HOW SOUND CORRELATES WITH MEANING: AN ANALYSIS ON MANDARIN CHINESE FINAL PARTICLE *A*

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ABSTRACT

This study investigates the relation between pitch realization and pragmatic function/meaning in Mandarin Chinese final particle *a*. Based on Shie [7] and Liu [6], nineteen pragmatic functions were adopted and re-designed. Two different groups of participants, native speakers (L1) and foreign learners (L2) who were learning Mandarin Chinese were recruited. Result showed that there was a strong Language effect, which referred that participants with different backgrounds relied on distinct cues, such as duration, pitch range, slope for L1 and pitch range for L2. It also indicated that pitch range was the most salient feature of final *a* in tonal recognition. Although the one-to-one mapping between pitch and pragmatic functions was not remarkably observed, the tonal result tended to support Wu's [9] classifications compared with two studies mentioned above.

Keywords: Mandarin tones, pragmatics functions

1. INTRODUCTION

The topic of Mandarin Chinese utterance-final particles (UFPs hereafter) is not very seriously mentioned in the Mandarin Chinese textbooks for foreign learners. However, UFPs are ones of the most prevailing lexicons, and they are usually found in the end of clauses or sentences but with a small portion for introduction of UFPs in the Mandarin Chinese textbooks. Without more elaborations, it is inferred that understanding UFPs probably depends on teachers' pedagogical methods and explanations. According to our foreign participants, they were good at indicating UFPs as interjections, but distinguishing the appropriate usages among UFPs was difficult to them. From the experiment, the foreign learners did not present their own strategy to differentiate UFPs by linking the cues among sounds and meanings. Under this circumstance, the concept of the sound-and-meaning mapping is challenged. Among these UFPs, final particle *a* is the crucial target in the study.

Several scholars have proposed some classifications of Mandarin Chinese final particle *a*, or final *a* for short, in terms of different semantic or pragmatic functions. Chao [2], one of pioneering words, lists ten different functional uses for final *a* by observing each single sentences. Li and Thompson [5] follow the similar view as Chao, and they propose the basic semantic and pragmatic function for final *a* as "reducing the forcefulness of the message conveyed by the sentence," making the tone soften in the utterance. Wu [8] treats final *a* as a discourse marker with a core property. Following Shie's [7] classification of final *a*, Chu deems that a low pitch carried by final *a*/*ya* signifies "speaker involvement" while a high pitch signifies "addressee orientation." Wu [9] suggests two phonetically distinctive types, namely *a* with a notably low pitch and *a* with a flat or slightly high pitch. As for the former one, it serves as a question indicator of the matter when attached to a grammatically-constructed question, whereas the second one serves to inform something should have known, to assert a counteractive position, and to address some problem related to sequential contingency.

Although many studies associate meaning or function with pitch realization, they merely depend on the personal intuition. Differently, Liu [6] makes use of corpus data and undertakes the pitch analysis of final *a* with the aid of computational engineering. Liu mainly adopts Shie's [7] work. A1 is a marker of initiating or completing an adjacency pair within discourse in the exchange structure and of detecting speakers' propositions that have been arranged in the context (namely, summarization and abstraction in ideational structure), while the functions of A2 fall into other three categories, i.e., action structure, participation framework, and exclamation in ideational structure. There are totally nineteen pragmatic functions, including sixteen functions classified by Shie and the other three found by Liu. Due to space restrictions, only pragmatic functions are presented without examples as follows:

- **Exchange structure**: *A1* question-answer, *A2* puzzlement-clearance, *A3* accusation-defence, *A4* assertion-endorsement, *A5* assertion-challenge, *A6* request-compliance, *A7* request-noncompliance, *A17* accusation-endorsement, *A18* accusation-challenge, *A19* surmise-approval
- **Ideational structure**: *A8* summarization, *A9* abstraction, *A10* exclamation
- **Action structure**: *A11* question: Challenge, *A12* question: Accusation, *A13* question: Asking for information, *A14* question: Asking for confirmation, *A15* tag question
- **Participation Framework**: *A16* echo question

2. METHOD

The present study is designed to address the issues regarding final *a* in Mandarin. (1) Would it have a pattern to show the relation between pitch realization and semantic or pragmatic functions through the experiment-based design? On the other hand, we would like to know whether our result corresponds with previous scholar's findings. (2) Since foreign subjects asserted that they have learned about UFPs, and they were able to produce or perceive UFPs during the experiment, whether they produce final *a* as same as native speakers do or not?

2.1. Subject

Eight female nuns learning Mandarin Chinese at Ci Guang Temple served as subjects. They are Vietnamese and took same Mandarin classes at Ci Guang Temple from Monday to Friday. On the other hand, 8 female native speakers of Mandarin were university students majored in Nursing at Chang Gung Institute of Technology. They were raised in Taiwan. All of participants were linguistically-naïve and naïve about the purpose of the study. They had no self-reported speech and hearing disorders.

