1	1	0
	Old	12	4	1	12	5	1	0	0	0
Female	Young	49	29	4	7	7	2	3	3	1
	Middle	25	13	3	23	14	4	0	0	0
	Old	49	22	6	4	1	1	0	0	0
	Total	236	120	4	75	43	2	6	5	0

Table H. 3 The number of NG *ianr* obtained in the corpus (*N*=22), the actual number of *ianr* in the formant analysis (*N*=16) and the actual average number of *ianr* per speaker per social group.

Gender	Age	Beijing			With-r			Non-r		
		ianr	*actl. ianr*	*actl. avg.*	*ianr*	*actl. ianr*	*actl. avg.*	*ianr*	*actl. ianr*	*actl. avg.*
Male	Young	19	12	2	6	5	1	0	0	0
	Middle	12	7	2	4	4	1	0	0	0
	Old	22	9	2	7	2	1	1	1	1
Female	Young	14	9	1	2	2	1	0	0	0
	Middle	3	1	0	2	1	0	0	0	0
	Old	14	4	1	0	0	0	0	0	0
	Total	84	42	1	21	14	1	1	1	0

Note: ianr refers to the number of rimes ianr obtained by all the speakers of each social group; *actl. ianr* refers to the actual number of rimes ianr being able to be used in acoustics analysis of each social group; *actl. avg.* refers to the actual average number of rimes ianr per speaker per social group in the acoustics analysis.

Summary

This dissertation investigates the social, attitudinal, and linguistic mechanisms behind language choice and language change in postmodern urban China. More specifically, it investigates the language choice, use and pronunciation norm formation of rhotacization in Beijing, the country's capital city, due to the constraints of urbanization, Standard Chinese, native dialects, and the expression of belonging. This dissertation is composed of eight chapters.

Chapter 1 introduces the research framework and the research object of this dissertation and the research questions to be addressed, as well as a brief chapter-by-chapter overview.

Chapter 2 presents the linguistic and social backgrounds of this dissertation and previous research on the topic, namely, rhotacization in general, rhotacization in Beijing Mandarin (BM) and Standard Chinese (SC), Beijing speech community, and urbanization and migration. This chapter aims to present the phonetic, lexical, and grammatical features of rhotacization, the special relationship between rhotacization and BM and SC, as well as the social backgrounds triggering the rhotacization change. In addition, this chapter also compares postvocalic r in Mandarin and western languages. Although r comes after a vowel in those languages, rhotacization in Mandarin also has lexical and grammatical features. From the perspective of phonetics alone, rhotacization in Mandarin is also related to sound change, tone and neutralization etc. Therefore, postvocalic r in Mandarin and western languages should not be simply taken as the same thing.

Chapter 3 describes the research design and data collection methods of this dissertation, namely, the criteria of participant selection, pair-talking and sociolinguistic interviews, and the collection of natural and spontaneous speech, as well as the speech recording. One of the objectives of this dissertation is to investigate the language choice and pronunciation norms formation of rhotacization in speakers' natural speech in the Beijing Speech community. Therefore, except examining the speech of Beijing native speakers, that of migrants from rhotic and non-rhotic dialect backgrounds is also examined. In addition, this study adopts the data collection method of "talking with a familiar person at a familiar place about familiar topics". The purpose is to overcome the bias that previous studies usually only examine native Beijing speakers' rhotacization and only their speech of the read-aloud rhotacization.

Chapter 4 investigates speakers' language attitudes towards language use and users in the Beijing Speech Community. More specifically, lay viewpoints of BM and SC, of rhotacization use and users, of rhotacization imitation, and of the advantage/disadvantage of using BM. There are three main findings. First, rhotacization is recognized as the most typical feature of BM by both Beijing natives and migrants. Second, BM rhotacization imitation by migrants, among other ways of speech imitation, is salient in respondents' perception, which is, however, perceived as "unnatural, awkward & stiff, and not like" and is believed

to be unnecessary by both Beijing natives and migrant respondents. Third, in general, instead of BM, SC is the more prestigious variety in Beijing. When being asked about the advantage/disadvantage of using BM, more respondents report "no advantage/disadvantage". However, the Beijing native respondents report that they would speak SC to avoid being recognized as a Beijinger, e.g., using fewer rhotacized words. Among the middle-aged and old non-native respondents, this question triggers their emotional expressions, like "Migrants work hard and are more capable. Beijingers do not. Speaking BM is not a big deal. Speaking SC is enough". Most young rhotic speakers, however, believe that speaking BM could bring advantages, and they will study and speak BM; such a viewpoint is probably related to the length of living and studying in Beijing and their knowledge of the city.

