

### Verbal reduplication in Mandarin Chinese: an analysis at syntax-phonology interface

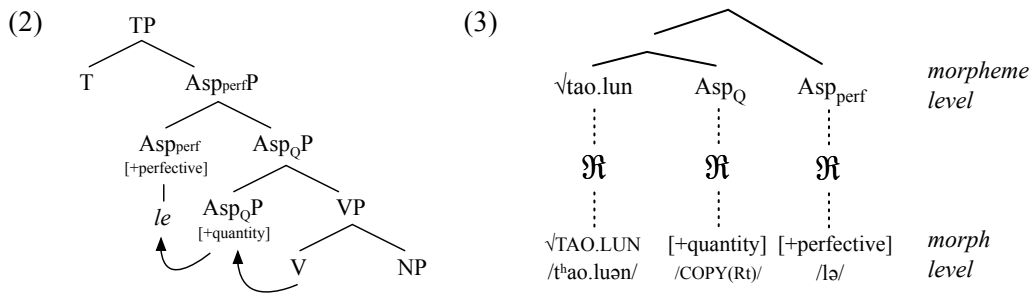
**Overview:** This paper zooms in on the word order puzzle of verbal reduplication (VR) in Mandarin Chinese: when the reduplicated verb co-occurs with aspectual marker *-le*, for the surface string in question, pure syntactic derivation based on the merging order of the functional heads cannot generate the correct surface order. We propose that the surface patterns of VR are due to the phonological realization of a functional projection  $Asp_Q$  (Q for quantity). Further, when a perfective *-le* merges above  $Asp_Q$ , the surface order such like ‘ $V_1V_2-le \underline{V_1V_2}$ ’ (‘V’ represents monosyllabic verbal morpheme; reduplicant is underlined) is linearized by the constraint ALIGN(*-le*, L, Prosodic Head, R). This analysis contributes to the study of reduplication in two significant ways: 1) it provides a phonological constraint for explaining the surface order of other reduplication-related phenomena; 2) it reveals that the generation of a reduplicated bundle is a phonologically conditioned process with a syntactic motivation and plausible analyses can be sought at the syntax-phonology interface.

**Background and questions:** The reduplicated patterns of disyllabic verbs in Mandarin vary according to their inner structures, as exemplified in (1) (‘0’ indicates neutral tone). When the forms in (1a) and (1b) co-occur with the perfective aspectual marker *-le*, the surface linear order is infixation-like ‘AB-*le* AB’ instead of ‘ABAB-*le*’ (e.g. [tʰjao.lə.tʰjao.wu], [tʰao.lun.lə.tʰao.lun], etc.). Previous studies analyze them mainly from a pure phonological perspective which cannot account for the linearization between the reduplicated form and the perfective aspectual marker *-le*. Thus, the major questions to be dealt with in this paper include: 1) how to represent the verbal reduplication as a functional projection in syntax; 2) what is the input of phonology for spellout and 3) how does the surface order such as A-*le*-A, A-*le*-AB, or AB-*le*-AB realize based on the syntactic structure hypothesized. It should be noted that [AB] in (1c) is not viewed as the base of AABB type mainly due to their difference in meaning. We present in a separate paper that the AABB type is in effect a coordination of the reduplicated monosyllabic verb A and B respectively, so this pattern is temporarily excluded from the proposal below.

(1)	Type	Reduplicated	Meaning	Base	Gloss of base	Structure
a).	AAB	[tʰjao <sup>53</sup> .tʰjao <sup>0</sup> .wu <sup>214</sup> ]	dance a little bit	[tʰjao.wu]	dance-dance	V-O
b).	ABAB	[tʰao <sup>21</sup> .luən <sup>53</sup> .tʰao <sup>0</sup> .luən <sup>0</sup> ]	discuss a little bit	[tʰao.luən]	discuss-discuss	V-V
c).	AABB	[tʂʅ <sup>35</sup> .tʂʅ <sup>21</sup> .tian <sup>35</sup> .tian <sup>214</sup> ]	criticize	*[tʂʅ.tian]	advise	V-V

**Proposal and analysis:** The major claim of this paper is that the verbal reduplication in question is the phonological exponence of a functional head above VP which is labeled as  $Asp_Q$  (Q for quantity). Semantically, the quantification force from the  $Asp_Q$  gives rise to the meaning of reduced duration (hence ‘delimitative’<sup>[1]</sup>) or reduced frequency (hence ‘tentative’<sup>[2]</sup> or ‘pluraction’<sup>[3]</sup>). Although the events denoted by the verb are typically activity and have no natural end point,  $Asp_Q$  assigns quantity to the activity and hence presents a situation as closed. Consequently, the event denoted by the verbal reduplication is quantified and thus telic. As telic-inducing functional head,  $Asp_Q$  entails a perfective interpretation. This explains why VR is compatible only with perfective aspect marker *-le* in Chinese. the  $Asp_Q$  proposed here is not the same with the inner aspect in some multi-layered analyses of aspectual projections, because the inner aspect is equated with the lexical aspect, which, however, we do not view the verb reduplication as. Two major arguments for this treatment are: 1) insertion of aspectual marker *-le* and 2) the different reduplicating patterns (AAB or ABAB) of V-V and V-O compounds in Chinese

(i.e. AAB type in data (1a)). The proposed syntactic structure is illustrated in (2).



