INFERRING THE TEMPORAL AND SPATIAL EVOLUTION OF ACCENT SYSTEMS IN JAPANESE DIALECTS: A PHYLOGEOGRAPHIC APPROACH

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1. Abstract

Accent systems of Japanese dialects over Japan's mainland are characterized by pitch changes, which are further subdivided into two phonological features; pitch accent and word tone (Hayata, 1999; see also Labrune, 2012; Uwano, 2012). As for the former, a majority of the dialects accentually distinguish words, that is, words are distinguished by the mora where the voice-pitch changes (McCawley, 1968; Uwano, 2012). For example, consider three words "hashi" (chopsticks), "hashi" (bridge), and "hashi" (edge) followed by the topic marker "ga." In Tokyo dialect, the phrase "hashiga" (mora structure: ha-shi-ga) is pronounced in a high-low-low manner for "chopsticks," low-high-low for "bridge," and low-high-high for "edge". These words are thus distinguished by the position of pitch accent, where the pitch drops, which is placed on the first and second morae for "chopsticks" and "bridge," respectively, but absent for "edge." On the other hand, "word tone" (Hayata, 1999) or "tonal register" (Uwano, 2012) concerns the change of voice pitch in a whole word, which characterizes the accent system of some regions such as the Kyoto and Kagoshima dialects, but is absent in other dialects. Utsugi (2007) describes that word tone (Hayata, 1999) is an almost equivalent concept to N-pattern accent (Uwano 2012).

Studying these two phonological features potentially gives insight into the ancestry of the Japanese language for the following reasons. First, the word tone has been pointed out to be a continuous feature of the Chinese tones (Hayata, 1999). Second, since pitch accent and word tone affect the whole phonological

system, they change only infrequently, and their low speed of replacement enables the trace of far past lineages and phylogenic reconstruction of regional dialects.

In the current research, we distinguish four accent patterns according to the presence/absence of pitch accent and word tone, aiming at elucidating how this variation was formed after the regional dialects had split from the common ancestor, in which both pitch accent and tone were present. In particular, the purpose of this research is two-fold: (1) inference of transition rate between accent patterns and (2) estimation of phylogenic tree of regional dialects based on their accent systems. To create empirical data, we randomly select 100 locations in Japan and specify the accent pattern at every location. To consider the spatial contact patterns between human groups, we develop a network of populations, which reflects the real geography and population density of Japan's mainland, and simulate the spread of accent patterns on the network (see Takahashi & Ihara, 2020). Simulating the genealogy of accent patterns, and applying a method borrowed from Bayesian phylogenetics (Felsenstein, 1981; Pagel & Meade, 2017), we obtain the posterior distribution of transition rates among accent patterns, the range of spatial interaction between populations, and the phylogenetic topology and divergence time of the present dialects.

Thus far, we have quantified the loss rates of pitch accent and word tone, but are unable to reconstruct a clear phylogenetic tree with a sufficiently high posterior clade probability. Future study needs to include more data.

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