

# Topic states in Mandarin discourse<sup>1</sup>

Maria Bittner  
*Rutgers University*

I propose that Mandarin *o*-sentences (units marked by *o*) are aspectual topic-comment sequences, where an initial update (terminating in a pause) introduces a *topic state* for comment by one or more clauses. Each comment anaphorically refers to the topic state via the *aspect feature* of the verbal predicate. This proposal explains why Mandarin *o*-sentences have controversial boundaries, since speakers may disagree where one topic state ends and the next one begins. It also explains various manifestations of aspect-prominence and topic-prominence in Mandarin discourse. In Bittner (2014), this proposal is formally implemented in Categorical Grammar and a new dynamic logic called *Update with Centering*.

## 0. Introduction

Typologically, Mandarin is topic-prominent as well as aspect-prominent (see e.g. Chao 1968; Henne *et al.* 1977; Tsao 1979; Li & Thompson 1981), in contrast to subject- and tense-prominent languages like English. In Bittner (2014), I propose a unified theory of the typological profile of Mandarin in terms of discourse reference to the current *topic state* — intuitively, the situation currently under discussion. The present paper is a non-technical introduction to this formally explicit proposal. That is, the goal is to introduce and empirically motivate the leading ideas, without any formal logic.

To unify topic-prominence and aspect-prominence, I propose that Mandarin discourse consists of aspectual topic-comment sequences, which I call *o*-sentences (units marked by *o*). In each *o*-sentence, an initial update introduces a new topic state and is followed by one or more comments. In each comment, the verbal predicate anaphorically refers to the current topic state, by means of the verb's *aspect feature* (eventive *E/* or stative *S/*) or by an anaphoric chain consisting of the aspect feature and an anaphorically dependent *aspect marker* (e.g. *le*, which I analyze as punctual aspect, glossed 'PNC').

This proposal explains some otherwise puzzling facts about Mandarin. First of all, unlike English sentences (units marked by *.*), Mandarin *o*-sentences behave like units of discourse, not syntax. When presented with a Mandarin text with the *o*'s removed, native speakers disagree how many *o*'s there are and where to restore them (see Tsao 1990; Li 2005). On the proposed analysis, they disagree how many topic states there are and where

---

<sup>1</sup> I thank my Mandarin consultants for help with the data. I am also grateful to William Baxter for the invitation to present this work at NACCL-25, and to the audience, for helpful discussion.

one topic state ends and the next one begins. Different Mandarin speakers may structure given information in different ways. In this respect, Mandarin  $\circ$ -sentences are like English paragraphs, which are likewise units of discourse with flexible boundaries that reflect the speaker's view of the information structure. In contrast, English  $\cdot$ -sentences are units of syntax, with uncontroversial boundaries determined by grammatical rules.

Secondly, this proposal illuminates the next larger unit of Mandarin discourse, the *topic chain* (see e.g. Tsao 1979; Chu 1998; Li 2005). I propose that a topic chain consists of one or more  $\circ$ -sentences whose topic states are centered on the same *topical individual* and jointly function as a single 'tracking shot', following that individual. For example, a  $\circ$ -sentence about a state narrowly focused on the topical individual may form a topic chain with a  $\circ$ -sentence about a larger state, zooming out to relate the central individual to another individual in the background. Topic chains may also zoom in from a 'wide angle' topic state to a detail-oriented state, centered on the same topical individual.

Thirdly, various uses of Mandarin verbs that are unattested in English — *serial verb constructions* (SVC) as well as preposition-like and adjective-like uses — can be understood if we analyze Mandarin verbs into two components: an *eventuality predicate* and an argument-filling *aspect feature*. The eventuality argument of the predicate is filled by the aspect feature (E/ or S/), which introduces an eventuality into discourse. Mandarin verbs used like prepositions or adjectives are bare eventuality predicates, without aspect features. The predicate modifies the head referent, without introducing any eventuality. An SVC is a series of eventuality predicates co-specifying a shared eventuality referent introduced by a shared aspect feature. An SVC is thus a complex predicate that can only have one subject (the central individual of the shared eventuality) and the shared aspect feature can only be linked to one aspect marker, which marks the entire SVC.

Finally, the proposed analysis explains how tenseless Mandarin can express temporal reference as precisely as tense-based English. In an English  $\cdot$ -sentence, the subject and tense typically introduce a *topical individual* and a *topic time*, respectively. The verb phrase comments on both topics by introducing an eventuality that is centered on the topical individual and temporally located at the topic time. In contrast, in a Mandarin  $\circ$ -sentence, topic-setting update introduces a *topic state*. In the rest of the  $\circ$ -sentence, the verbal predicate of every comment introduces a new eventuality and relates it to the topic state by a relation that depends on the argument-filling aspect feature (E/ or S/), any recentering aspect marker (e.g. *le* or *zhe*), as well as the pragmatics of coherence establishment. Typical relations in Mandarin are stronger than purely temporal relations found in tensed languages. For example, the mereological relation *central part of* entails *temporal inclusion*. But in addition, it also entails various non-temporal relations, such as spatial inclusion, centering on the same individual, and realization in the same worlds.

In what follows, we first review two salient typological characteristics of Mandarin: topic- and aspect-prominence. Next, we introduce topic state-tracking aspect features as the unifying generalization. We outline how aspect features account for Mandarin-specific verb uses, discourse units, and tenseless temporality. Finally, we conclude.

