

Processing L1 and L2 Chinese compound words: Evidence from masked priming

Yang Liu¹, Juliet Huynh²

¹Department of Asian Languages and Cultures, University of Wisconsin-Madison

²English Department, University of Wisconsin-Madison

Previous studies have explored whether complex words are accessed as whole words or morphemes during morphological processing [1, 2, 3, 4, 5]. Semantic transparency (e.g., clean-cleaner, corn-corner) and orthography overlap (freeze-free) have been shown to influence morphological processing in Indo-European languages [3, 5] and within mono-linguistic groups [6, 7], comparatively little attention has been paid to Chinese compound words and L2 morphological processing.

This study investigates how L1 and L2 speakers of Mandarin Chinese process semantically transparent (e.g., 书架 "book+shelf"--->"bookshelf") and opaque (e.g., 马上 "horse+on"--->"immediately") bimorphemic compound words during early visual word recognition. While compound words comprise over 70% of the Modern Chinese lexicon [8], it remains unclear how semantic transparency influences morphological decomposition and lexical access in L2 Chinese learners compared to L1 speakers.

A lexical decision task employing the standard masked priming paradigm was conducted with 30 L1 Mandarin speakers and 24 advanced L2 learners of Chinese. Each trial consisted of a forward mask (晶晶晶晶晶) for 500 ms, followed by a prime presented for 50 ms and a target that remained on screen until response. Primes will be categorized under the following conditions: transparent-transparent compounds (e.g. 父母, "父dad + 母mom"--->父母 "parents"), where both constituents are related to the overall meaning of the word, and opaque-opaque compounds (e.g. 花生, "花flower + 生birth"--->花生 "peanut"), where both constituents are not related to the overall meaning, semantic only (e.g., 医院, "hospital"--->护士 "nurse"), and orthographic overlap pseudowords (e.g., 田电--->田音). Table 1 and Table2 demonstrates the design of this study. Participants are categorized under two groups: L1 Mandarin speakers and advanced L2 Chinese learners. Reaction times and error rates will be analyzed.

Reaction time analyses revealed distinct patterns between L1 and L2 speakers. For L1 speakers, transparent compounds produced significant facilitation effects, suggesting early morpho-semantic decomposition. Orthographic-overlap pseudowords also facilitated target recognition, indicating early pre-lexical orthographic activation. In contrast, opaque compounds produced significant inhibitory effects relative to unrelated controls, suggesting that constituent activation without semantic transparency interferes with lexical access during early word recognition. Semantic-only related primes showed a weak facilitation trend, although the effect did not reach significance within the 50 ms exposure window.

L2 learners, however, showed no reliable facilitation effects across any condition. The absence of significant priming effects suggests that 50 ms exposure may be insufficient for robust morphological or semantic activation in L2 Chinese processing. These findings support the view that early Chinese compound word recognition in L1 speakers involves rapid morpho-orthographic decomposition followed by semantic verification, while L2 learners may require longer processing time for constituent activation to emerge.

The findings contribute to broader debates on morphological decomposition, semantic transparency, and bilingual lexical processing, while providing new evidence from Chinese compound word recognition under masked priming conditions.

Tables

Table 1. *Design and Example Stimuli*

Prime Type	Constituent1		
	Related Prime	Unrelated Prime	Target
TT (+M+S+O)	父母	左手	父亲
	dad+mom-->parents	left hand	dad+relative->father
OO (+M-S+O)	马上	超市	马虎
	horse+on-->immediately	supermarket	horse+tiger-->careless
Semantic Only(-M+S-O)	医院	雪山	护士
	hospital	snow mountain	nurse

Table 2. *Design and Example Stimuli-nonwords*

Prime Type	Constituent 1		
	Related Prime	Unrelated Prime	Target
Ortho overlap(-M-S+O)	田电	林菜	田音
	field+sound	forest+vegetable	field+electricity

Reference:

- [1] Brian Butterworth. Lexical representation. In B. Butterworth (Ed.), *Language Production: Vol. 2* (pp. 257–294). London: Academic Press.
- [2] Marcus Taft and Kenneth I. Forster. Lexical storage and the retrieval of prefixed words. *Journal of Verbal Learning and Verbal Behavior*, 14(1):17–26, 1975.
- [3] Kathleen Rastle, Matthew H. Davis, and Boris New. The broth in my brother's brothel: Morpho-orthographic segmentation in visual word recognition. *Psychonomic Bulletin & Review*, 11:1090–1098, 2004.
- [4] Laura M. Gonnerman, Mark S. Seidenberg, and Elaine S. Andersen. Graded semantic and phonological similarity effects in priming: Evidence for a distributed connectionist approach to morphology. *Journal of Experimental Psychology: General*, 136(2):323–345, 2007.

[5] Kevin Diependaele, Joanna Morris, Raphael M. Serota, Daisy Bertrand, and Jonathan Grainger. Breaking boundaries: Letter transpositions and morphological processing. *Language and Cognitive Processes*, 28(7):988–1003, 2012.

[6] Laurie B. Feldman, Patrick A. O'Connor, Fermín M. Del Prado Martín. Early morphological processing is morphosemantic and not simply morpho-orthographic: A violation of form-then-meaning accounts of word recognition. *Psychonomic Bulletin & Review*, 16(4):684–691, 2009.

[7] Joanna Morris, Tiffany Frank, Jonathan Grainger, and Phillip J. Holcomb. Semantic transparency and masked morphological priming: An ERP investigation. *Psychophysiology*, 44(4):506–521, 2007.

[8] Institute of Language Teaching and Research. *Modern Chinese frequency dictionary*. Beijing Language Institute Press, 1986.