

Acquisition patterns of two transparent tone sandhi processes in Baotou Jin

Xinyue LIU¹, Peggy MOK¹

¹The Chinese University of Hong Kong

liuxinyueleona@link.cuhk.edu.hk, peggymok@cuhk.edu.hk

This study examines the application of two transparent tone sandhi processes in Baotou Jin Chinese, a dialect very similar to Mandarin Chinese. There are five lexical tones in Baotou Jin: T1[24], T2[44], T3[312], T4[52], and T5[24] (a checked tone) with two tone sandhi processes: 1) T1 sandhi (left-dominant): T1[24] + T1[24] → T1[24] + T2[44] (e.g., /fei²⁴tei²⁴/ → [fei²⁴tei⁴⁴] “plane”); 2) T3 sandhi (right-dominant; similar to Mandarin T3 sandhi): T3[312] + T3[312] → T1[24] + T3[312] (e.g., /ma³¹²ji³¹²/ → [ma²⁴ji³¹²] “ant”) [1, 2]. Previous studies [3, 4, 5] showed that by the age of three to four, Mandarin-speaking children display a notably high application rate of Mandarin T3 sandhi (T3[214] + T3[214] → T2[35] + T3[214]) in real words as well as pseudowords. However, it is unclear whether Baotou Jin-speaking children will have similarly high application to the two tone sandhi processes, and whether the tone sandhi processes will differ. Answers to these questions can shed light on how tone sandhi is represented mentally.

A picture-naming task following the nonce-probe test design [6, 7, 8] was used. The task included four types of disyllabic-word stimuli to test both real and novel materials (see Figure 1): 1) real words with one picture (Rw1P); 2) real words combining two pictures (Rw2P); 3) pseudo words (Pw) combining two pictures resulting in a nonword; 4) AG words (AGw) combining a real monosyllable and an accidental gap (AG) syllable represented by an imaginary picture with an audio. Each condition consisted of 5 disyllabic words, each for T1 sandhi and T3 sandhi. Each disyllabic word was repeated three times non-consecutively. Participants were all native Jin dialect speakers, including 26 children (5-12 yrs; 15M, 11F), and 12 adults (33-60 yrs; 6M, 6F). The accuracy of tone sandhi application was auditorily judged by two Baotou Jin native speakers with phonetic training, and the inter-rater consistency was 91.8%. There were three types of accuracy judgments: the correct sandhi tone, the citation tone, and wrong tone (neither “sandhi” nor “citation”).

The overall judgement by tone sandhi process, age group, and word type is shown in Figure 2. For Baotou T3 sandhi, both children and adults showed near-ceiling accuracy even for AG words, similar to findings on Mandarin T3 sandhi [3, 4, 5]. For T1 sandhi, much lower accuracy was found in AG words consistently for both children and adults. In particular, adults exhibited a preference against keeping the citation forms, which led to the surface forms of two consecutive T3-T3 or T1-T1. This dis-preference revealed a more adept application of phonological knowledge by adults compared to children.

Regularly wrong patterns for both children and adults were observed. The wrong productions in T1 sandhi were mostly T1[24] + T3[312] (i.e., the surface form of Baotou T3 sandhi), and the wrong productions in T3 sandhi were mostly T2[44] + T3[312] (the same tone categories as the surface form of Mandarin T3 sandhi but using the Baotou tone values) which was not found in previous studies on Mandarin T3 sandhi. A detailed analysis (including 14 children and 6 adults so far) showed very consistent patterns across the three repetitions in all word types and sandhi processes for both children and adults (see Figure 3). Furthermore, the repeated trials demonstrated a trend where children exhibited enhanced production stability with age, while adults generally exhibited greater stability than children; besides, both children and adults displayed relatively low stability in AG words with T1 sandhi (data not shown).

Both T1 and T3 sandhi processes involve transparent and simple tone substitution, but they exhibit distinct patterns in AG words. The frequent contact between Baotou Jin and Mandarin Chinese, along with the similarity of T3 sandhi processes in both languages, likely facilitated the application of Baotou T3 sandhi. The poorer application rates for T1 sandhi illustrate that not all transparent phonological processes are equally productive. Further analysis is crucial to delve deeper into the distinctions and enhance our understanding of the mental mechanisms of different tone sandhi processes.

