

The lexical “morphology” and “phonology” of Chinese character form

James Myers

National Chung Cheng University

Writing systems have often been observed to have something like double articulation (Ladd 2014) in their inner structure versus outer form (Gelb 1963), with some explicitly comparing this dichotomy with morphology versus phonology (Watt 1980). Myers (2019) argues that this analogy is particularly strong in Chinese script. Character components (部件) are analogous to morphemes in that they have functional interpretations (meaning and/or pronunciation) and combine via operations similar to morphological **affixation** (in 形聲 characters like 住, semantic components have relatively fixed locations and abstract semantics), **compounding** (in 會意 characters like 囚, component locations are freer and semantics richer), and **reduplication** (in 疊體 characters like 林, semantics is iconic and only certain arrangements are allowed). Strokes also combine and modify in ways analogous to phonology (see also Wang 1983), including **axis assimilation** (三, 彡; see also Morin 2017), stress-like **prominence** at the bottom and right (三, 川, 林, 昌, 大 in 尖 vs. 奇), stroke **curving** on the left (川, 月), alternations in stroke **diagonalization** (土 in 場, 工 in 江 vs. 鴻), and **idiosyncratic allomorphy** (水 vs. 氵 in 清), all of which reflect an orthographic analog of **prosody**, with weak-vs.-strong branching as in 林 [WS] (Myers 2019, section 3.3; see Evertz 2018 for similar notions). Most of these patterns have been tested and confirmed in quantitative corpus analyses and psycholinguistic experiments (Myers 2016, 2019, 2021a, 2021b).

One unexplored set of predictions of this research program is that Chinese character “morphology” and “phonology” should interact in ways consistent with theories of lexical morphology and phonology (Kiparsky 1982). In particular, Stratal Optimality Theory (Stratal OT; Bermúdez-Otero 2018, Kiparsky 2015; Jaker and Kiparsky 2020) posits that (1) the stem stratum, where phonological cyclicity is allowed, is ordered before the non-cyclic word stratum, and (2) there can be no stratum-internal opaque interactions because each stratum is an ordinary (and thus fully transparent) OT grammar.

Consistent with prediction (1), the morphological operations in Chinese characters are indeed ordered. Reduplication applies first, since it can only act on nonderived forms (多, 昌, 炎, 圭; 比, 林, 朋, 弱, 羽, 艸; 品, 森, 蟲, 晶, 轟). All apparent exceptions involve historically derived forms that have been reanalyzed as monomorphemic (哥: 可 < 口 + 可), or else are ludic forms, virtually all vanishingly rare in actual use (囍: 喜 < 喜 + 喜; 囍: 雲 < 雨 + 云). Compounding is ordered next, since it can apply both to nonderived forms (明, 相, 尋) and to reduplicated forms (區, 雙, 器, 替, 琵琶). Finally, affixation, ordered last, can apply to all morphological classes: base morphemes (住, 根, 英), reduplicated forms (錢, 琳, 臨), compounded forms (請, 想, 份), and even previously affixed forms (燙, 榴, 瞇, 噀).

This last point means that affixation, alone among the morphological operations, is recursive. This in turn implies that all Chinese character morphology applies in the stem stratum, because in principle any character may undergo affixation to generate a new character (though in practice recursion is restricted by the “phonetic” requirement that all characters must be the same size), and thus no operation ever “finishes” a character once and for all, as a word-stratum operation (like inflection) must do. This conclusion is consistent with Stratal OT because recursive morphology is associated with cyclic phonology, and Stratal OT restricts cyclicity to the stem stratum. More precisely, given the ordering of reduplication, compounding, and affixation, there must be a sequence of three stem strata (cf. the three stem-like base strata posited by Jaker & Kiparsky 2020 for the Athapaskan language Tetsót’iné).

Prediction (2), regarding the absence of stratum-internal opacity, is also supported in Chinese characters. Most patterns in character phonology do not interact at all (e.g. 川 obeys axis assimilation, prominence, and curving, but each pattern applies independently of the others), and most other interactions are transparent. For example, the three patterns applying in 川 are all “fed” (triggered) by the building of the prosodic structure [WS], and base-reduplicant identity “bleeds” (blocks) idiosyncratic allomorphy (水 does not become 氵 in the reduplicated form 淼); ordinary OT constraint ranking can easily handle both feeding and bleeding. There are only three truly opaque interactions: base-reduplicant identity does not bleed curving (艸) and diagonalization (珪), nor is diagonalization bled by axis assimilation (note the non-parallel strokes of 土 in 場). Ordinary OT cannot handle such cases of “counterbleeding” (McCarthy 2007), but Stratal OT can, by associating curving and diagonalization with a later stratum (word) than reduplication and axis assimilation (stem).

