Visual Symbols Can Facilitate Tone Identification by Non-tonal Speakers

McGurk effect has implied an interaction between hearing and vision in speech perception, and suggests that visual information (such as face movements) can be helpful for tone identification. Unlike many published case studies that aimed to address tone identification with a focus on face movements, the present study chose visual symbols (―, /, ∨, \), which can correspond well to categories of lexical tones, as its main research focus. Visual symbols were chosen also because its influence on tone contours has been barely investigated compared to the long tradition of paying close attention to the letter-sound association. Speech variability, dual modes, interference, and language learning experience were introduced to demonstrate how and to what extent visual symbols’ influence on tone identification would be mediated by those above.

The present study aims to investigate to what extent visual symbols can make contribution to Chinese lexical tone identification and the corresponding pedagogical implications on lexical tone instruction. Three groups of participants, all being non-tonal speakers, participated our experiments, and they were considered as non-experienced, low-level experienced, or high-level experienced in Chinese language learning. A judgment task was administered in four priming conditions: auditory only, visual only, auditory plus visual, and no auditory plus no visual. Participants were instructed to identify whether the auditory tone is rising or falling. Block design with Latin Square technique was utilized among the four conditions. Accuracy rate and reaction time were analyzed using repeated measure ANOVA and one-way ANOVA.

The results have suggested that successful tone identification would usually be
achieved if visual symbols were provided, especially if the stimuli were of high variability. Visual symbols have greatly enhanced L2 learners’ perceptual mapping from highly variously acoustic speech signal to a limited number of linguistic representations by weighting the acoustic cues between categories and diminishing differences within categories.

When it comes to dual modes, once sounds were provided, participants would rely less heavily on visual symbols. In fact, it was noticed that participants would make successful tone identification with the least time when both auditory information and visual symbols were provided.

The interference effect made participants less capable in identifying tones because of the conflict between visual symbols and sounds in the mental representation. Participants, as noticed in the experiments, seemingly intended to use auditory cues as “secondary” to vision. Another observation we have made on the experiments’ results is that, the more experienced a learner is, the priming effect of visual symbols would become less and a stronger ability would be developed to resolve the conflict between auditory and visual inputs.

The findings from our experiments have important pedagogical implications for lexical tone instruction, especially for the teaching of Chinese language beginners. Chinese language teachers are suggested to utilize visual gestures as complementary to auditory information as bimodal inputs have demonstrated. Multiple phonetic environments, with speakers of different gender, age, and accents being involved, should be offered to learners.