Chapter 5 studies the effects of social factors on rhotacization frequency in speakers' natural speech. There are three main findings. First, among Beijing native speakers, age is a critical factor. The young speakers show the lowest rhotacization frequency and the old highest. Second, gender has no significant effect on the frequency; speakers in different age groups but of the same gender also have no significant frequency difference. Third, dialect background has a significant effect. The rhotacization frequency by Beijing native speakers is highest and that by non-rhotic speakers the lowest. There is no significant difference between young Beijing native speakers and young rhotic speakers. The results of this chapter reveal that 1) young rhotic speakers are influenced by BM and its rhotacization, and 2) there is an ongoing de-rhotacizing process among Beijing native speakers.

Chapter 6 examines the effects of social factors on rhotacization type frequency, based on the results of Chapter 5. There are three main findings. First, among Beijing native speakers, age has a significant effect on the rhotacization type frequency. The young speakers use fewer types than the old. Second, gender is not a critical factor. There is no significant difference between gender groups. Third, dialect background has a significant effect on the frequency. Beijing native speakers use the most and non-rhotic speakers use the least. Together with the results of Chapter 5 on the rhotacization token frequency, we mainly have three main findings. First, dialect background is a crucial social factor. Regarding both token frequency and type frequency, Beijing native speakers produce the most and the non-rhotic speakers the least. Second, for the token frequency, there is no significant difference between the young Beijing native speakers and the young rhotic speakers; but for the type frequency, the former is found to be capable of using more different types than the latter. This reveals that young rhotic speakers are influenced by BM and its rhotacization, but they have limited rhotacization types in mind. Therefore, they repeat the rhotacization they know to achieve their goal of producing a greater number of rhotacized words. Third, among Beijing native speakers, the young use significantly fewer rhotacization tokens and types, compared to the old. This means that "de-rhotacizing" is undergoing among Beijing native speakers and the younger the speakers are, the fewer rhotacization tokens and types they are actively using. The promotion of Standard Chinese, the long-term and profound social and language link between

Beijing natives and migrants, as well as the population superiority of migrants are all possible causes of the observed de-rhotacization.

Chapter 7 investigates the social and linguistic constraints on rhotacization variants and pronunciation norms formation of rhotacization. The methods of Acoustic Phonetics are used in this chapter, and the formant trajectories, vowel space, and duration of the most used rhotacized vowel are measured. There are three main findings. First, in the studies on language variation, besides the syllable contexts, lexical and suprasegmental factors (e.g. tone) should also be taken into account. This chapter categorizes the most used rhotacized vowel *ianr* into three categories, namely OT, NT, and NG, due to the effects of lexical meaning and tones (original tone and neutral tone) on *ianr*. It turns out that *ianr* in different categories have different formant trajectories and vowel space patterns. In general, on the formant trajectories, OT *ianr* and NT *ianr* show similarities, while NG ianr has three flat formant contours with very mild fluctuation. On the F2-F1 vowel charts, OT *ianr* takes the largest space, which covers the area between near-close and near-open. NT *ianr* and NG *ianr* take a smaller space, which is usually above the mid-central area. Second, social factors show different effects on the three types of *ianr*. 1) The non-rhotic speakers produce no NG *ianr.* 2) On the formant trajectories, we also observe a rise at *ianr* formants endings with the rhotic and the non-rhotic speakers. This suggests that though non-native speakers do rhotacize the rime, the retroflex effect is probably not sufficiently realized, and the speaker's tongue is de-retroflexed at the rime ending, while Beijing native speakers do not. 3) On the F2-F1 vowel charts, non-native speakers do not show group differences. However, among Beijing native speakers, the three *ianr* categories are overlapped for the old speakers but clustered for the young. This shows that native speakers in different generations use different tongue heights when producing rhotacization and thus produce different variants.

Chapter 8 summarizes the main findings of each chapter and presents the shortcomings of this dissertation, as well as issues for future research.