### 1. Typological characteristics of Mandarin

A beginning student of Mandarin (such as this author) soon learns that Mandarin is typologically topic-prominent as well as aspect-prominent. Claims or hints to this effect are found in several reference grammars (see e.g. Chao 1968; Henne *et al.* 1977; Li & Thompson 1981; Chu 1983, 1998) and monographs (e.g. Tsao 1979, 1990; Li 2005). As a formal semanticist who does not speak Mandarin, I found these typological claims intuitively helpful, but difficult to relate to actual Mandarin discourse — to work out the predictions, one needs a formal implementation. Nevertheless, a sample of colloquial Mandarin texts (available at <http://www.rci.rutgers.edu/~mbittner>) did reveal salient phenomena that provide empirical support for these typological claims.

First of all, Mandarin is topic-prominent in the sense that a salient unit of Mandarin discourse is a *topic chain* (see e.g. Tsao 1979; Chu 1998; Li 2005). Paradigm examples are shown in (1), (2) (from Chu 1998), (3), and (4) (from Li 2005). As these examples illustrate, a topic chain consists of one or more  $\circ$ -sentences about the same individual (e.g. person, thing, or place). This *topical individual* is introduced early on in the topic chain ( $np^T$ ) and is referred to in the subsequent comments (clauses) by means of *zero anaphors* (i.e. missing topical subjects  $\tau v$ , objects  $v\tau$ , or possessors  $\tau n$ ). A comment clause may also introduce a *background individual* ( $np^+$ ) and relate it to the current topic, as the second clause of (1) and the last clause of (4i) illustrate. The background individual can also be referred to by zero anaphors (missing background subjects  $\perp v$ , objects  $v\perp$ , or possessors  $\perp n$ ), instead of or along with the topical individual (see  $\perp v$  in (1);  $\perp v\tau$  in (4ii)).

- (1) *Luòyáng yǒu ge míng gē-nǚ, hái yǒu ge wǔ-nǚ*  
 Luoyang<sup>T</sup> have CL famous song-girl<sup>+</sup>, also  $\tau$ have CL dance-girl<sup>+</sup>,  
*yě yí-yàng yǒu míng*  $\circ$ .  
 also equally  $\perp$ have fame  $\circ$ .  
 In Luoyang<sup>T</sup> there was a famous female singer<sup>+</sup>. There $\tau$  was also a female dancer<sup>+</sup>, who $\tau$  was just as famous.
- (2) *Luòyáng yǒu ge míng gē-nǚ, jiào Yáng Zhùluó,*  
 Luoyang<sup>+</sup> have CL famous song-girl<sup>T</sup>,  $\tau$ named Yang Zhuluo,  
*cōnghuì guò rén*  $\circ$ .  
 $\tau$ intelligent surpass people  $\circ$ .  
 In Luoyang<sup>+</sup> there was a famous female singer<sup>T</sup>. Her $\tau$  name was Yang Zhuluo and she $\tau$  was extremely intelligent.
- (3) i. *Xiǎoli niánqīng piàoliàng, gōnzhuò yě hǎo*  $\circ$ .  
 Xiaoli<sup>T</sup> young pretty,  $\tau$ job also good  
 Xiaoli<sup>T</sup> is young and pretty. She $\tau$  has a good job too.
- ii. *Suīrán yǒu ge nán péngyǒu, kěshì bù xiǎng jiéhūn*  $\circ$ .  
 although  $\tau$ have CL boyfriend, but not  $\tau$ wish marry  $\circ$ .  
 Although she $\tau$  has a boyfriend, she $\tau$  doesn't wish to get married.

- (4) i. *Nà-liàng chē, jiàqián tài guì, yánsè yě bù hǎo, Lǐsì bù xǐhuān* 。  
 that-CL car<sup>T</sup>, <sub>T</sub>price too high, <sub>T</sub>color also not good, Lisi<sup>±</sup> not like<sub>T</sub> 。  
 That car<sup>T</sup> is too expensive and it<sub>T</sub>'s an ugly color. Lisi<sup>±</sup> doesn't like it<sub>T</sub>.
- ii. *Jīntiān qù kàn le, hái kāi le yí.huǐr, háishì bù xǐhuān,*  
 today <sub>±</sub>go look<sub>T</sub> PNC, even <sub>±</sub>drive<sub>T</sub> PNC a.M<sub>while</sub>, still not <sub>±</sub>like<sub>T</sub>,  
*méi mǎi* 。  
 not <sub>±</sub>buy<sub>T</sub> 。  
 Today he<sub>±</sub> went to take a look at it<sub>T</sub>. He even <sub>±</sub>drove it<sub>T</sub> for a while, but he<sub>±</sub> still  
 didn't like it<sub>T</sub>. He<sub>±</sub> didn't buy it<sub>T</sub>.

