



## Teaching and Learning Mandarin Tones in an English Secondary School

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*Robert J. Neal<sup>1</sup>*

*University of Cambridge*

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**Abstract:** This study investigates the tonal production of five Anglophone young beginner learners of Mandarin Chinese and their ability to notice and self-correct their tonal errors during and after speech production. Set within the context of learning Chinese at a comprehensive secondary school in the north of England and adopting a case study research design, the aim of the study was to identify major barriers impeding successful tonal acquisition and to propose appropriate pedagogical interventions. The largest obstacle hindering tonal acquisition appeared to be due to participants' inherent unfamiliarity with tones, as evidenced by their general inability to notice or correct their tonal errors during a stimulated recall interview. A combination of more explicit instruction which focussed on providing learners with a deeper understanding of the formal tonal system, with the more implicit teaching methods currently employed, was proposed as a suitable pedagogical strategy.

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**Keywords:** Mandarin Chinese, tones, procedural knowledge, declarative knowledge

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### Introduction

As a teacher of Mandarin Chinese at a comprehensive secondary school in the North of England, it has been worrying to observe the relative stagnation in the numbers of British schools teaching Mandarin in the last few years. In a recent YouGov poll of UK teachers commissioned by the British Council and HSBC, only three per cent of primary and nine per cent of secondary teachers said their schools offer Mandarin lessons. Two per cent said their schools no longer teach Mandarin, with only one per cent planning to start (British Council, 2013). A sobering warning comes from Australia where despite twenty years' experience of the provision of the teaching of Mandarin at school level there is still a 94% attrition rate among classroom learners before they reach the final year of secondary school (Orton, 2008: 5). One of Orton's key recommendations for remedying this problem is for 'concerted, sound and innovative development in pedagogy for Chinese and in education of teachers of Chinese' (ibid. 6). Fired up by Orton's 'call to arms', the main aim of this research project is to help make a contribution, albeit a modest one, towards creating a specific 'Chinese pedagogy'. The perspective that underlies my study is that before we can make authoritative pedagogical recommendations about how to teach Mandarin to Anglophone teenagers, far more understanding is needed of how such students learn Mandarin. Although Mandarin has a number of intrinsic linguistic challenges for Anglophone students in particular, including reading and writing characters and the complex system of particles (Orton, 2008: 30-2), the focus here is exclusively on the teaching and learning of Mandarin tones.

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<sup>1</sup> You may contact the author by email: [rjn41@cam.ac.uk](mailto:rjn41@cam.ac.uk)

## The Tonal System of Mandarin Chinese

It is widely accepted that (at syllable level) there are four basic tones in Mandarin (as well as a short and weak neutral tone which will not be discussed in this study). The most commonly used system for describing Mandarin tones is in terms of the five pitch levels. Chao (1968) proposes dividing the range of a speaker's voice into four equal levels, marked by five points, 1 low, 2 half-low, 3 middle, 4 half-high, and 5 high [so that] practically any tone occurring in any of the Chinese dialects can be represented unambiguously by noting the beginning and ending points, and in the case of a circumflex tone, also the turning point (ibid. 25).

Table 1: The four basic tones in Mandarin Chinese (Adapted from Chao, 1968: 25)

Tone	Description	Pitch
1 <sup>st</sup>	High-level	55
2 <sup>nd</sup>	High-rising	35
3 <sup>rd</sup>	Low-dipping	214
4 <sup>th</sup>	High-falling	51

Like other pieces of research mentioned in this article, my study also leans heavily on Chao's conceptualisation of Mandarin tones. Indeed, an adapted form of Chao's framework is set out in the textbook my students have been following (Zhu & Bin, 2010: 5). Nevertheless, I agree with Duanmu (2007) that Chao's system is 'intrinsically vague' (ibid: 226) and while relatively user-friendly it does not always 'translate readily into phonological features of the present day' (ibid. 228).

## Why are Mandarin tones difficult for Anglophone learners?

Although there is agreement in the literature that Anglophone learners experience difficulty acquiring Mandarin tones (e.g. White, 1981; Shen, 1989; Chen, 1997; Winke, 2007; Zhang, 2010), there is a lack of consensus on the origins of these problems. White (1981) claimed that tonal errors could be 'partially traced to speaker transfer of English intonation patterns onto Mandarin sentences' (ibid: 27) whereas Shen (1989) highlighted negative interference from L1 English speakers' lower pitch range compared to L1 Mandarin speakers. More recently, it has been suggested that a major source of difficulty stems from English speakers' lack of familiarity with tones *per se* (Winke, 2007). Zhang (2010), conversely, argued that the tonal productions made by English speakers are constrained by at least two universal phonological phenomena, referred to as the Tonal Markedness Scale (TMS) and the Obligatory Contour Principle (OCP).<sup>2</sup>

