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ScienceDirect

Journal of Pragmatics 113 (2017) 53–70

journal of PRAGMATICS

www.elsevier.com/locate/pragma

Multimodal research on tonal variations for pragmatic purposes in Mandarin

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Received 8 October 2016; received in revised form 20 March 2017; accepted 22 March 2017
Available online 14 April 2017

Abstract

The aim of this paper was to explore how tonal variations occur in Standard Chinese (SC) and Taiwanese Standard Chinese (TWSC). An experimental research design was first conducted and integrated into a multimodal framework with 30 participants divided into two groups (SC and TWSC). The results of a Mann–Whitney *U* Test showed that the variations were significant between the two groups. Four phonological rules were then proposed. Additionally, three video clips were integrated into the multimodal study to explain how the tonal variations occur and how a low-rising tone is used for various pragmatic purposes and politeness strategies. The results were also confirmed using *Praat* to measure the pitch shape. It is suggested that tonal variations in different language layers such as rising tones are likely to occur for pragmatic purposes in TWSC.

Keywords: Multimodal; Tonal variations; Pragmatic purposes; Reduplicated kinship

1. Introduction

It is commonly recognized that tonal variations often occur in Standard Chinese (SC), which may or may not change the meanings of disyllabic words and their use in discourse. Tone sandhi (or change) may happen and may vary pragmatically in daily life. Variations (Baker, 2010) can be explained categorically (e.g., *deterministic rules*), or quantitatively (e.g., *frequency* and *percentage*). The categorical solution may be clarified by deterministic rules; however, its counterpart tends to be probabilistic.

O'Keeffe et al. (2007) argued that language variations may be *deterministic* (e.g., English suffix *-ed* used for the regular past tense) or *probabilistic* (e.g., the examples of "He got killed", 93% of "get + passive examples" used without an explicit agent). In SC, it is also deterministic that when $Tone_3$ is followed by $Tone_3$ it will become "$Tone_2$ followed by $Tone_3$" in a tone group, e.g., (a) /hao_3 + jiu_3/ → [hao_2jiu_3] ("good wine"). Likewise, (b) /yi_1/ ("one") in /yi_1 + $yang_4$/ ("the same") only becomes [yi_2] in [yi_2yang_4], i.e., "HH → MH /__ HL" (Lin, 2007:198–199). However, it is probabilistic that /yi_1/ followed by $Tone_4$ in (c) /yi_1 + hao_4/ ("Number 1") undergoes *free variation* and becomes $Tone_2$ ([yi_2hao_4]) or remains unchanged ([yi_1hao_4]):

(a) /hao_3 + jiu_3/ → [hao_2jiu_3] ("T_3 + T_3 → T_2 + T_3": regular tone change)
(b) /yi_1 + $yang_4$/ → [yi_2yang_4] ("HH → MH /__ HL": regular tone change)
(c) /yi_1 + hao_4/ → [yi_1hao_4]/[yi_2hao_4] ("T_1 → T_1/T_2": tonal variation)

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http://dx.doi.org/10.1016/j.pragma.2017.03.012
0378-2166/

These variations have been taken for granted and ignored pragmatically in previous studies, but tonal variations are worth exploring at different language levels.

First, tonal variations also occur in Taiwanese Standard Chinese (TWSC), e.g., reduplicated kinship terms and proper names for pragmatic purposes in terms of some tonal patterns such as high-leveling (HH), tone-rising (LH), tone-falling (HL), and neutral/toneless (ø). For example, the tone ''HL HL'' of the kinship term /ba_4 + ba_4/ (''dad'') becomes [ba_3 + ba] ''L-LH'' in TWSC (Duanmu, 2007:307) or becomes [ba_4 + ba_0] ''HL-Ø'' which is the same as the tone sandhi form in SC.