Aspect-prominence manifests itself in various ways. According to the linguistic literature, the main manifestation is a grammatical system of *aspect markers* (see e.g. Chao 1968; Henne *et al.* 1977; Li & Thompson 1981; Smith 1991/7; Chu 1983, 1998; Wu 2003; Xiao & McEnery 2004; Smith & Erbaugh 2005; etc.). Based on this literature, I expected that every Mandarin *o*-sentence would contain at least one aspect marker, just like every English *.-*sentence contains at least one tense marker. What I in fact found, in my sample of Mandarin discourse comprising a total of 1141 *o*-sentences with 3758 verbs, is that only about 16% of the verbs have any kind of overt aspect marker (13.3% *le*, 2.6% *zhe*, 0.1% *guo*). Some authors posit an unmarked 'default' aspect (see e.g. Smith 1991/7; Lin 2006), but I find it problematic to posit this for 84% of the verbs. In any event, covert aspect markers are not salient, and overt aspect markers are too few and far between to justify the classification of Mandarin as an aspect-prominent language.

Instead, I propose that what makes Mandarin aspect-prominent is a system of grammaticalized *aspectual types* that interact with grammatical rules in ways that affect every verb in every Mandarin *o*-sentence. Specifically, I propose that Mandarin verbal predicates are of four aspectual types: *n*-atom events ( $v_e$ ), *point events* ( $v_{e^*}$ ), *n*-degree states ( $v_\sigma$ ), and *point scale states* ( $v_{\sigma^*}$ ) (see Figure 1 and diagnostics in (5)–(7)).

Figure 1 Mandarin aspectual types

	[± event] event-measure	[± point event] phase modifier	[± point scale] degree modifier
$v_e$ (event predicate)	✓	✓	*
$v_{e^*}$ (pt. event predicate)	✓	*	*
$v_\sigma$ (state predicate)	*	*	✓
$v_{\sigma^*}$ (pt. scale state pred.)	*	*	*

- (5) [± event]: (in)compatibility with event-measure *ci* 'M<sub>evt</sub>'
- a. *Míngzi, Lǐsì {xiě | xiě.wán} sān-ci le* 。 V<sub>e</sub> | V<sub>e^\*</sub>  
 name, Lisi {write | write.finish} three-M<sub>evt</sub> PNC  
 His name, Lisi {wrote | finished writing} three times.
- b. *Lǐsì {\*hén lèi | \*lèi.si} sān-ci (le)* 。 V<sub>σ</sub> | V<sub>σ^\*</sub>  
 Lisi { POS tired | tired.die} three-M<sub>evt</sub> (PNC)

- (6) [ $\pm$  point event]: (in)compatibility with phase verbs, e.g. *zài* ‘be in progress’
- a. *Lǐsì zài* {*xiě* | \**xiě.wán*} *míngzi* ◦  $V_\epsilon$  |  $V_{\epsilon^*}$   
 Lisi be.in.prg {write | write.finish} name  
 Lisi {is writing | INTENDED: is finishing writing} his name.
- b. *Lǐsì zài* {\**lèi* | \**lèi.sì*} ◦  $V_\sigma$  |  $V_{\sigma^*}$   
 Lisi be.in.prg {tired | tired.die}
- (7) [ $\pm$  point scale]: (in)compatibility with degree modifiers, e.g. *tài* ‘extremely’
- a. *Lǐsì tài* {\**xiě* | \**xiě.wán*} *míngzi* ◦  $V_\epsilon$  |  $V_{\epsilon^*}$   
 Lisi extremely {write | write.finish} name
- b. *Lǐsì tài* {*lèi* | \**lèi.sì*} ◦  $V_\sigma$  |  $V_{\sigma^*}$   
 Lisi extremely {tired | tired.die}  
 Lisi is extremely {tired | \*dead tired}.

For instance, aspectual types interact with verb-forming compounding (v-x, x-v) and reduplication (v~v) to give rise to a highly symmetric verbal system (see Figure 2).

Figure 2 Mandarin aspectual types and verb formation

$\epsilon$ : *n*-atom **event** (‘action’)

$v_\epsilon$ :	<i>xué</i> ‘study/learn’ <i>mǎi</i> ‘shop/buy’ <i>dǎ</i> ‘beat/hit’ <i>kàn</i> ‘look/see/read’ <i>xiǎng</i> <sub><math>\epsilon</math></sub> ‘think’ <i>zuò</i> <sub><math>\epsilon</math></sub> ‘sit down’ <i>chuān</i> <sub><math>\epsilon</math></sub> ‘put on’ <i>kāi</i> <sub><math>\epsilon</math></sub> ‘open/drive’
$v_\epsilon$ - $v_\epsilon$ :	<i>gòu-mǎi</i> (purchase-buy) ‘buy’
$v_\epsilon$ -n:	<i>kàn-shū</i> (read-book) ‘read’
$v_\sigma$ - $v_\epsilon$ :	<i>àn-shā</i> (dark-kill) ‘assassinate’
$\epsilon$ : <b>point event</b> (‘resultative action’)	
$v_{\epsilon^*}$ :	<i>lái</i> ‘come’, <i>qù</i> ‘go’ <i>jìn</i> ‘enter’, <i>chū</i> ‘exit’ <i>dào</i> ‘arrive’ <i>guò</i> ‘cross/pass’ <i>gěi</i> ‘give/let’ <i>sǐ</i> ‘die’ <i>wán</i> ‘finish’ <i>yíng</i> ‘win’
$v_\epsilon$ ~ $v_\epsilon$ :	<i>kànkàn</i> ‘take a look/read a bit’
$v_\epsilon$ - $v_{\epsilon^*}$ :	<i>dǎ-sǐ</i> (beat-die) ‘beat to death’
$v_\epsilon$ - $v_\sigma$ :	<i>xiě-cuò</i> ‘write wrong’
$v_\epsilon$ -n:	<i>dào-jīa</i> ‘come home’

