



Universiteit
Leiden
The Netherlands

Production and perception of tones by Dutch learners of Mandarin
Zou, T.; Zou T.

Citation

Zou, T. (2017, September 28). *Production and perception of tones by Dutch learners of Mandarin*. LOT dissertation series. LOT, Utrecht. Retrieved from <https://hdl.handle.net/1887/52977>

Version: Not Applicable (or Unknown)

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/52977>

Note: To cite this publication please use the final published version (if applicable).

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/52977> holds various files of this Leiden University dissertation.

Author: Zou, T.

Title: Production and perception of tones by Dutch learners of Mandarin

Issue Date: 2017-9-28

Summary

This thesis examines the production and perception of lexical tones by beginning and advanced Dutch learners of Mandarin as well as the developmental trajectory in second-language (L2) tone acquisition.

In Mandarin Chinese, a lexical tone language, pitch configurations such as a high, low and rising tone (cued primarily through fundamental frequency) are used to differentiate between word forms. As documented in previous studies, lexical tone always presents great difficulty for adult L2 Mandarin learners whose native language is non-tonal. In terms of tone production, past research mainly focused on the accuracy of L2 tone pronunciation in isolated words. The L2 acquisition of tonal coarticulation, which leads to deviant tonal contours differing from the canonical forms in natural connected speech, has not been studied systematically. The L2 perception of tone in isolated words has been examined in identification and discrimination tasks in previous works. Yet, how non-natives learn to use pitch information in a lexically contrastive manner and how such learners process tone at the phonological level remains unclear. Moreover, the online processing of tonal information in word recognition by L2 learners is also an interesting issue to investigate. Based on these research questions, this thesis provides a systematic study of the production and perception of lexical tones by beginning and advanced Dutch learners of Mandarin with four well-controlled experiments.

Chapter 1 is a general introduction. After a brief introduction to the tone system in Mandarin, an overview of different aspects of L2 tone acquisition is organized around the basic research questions.

Chapter 2 investigates the tonal coarticulation in two-syllable words by Dutch learners of Mandarin and native Mandarin speakers. All the 16 tonal combinations in disyllables were tested using the non-word /mama/ with each syllable bearing one of the four Mandarin tones. The underlying coarticulatory mechanism was investigated in a high cognitive load condition. This chapter shows that for native Mandarin speakers, the substantial carryover coarticulation is assimilatory and not planned, contrary to the dissimilatory anticipatory coarticulation, which shows a smaller magnitude and involves advance planning. For L2 learners, a developmental trajectory toward the native norm has been found for carryover coarticulation, with the advanced learners showing stronger assimilatory coarticulatory effects than beginning learners. Although the carry-over effect is mainly a result of physiological constraints and does not involve planning, its acquisition by L2 learners is still a gradual process. As for the anticipatory coarticulation, the advanced learners show a strong dissimilatory effect, which is more robust than that found for the native speakers. This may indicate that the learners effectively employ an inhibitory mechanism to maintain the contrast and ensure the perceptibility of different tonal categories in running speech.

Chapter 3 sets out to examine the phonological discrimination of Mandarin tones and segment-tone integration in Dutch learners of Mandarin, with both native Mandarin and Dutch speakers without tonal learning experience as control groups. An ABX task with four conditions is used to test how participants' attention is distributed

between segments and tones. This chapter demonstrates a developmental path toward the native norm in tone processing for L2 learners. The beginning learners do not attend to tonal information and process segmental and tonal information separately, like native Dutch listeners without any Mandarin experience. The advanced learners show a more native-like pattern in distributing their attention between segmental and tonal information. Moreover, they process the two dimensions in an integrated manner, similar to native Mandarin listeners. This chapter suggests that the acquisition of new tonal categories in L2 involves a redistribution of attention between segmental and tonal dimensions as well as the development of segment-tone integration.

Chapter 4 further explores the processing of all tonal contrasts at the phonological level and the use of tones in lexical access by Dutch learners of Mandarin using a cognitively demanding sequence recall task and a lexical decision task. The results of the sequence recall task show a clear developmental path in phonological processing of tonal information by L2 learners. The results of the lexical decision task also indicate that, compared to beginners, advanced learners performed significantly better in correctly identifying real words and rejecting non-words that are minimally different from real words in terms of their tone structure. The improvement of advanced learners in both tasks demonstrates that they are shaping new selective perception routines, and that their phonological mode of tone processing is in development.

Furthermore, this chapter bears out that in the lexical decision task, Tone 2 and Tone 3 are mutually confusable for learners and are difficult to learn. Such difficulty may stem from the acoustic similarity between these two tones. Asymmetric patterns are also found for advanced learners in the lexical decision task. For these learners, the category of Tone 1 has been relatively well established when compared to the other three tones. In contrast to this, the category of Tone 4 is less well-established when compared to the other three tones in pairs. These results are potentially related to the prosodic features of the learners' native language, since previous research showed that, compared to tone-language speakers, intonation-language speakers are more sensitive to pitch height than to pitch direction.

Chapter 5 investigates the time course of lexical activation and the relative contribution of segmental and tonal information to speech recognition by testing native Mandarin speakers, as well as beginning and advanced learners of Mandarin in an eye-tracking experiment using the visual world paradigm. The participants heard a spoken word and were asked to identify the corresponding picture from a display of four pictures that consisted of the target, a phonological competitor, and two phonologically unrelated distractors. The probability of fixation on the target and competitor was recorded since it may reflect the activation of the corresponding items. This chapter demonstrates that native Mandarin speakers use tonal information effectively to constrain lexical activation in an early stage of word recognition, in much the same way as they exploit segmental information. Similar to native Mandarin speakers, tonal information is also used by Dutch learners of Mandarin in an early stage to inhibit the activation of incompatible lexical candidates, although they still experience difficulty in the discrimination of some tonal minimal pairs. Compared to beginning learners, significant improvement has been found for advanced learners toward the native norm.

Finally, **Chapter 6** recapitulates the research questions and summarizes the main findings of this thesis. This chapter also provides suggestions for future research.