TMS 'can be read as rising tones are more difficult to produce than falling tones, which are more difficult than level tones' (Zhang, 2010: 43). In the context of Mandarin Chinese this translates as 'level' Tone 1 being the easiest to acquire, followed by 'falling' Tone 4. 'Rising' Tone 2 and 'dipping' Tone 3 are the most problematic tones. According to OCP 'adjacent

<sup>2</sup> See also: [http://en.wikipedia.org/wiki/Obligatory\\_Contour\\_Principle](http://en.wikipedia.org/wiki/Obligatory_Contour_Principle)

identical elements are prohibited' (ibid: 43). While this principle is observed for Tone 3 in the Mandarin Chinese tonal sound system (i.e. if there are two consecutive Tone 3 syllables, the first one changes to Tone 2), there are also a number of other identical tonal combinations which Zhang found were particularly problematic for English-speaking undergraduate students in her examination of their disyllabic tonal combinations (ibid: 53).

## Presentation of the Research Questions

In my study, I aimed to answer the following research questions in relation to five students from my own Year 10 class<sup>3</sup> who began learning Mandarin *ab initio* in September 2012 at a suburban comprehensive school in the north of England:

1. Which tones, if any, are the most problematic for beginning Year 10 British school learners of Mandarin to produce?
2. Can learners' tonal errors be attributed to two universal phonological principles, the Tonal Markedness Scale and the Obligatory Contour Principle?
3. To what extent are learners able to notice and correct their tonal errors both during speech production and after the event?

The common theme linking these questions is an attempt to better understand some of the major factors affecting the production of Mandarin tones by Anglophone learners and in particular young beginner learners in a secondary school with the aim of drawing up some recommendations for the teaching of Mandarin tones to Anglophone beginner learners.

## Procedure

Five learners were invited to participate in two oral proficiency tasks at the end of February 2013 (after participants had been studying Mandarin for six months). The first oral proficiency task took the form of a role play in which I played the part of a Chinese person meeting the participant for the first time, similar to one developed by Winke (2007: 30). The role play covered areas of language already learnt in class (e.g. hobbies, food and drink) and participants were expected to respond spontaneously to questions without any recourse to notes. The role play lasted around 90 seconds. The second task was a pre-prepared speech in which the learner spoke for up to one and a half minutes on a topic of his/her choice (e.g. family members), also without notes. By collecting performance data from these two different tasks, I was able to acknowledge the inherent variability of learner language and look for 'points of convergence' as evidence of what learners knew (Ellis & Barkhuizen, 2005: 7), as well as consider whether learners' tonal performance was affected by the nature of the task. Participants had been informed before the tasks that their pronunciation, but not specifically their tonal performance, was being investigated (Zhang, 2010: 47).

Stimulated recall interviews were also carried out in order to investigate the extent to which learners were able to notice and correct their tonal errors. Each participant was presented

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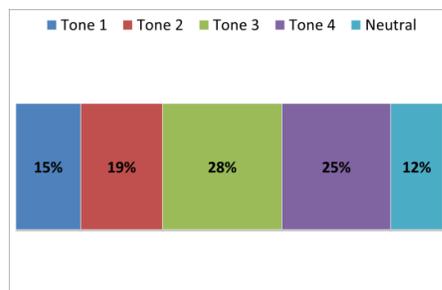
<sup>3</sup> Equivalent to S3 in Scotland (ages 14-15 at end of school year)

with ten audio extracts from their oral proficiency tasks. Each extract contained a meaningful Chinese utterance between two and six syllables long. The fact that the audio extracts were of different lengths was regrettable but this was in order to present participants with meaningful utterances rather than shorter extracts taken completely out of context. Five of the extracts were independently judged by at least two L1 Chinese raters to contain at least one major tonal error while the other five extracts were judged by at least two L1 Chinese raters to be acceptable and containing no significant tonal error. Participants were also presented with a written transcript of each extract in Chinese characters to increase the strength of the stimulus (Gass & Mackey, 2000: 54) and after listening to the audio extract were asked to judge the acceptability of their utterances in terms of tonal production. They were told before the interview that five of the extracts had been judged as correct and five contained at least one tonal error. At the end of the interview, in order to make the stimulated recall experience as useful as possible for the learners, I went through each audio extract with each participant and pointed out any discrepancies between their perceptions and their actual tonal performance.