$\sigma$ : *n*-degree **state** (‘quality stative’)

$v_\sigma$ :	<i>qīng</i> <sub>1</sub> ‘clean/clear’ <i>qīng</i> <sub>2</sub> ‘light/low’ <i>lèi</i> ‘tired’, <i>duō</i> ‘many/much’, <i>xiǎng</i> <sub><math>\sigma</math></sub> ‘wish/miss’ <i>ài</i> ‘love’ <i>tèng</i> ‘ache’ <i>yǒu</i> ‘have’
$v_\sigma$ - $v_\sigma$ :	<i>qīng</i> <sub>1</sub> - <i>chu</i> (pure-clear) ‘clear’
$v_\sigma$ -n:	<i>ài-guó</i> (love-country) ‘patriotic’
n- $v_\sigma$ :	<i>tóu-téng</i> (head-ache) ‘hv hd-ache’
$\sigma$ : <b>point-scale state</b> (‘status stative’)	
$v_{\sigma^*}$ :	<i>zuò</i> <sub><math>\sigma</math></sub> ‘be sitting’ <i>zhàn</i> <sub><math>\sigma</math></sub> ‘be standing’ <i>chuān</i> <sub><math>\sigma</math></sub> ‘have on’ <i>kāi</i> <sub><math>\sigma</math></sub> ‘be open’ <i>zài</i> ‘be in/on/at/in progress’ <i>cuò</i> ‘be wrong’ <i>jiào</i> ‘be named’ <i>méiyǒu</i> ‘have no’
$v_\sigma$ ~ $v_\sigma$ :	<i>qīngqīngchǔchǔ</i> ‘perfectly clear’
$v_\sigma$ - $v_{\sigma^*}$ :	<i>lèi-sì</i> (tired-die) ‘dead tired’
$v_\epsilon$ - $v_\sigma$ :	<i>zhù-zài</i> (live-be.in) ‘live in’
$\langle v_\sigma \rangle$ :	<i>kāi</i> <sub><math>\epsilon</math></sub> $\langle de \rangle$ <i>guò</i> ‘able to drive across’

In Figure 2, traditional terms are given in parentheses to indicate the relation between this proposal and compatible ideas in the literature (see e.g. Chao 1968; deFrancis 1976; Henne *et al.* 1977; Tai 1984; Ross & Ma 2006). I have modified the traditional terminology to highlight the key contrasts (event v. state, point v. unspecified) and to avoid misleading connotations. For example, the class traditionally termed ‘actions’ includes non-agentive changes of state (e.g. *kāi<sub>ε</sub>* ‘open’); ‘resultative actions’ include point events that may have neither agents nor results (e.g. *wán* ‘finish’, *kànkàn* ‘take a look/read a bit’); and the contrast between ‘quality’ v. ‘status’ is often obscure (e.g. for *qīng-chu* ‘clear’ v. *qīngqīngchūchū* ‘perfectly clear’).

As illustrated in Figure 2, each aspectual type includes morphologically simple verbs and complex verbs derived by compounding or reduplication. Morphologically simple *n*-atom event-verbs are unspecified for (a)telicity and the number of discourse-transparent atomic parts (e.g. *xué* translates into atelic ‘study’ or telic ‘learn’ and can be predicated of a multi-stage process or a point event). Both kinds of underspecification can be resolved in context — e.g. in (5a) *sān-cì* ‘three-*M<sub>evl</sub>*’ counts episodes (point events), whereas in (6a) *zài* ‘be in progress’ requires a process. Complex *n*-atom event-verbs are formed by compounding an event-verb with a disambiguating event-verb ( $v_{\epsilon}\text{-}v_{\epsilon}$ ), a nominal theme ( $v_{\epsilon}\text{-}n$ ), or a stative manner modifier ( $v_{\sigma}\text{-}v_{\epsilon}$ ). Similarly, complex *n*-degree state-verbs are formed by compounding an *n*-degree state-verb with a disambiguating state-verb ( $v_{\sigma}\text{-}v_{\sigma}$ ) or a nominal theme ( $v_{\sigma}\text{-}n$  or  $n\text{-}v_{\sigma}$ ). Manner modification is ruled out for state-verbs, since states do not have manners.

Complex predicates of point events and point-scale states are likewise formed by parallel morphological processes. Specifically, reduplicating an *n*-atom event-verb or *n*-degree state-verb yields a predicate of a point event or a point-scale state, respectively ( $v_{\epsilon}\sim v_{\epsilon}$ : ‘ $v_{\epsilon}$  a bit’ ::  $v_{\sigma}\sim v_{\sigma}$ : ‘ $v_{\sigma}$  to the maximum degree’). Complex predicates of point events and point-scale states can also be formed by compounding an *n*-atom event-verb or *n*-degree state-verb with a point-event-verb, which specifies the culmination point or the maximum degree ( $v_{\epsilon}\text{-}v_{\epsilon}$  ::  $v_{\sigma}\text{-}v_{\epsilon}$ ); or with a state-verb, which specifies the resulting or concurrent state ( $v_{\epsilon}\text{-}v_{\sigma}$  ::  $v_{\sigma}\text{-}v_{\sigma}$ ). Finally, there are some aspect-specific verb-forming operations. For point event-verbs, these include compounding a culmination point with a noun that specifies the resulting location ( $v_{\epsilon}\text{-}n$ ). For point-scale state verbs, they include combining an agentive event-verb with a verb that specifies the intended culmination, via an infix *de* or *bu*, to derive a predicate of a state of being able ( $v_{\epsilon}\langle de \rangle v_{\cdot}$ ) or unable ( $v_{\epsilon}\langle bu \rangle v_{\cdot}$ ) to reach the specified culmination ( $v_{\cdot}$ ) by means of the specified action ( $v_{\epsilon}$ ).