Figure 1 summarizes the analysis. That Chinese character structure conforms to theories developed for spoken language suggests that both systems have been shaped by similar historical and psychological forces, such as the preservation of older forms within productively generated new ones. It is hoped that the perspective reviewed here will help provide new insights into both of these forces.

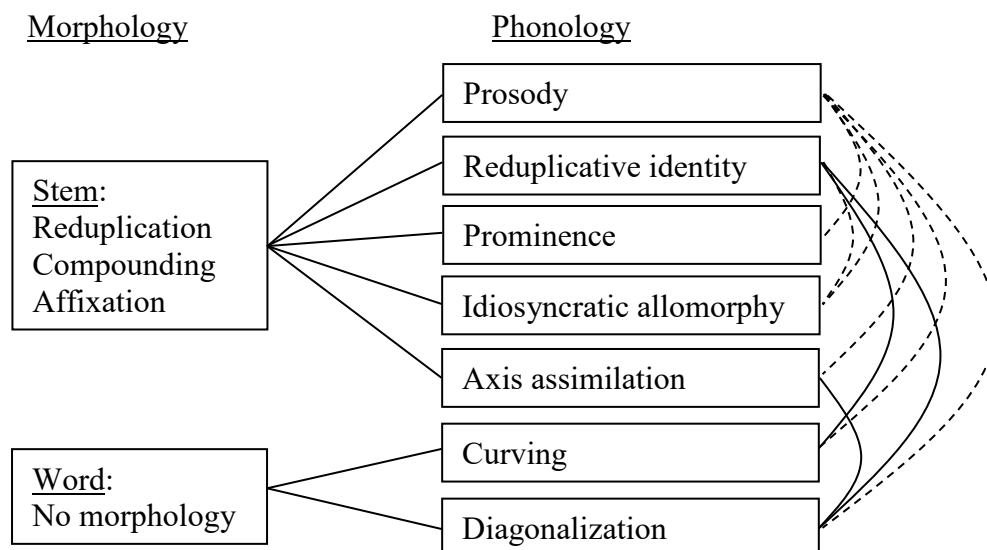


Figure 1. A partial Stratal OT analysis of Chinese character structure (curved dashed and solid lines indicate transparent and opaque interactions, respectively).

Keywords: Chinese script, writing systems, morphology, phonology, formal grammatical theory

References

- Bermúdez-Otero, Ricardo. 2018. Stratal phonology. In Hannahs, Stephen J. & Bosch, Anna R. K. (eds.), *The Routledge handbook of phonological theory*, 100-134. London: Routledge.
- Evertz, Martin. 2018. *Visual prosody: The graphematic foot in English and German*. Berlin: Walter de Gruyter.
- Gelb, I. J. (1963). *A study of writing* (revised edition). Chicago: University of Chicago Press.
- Jaker, Alessandro & Kiparsky, Paul. 2020. Level ordering and opacity in Tetsó't'iné: a Stratal OT account. *Phonology* 37(4). 617-655.
- Kiparsky, Paul. 1982. Lexical morphology and phonology. In Linguistic Society of Korea (eds.), *Linguistics in the morning calm: Selected papers from SICOL-1981*, 3-91. Seoul: Hanshin Publishing Company.
- Kiparsky, Paul. 2015. Stratal OT: A synopsis and FAQs. In E. Hsiao, Yuchau & Wee, Lian-Hee (eds.), *Capturing phonological shades within and across languages*, 2-44. Newcastle upon Tyne: Cambridge Scholars Publishing.
- Ladd, D. Robert. 2014. *Simultaneous structure in phonology*. Oxford: Oxford University Press.
- McCarthy 2007
- McCarthy, John J. 2007. *Hidden generalizations: Phonological opacity in Optimality Theory*. Sheffield, UK: Equinox.
- Morin, Olivier. 2017. Spontaneous emergence of legibility in writing systems: The case of orientation anisotropy. *Cognitive Science* 42(2). 664-677.
- Myers, James. 2016. Knowing Chinese character grammar. *Cognition*, 147, 127-132.
- Myers, James. 2019. *The grammar of Chinese characters: Productive knowledge of formal patterns in an orthographic system*. London: Routledge.
- Myers, James. 2021a. Levels of structure within Chinese character constituents. In Haralambous, Yannis (ed.) *Grapholinguistics in the 21st Century: From graphemes to knowledge*, Part II, 645-582. Paris: Fluxus Editions.
- Myers, James. 2021b. Areal script form patterns with Chinese characteristics. *Written Language & Literacy* 24(2). 259-283.
- Wang, Jason Chia-Sheng. 1983. *Toward a generative grammar of Chinese character structure and stroke order*. University of Wisconsin-Madison Ph.D. thesis.
- Watt, William C. 1980. What is the proper characterization of the alphabet? II: Composition. *Ars Semeiotica*, 3(1), 3-46.