Based on the structure in (2), the input of phonology is viewed as a morphosyntactic tree which is generated by syntactic movement<sup>[4]</sup>, as shown in (3). In this model, the morphemes are associated with morphs which contain paired features and phonological exponents. The morphemes are phonologically realized by establishing the correspondent relation between the features on morpheme level and those on morph level, which is enforced by constraint MAX-M(F). The phonological exponent of Asp<sub>Q</sub> is an operation COPY(root), designated to copy the template of the root verb (cf. [5]). For the surface form [t<sup>h</sup>ao<sup>21</sup>.luən<sup>53</sup>.lə<sup>0</sup>.t<sup>h</sup>ao<sup>0</sup>.luən<sup>0</sup>], it can be viewed as a prosodic unit which is headed by the base verb, the reason being that only the syllables in the base bear full tone while the tones on the other syllables are neutralized. We propose a constraint ALIGN(-le, L, Prosodic Head, R) which requires the marker -le immediately follow the prosodically prominent element, generating the linear misordered output [t<sup>h</sup>ao<sup>21</sup>.luən<sup>53</sup>.lə<sup>0</sup>.t<sup>h</sup>ao<sup>0</sup>.luən<sup>0</sup>]. Meanwhile, this form violates MIRROR which demands the underlying morpheme order be reflected in the surface morph order<sup>[4][6]</sup>, and also violates COPY-LOCALLY which requires the base and reduplicant be adjacent<sup>[5]</sup>. A demonstration tableau with crucial constraints and candidates is given in (4). For the AAB type (1a), the surface order with marker -le is ‘A-le AB’. Since AB is V-O compound derived in syntax, it is the verb (i.e. ‘A’) that undergoes cyclic head movement to incorporate into the higher Asp heads, and the phrase is subsequently realized in phonology as ‘A-le A’ (hence ‘A-le AB’).

(4)

	MAX-M(root)	MAX-M(Asp <sub>Q</sub> )	MAX-M(Asp <sub>perf</sub> )	ALIGN-le	MIRROR	COPY-LOC	*COPY(root)
a. [t <sup>h</sup> ao <sup>21</sup> .luən <sup>53</sup> .lə <sup>0</sup> .t <sup>h</sup> ao <sup>0</sup> .luən <sup>0</sup> ]					2	1	1
b. [t <sup>h</sup> ao <sup>21</sup> .luən <sup>53</sup> .t <sup>h</sup> ao <sup>0</sup> .luən <sup>0</sup> .lə <sup>0</sup> ]				W <sub>2</sub>	L	L	1
c. [t <sup>h</sup> ao <sup>21</sup> .luən <sup>53</sup> .t <sup>h</sup> ao <sup>0</sup> .luən <sup>0</sup> ]			W <sub>1</sub>		L	L	1
d. [t <sup>h</sup> ao <sup>21</sup> .luən <sup>53</sup> .lə <sup>0</sup> ]		W <sub>1</sub>			L	L	L

**Summary:** The linearization of ‘V<sub>1</sub>V<sub>2</sub>-le V<sub>1</sub>V<sub>2</sub>’ in Mandarin Chinese cannot be properly explained solely by syntax or phonology. Instead, the proposed Asp<sub>Q</sub> a constraint ALIGN(-le, L, Prosodic Head, R) provides a plausible account, and this proposal offers a new perspective regarding reduplication-related phenomena in Chinese.

**Selected References** [1]. Li, N. & Sandra A. Thompson. 1981. *Mandarin Chinese: A Functional Reference Grammar*. University of California Press. [2]. Chao, Y-R. 1968. *A Grammar of Spoken Chinese*. Berkeley: University of California Press. [3]. Deng, D. 2013. The Syntax and Semantics of Event Quantifiers in Mandarin Chinese. PhD dissertation. University of Wisconsin-Madison. [4]. Wolf, M. 2008. Optimal interleaving: Serial phonology-morphology interaction in a constraint-based model. PhD dissertation. University of Massachusetts, Amherst. [5]. McCarthy J.J., Wendell Kimper & Kevin Mullin. 2012. Reduplication in Harmonic Serialism. *Morphology* 22(2). 173–232. [6]. Baker, M. 1985. The mirror principle and morphosyntactic explanation. *Linguistic Inquiry*, 16, 373-415