Above all, this dissertation has demonstrated the normative forces, namely, urbanization and migration, Standard Chinese, native dialect and expressions of belongings, on the rhotacization use and pronunciation norm formation. This dissertation studies the language attitude and language use of speakers in the Beijing Speech Community in quality and quantity, with the methods of sociolinguistics and phonetics. Regarding language attitude, both Beijing native speakers and migrants report the perceived salience of rhotacization and rhotacization imitation by migrants. On the other hand, in the background of Standard Chinese promotion and influx of migrants, both native speakers and migrants associate migrants with the upwards social mobility in Beijing. They also report the difficulty of learning rhotacization, the prestige of SC, and the non-necessity of learning BM. Regarding language use, as an important feature in both BM and SC, rhotacization is undergoing the decline of both tokens and types in native speakers' speech. However, compared to migrants, Beijing native speakers still produce the biggest number of rhotacization tokens, types and variants. Together, this dissertation reveals the

social, attitudinal and linguistic forces on language choices and pronunciation norms formation in postmodern urban settings, advancing our understanding of the mechanisms from various aspects.

Samenvatting

Dit proefschrift onderzoekt de sociale, attitude- en taalkundige mechanismen achter taalkeuzes en taalverandering in het postmoderne stedelijke China. Meer specifiek onderzoekt het de taalkeuze, het gebruik en de uitspraaknormvorming van rhotacisatie in Peking, de hoofdstad van het land, in het licht van de verstedelijking, de zich versterkende positie van het Standaard Chinees, de regionale dialecten en de uitdrukking van verbondenheid. Dit proefschrift bestaat uit acht hoofdstukken.

Hoofdstuk 1 introduceert het theoretisch kader, het onderzoeksobject van dit proefschrift en de onderzoeksvragen die worden beantwoord. Het hoofdstuk eindigt met een kort overzicht van de resterende hoofdstukken.

Hoofdstuk 2 presenteert de taalkundige en sociale achtergronden van dit proefschrift en eerder onderzoek over het onderwerp, namelijk rhotacisatie in het algemeen, rhotacisatie in het Peking Mandarijn (BM) en het Standaard Chinees (SC), de Peking taalgemeenschap, en verstedelijking en binnenlandse migratie. Het hoofdstuk heeft tot doel de fonetische, lexicale en grammaticale kenmerken van rhotacisatie en de speciale relatie tussen rhotacisatie en BM en SC te presenteren, evenals de sociale achtergronden die de verandering in rhotacisatie teweegbrengen. Daarnaast vergelijkt dit hoofdstuk de postvocalische *r* in het Mandarijn met die in westerse talen. Rhotacisatie heeft in het Mandarijn ook lexicale en grammaticale kenmerken. Daarom moeten de postvocale *r* in het Mandarijn en die in westerse talen niet zomaar als hetzelfde verschijnsel worden opgevat.

Hoofdstuk 3 beschrijft de onderzoeksopzet en methoden van dataverzameling van dit proefschrift: de criteria van deelnemersselectie, de opzet van de tweegesprekken en sociotaalkundige interviews, en de dataverzameling en -opname van de natuurlijke en spontane spraak. Een van de doelstellingen van dit proefschrift is het onderzoeken van de taalkeuze en uitspraaknormvorming van rhotacisatie in de natuurlijke spraak van sprekers in de Pekingse taalgemeenschap. Daarom wordt, behalve de spraak van moedertaalsprekers uit Peking, ook die van migranten met een rhotische en niet-rhotische dialectachtergrond onderzocht. Bovendien past deze studie de dataverzamelingsmethode toe van "praten met een bekende persoon op een bekende plaats over bekende onderwerpen". Het doel is om de *bias* van eerdere studies te overwinnen waarin meestal alleen de rhotacisatie van moedertaalsprekers uit Peking en alleen hun spraak van de voorgelezen rhotacisatie werd onderzocht.

Hoofdstuk 4 onderzoekt de taalattitudes van sprekers ten opzichte van taalgebruik en gebruikers in de Pekingse taalgemeenschap. Meer specifiek bespreekt dit hoofdstuk de positie van BM en SC, van rhotacisatiegebruik en -gebruikers, rhotacisatie-imitatie en van het voordeel/nadeel van het gebruik van BM. Er zijn drie hoofdbevindingen. Allereerst: rhotacisatie wordt erkend als het meest typische kenmerk van BM door zowel autochtone respondenten als