Secondly, different tones of the same lexical item, e.g., polyphonic words, may exhibit variations of sound, meaning or use in discourse (Li and Thompson, 1981). According to Fromkin et al. (2011:545), *free variation* is defined as ''alternative pronunciations of a word in which one sound is substituted for another without changing the word's meaning.'' The free variation can be captured to some extent by invoking optional rules (Giegerich, 1992). These rules can or cannot be applied. Anttila (2004) proposes that there are two types of deviation: i.e., *variation* (F_1: two forms with one meaning) and *ambiguity* (F_2: one form with two meanings). For instance, the character ''zi'' (子) has two tones with different meanings in high rising tone (*Sūnzǐ*, ''proper name'') and neutral tone (*sūnzi*, ''grandson''). However, few studies have explored the phonological variations of Chinese /sunzi/ at different language levels, which could be F_1 or F_2; its single form (F_1) may have two meanings leading to ambiguity (F_2).

Thirdly, tone sandhi or prosodic autonomy may also occur at the end of a tone group (Romero-Trillo, 2012) due to pragmatic reasons. For instance, a reduplicated kinship term such as ''father'' undergoes tonal variations from HL-HL to HL-ø or L-LH: /ba_4 + ba_4/ → [ba_4ba_0] in SC or [ba_4ba_0]/[ba_3ba_2] in TWSC discourse contexts. Yet, few studies have explored this variation in daily conversation.

Fourthly, language variations may also occur because of language contact, socio-cultural factors, identity, etc. Although Duanmu (2007) and Su (2004) examined the variation of TWSC, which has been influenced by Taiwanese phonology, leading to a continuum from TWSC to a variety of Taiwanese-accented Mandarin, previous studies seldom investigated tonal variations or the low-rising tone ''L-LH'' with possible pragmatic factors through authentic materials or experimental research.

Additionally, the voice of tone involves the degree or strategy of politeness in speech (Brown and Levinson, 1987). However, few studies have explored whether the polite voice or attitude may trigger tonal variations. These phonological variations may occur in genuine language use at the word level, sentence-level, and discourse-level (Duanmu, 2007). Therefore, this research aimed to examine the tonal variations of SC and TWSC speakers. It is possibly a pioneering effort to link quantitative results with a framework of multimodal discourse analysis for tonal variations at the pragmatic level.

2. Literature review

2.1. Multimodal approach

Multimodal methods deal with the communicative language in different modes. Herring (2015) proposes a framework of multimodal computer-mediated communication (CMC), including *interactive multimodal platforms* – used to support a union of modes such as *text*, *audio*, *video*, and *images* for user-to-user communication, and *robot-mediated communication* – human–human communication through ''voice, video, and motion'' in physical space via a remotely controlled robot. For example, video websites such as YouTube have become popular in language research (Barton and Lee, 2013). In other words, language must cooperate with other communication modes. For instance, there are two types of *multimodal discourse analysis* (MDA; Jones, 2012:29): one which focuses on texts of magazines, web pages, films, and the like, and the other which is *multimodal interaction analysis*, focusing on social interaction.

MDA is used to investigate how language and other multiple modes (e.g., non-verbal signals, gaze, gesture, physical movement, and proxemics) are combined together with discourse (Jones, 2012). Sindoni (2014) proposed three factors for MDA to gain information from non-verbal resources and language cues: speaker's *facial expression*, *kinetic action*, and *proxemics*. Kinetic action is related to body movement such as head-nodding and hand-waving. Proxemics refers to the distance between addressers and addressees. Fig. 1 incorporates these aspects into the *Integrated Multimodal Framework* (IMF).

IMF analyzes audio or video texts using MDA and the acoustic speech analysis of *Praat*. The current study applied this modified framework to explore how tonal variations such as the rising and neutral tones occur at different language levels, especially at the discourse level.

2.2. Tones, syllables, reduplicated words, and tone-stress principle

SC includes four lexical tones (Chao, 1968; Duanmu, 2007; Lin, 2007), represented by different pitches, i.e., $Tone_1$: HH (55), $Tone_2$: MH(35), $Tone_3$: MLH(315), and $Tone_4$: HL(51), plus a neutral tone (Ø). The neutral tone is short and