## Analyses and Results

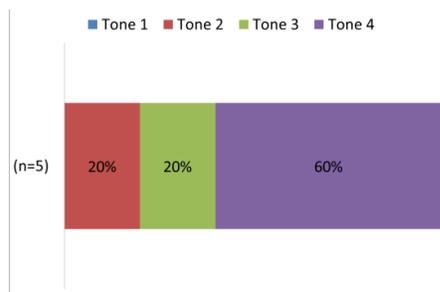
The corpus of speech produced by the five participants totalled 855 characters with a range of tones as set out in Figure 1.

Figure 1: Distribution of tones in corpus of speech (855 characters)



Each character was coded independently by the three L1 Chinese raters as acceptable or unacceptable. Following Chao's (1968) system of tone values, the two main parameters of judgement used were tonal register denoting pitch height and tonal contour denoting pitch movement (Zhang, 2010: 47). Raters were informed not to be overly strict and only highlight tonal errors which led to 'a breakdown of intelligibility' (Collins & Mees, 2008: 208). Given the subjective nature of the coding, it was essential to examine the levels of agreement between the three raters. In order to increase the reliability of the study, only tones coded as acceptable by all three raters were used in the following analyses to answer the first two research questions. Regrettably, I had to use some audio extracts for the stimulated recall interviews in which only two of the three raters were in agreement. Based solely on the percentage distribution of acceptable tones across both oral proficiency tasks, the five participants provide a range of responses to my first research question, highlighted in Figure 2.

Figure 2: Which tone(s) are the most difficult to produce (n=5)?



Essentially, the answer can be summed up with ‘anything but Tone 1’ although it is noteworthy that three of the five participants found Tone 4 to be the most problematic tone, possibly as a result of the narrower pitch range of L1 English learners (Shen, 1989; Xing, 2006) or as a result of negative transfer of English prosodic features (stress and intonation patterns, Chen, 1997). Also, three of the participants actually produced more accurate tones in the role play rather than the pre-prepared speech. These results may suggest that ‘distance to a native speaker’s model’ (or at least to a competent L2 speaker) affects tone accuracy (Nguyen & Macken, 2008: 56) more than the nature of the task. However, it is important to remember that the role play may not have been truly spontaneous as it contained many pre-fabricated chunks and some overlapping of content with the speech. Moreover, I also have my doubts about the extent to which all the participants had prepared their speech in advance. Perhaps the most important finding is simply the low overall accuracy rates of participants’ tonal productions with only one participant scoring over 50 per cent, suggesting that at the early stages of learning ‘it is the whole skill of using tones in general that causes problems’ (Tsai, 2012: 48), rather than one or two specific tones.

In the second research question, I considered whether TMS and OCP could help explain participants’ tonal errors with the results somewhat inconclusive. Certainly, for four of the five participants, ‘flat’ Tone 1 is by far the easiest and requires the least effort to produce, as predicted by TMS. Yet surprisingly, only two participants experienced the most problems with ‘rising’ Tone 2 and ‘dipping’ Tone 3. However, the error rates of Tones 2, 3 and 4 are generally fairly similar. In other words, some participants may simply be further along the development sequence for ‘downward’ Tone 4 and consequently making more errors. While such an argument may seem somewhat tenuous and counter-intuitive, it cannot be dismissed until substantial longitudinal data is collected, tracking the same group of participants over a longer period of time. With regard to OCP, it appears that all participants tended to struggle with identical Tone 2 and Tone 4 combinations, although much less so, if at all, with identical Tone 1 tonal combinations. The evidence from the participants’ productions of Tone 2 Tone 3 combinations is more convincing with all participants appearing to have difficulties. Whether this is a definite consequence of the combined effects of TMS and OCP is less certain although it certainly seems a plausible explanation.

Arguably the most conclusive data came in response to the third research question, which focusses on participants’ ability to notice and correct their tonal errors.

Remarkably, none of the participants provided any examples of successful tonal repair during the oral proficiency tasks and only one participant attempted a tonal repair. This is contrary to Winke (2007:38) who found that the majority of the participants in her study (N=32, 62%) 'repaired or attempted to repair at least one of their tonal errors.' The results of the stimulated recall interviews, with scores between 20 and 40 per cent, also suggest that all participants in my study have problems processing their own tonal productions. However, I should add that some of the audio extracts were less than clear-cut in terms of the acceptability of participants' tonal productions.