In general, the aspectual types defined in Figure 1 interact with morphological and syntactic rules in ways that affect every Mandarin  $\circ$ -sentence. Verb-forming rules of compounding and reduplication exemplified in Figure 2 are typical in this respect. Every verb in Mandarin instantiates one of these grammaticalized aspectual types, which govern its interactions with aspect-sensitive grammatical rules. The ubiquitous grammatical interactions with aspectual types are the main manifestations of aspect-prominence in Mandarin discourse. The occasional aspect markers are secondary, but also important.

## 2. Toward a unified analysis: Aspect features

In the linguistic literature on Mandarin, topic-prominence and aspect-prominence are presented as unrelated phenomena. Instead, I propose that these two facets of the typological profile of Mandarin are amenable to a unified analysis. The basic idea is that the aspectually typed eventuality predicates of Mandarin select compatible *aspect features* (eventive E/ or stative S/). The aspect feature saturates the eventuality argument of the predicate with a discourse referent and relates this referent to the current *topic state*.

As a first step toward developing this idea, let me introduce grammatical aspect features as a category distinct from grammatical aspect markers, using paradigm examples from my native Polish, which has both. In Polish, a verb consists of a verbal base and a verbal inflection. The base has a grammatical aspect feature (*perfective* \P or *imperfective* \I) that is referred to by morphological and syntactic rules of the Polish grammar and is specified by Polish dictionaries as part of the lexical entry of the verb. Thus, each Polish verb has a grammatical aspect feature (\I or \P), determined by its base, and is inflectionally marked according to its grammatical role in the sentence. Finite verbs inflect for tense (*past* PST, *present* PRS, or *future* FUT) and the subject (e.g. first person singular 1SG, first person singular masculine 1SM; etc.); adverbial participles inflect for aspect (*perfect* PRF ‘having v-ed’, *durative* DUR ‘while v-ing’); and so on.

Example (8) illustrates a partial paradigm for an imperfective base (*siedz-* ‘sit\I’) and a perfective base (*usiad-* ‘sit.down\P’). It also illustrates the characteristic interaction of grammatical aspect features (\I, \P) with the morphological rules for tense and aspect inflection in Polish. For example, perfective bases have no present tense (\* v\P.PRS). Future tense is periphrastic for imperfective bases (e.g. be\I.FUT.1SG v\I.SM), but inflectional for perfective bases (v\P.FUT). Imperfective bases have a durative participle (v\I-DUR), but no perfect participle (\* v\I-PRF). Perfective bases have a perfect participle (v\P-PRF), but no durative participle (\* v\P-DUR). And so on, and so forth.

(8)	POLISH verbs: Aspect features (\I, \P) v. tense and aspect markers														
	<table border="0"> <tr> <td>v\I</td> <td>v\P</td> </tr> <tr> <td><i>siedziałem</i> ‘sit\I.PST.1SM’</td> <td><i>usiałem</i> ‘sit.down\P.PST.1SM’</td> </tr> <tr> <td><i>siedzę</i> ‘sit\I.PRS.1SG’</td> <td>– (* v\P.PRS)</td> </tr> <tr> <td><i>będę siedział</i> ‘be\I.FUT.1SG sit\I.SM’</td> <td><i>usiądę</i> ‘sit.down\P.FUT.1SG’</td> </tr> <tr> <td><i>siedz-ąc</i> ‘sit\I-DUR’</td> <td>– (* v\P-DUR)</td> </tr> <tr> <td>– (* v\I-PRF)</td> <td><i>usiał-wszy</i> ‘sit.down\P-PRF’</td> </tr> <tr> <td>⋮</td> <td>⋮</td> </tr> </table>	v\I	v\P	<i>siedziałem</i> ‘sit\I.PST.1SM’	<i>usiałem</i> ‘sit.down\P.PST.1SM’	<i>siedzę</i> ‘sit\I.PRS.1SG’	– (* v\P.PRS)	<i>będę siedział</i> ‘be\I.FUT.1SG sit\I.SM’	<i>usiądę</i> ‘sit.down\P.FUT.1SG’	<i>siedz-ąc</i> ‘sit\I-DUR’	– (* v\P-DUR)	– (* v\I-PRF)	<i>usiał-wszy</i> ‘sit.down\P-PRF’	⋮	⋮
v\I	v\P														
<i>siedziałem</i> ‘sit\I.PST.1SM’	<i>usiałem</i> ‘sit.down\P.PST.1SM’														
<i>siedzę</i> ‘sit\I.PRS.1SG’	– (* v\P.PRS)														
<i>będę siedział</i> ‘be\I.FUT.1SG sit\I.SM’	<i>usiądę</i> ‘sit.down\P.FUT.1SG’														
<i>siedz-ąc</i> ‘sit\I-DUR’	– (* v\P-DUR)														
– (* v\I-PRF)	<i>usiał-wszy</i> ‘sit.down\P-PRF’														
⋮	⋮														

In Bittner (2014), I propose that a verbal base in Polish consists of an aspectually typed eventuality predicate ( $v_a$ ) and an argument-filling aspect feature (\I or \P). The aspect feature saturates the eventuality argument of the predicate with a discourse referent (*state* for \I, *point event* for \P) and relates this eventuality referent to the currently top-ranked time-referent, the *reference time*, in a predictable manner. Thus, grammatical aspect features play a crucial role in temporal discourse reference in Polish.



