

On the Effect of Modality and Speaking Style for Mandarin Tones Classification by L2 Learners

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The broader goal of my research project is to examine how second language (L2) learners who do not have a tonal system in their first language (L1) perceive and produce Mandarin tones. Given this, the current study, more specifically, explores to what extent L2 learners can benefit from (1) communication modality (i.e., whether or not a learner can see a speaker who is producing the tones) and (2) the speaking style (i.e., whether the language input is transmitted in a normal or teaching style) for their Mandarin tone perception.

Previous studies have shown that speech perception is affected by visual information coming from the speaker, such as his/her facial expressions (e.g., Sumbly & Pollack, 1954; Campbell, Dodd, & Burnham, 1998; Bailly, Perrier, & Vatikiotis-Bateson, 2012). The McGurk effect (1976) provides evidence that the perception of sounds does not only rely on auditory information, but also visual inputs. Could tone perception also benefit from facial expressions? Previous studies already suggested that head and eyebrow movements are most useful for the discrimination of tones (Burnham et al., 2006; Chen and Massaro, 2008), though it remains unclear how exactly those cues are used (Raid, Burnham et al., 2014).

Does the speaking style play a role in language learning? A considerable literature has argued that motherese or Infant-Directed Speech plays a crucial role in infants' early language development (Kuhl et al., 1997). Burnham et al. (2002) proposed that (adult) "speakers are sensitive to their audience", they have the ability of intuitively and automatically adjust their speaking style accordingly. We can logically predict that foreigner-directed teaching style as a didactic device would have higher hyperarticulated features (either auditory or visual ones) than a natural speaking style. It is not clear, though, how hyperarticulated speech manifests itself regarding the realization of tones, and how this in turn may affect tone learning.

90 participants were randomly exposed to stimuli created following a 2-by-2 design with the factors modality (auditory and audiovisual) and style (teaching and natural). Participants would see and/or hear speakers producing words with one of the four tones of Mandarin Chinese, and were instructed to respond quickly and accurately which tone they had heard by pressing designated keys. Their responses and reaction time were recorded. Results show that the audio+visual condition led to more accurate and rapid responses for tone distinction than the audio-only modality (see figure 1, 2). While this modality effect was very small in the natural style condition, the effect turned out to be stronger in the teaching mode (see figure 1, 2). Interestingly, the effects also varied as a function of the speaker who had produced the tones. Additionally, some tones were recognized more quickly and accurately than others, and the listeners' musical experience positively affected their classification of tones.

Figure 1: Results: accuracy (% correct)

- Accuracy: tone*AudVid* TeachNatu blue---video (audio+visual) green---audio (audio-only)

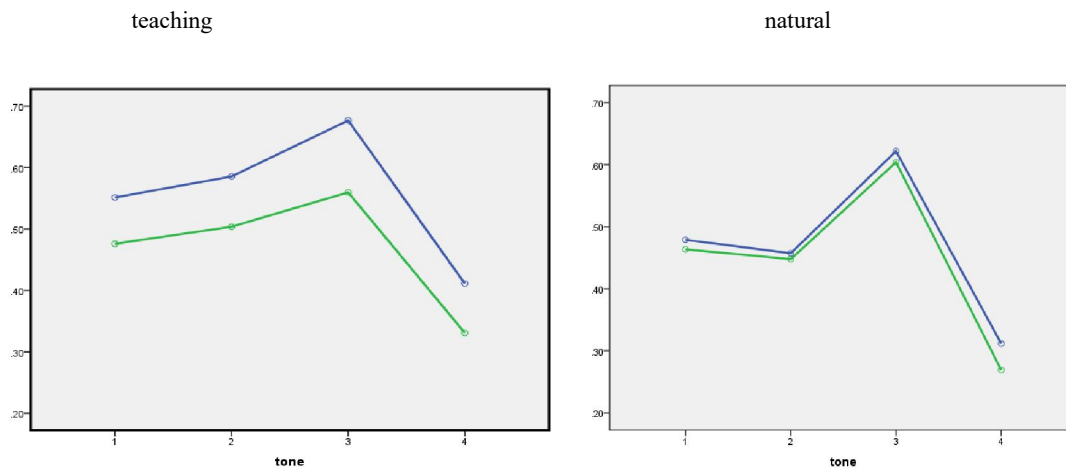
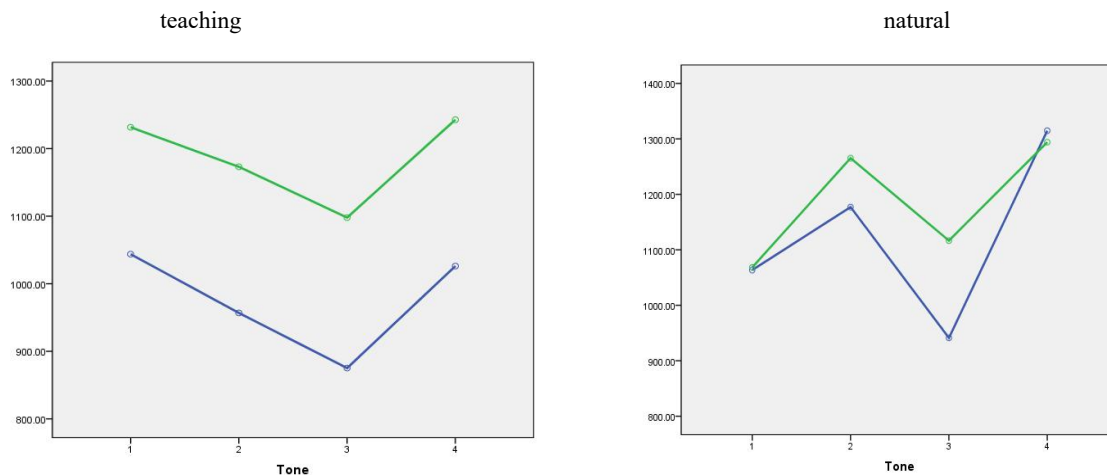


Figure 2: Results: reaction time (ms)

- RT: tone*AudVid* TeachNatu blue---video green---audio



References (partial)

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