## **Pedagogical Implications**

I would like to start this section, in which I endeavour to draw some pedagogical implications from my research findings, with some important caveats. As Ellis (2012) notes of language teaching research in general, its value 'lies in its ability to identify problems that otherwise might go unnoticed and, sometimes, to provide evidence as to how these problems might be solved in specific teaching contexts' (ibid: 4). The 'problem' that I have been trying to address is the difficulty my students have in producing Mandarin tones. I have gone about tackling this issue by focussing on participants' tonal production and by examining their ability to notice and self-correct their own tonal errors. Unsurprisingly, there appear to be wide levels of diversity between all five learners, which highlight the need for not only more data from more participants, but also more data from each participant, including longitudinal data, so that the trends discussed in the previous section can be confirmed or modified (Nguyen and Macken, 2008: 74). Moreover, I appreciate that I have not considered a number of potentially very important factors affecting participants' tonal production, including the position of a tone in a clause, and the possible effects of syllable structure and voice (ibid: 56). It has also been beyond the scope of this research project to investigate the complicated relationship between tonal perception and production (Ke, 2012: 79). Nevertheless, my aim has not been to be comprehensive, but to 'point out possibilities it might be profitable to explore' (Widdowson, 2003: 15, as cited in Ellis, 2012: 4). What follows, therefore, is an attempt at interpreting the findings of the data and thereby providing a plausible and convincing response to the challenge of teaching Mandarin tones to a group of Year 10 beginners in an English secondary school. While the pedagogical suggestions I make are framed with reference to my own students, in line with the action research context of this study, my aim is that they will also be useful for wider application within the context of the teaching of Mandarin as a foreign language to young beginners. It is my hope that this discussion, which is primarily linked to increasing participants' declarative knowledge (Johnson 1996), will resonate with other Mandarin teachers in Anglophone settings or at least lead to fruitful dialogue.

## **DECPRO and PRODEC**

Johnson (1996) argues that there are two equally valid routes towards language mastery, or in this case, successful tonal acquisition, which he terms as 'DECPRO' and 'PRODEC' (Johnson, 1996: 100-1). DECPRO involves moving from initial declarative

knowledge towards more procedurally oriented knowledge and is described by Johnson as ‘a learning strategy’ (ibid. 100). PRODEC, which relies more on ‘acquisition-based approaches to teaching’ (ibid. 100), accounts for ‘a means of processing whereby procedural precedes declarative [knowledge]’ (ibid. 100). Johnson readily admits that in reality, ‘the language learner does not exclusively follow either one or the other of these sequences, but mixes the two’ (ibid. 101). Nevertheless, he argues that:

*The main value of conceptualizing language learning and teaching in terms of DEC and PRO is that it identifies declarativization and proceduralization as central to both processes, and hence provides a framework within which to locate the various tasks and problems a learner is likely to meet (ibid. 101).*

In the figures below, which are adapted from Johnson (ibid. 102-3), I reflect on the implications of the ‘DECPRO’ and ‘PRODEC’ models for the teaching of Mandarin tone to L1 Anglophone learners.

Figure 3: DECPRO model (adapted from Johnson 1996: 102)



Figure 4: PRODEC model (adapted from Johnson 1996: 103)



All the participants in this study have arguably followed a far more ‘procedural’ route towards tonal acquisition thus far with the emphasis in the classroom, in line with mainstream communicative language teaching approaches, on providing ‘activities and language samples to help stimulate the acquisition processes’ (Klapper, 2003: 33). In many ways, this approach has been broadly successful. Levels of motivation amongst this group of learners are generally very high, possibly as a result of frequent ‘learner-centred’ activities, and the fact that all five participants, after only six months’ Mandarin learning, easily coped with the demands of the oral proficiency tasks by being able to respond to the questions in the role play and give a 90 second speech is testament to the progress they have made. Nevertheless, a close analysis of their tonal performance revealed high levels of a kind of default ‘flat’ Tone 1 setting. Moreover, when participants’ tonal productions were judged to be acceptable, this was often due to a

total reliance on unanalysed pre-fabricated chunks with little or no understanding of how the tonal system works. What follows, therefore, are a few practical teaching suggestions aimed at redressing the balance. This certainly does not mean that the more learner-centred activities should be dropped as it is crucial that participants' procedural knowledge of tone is maintained and encouraged. Indeed, Myles *et al* (1998) demonstrate convincingly that L2 French beginners use pre-fabricated chunks extensively as a normal and essential part of the process of language acquisition. However, in view of participants' difficulties in self-correcting their tonal errors, coupled with the risk of faulty proceduralised forms becoming 'highly automatised and impermeable to change' (Johnson, 1996: 99), I think that it is also time to add some more declarative tonal knowledge to the learning mix.