### 3. Mandarin aspect features and verb uses

Mandarin verbs can be used in a variety of ways that do not introduce any eventualities into discourse. These uses can be attributed to the proposed decomposition of a Mandarin verb into an eventuality predicate and an argument-filling aspect feature. It is the latter that introduces a discourse referent for an event or state. Crucially, an eventuality predicate may occur without any aspect feature, in which case no eventuality is introduced. In contrast, an English verb always introduces an eventuality referent, as part of its lexical meaning (see Muskens 1995; Bittner 2014), so it cannot be used in this way.

For example, a number of transitive verbs in Mandarin can serve as preposition-like *coverbs* (see e.g. Henne *et al.* 1977; Li & Thompson 1981; Ross & Ma 2006). Paradigm examples include *zài* ‘be in/on/at/in progress’ and *dào* ‘get to’, whose full-fledged verb uses are exemplified in (10a) and (11a); and preposition-like coverb uses, in (10b) and (11b). As indicated in the glosses, I propose that the two uses differ in the presence or absence of an aspect feature. When used as coverbs, *zài* and *dào* contribute only their eventuality predicates, of a locative state ( $v_{\sigma}$ ) and a culmination point ( $v_e$ ), respectively. There is no aspect feature, so a coverb does not introduce any eventuality of its own. Instead, the bare eventuality predicate modifies the eventuality introduced by the aspect feature of the main verb. In (10b), the main verb introduces an eating event; the coverb phrase [*zài* np] locates the progress state of this event in the agent’s home. Similarly, in (11b), the main verb introduces a planned departure; the coverb phrase [*dào* np] locates the culmination point of the planned trip in New York. When the same items are used as full-fledged verbs, the eventuality predicate selects a compatible aspect feature, which derives the full-fledged verb meaning. Thus, in (10a), the stative verb *zài* ( $S/v_{\sigma}$ ) introduces a state of the subject being at home. Similarly, in (11a), the point event verb *dào* ( $E/v_e$ ) introduces the culmination point of the subject’s trip to New York.

- (10) a. *Tā zài jiā* 。  
 3SG s/be.at home  
 S/he is at home.
- b. *Tā zài jiā chī fàn* 。  
 3SG be.at home E/eat.rice  
 S/he is eating at home.
- (11) a. *Tā jīntiān dào le Nǚyūē* 。  
 3SG today E/get.to PNC New York  
 S/he arrived in New York today.
- b. *Wǒ míngtiān dào Nǚyūē qù* 。  
 1SG tomorrow get.to New York E/go  
 I am going to New York tomorrow.

Similarly, the fact that most gradable stative verbs in Mandarin (e.g. (12a)) do double duty as adjectival modifiers (see (12b)) is amenable to a parallel account. The two uses, I suggest, are likewise distinguished by the presence or absence of an aspect feature.

In (12a), the aspect feature of the verb *piàoliàng* ( $S/v_{\sigma}$ ) introduces a state of the topical skirt being pretty. In (12b), the bare state-predicate ( $v_{\sigma}$ ) modifies the discourse referent introduced by the individual classifier (*yī-tiáo* ‘one-CL’) of the modified noun.

- (12) a. *Zhèi-tiáo qúnzi zhēn piàoliàng* 。  
 that-CL skirt really S/pretty  
 This skirt is really pretty.
- b. *Wǒ jīntiān mǎi le yī-tiáo piàoliàng de qúnzi* 。  
 1SG today E/buy PNC one-CL pretty H skirt  
 I bought a pretty skirt today.

Finally, Mandarin verbs often combine into *serial verb constructions* (SVC’s), as discourse (13i–ii) illustrates (see e.g. Chao 1968; Li & Thompson 1981; Yip & Rimmington 2004). An SVC consists of two or more verbs, possibly with complements, jointly forming a complex predicate. There is only one subject, and any aspect marker marks the entire SVC. For example, in (13i), *le* marks the SVC interpreted as ‘go shopping in town’. Similarly, in (13ii), the first *le* marks the SVC interpreted as ‘get tired of walking’.

- (13) i. *Xiǎoli jīntiān jìn.chéng qù mǎi dōngxi le* 。  
 Xiaoli today E/enter.town go buy things PNC  
 Xiaoli went shopping in town today.
- ii. *Tā zǒu lèi le, zuò.xiàlai xiūxiūxi,*  
 3SG E/walk tired PNC, E/sit.down rest.a.bit,  
*zuò zhè tīng shōuyīnjī shuì.zháo le* 。  
 E/sit DUR E/listen radio E/sleep.catch PNC  
 When she got tired of walking, she sat down to rest a bit. She fell asleep listening to the radio.