2.2. Materials

Stimuli were separated into two sections, namely Condition A and Condition B. In Condition A, nineteen pairs of context-based conversations were presented without the presence of final *a*. Take Function A19 as an example. The Mandarin sentence *dui*^{4} __ *bu*^{4} *xiao*^{3} *de*^{2} 'Right. I have no idea.' was showed with a underlined space instead of final *a*. Punctuation marks were not used in the target sentences that subjects were asked to answer because they would give any possible hints for subjects. In Condition B, new nineteen pairs of context-based conversation were re-designed. Note that, the designed conversation corresponded with the pragmatic functions respectively shown in Condition A above. Moreover, nineteen designed conversations were tightly connected under a certain framework of story.

Moreover, Qs uttered from imaginary figures in the designed contexts, while A (R) stood for the answers replied by the author and (R) referred to the repetition of subjects. In between Q and A (R), the subjects were encouraged to respond to Qs by their own self, so the spontaneous data were labeled as A (S).

2.3. Equipment

Recordings were conducted using a Roland Edirol R-09HR digital audio recorder and an ECM-MS907 dynamic stereo microphone.

2.4. Procedure

Subjects were seated in a sound-treated room. They were presented with PowerPoint slides on which one sentence corresponding to each pragmatic function was written in Mandarin Chinese characters. In Condition A, subjects were asked to speak the sentence with any one of Mandarin final particles that they thought fit. The author did not provide any hints but explanations about the original sentences if subjects had trouble understanding them. In Condition B, two practices were conducted to familiarize participants, but the results were not included into analysis. Then, they were encouraged to give a related response (B(S)) to the preceding Q, and they were asked to read the following answers (B(R)) naturally. The procedure is illustrated in Table 1. Each answer was repeated four times to avoid external interference.

Table 1: The provided contexts for elicitation.

Stage	Provided context
Practice /test	Try to imagine that your friend asks you whether it is your graduation ceremony held tomorrow. Your friend says: (Q): *Ming*^{2} *tian*^{1} *shi*^{4} *ni*^{3} *de*^{0} *bi*^{4} *ye*^{4} *dian*^{3} *li*^{3} *ma*^{1} 'Is your graduation ceremony held tomorrow?' If your answer is positive, then you would say: ____ (B(S)) Then try to say the following sentence in a natural way: *dui*^{4} *a jiu*^{4} *shi*^{4} *ming*^{2} *tian*^{1} 'Yes (PARTICLE_ *a*), it is.' (B(R))

2.5. Labeling and pitch extraction criteria

Only were sentences B(R) adopted and final *a* was extracted from it because every subject was asked to read sentence B(R) spontaneously but they would use diverse final particles in previous sentences. Pitch extraction and measurement were done by Praat (Boersma and Weenink [1]).

A total of 912 occurrences (19 pragmatic functions × 3 repetitions × 16 subjects) of final *a* was extracted. In fact, we found that some final *a* syllables were accidentally produced in creaky voice quality, particularly found in the tokens of native speakers. Therefore, these tokens had been temporarily excluded here preventing from disturbing pitch contour and making the extraction invalid.

After the extraction, the Matlab program computed measurements, including the F_0 values of ten percentages from minimum to maximum and duration. For visual inspection and graphic analysis, the Matlab program also demonstrated time-normalized F_0 contours.

3. RESULTS

3.1. Examining classifications of final *a* under statistical analysis in condition B

Independent variables were nineteenth pragmatic functions and language groups, divided into L1 speakers and L2 learners. Dependent variables were five kinds of values adopted based on different perspectives. The first one for overall statistics is that extracted values of ten percentages in L1 or L2 group were averaged to mean values. The second one was to pick out two points from ten percentages, that is the beginning point (BP) and the ending point (EP), measured to indicate Tone 1 (Fon [3]). And the duration of the target syllable *a* (measured in ms) was measured since many scholars (Chao [2], Howie [4], Ho 1976 & 1977, Shih 1988, Tseng 1990) have mentioned that duration is moderately well correlated with tone category; that is to say, Tone 1 and 4 are generally shorter than Tone 2, and Tone 3 is usually the longest. Other two variables, slope (SLP) and pitch range.

