Perceptual Processing of Mandarin Nasals by L1 and L2 Mandarin Speakers

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Abstract Nasals are cross-linguistically susceptible to change, especially in the syllable final position. Acoustic reports on Mandarin nasal production have recently shown that the syllable-final distinction is frequently dropped. Few studies, however, have addressed the issue of perceptual processing in Mandarin nasals for L1 and L2 speakers of Mandarin Chinese. The current paper addressed to what extent and in what directions L1 and L2 speakers of Mandarin differed in perceiving Mandarin nasals. Possible variables, including the linguistic backgrounds (i.e. L1 vs. L2 speakers of Mandarin Chinese), the vocalic contexts (i.e. [i, ə, a, y, uə, uə, ia]) and the phonetic settings (i.e. syllable-initial vs. syllable-final), were discussed. Asymmetrical findings in the current investigation indicated limitations of speech learning theories developed from European languages in the context of Mandarin nasals. A tri-dimensional model was thus suggested for interpreting the cognitive mechanism in Mandarin nasal perception.

Keywords Mandarin nasals · Perceptual merger · Chinese as a second language

Introduction

Nasals are a common type of segments in the world languages (Ladefoged and Maddieson 1996; Maddieson 1984). They are cross-linguistically susceptible to change, especially in the syllable final position (Chen 1991b; Hajek 1997; Li 1999). How to define the changing phonetic nature in nasal endings has been widely documented. Relative importance of
murmurs and transitions as nasal place cues has been assessed in previous acoustic reports of nasals. Recently, acoustic reports on Mandarin nasal production have shown that the syllable-final distinction is frequently dropped in Taiwan Mandarin, particularly in the younger L1 generation (Lai 2008; Tse 1992; Yueh 1992). Bifurcated conclusions have been reached in terms of the merging directions in production. Some researchers (Kubler 1985; Tse 1992) argued that alveolarization was the predominant trend of syllable-final nasal merger in [i] and [a]. Others (Chen 1991a; Hsu and Tse 2007; Ing 1985) claimed that the syllable-final nasal following [i] was more likely to be velarized.

Previous reports on Mandarin nasals were limited partly because of lacking detailed discussion on perceptual saliency for listeners of different linguistic backgrounds and partly because of neglecting different degrees of markedness in nasals. To date, few research reports have elaborated the speech processing in Mandarin nasals for learners of Chinese as a second language (CSL). How these learners perceive these nasal contrasts and how speech learning theories developed from European languages, for example, Speech Learning Model (SLM) (Flege 1995) and Markedness Differential Hypothesis (MDH) (Eckman 1977, 2004), interpret their cognitive processes needs further investigation. Speech Learning Model refers to L1–L2 segment inventories and adopts the terminology of “similar/old sounds” and “new sounds” in interpreting speech learning. Most L2 learners fail to articulate or discriminate some non-native contrasts because they interpret them as being equivalent, that is, “Similarity Effect” (Flege 1987, 1988, 1995). Markedness Differential Hypothesis predicts certain areas of difficulty for language learners on a systematic comparison of native language, target language, and the markedness relations in the universal grammar. Usually, unmarked structures are simpler for language learners to acquire than the corresponding marked ones. To what extent L1 and L2 speakers of Mandarin Chinese follow these two models’ predictions await further investigation.

Inspired by previous reports, the researcher in the current study aimed to explore both the cognitive processes during Mandarin Chinese nasal perception and the universality of recent theories developed from European languages. Perception of Mandarin nasals was investigated via an experiment in which young native speakers of Mandarin in Taiwan and native speakers of Malay and of Burmese who learned Chinese as second language identified speech sounds varying across places of articulation (i.e. bilabial [m], alveolar [n] and velar [ŋ]), the vowel types (i.e. [i, a, y, ua, uə, ia]) and phonetic settings (i.e. syllable-initial vs. syllable-final). Three research purposes in the present study included: (1) to examine to what extent CSL learners differ from native speakers of Mandarin Chinese in perceiving Mandarin nasals, (2) to investigate the extent and directions L1 and L2 speakers of Mandarin merge Mandarin nasals, (3) to elaborate the recent speech learning theories from European languages in CSL learners’ perception of Mandarin nasals.

This study carves up the discussion into the following parts. The first part is an introduction, followed by a phonological comparison among Mandarin, Malay and Burmese nasals and some literature review on Mandarin nasals in the second part. Description of participants, the perception experiment and data analysis is presented in the third part. The fourth part reports statistical findings and offers further discussion. The last part summarizes the main findings and interprets how speech processing may actively interact in Mandarin Chinese nasal discrimination by L1 and L2 speakers. Finally, some possible implications as well as recommendations for teaching and learning Mandarin nasals are offered.

1 Taiwan Mandarin, as Hsu and Tse (2007: 2) define, refers to the “Mandarin natively spoken by people in Taiwan, particularly young people.” With the constant contact with local languages, Taiwan Mandarin develops its own linguistic system and becomes distinct from the Standard Mandarin, which is mainly modeled after Beijing Mandarin.