migranten. Ten tweede: het imiteren van BM-rhotacisatie door migranten, naast andere manieren van spraakimitatie, valt respondenten op. Dit wordt echter opgevat als "onnatuurlijk, ongemakkelijk en stijf" en wordt door zowel autochtone respondenten als migranten als onnodig beschouwd. Ten derde: SC, en niet BM, is over het algemeen de meer prestigieuze variant in Peking. Gevraagd naar het voordeel/nadeel van het gebruik van BM, rapporteren de meeste respondenten "geen voordeel/nadeel". De moedertaalsprekers uit Peking melden echter dat ze SC zouden spreken om te voorkomen dat ze herkend worden als Pekinees, bijvoorbeeld door minder gerhotaceerde woorden te gebruiken. Bij migrantenrespondenten van middelbare en leeftijd en daarboven roept deze vraag emotionele uitingen op, zoals "Migranten werken hard en zijn capabeler. Pekinezen niet. BM spreken is niet erg. SC spreken is genoeg". De meeste jonge rhotische-sprekers zijn echter van mening dat het spreken van BM voordelen kan opleveren, en ze bestuderen en spreken BM; zo'n gezichtspunt houdt waarschijnlijk verband met hoe lang respondenten in Peking wonen en studeren en met hun kennis van de stad.

Hoofdstuk 5 bestudeert de effecten van sociale factoren op de frequentie van rhotacisatie in de natuurlijke spraak van sprekers. Er zijn drie hoofdbevindingen. Ten eerste: leeftijd is onder de moedertaalsprekers uit Peking een kritische factor. De jongere sprekers tonen de laagste rhotacisatiefrequentie en de oudere de hoogste. Ten tweede: gender heeft geen significant effect op de frequentie; er is ook geen significant verschil tussen sprekers met hetzelfde gender in verschillende leeftijdsgroepen. Ten derde: de dialectachtergrond heeft een significant effect. De rhotacisatiesfrequentie door moedertaalsprekers uit Peking is het hoogst en die van niet-rhotische sprekers het laagst. Er is geen significant verschil tussen jonge moedertaalsprekers uit Peking en jonge rhotische sprekers. De resultaten van dit hoofdstuk laten zien dat 1) jonge rhotische sprekers worden beïnvloed door BM en de rhotacisatie ervan, en 2) dat er een proces van de-rhoticisering plaatsvindt onder moedertaalsprekers uit Peking.

Hoofdstuk 6 onderzoekt de effecten van sociale factoren op de frequentie van rhotacisatie*types*, gebaseerd op de resultaten van Hoofdstuk 5. Er zijn drie hoofdbevindingen. Ten eerste: leeftijd heeft onder de moedertaalsprekers uit Peking een significant effect op de frequentie van het rhotacisatie*type*. Jongere sprekers gebruiken minder verschillende *types* dan oudere. Ten tweede: gender is geen kritische factor. Er is geen significant verschil tussen de genders. Ten derde: de dialectachtergrond heeft een significant effect op de frequentie. Moedertaalsprekers uit Peking gebruiken rhotaciseren het vaakst en niet-rhotische sprekers het minst vaak. Samen met de resultaten van Hoofdstuk 5 over de frequentie van rhotacisatie*tokens* leidt dit tot drie hoofdbevindingen. Ten eerste: de dialectachtergrond is een cruciale sociale factor. Wat betreft zowel de *token*frequentie als de *type*frequentie, produceren de moedertaalsprekers uit Peking de meeste en de niet-rhotische sprekers de minste. Ten tweede: er is voor de *token*frequentie geen significant verschil tussen de jongere moedertaalsprekers uit Peking en de jongere rhotische sprekers. Voor de *type*frequentie blijkt de eerste groep echter in staat te zijn

meer verschillende *types* te gebruiken dan de laatste groep. Hieruit blijkt dat jongere rhotische sprekers worden beïnvloed door BM en de rhotacisatie ervan, maar dat ze beperkte rhotacisaties*types* kennen. Daarom herhalen ze de rhotacisatie die ze kennen om een groter aantal rhotische woorden te kunnen produceren. Ten derde: onder de moedertaalsprekers uit Peking gebruiken de jongeren aanzienlijk minder rhotacisatie-*tokens* en -*types* in vergelijking met de oudere sprekers. Dit betekent dat "de-rhotacisering" plaatsvindt onder de moedertaalsprekers uit Peking en hoe jonger de sprekers zijn, hoe minder rhotacisatie-*tokens* en -*types* ze actief gebruiken. De bevordering van Standaard Chinees, de langdurige en diepgaande sociale en taalkundige band tussen moedertaalsprekers uit Peking en migranten, evenals de bevolkingssuperioriteit van migranten zijn allemaal mogelijke oorzaken van de waargenomen de-rhotacisering.

