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Phonetic Accommodation as an Important Force for Tone Evolution

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Phonetic accommodation is defined as a phenomenon that speakers spontaneously adjust their speech when talking to another talker, which could lead a result of convergence (being more similar to the counterpart) or divergence (being more different from the counterpart). When hearing a new sound, no matter the hearer chooses to spontaneously imitate the new sound or stay different with it, he or she will always play a role in the progress of language development. The decision of the hearer either could become a new trend of sound change, or could reinforce the prestige of the original one. Hence phonetic accommodation of the speakers in contact is one of the powerful forces that drive our language into sound changes. Therefore, the present study investigated the role of phonetic accommodations as a potential force on Mandarin tone change. Our finding suggest that phonetic accommodations do seem to be an important force for Mandarin tone evolution, while it could be affected by various of factors, such as age, gender, social statues, and other social factors, linguistic experience, stage of a change in progress, motor activation condition, cognitive sensitivity, and other cognitive factors.

Keywords: tone evolution, phonetic accommodation, speech imitation, cognition

Tonal Evolution

More than half of the languages in the world are characterized by contrasting tones. From the view of historical linguistics, the change of tones generally included two stages: the origin of tones and the split of tones. At present, most of the studies on the change of tone focus on the origin of tone, that is, tongenesis. Human sound changes were diverse, but in widely separated languages, the origin of tones reveals many unexpectedly common patterns (Hombert, Ohala, & Ewan, 1979). One of the classic interpretations was proposed by Haudricourt (1954), which pointed out that tone was caused by initial consonants and syllable-final. Firstly, three kinds of codas were the key to determine the three types of tone:

1. The rising tone was caused by the final stops (including glottal stop [(-ʔ]).
2. The falling tone was induced by the final voiceless fricative.
3. A flat sound was caused by an open or ended in a nasal.

Secondly, the distinction between voiceless and voiced initials determined pitches heights of these tones. However, some experts have subsequently found that it was insufficient to explain all of them. Therefore, Thurgood (2002) developed the statement of Haudricourt that tonal split was classified as three final types into

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three kinds of laryngeal configuration. Hyslop (2009) explored the details of tonogenesis of Kurtöp by comparing data and an acoustic study. The results showed that the tone first entered Kurtöp after the onset of the consonant, spread to the palatal fricative, and seemed to extend to all obstruent. However, these hypotheses of tone origin lacked quantitative tests in the evolutionary framework. Therefore, the phylogenetic method in evolutionary biology was introduced to explore 10 hypotheses about the origin of tones in the Sino-Tibetan languages. Under the framework of evolution, this study verified three statements:

1. The original Sino-Tibetan language was likely to be a non-tonal language.

2. The origin of tone was related to the simplification of syllable structure in Sino-Tibetan languages (such as the loss of codas and the change of vowel sound state).

3. The generation of tones did not affect the differentiation process of the Sino-Tibetan languages.

Phonetic Accommodation

Phonetic accommodation, also known as phonetic imitation, is one of the important topics on sound change. It usually occurs in three forms: convergence, divergence, and maintenance, among which convergence is more widely documented than maintenance and divergence, probably because imitation is human nature (Lin, Yao, & Luo, 2021). This part will review the researches of phonetic accommodation theoretically and empirically.

Theoretical Research of Phonetic Accommodation

There are a variety of related theories that contribute to explaining the phenomenon of phonetic accommodation. This study focuses on the Interactive Alignment Account (Gambi & Pickering, 2013), and the Communication Accommodation Theory (CAT) (Giles, 1973; Giles, Coupland, & Coupland, 1991).

CAT is one of the most important theories in the study of accommodation. Giles (1973) firstly put forward the term “accommodation”, which refers to that talker adapt to the speaking style of the counterpart to gain their approval. Subsequentially, Giles et al. (1991) developed it as CAT. The proposal of this theory has promoted the relevant study of phonetic accommodation in interactive (Dunbar, Fujiwara, & Bernhold, 2023) and non-interactive settings (Lin et al., 2021; Wagner et al., 2021). McGlone and Giles (2011) held that there were six stages in the development of CAT. The different focuses of different stages did not mean that they were independent. On the contrary, the development of the stage made the related research on CAT more complicated.

Another relative theory of phonetic accommodation is Interactive Alignment Model (IAM). A large number of studies have proved that interlocutors could be consistent at different language levels, such as semantics (Garrod & Doherty, 1994), syntax (Michel, Appel, & Cipitria, 2022), and phonetics (Wagner et al., 2021). For instance, Branigan, Pickering, and Cleland (2000) confirmed the priming effect through a syntactic priming experiment. However, if alignment is produced through priming, the alignment effect should increase as the longer the contact with the given perceptual structure, and it still persists after being away from the exposed environment. The experimental results of Gijssels et al. (2015) disagreed with this view. Gijssels manipulated a virtual reality experiment. He suggested that alignment along the continuous dimensions of language (such as speech rate and pitch) required other mechanisms to explain.