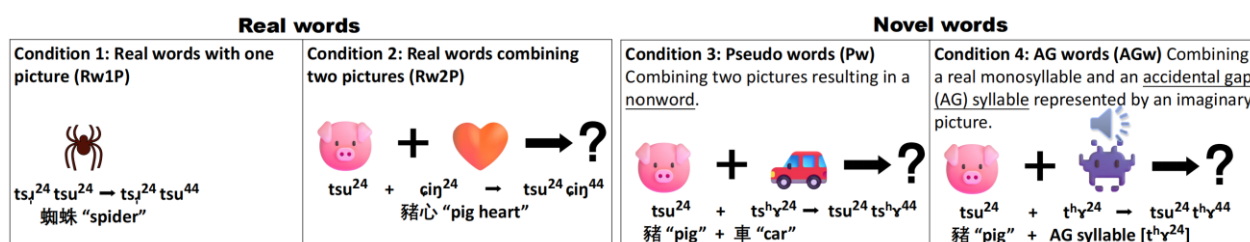


Figure 1. Example of pictures and words with T1 sandhi in the four conditions of the picture-naming task.

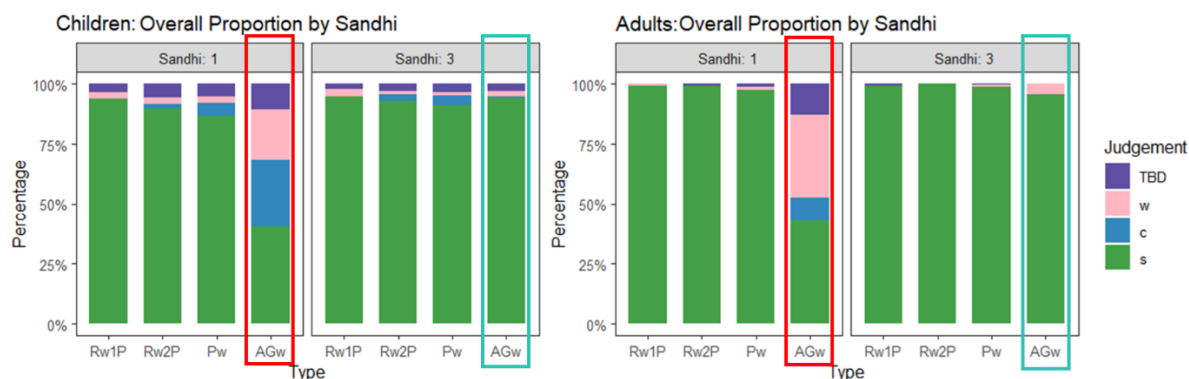


Figure 2. The overall judgement proportion by tone sandhi process, age group, and word type (Notes: “TBD” tokens with inconsistent judgements; “w” wrong; “c” citation; “s” sandhi).

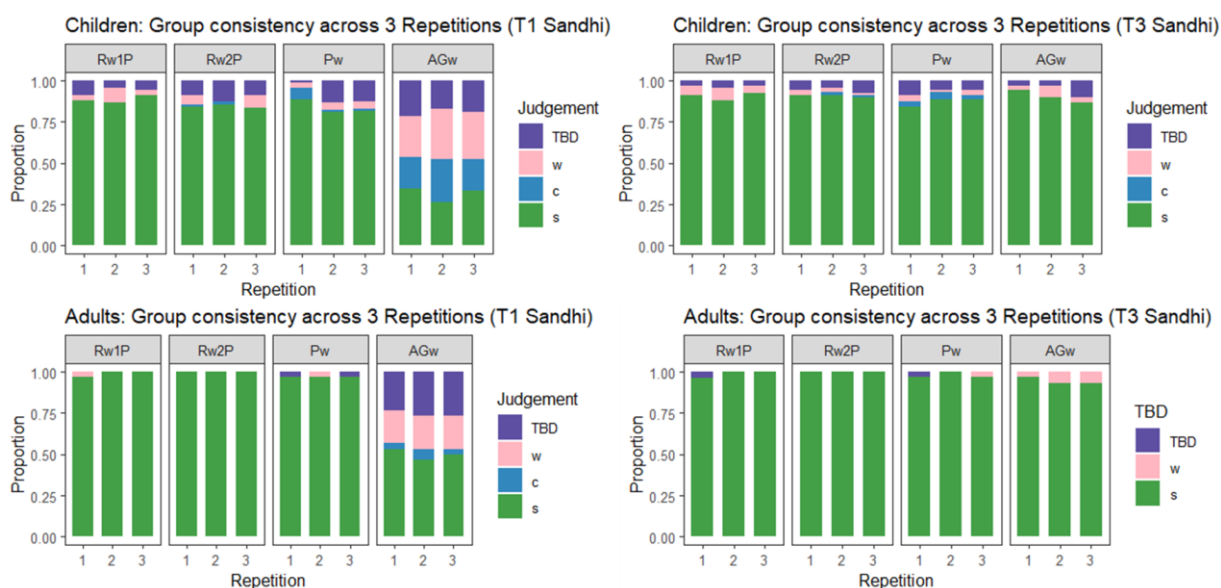


Figure 3. Group consistency across 3 repetitions by tone sandhi process, age group, and word type

Selected references

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