Hoofdstuk 7 onderzoekt de sociale en taalkundige beperkingen op rhotacisatiesvarianten en uitspraaknormvorming van rhotacisatie. De methoden van akoestische fonetiek worden in dit hoofdstuk gebruikt en de formanttrajecten, klinkerruimte en duur van de meest gebruikte gerhotaciseerde klinker (lettergreep) worden gemeten. Er zijn drie hoofdbevindingen. Ten eerste: in studies naar taalvariatie moet behalve met de lettergreepcontexten ook rekening gehouden worden met lexicale en suprasegmentele factoren (bijvoorbeeld toon). Dit hoofdstuk categoriseert de meest gebruikte gerhotaceerde klinker *ianr* in drie categorieën, namelijk OT (oorspronkelijke toon), NT (neutrale toon) en NG (??), vanwege de effecten van lexicale betekenis en tonen op *ianr*. Het blijkt dat *ianr* in verschillende categorieën verschillende formanttrajecten en klinkerruimtepatronen heeft. Over het algemeen vertonen OT *ianr* en NT *ianr* overeenkomsten op de formanttrajecten, terwijl NG *ianr* drie vlakke formantcontouren heeft met zeer milde fluctuatie. Op de F2-F1 klinkerkaarten neemt OT *ianr* de grootste ruimte in, namelijk het gebied tussen bijna-dicht en bijna-open. NT *ianr* en NG *ianr* nemen een kleinere ruimte in, die zich meestal boven het midden-middengebied bevindt. Ten tweede: sociale factoren vertonen verschillende effecten op de drie typen *ianr*. 1) De niet-rhotische sprekers produceren geen NG *ianr*. 2) Op de formanttrajecten is er ook een stijging aan het einde van de *ianr*-formanten bij de migranten speakers. Dit suggereert dat hoewel migrantensprekers de rimte rhotaceren, het retroflexe effect waarschijnlijk niet voldoende wordt gerealiseerd, en de tong van de sprekers wordt gederetroflexeerd aan het einde van het rijm, terwijl moedertaalsprekers uit Peking dat niet doen. 3) Op de F2-F1 klinkerkaarten laten anderstaligen geen groepsverschillen zien. Onder de moedertaalsprekers uit Peking overlappen de drie *ianr*-categorieën elkaar echter voor de oudere sprekers, maar zijn deze geclusterd voor de jongere. Hieruit blijkt dat moedertaalsprekers in verschillende generaties verschillende tonghoogten gebruiken bij het produceren van rhotacisatie en dus verschillende varianten produceren.

Hoofdstuk 8 vat de belangrijkste bevindingen van elk hoofdstuk samen en presenteert de beperkingen van dit proefschrift, evenals kwesties voor toekomstig onderzoek.

In de eerste plaats heeft dit proefschrift de normatieve krachten aangetoond, namelijk verstedelijking en migratie, het Standaard Chinees, de regionale dialecten en uitdrukkingen van verbondenheid, op het gebruik van rhotacisatie en de uitspraaknormvorming. Dit proefschrift bestudeert de taalattitudes en het taalgebruik van sprekers in de Peking taalgemeenschap in kwaliteit en kwantiteit, met de methoden uit de sociolinguïstiek en fonetiek. Met betrekking tot taalattitudes rapporteren zowel moedertaalsprekers als migranten dat rhotacisatie en imitatie van rhotacisatie door migranten hen opvallen. Aan de andere kant associëren zowel migranten als moedertaalsprekers migranten met de opwaartse sociale mobiliteit in Peking, tegen de achtergrond van de promotie van het Standaard Chinese en de instroom van migranten. Ze rapporteren ook dat het moeilijk is om rhotacisatie aan te leren naast het prestige van SC en het gebrek aan noodzaak om BM te leren. Wat betreft taalgebruik, als een belangrijk kenmerk van zowel BM als SC, ondergaat rhotacisatie de achteruitgang van zowel *tokens* als *types* onder moedertaalsprekers. In vergelijking met migranten produceren de moedertaalsprekers uit Peking echter nog steeds het grootste aantal rhotacisatie-*tokens*, -*types* en -varianten. Samenvattend legt dit proefschrift de sociale, attitude- en taalkundige invloeden op taalkeuzes en uitspraaknormvorming in postmoderne stedelijke omgevingen bloot. Dit levert ons meer begrip van de relevante mechanismen vanuit verschillende invalshoeken op.