Pickering and Garrod (2013) continued to refine the IAM, proposing that language production and comprehension were intertwined. The realization of prediction was achieved by association route and imitation route. The theory of interactive alignment strictly predicted that the degree of alignment or convergence depended on the degree of similarity between the language systems of interactors. The more similar the language experience

of interactors was, the more likely they were to accurately predict language behavior of each other through the simulation route, resulting in a convergence effect (Lin et al., 2021).

Empirical Research of Phonetic Accommodation

Pronunciation imitation played an important role in various language learning and communication situations. Great progress has been made in the study of phonetic accommodation in laboratories and different communication environments.

Previous studies have observed phonetic convergence in facial expressions (Wörmann, Holodynski, Kärtner, & Keller, 2012), body movements, and various parameters of language forms at almost all language levels. Language levels mainly included linguistics level and paralinguistic level. The former concerned lexical and syntactical levels. For example, Nenkova, Gravano, and Hirschberg (2008) conducted an experiment to examine a new type of entrainment in use of high-frequency words in two corpora and its connection with dialogue fluency and naturalness, as well as with task success. The results suggested that a higher degree of entrainment was associated with more overlaps and less interruptions throughout the interaction flow. The later referred to the paralinguistic level, such as duration (Xia & Ma, 2016; Cabarrão et al., 2016), intensity (Welkowitz, Feldstein, Finklestein, & Aylesworth, 1972), voice onset time (Kwon, 2021), fundamental frequency (Gijssels et al., 2015; Lin et al., 2021). Sancier and Fowler (1997) discovered that the onset time (VOTs) of the two languages of a Portuguese-English bilingual varied with the change of linguistic context. Tobin, Nam, and Fowler (2017) extended the findings of this phonetic accommodation to a sample of Spanish-English bilinguals. However, it is worth mentioning that the above studies only examined the effect of imitation on merger, which is based on the sound changes of two phonemes, while this study extends the research object to a non-categorical evolution, that is, the sound changes evolving to the standard language. Although phonetic accommodation is a hot research topic abroad, there are not many domestic scholars paying attention to it.

Previous studies have explored whether phonetic accommodation was an automatic process or determined by social factors. Trudgill (2008) believed that phonetic accommodation was the result of automatic triggering under dialect contact, and disconnected from social identity. Other empirical studies have shown that phonetic accommodation can be influenced by many factors, such as language experience, change process stage, motor activation conditions, cognitive sensitivity, and other cognitive factors as well. However, the large number of empirical studies on phonetic accommodation have proved the fact that the effects of imitation were typically subtle. In fact, the size of the impact was usually small and variable in social and situational factors (Nguyen & Delvaux, 2015). Olmstead, Viswanathan, Aivar, and Manuel (2013) grouped native Spanish speakers and native English speakers to determine whether the imitation of non-native symbols was different in quality from their imitation of native symbols. Therefore, it is easy to come to a conclusion that the influence of language experience on phonetic accommodation is grounded, but after the intervention of phonetic stimulus in the experiment, whether the participants are more convergent or divergent with the model talker still needs to be verified, and different experiments show different results.

Possible Effect of Phonetic Accommodation on Tonal Evolution

Among the tonal change, the reason of change was the most important, because the reasons of change directly affected the process and result. The internal factors include: the simplification of the phonological system, the similarity between the tones value, the influence of sound changes in articulation, the poly-syllabication of

Chinese Characters, the disappearance of the voicing contrast of the initials, and the loss of the *rusheng* (the falling tone in Chinese) coda. The process of tonal change caused by this kind of reasons was gradually varying, and the change result was systematic. The external factors include: the influence of prestige language, Putonghua, or other dialects. Conversely, the process of tonal evolution caused by this kind of reasons was abrupt and not systematic. Evolutionary linguistics holds that there was a universal pattern in the synchronic variation of individuals. The rule of evolution was reflected in individual variation.

If tones keep changing, they might be considered as developing in a constantly changing condition, instead of being comparatively stable as the vowels and consonants. Therefore, phonetic accommodation could have three kind of effects on tonal evolution, including: (a) introduce and solicit a new tonal change direction; (b) accelerate the tonal change progress; and (c) reversing a tonal change progress.

However, it depends on plenty of factors to decide which role would the accommodation play. Based on the reviewed factors on accommodation, these factors are including but not limited to language background, accommodation target familiarity, linguistic similarity, language attitude, social factors as gender and social rank.

Conclusion

The related research on phonetic accommodation has achieved fruitful results. Some scholars have found that the accommodation effect was observed in some segmental features (such as vowel and consonants), and suprasegmental features (such as pitch, intensity, VOT, etc.). Although foreign studies on phonetic accommodation have been abundant, it is a pity that phonetic accommodation has not aroused the interest of domestic scholars. As a tonal language, Chinese has a wide variety of dialects, and there are significant differences between dialects and the Putonghua. The contact between the two language systems will result in a certain impact on their tonal systems.

The present study investigated the role of phonetic accommodations aa potential force on Mandarin tone change. Our findings suggest that phonetic accommodations do seem to an important force for Mandarin tone evolution, while it could be affect by various of factors, such as linguistic experience, stage of a change in progress, motor activation condition, cognitive sensitivity, and other cognitive factors.

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