I propose that a Mandarin SVC consists of two or more eventuality predicates in the scope of a shared aspect feature. The predicates jointly form a complex predicate, because they all co-specify the eventuality introduced by the shared aspect feature. The shared subject of the SVC is the central individual of that shared eventuality. An SVC licenses at most one aspect marker, because Mandarin aspect markers are anaphorically dependent on antecedent aspect features. For example, *le* ‘PNC’ (punctual) is doubly anaphoric, not only to the antecedent aspect feature but also to the current topic state. Specifically, combining Chu (1998) and Wu (2003), I propose that *le* foregrounds the antecedent eventuality, by aligning its *significant point* (start or culmination) with the significant point of the topic state. In addition, *le* ‘PNC’ asserts that, from the current point of view (usually, the speech point), the shared significant point is *verifiable* — i.e. is already realized in the same world (see Bittner 2008, 2011, 2014). For example, (13i) is about an already realized state of Xiaoli today that culminated in her going to town to shop (... PNC ◦). (13ii) is about a resulting state, which is also already realized. This state started with her getting tired (... PNC,) and culminated in her falling asleep (... PNC ◦).

#### 4. Mandarin aspect features and discourse units

In addition to Mandarin-specific verb uses, the proposed decomposition of Mandarin verbs into eventuality predicates and argument-filling aspect features also explains Mandarin-specific units of discourse — to wit, *o*-sentences and *topic chains*. These, in turn, shed light on the semantic interpretation of Mandarin aspect features.

As noted in the introduction, an ingenious experiment by Tsao (1990) shows that Mandarin speakers learning English agree with English speakers on the boundaries of English *o*-sentences, but not with Mandarin speakers on the boundaries of Mandarin *o*-sentences. This finding suggests that Mandarin *o*-sentences are units of discourse, reflecting the speaker's view of information structure (like English paragraphs); not units of syntax, governed by uncontroversial rules of the grammar (like English *o*-sentences).

Specifically, I propose that a Mandarin *o*-sentence is an aspectual topic-comment sequence. For (3i) and (3ii), the proposed topic-comment sequences are informally outlined in (14i) and (14ii) (see Bittner 2014 for a formal implementation). In general, a Mandarin *o*-sentence begins with a context-setting update terminating in a *topic-setting pause* (... |<sup>TS</sup>). This introduces a new *topic state* (<sup>T</sup>s<sub>n</sub>, a new situation to be discussed), and is followed by one or more comments. Each comment introduces an eventuality and anchors it to the current topic state, by means of an anaphorically anchored aspect feature (S<sub>Tσ</sub>/ or E<sub>Tσ</sub>) or an anaphoric chain consisting of the aspect feature and an anaphorically linked recentring aspect marker (e.g. foregrounding chain: S/ ... PNC<sub>Tσ</sub> or E/ ... PNC<sub>Tσ</sub>). Finally, in written discourse, *o* marks the end of the comments about this topic state.

(14) i. introduce **topic state** <sup>T</sup>s<sub>1</sub>: Xiaoli now

*Xiǎoli*

Xiaoli<sup>T</sup> |<sup>TS</sup>

... **comment 1**: <sup>T</sup>s<sub>1</sub> is part of a state s<sub>1.1</sub> of Xiaoli being young and pretty

*niánqīng piàoliàng* ,

S<sub>Tσ</sub>/<sub>T</sub>young S<sub>Tσ</sub>/<sub>T</sub>pretty ,

is young and pretty.

... **comment 2**: <sup>T</sup>s<sub>1</sub> is also part of a state s<sub>1.2</sub> of Xiaoli having a good job

*gōnzuò yě hǎo* ◦

<sub>T</sub>job also S<sub>Tσ</sub>/good ◦

She has a good job too.

ii. introduce **topic state** <sup>T</sup>s<sub>2</sub>: Xiaoli now with her present boyfriend in the background

*Suīrán yǒu ge nán péngyǒu* ,

although S<sub>Tσ</sub>/<sub>T</sub>have CL boyfriend<sup>+</sup> ,|<sup>TS</sup>

Although she<sub>T</sub> has a boyfriend,

... **comment 1**: <sup>T</sup>s<sub>2</sub> is part of a state s<sub>2.1</sub> of Xiaoli not wanting to get married

*kěshì bù xiǎng jiéhūn* ◦

but not S<sub>Tσ</sub>/<sub>T</sub>wish E/marry ◦

she<sub>T</sub> doesn't wish to get married.

Since states do not have visible boundaries, speakers may disagree how many topic states there are and where one state ends and the next one begins. That is why when Mandarin speakers are presented with a text with the 〇's omitted, they may disagree how many 〇's there are and where to restore them. For example, when presented with discourse (14i–ii) without the 〇's, they may disagree whether this discourse is about two topic states ( ${}^T s_1$  and  ${}^T s_2$ , as in the proposed analysis) or one ( ${}^T s'_1$ , present state of Xiaoli).

This analysis of Mandarin 〇-sentences can be extended to the next larger unit of Mandarin discourse — the *topic chain*. I propose that a Mandarin topic chain consists of one or more 〇-sentences whose topic states are centered on the same *topical individual* and are viewed by the speaker as a single ‘tracking shot’, following that individual. The speaker signals this view by referring to the topical individual by means of zero anaphors (missing subjects, objects, or possessors) throughout the topic chain.