摘要

　　本论文旨在调查北京城市化背景下，社会、语言及语言态度等机制对语言选择和语音规范形成的影响。具体来说，本研究以自然口语语音中的儿化音为对象，考察北京城市话语者在四种规范力量（城市化和移民、普通话、方言母语以及归属和认同感的表达）的制约下，儿化音选择、使用和规范的形成。全文共分八章。

　　第一章引入了本论文的研究背景，研究对象和研究问题，并概述了各个章节的主要内容。

　　第二章具体介绍本研究的语言和社会背景，即儿化音概述、北京话和普通话中的儿化音，以及北京言语社团、城市化和移民，并回顾了以往的相关研究。本章旨在呈现儿化音的语音、词汇和语法特点，儿化音与北京话和普通话的特殊关系，以及引起儿化音变化的社会背景。本章还对汉语中的儿化音和西方语言中元音后的 *r*（postvocalic *r*）做了比较，指出虽然两者都出现在元音之后，但汉语的儿化音还有词汇和语法等多方面的语言特点，但从语音方面来看，还涉及音变、声调和轻化等，因此不能简单地把汉语和西方语言的元音后 *r* 一概而论。

　　第三章详细描述本论文研究设计和数据收集的方法。主要包括，被试选择的考虑因素和步骤，被试小组对话和社会语言学采访的研究设计，自然交谈中语音的收集方法，以及对话和采访的录音等内容。本论文的研究目的之一是考察北京言语社团中，不同成员在日常自然交流语音中儿化的选择和使用，以及自发的儿化语音规范的形成。因此，除了考察北京话母语者，本论文还将移民的语音作为被试对象；第二，本研究采用上述被试"与熟悉的人在熟悉的环境下交谈熟悉的话题"的语音数据收集方法。采用此方法旨在弥补前人研究中通常只考察北京母语者的儿化语音以及只收集其朗读儿化词的语音的不足。

　　第四章调查被试对北京言语社团的语言使用及其使用者的态度。具体来说，对北京话和普通话的认识，以及对儿化的使用及其使用者、儿化音的模仿及使用北京话的好处和坏处等问题的态度和看法。本章有三大主要发现。第一，被试可以指出儿化音是北京话的最突出的特点之一；第二，被试可以明确感知到移民对于儿化音的模仿，但认为模仿是"生硬不自然的，不像"，并指出学说北京话并无必要；第三，总的来说，普通话，而非北京话，是北京城市中更有声望的语言变体。对于北京话有无好处或坏处的问题，多数被试指出没有好坏处。但北京话母语的青年被试表示他们会通过使用普通话来避开自身北京人的身份，如避免发出过多儿化音等。中年和老年的移民被试组中，回答这一问题则会引起被试诸如"移民勤奋有能力而北京人不努力，说北京话没什么了不起，普通话就够了"的情绪表达。而多数有卷舌音方言背景的年轻移民被试却认为说北京话可以带来好处，并要学习使用北京话；

这一看法的产生可能与其在京学习生活的时间长短、以及对于城市的认识等因素有关。

  第五章探讨社会因素对自然口语语音中的儿化频次的影响。本章有三大主要发现。首先，在北京话母语者被试间，年龄是一个关键影响因素：年轻组儿化使用频次最低，老年组最高。第二，性别因素对儿化频次未发现有显著影响，同年龄组不同性别间也无显著差异。第三，方言背景对儿化频次有显著影响，北京话母语组被试的儿化频次最高，无卷舌方言背景被试的最低；北京话母语者年轻组和有卷舌音方言背景年轻组的儿化频次没有显著性差异。本章的研究结果初步表明，1) 有卷舌方言背景年轻人受到北京话及其儿化的影响较大；2)而北京话母语者间则呈现"去儿化"的现象。