3.1.1. The intrinsic value of final a

Naturally, Final *a* is a level tone, with its beginning pitch at about 161.0483 to 246. 261 Hz and ending at about 170.7211 to 218.3216 Hz for L1 group, and it began at about 217.2155 to 262.2155 and ended at about 224.4181 to 258.0458 for L2 group. Apparently, BP and EP of group L2 are higher than that of group L1. The correlation between the two is highly positive (r =.885, p < .001). Moreover, the correlation between duration and pitch is also positive (r =.345, p < .001). That is to say, the higher the pitch, the longer the duration. This point also showed the discrepancy between difference language groups. A 19 (pragmatic functions) × 2 (language group) two-way ANOVA was performed. Results showed that only Language factor had main effect [Language: $F(1,236) = 248.965$, $p < .001$], but Function main effect did not perform very significantly and no any interaction effect.

The measurement of slope was adopted. Its calculating formula is shown in (1).

$$\text{Slope} = \frac{EP - BP}{DU} \quad (1)$$

It was used to determine the tonal shape, which a positive value would indicate a rising contour whereas a negative would refer to a falling one (Fon [3]). Interestingly, the number of negative and positive value shows different trend; that is, L1 group contained more positive values, while L2 group had more negative ones.

3.1.2. L1 group

A two-way mixed ANOVA, with pragmatic functions as a factor and with duration, slope and pitch range as dependent variables, were conducted. There were significant differences for the three variables all showing Function main effect [Duration: $F(18, 104) = 2.782$, $p < .05$; Pitch range: $F(18, 104) = 4.999$, $p < .001$; Slope: $F(18, 104) = 4.344$, $p < .001$]. Function 11 had the highest mean score in parameter of duration (236.794), Function 10 was the highest in pitch range (58.868), and Function 14 at the most positive value (.264) as well as Function 10 at the most negative value (-.221) in slope. However, the three parameters provided different results, which refers that Function 1 was the most distinguishable in duration dimension, and Function 10 in pitch range or slope. Above all, a consistent pattern was found between pitch range and slope; it meant that Function 10 and 14 played roles in differentiating from other functions.

3.1.3. L2 group

A one-way ANOVA, with pragmatic functions as a factor and with duration, slope and pitch range as

dependent variables, were conducted. There were significant differences in the relation between pitch range and functions [$F(18, 130) = 1.998$, $p < .05$]; however, no significance was found in other parameters. Among the results, Function 13 had the highest mean score (43.3771), followed by Function 10 (37.45). Post-hoc LSD-test showed twenty-eight pairs of pragmatic functions having significant differences, as Table 4 illustrated. Post-hoc/Duncan Homogeneous Subsets also determined the performances presented by three subsets. The first contrast was found in between Function 10, 13 and other functions, the second one in between Function 1, 4, 13, 17, 19 and others, and the last one in between Function 1, 3, 4, 6, 7, 8, 9, 11, 15, 17, 18, 19 and others.

3.2. Two types of final *a* in Wu (2004) and corresponding statistical analysis

Wu's classification was expected to minimize the number of pragmatic functions and to bring some more conspicuous patterns. Six pragmatic functions were picked out: (1) Grammatically-constructed question corresponded to question: Asking for confirmation (A14) and question: Challenge (A11); (2) Repeat-setting question corresponded to echo question (A16); (3) Non-interrogative corresponded to question-answer (A1), accusation-defence (A3), and request-compliance (A6).

A 6 (pragmatic functions) × 2 (language group) two-way mixed ANOVA was performed. Results showed that three parameters confirmed Function main effect [Duration: $F(5, 78) = 3.323$, $p < .05$; Pitch range: $F(5, 78) = 5.014$, $p < .05$; Slope: $F(5, 78) = 2.942$, $p < .05$], and Language main effect as well [Duration: $F(1, 78) = 4.469$, $p < .05$; Slope: $F(1, 78) = 4.651$, $p < .05$; F_0: $F(1, 78) = 69.91$, $p < .001$], but interaction effect was insignificant. As for Function effect, post-hoc LSD test showed some contrastive pragmatic functions [Duration: 1 vs. 11/16, 6 vs. 11/16; Pitch range: 1 vs. 11/14/16, 3 vs. 14, 6 vs. 14/16, 11 vs. 14; Slope: 1 vs. 3/14, 3 vs. 1, 6 vs. 14, 11 vs. 14, 14 vs. 16].

4. DISCUSSION

It is not surprising that there was no absolute one-to-one mapping between sound and meaning or function, especially under Shie's and Liu's framework. However, there three points are worth mentioning:

1. Duration was a significant indicator for native speakers not for foreign learners. That the higher the pitch, the longer the duration explains Language effect, indicating most of foreign learners who had higher pitch tending to elongate the length of duration. In contrast, most of native speakers produced lower pitch final *a* remaining a shore time.
2. L1 adopted the characteristic of duration, pitch range and slope to mark the differences among functions, while L2 merely used pitch range.
3. The results supported Wu's classification because it showed a contrastive relationship found in 1 vs. 11/16, 6 vs. 11/16, with Duration as a dependent variable.

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