

## THE FUNCTIONAL LOAD OF CHINESE TONES AND THE TONAL EVOLUTION

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### ABSTRACT

This study calculated the functional load of Chinese tones in different contexts by using an extensive corpus and the Markov model-based “Hockett-Wang algorithm”. The results show that, compared to vowels and consonants, tones carry the smallest functional load. In tones that are associated with monosyllabic, bi-syllabic, and multi-syllabic words, the functional load is inversely related to the number of syllables in that word. In other words, the more syllables in a word, the further the functional load of tones tends to decrease. Importantly, this study reveals a close correlation between the functional load of Chinese tones and the evolution of these tones. This is evidenced by the perceived imbalance of the functional load of different tonal contrasts within contemporary Chinese, as well as by the simulation results of the drastically declining functional load of Chinese tones in diachronic. These results may suggest that the declining load of Chinese tones is indeed the underlying driver for the merger and the resulting decline in the number of Chinese tones. The conclusions of the paper may shed new light for future research in the fields of phonology, speech engineering, as well as second language teaching.

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## 汉语声调功能负担与声调演变

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### 摘要

本文运用大规模语料库和基于马尔科夫模型的 Hockett-Wang 算法,对汉语声调音位功能负担计算的结果显示,汉语声调的功能负担在不同层面上存在差异:相较于元音辅音,声调的功能负担是最小的。从单音节词到双音节词、多音节词,声调的功能负担量与词的音节数呈现反比相关性,即随音节数量的增加,声调的功能负担趋于减小。汉语声调的功能负担由古至今呈现下降趋势。而官话方言区不同声调对立功能负担的不平衡则显示与现阶段声调合并的密切相关性,这意味着汉语声调功能负担的式微或许是汉语声调趋于合并减少的底层动因。本文的结论对音系学、言语工程及汉语声调二语教学等领域都具有启发意义。

### 关键词

功能负担 声调 汉语方言 语料库 声调演变