  第六章在第五章的基础上，考察社会因素对自然口语语言中的儿化类型频次的影响。本章有三大主要研究发现。第一，在北京话母语者被试间，年龄对儿化类型的频次有显著影响，年轻组比老年组低；性别对儿化类型频次没有影响。第二，性别不是关键影响因素，不同性别组之间，儿化类型的频次没有显著性差异。第三，方言背景与儿化类型频次有显著影响，北京话母语组被试的最高，无卷舌方言背景被试的最低。综合第五章中整体儿化频次的研究结果，我们有三大发现。首先，方言背景是一项重要的社会因素，在儿化频次和类型频次上，北京话母语者均最高，无卷舌音背景的被试均最低。其次，在儿化频次上，尽管北京话母语者年轻组与有卷舌音背景年轻组无显著差异，但在儿化类型频次上，前者比后者掌握和使用更多的儿化音；这体现出有卷舌音背景年轻组受到北京话及其儿化的影响较大，但由于掌握的儿化类型有限，他们通过重复已知类型的儿化而实现儿化使用数量多频次高的目的。最后，在北京母语者内部，年轻组在儿化频次和类型频次上，均比老年组的显著性降低；这表明，"去儿化"进程正发生在北京话母语者间，北京人使用儿化的数量正在随年龄减少，这应该与普通话的推广、北京母语者与移民间深刻和长期的社会和语言接触、以及移民群体数量上占优势等因素有关。

  第七章考察社会和语言学因素对儿化音变体和使用规范的形成的制约。本章采用声学语音学的方法，重点研究了使用频次最高的儿化音节（ianr）的共振峰曲线，元音空间以及时长等方面。研究结果表明，首先，在研究语音变体时，除考虑音节结构对目标音段发音的影响外，语言学制约因素，词义和超音段成分（如声调），也应当纳入考虑范围。基于音段 ianr 所在儿化词的词汇意义和声调（本调和轻声）对它的影响，本研究把含有该音段的语料分为了三大类，即 OT，NT 和 NG。这三类儿化音段呈现出了不同的共振峰走势和元音空间模式：总体来看，共振峰走势上，OT 和 NT 均高起直下，NG 较为平缓；在元音空间图上，OT 类的跨度范围最大，NT 类次之，NG 类最小。其次，社会因素对三类儿化音段有不同的影响：（1）无卷舌音方言背景被试没有产出 NG 类的儿化音段；（2）共振峰走势上，非北京话母语者被试在自然语流中产出的儿化共振峰末尾有上翘的走势，体现出其在音节末尾时卷舌程度已经明显降低，而北京话母语者的依然保持不变；（3）元音空间模式上，非北京话母语者没未呈现出有规律的差异，而北京话母语者从老年组到年轻

组，三类元音的空间从互相基本重叠到清晰的类聚分层，这体现出不同年龄母语被试在三类儿化元音上运用了不同的舌位高度，并产生了不同的变体。

第八章回顾本论文各实验章节的主要发现，并指出本研究的不足之处和未来有待进一步研究的相关问题。

综上所述，本论文表明儿化音的使用及其社会语音规范的形成受到城市化和社会发展、普通话（推广）、母语方言和归属认同感等多重的因素制约和影响。本论文运用社会语言学和语音学的研究方法，对北京言语社团内部的成员的语言态度和语言使用，进行了定性和定量的研究。在语言态度上，一方面，北京话母语者和外来移民均对儿化的凸显性及移民对儿化的模仿有明确感知，但另一方面，在大力推广普通话和庞大移民群体涌入的形势下，母语者和移民均将外来移民与社会阶层和社会上升移动趋势关联起来，并指出儿化学习的难度高、普通话的声望高和使用北京话的不必要性。在语言和语音的使用上，儿化本身作为北京话的一项重要特征，在北京话母语者内部正经历整体数量和使用类型数量减少的过程，但相比外来移民，北京话母语者依然产出整体数量、类型数量和变体数量最多的儿化词汇。总之，本论文研究了社会、态度和语言学因素对后现代城市语言的选择使用和语音规范规则形成的影响和作用，增进了我们对于其中机制的认识和理解。

Curriculum Vitae

Han Hu was born on 5 August 1988 in Shanxi in the People's Republic of China. In 2006, she started her bachelor's study in Journalism at Shanxi University and obtained her bachelor's degree in 2010. During her undergraduate study, she got interested in Chinese linguistics. In 2011, she started her Master's programme at Beijing Language and Culture University. She studied Linguistics and Applied Linguistics, in the specialization of Experimental Phonetics. In 2014, she finished her studies and received her Master's degree. In September 2014, she started her PhD research at Leiden University Centre for Linguistics (LUCL). This dissertation is the main product of her PhD research.