### Promoting declarative knowledge of tone

One practical way of highlighting tone is the use of gestures and other body movements (Tsai, 2012) as set out in Table 3 below. Tsai points out that hand signals mean that students can be corrected without interruption although she acknowledges that older students may feel self-conscious making some of the actions (Tsai, 2012: 46). Moreover, the gestures may even become fully proceduralised and difficult to eradicate in the future (*ibid.* 46).

Table 2: The use of gestures and body movements to promote awareness of tone (Adapted from Tsai, 2012: 46)

<b>Tone 1</b>	Flat hand moved across body
<b>Tone 2</b>	Raise eyebrow
<b>Tone 3</b>	Drop and raise chin
<b>Tone 4</b>	Stamp your feet

Tsai also advises using different colours to highlight tones which can then be 'extended to flashcards with characters at later stages of learning' (*ibid.* 46). In light of participants' uncertainty remembering which tone a character should carry, this seems to be a useful suggestion. I will also endeavour to insist that students mark the tone of the character when carrying out weekly vocabulary tests, similar to some French and German teachers insisting on the correct gender of the noun (M. James, personal communication, June 6, 2013). As Orton (2008:31) notes, it is crucial to encourage learners to accept 'the need to attend to tone' as well as to help them realise 'what tone means for communication'. Rather than using numbers to describe the tones, I will invite students to come up with their own descriptions such as 'flat', 'up', 'bouncy' and 'down' which may be more meaningful and memorable. Ultimately, however, learners need to move away from separating tone from phonemes, i.e. they would ask 'is this *má* or *mà*' rather than 'what tone is ma?' (*ibid.* 31).

Xing (2006) raises the difficult issue about what to do when faced with students' pronunciation errors in the classroom. An overly zealous approach, while raising learners' awareness of tones, may unwittingly destroy their confidence. However, by

not correcting learners' tonal errors, there is a very real risk that they will become fossilized in the learners' interlanguage grammars. Ultimately, each teacher needs to know the personality traits of their own students. Perhaps a more productive approach is to generally ignore tonal errors in the classroom, unobtrusive gestures notwithstanding, and to carry out frequent 'tonal awareness tasks' similar to the activity used in the stimulated recall interview. Participants certainly seemed to find this task beneficial for their learning although it does require a lot of time to prepare on the part of the teacher. I am also keen to involve learners in peer assessment activities in which they carry out their own tonal noticing/correction exercises in small groups. This could easily be done in a computer suite using USB microphones or in more traditional classroom settings with digital voice recorders, although such activities will obviously need to be monitored carefully, possibly utilizing L1 Chinese assistants. Following Zhang (2010), identical tonal combinations and Tone 2 Tone 3 combinations could also be emphasised and subsequently practiced for a couple of minutes at the start of lessons. While such controlled teacher-led practice could be seen as promoting more procedural knowledge (Johnson, 1996: 101), I intend using this activity primarily to raise metalinguistic awareness of both tone and also more universal phonological principles by explicitly warning my students of the possibility of OCP and TMS affecting our tonal production.

### **Towards the creation of a Chinese as a foreign language pedagogy**

Giving learners an understanding of how the Chinese tonal system works is arguably at the heart of creating a methodology for teaching Chinese as a foreign language. The teacher's role is crucial. Over-emphasizing tones for Anglophone beginners, or in Johnson's terms, 'providing too much DEC and not enough PRO', could easily backfire and be extremely demotivating for learners, playing into the 'Chinese is impossible' discourse, frequently observed in the mainstream Western media (Duff et. al., 2013: 3). Yet the dangers of the alternative approach of 'too much PRO and not enough DEC' are arguably evidenced by the interlanguage systems of the five participants in this study and run the risk that learners will either ignore tones altogether, or have no real understanding of how the tonal system works, or even find their faulty tones fossilizing into a kind of pidgin language (Johnson, 1996: 99). In this study, I have argued that Johnson's (1996) conceptualization of language learning and teaching in terms of PRODEC and DECPRO can help negotiate the tightrope of Mandarin tonal acquisition. Importantly, it also appeals to my sense of 'plausibility' as a teacher (Prabhu, 1987 as cited in Johnson, 2008: 212). Yet as Mitchell and Myles (2004: 261) point out, 'there can be no 'one best method', however much research evidence supports it, which applies at all times and in all situations, with every type of learner'. My aim here is consequently more to start a conversation with other Mandarin teachers in Anglophone secondary school settings on our journey towards the creation of a Chinese as a foreign language pedagogy.

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