For example, in a multi-sentential topic chain the speaker may zoom in, or out, from the topic state of the first 〇-sentence to a more detail-oriented, or more general, topic state of the same individual in the next 〇-sentence. For example, in (14i–ii) (= (3i–ii)) the topic states of both 〇-sentences ( ${}^T s_1$  and  ${}^T s_2$ ) are centered on the topical Xiaoli. They are also both situated in the speech world at the speech time. The first topic state ( ${}^T s_1$ ) is narrowly focused on the topical Xiaoli alone, whereas the second topic state ( ${}^T s_2$ ) zooms out to also include her present boyfriend in the background. In contrast, in (15i–ii) (= (4i–ii)) the ‘camera’ zooms in on a detail. In (15i) a familiar car is first of all (re)introduced as a topical individual. The main topic is the general state of this car ( ${}^T s_1$ ): its price, color, and relation to Lisi. (15ii) zooms in on part of this topic state that has already been realized today. The new topic state ( ${}^T s_2$ ) is still centered on the topical car, with Lisi in the background. It begins and ends with events that explain Lisi’s dislike.

(15) i. introduce **topic state**  ${}^T s_1$ : topical car now

*Nà-liàng chē* ,  
that-CL car<sup>T</sup> ,<sup>|T<sup>s</sup></sup>  
That car<sup>T</sup> ,<sup>|T<sup>s</sup></sup>

... **comment 1**:  ${}^T s_1$  is part of a state  $s_{1.1}$  of the car being too expensive

*jiàqián tài guì* ,  
<sub>T</sub>price too <sub>S<sub>Tσ</sub></sub>/high ,  
it<sub>T</sub>'s is too expensive

... **comment 2**:  ${}^T s_1$  is also part of a state  $s_{1.2}$  of the car having an ugly color

*yánsè yě bù hǎo* ,  
<sub>T</sub>color also not <sub>S<sub>Tσ</sub></sub>/good ,  
and it<sub>T</sub>'s an ugly color.

... **comment 3**:  ${}^T s_1$ -time is part of the time of a state  $s_{1.3}$  of Lisi disliking the car

*Lìsì bù xǐhuān* 〇  
Lisi<sup>⊥</sup> not <sub>S<sub>Tσ</sub></sub>/like<sub>T</sub> 〇  
Lisi<sup>⊥</sup> doesn't like it<sub>T</sub>.

- ii. introduce **topic state**  $\top s_2$ : the car in part of  $s_1$  realized today; L. in the background

*Jīntiān*

today | $\top s$

- ... **comment 1**:  $\top s_2$  begins with an event  $e_{2.1}$  of Lisi going to look at the car

*qù kàn le* ,

E/ $\perp$ go look $\top$  PNC $\top\sigma$  ,

he $\perp$  went to take a look at it $\top$ .

- ... **comment 2**:  $\top s_2$  ends with an event  $e_{2.2}$  of Lisi driving the car for a while

*hái kāi le yí.huǐ* ,

even E/ $\perp$ drive $\top$  PNC $\top\sigma$  a.M $_{while}$  ,

He $\perp$  even drove it $\top$  for a while,

- ... **comment 3**: at the end of  $\top s_2$ , there is still a state  $s_{2.3}$  of Lisi disliking the car

*háishì bù xǐhuān* ,

still not S $\top\sigma$ / $\perp$ like $\top$  ,

[but] he $\perp$  still didn't like it $\top$ .

- ... **comment 4**: during  $\top s_2$ , there is no event of Lisi buying the car

*méi mǎi* .

not $\top\sigma$  E/ $\perp$ buy $\top$  .

He $\perp$  didn't buy it $\top$ .

The shift to a new topic chain (new ‘tracking shot’) is usually signaled by the update of the topical individual. A case in point is discourse (16i–ii), where the two  $\circ$ -sentences constitute different topic chains. In (16i) the topic-setting update introduces Jiajia as the topical individual, and her state at the speech time in the speech world, as the topic state ( $\top s_1$ ). The first comment is that this topic state began with the topical Jiajia getting sick. The second comment adds that part of this topical state of sickness was a state of Jiajia running a fever last night (progress state of a fever episode). In (16ii), the topic-setting update introduces Lisi as the topical individual and his state during last night’s fever episode as the topic state ( $\top s_2$ ). The comments on this new topic state say that it began with Lisi taking Jiajia to a doctor and culminated when she got an injection.

- (16) i. introduce **topic state**  $\top s_1$ : Jiajia now

*Jiājia*

Jiajia $\top$  | $\top s$

- ... **comment 1**:  $\top s_1$  begins with Jiajia getting sick

*bìng le* ,

S/sick PNC $\top\sigma$  ,

is sick.

- ... **comment 2**: part of  $\top s_1$  is progress state of an event  $e_{1.2}$  of J. running a fever

*zuótiān wǎnshàng jiù fā shāo* .

yesterday night then E $\top\sigma$ / $\top$ have fever .

She $\top$  ran a fever last night.

- ii. introduce **topic state**  $\top s_2$ : Lisi during fever-episode  $e_{1.2}$ ; Jiajia in the background

*Lǐsì*<sup>T</sup> |<sup>Ts</sup>

- ... **comment 1**:  $\top s_2$  begins with Lisi taking Jiajia to a doctor

*dài tā qù kàn le yīshēng ,*  
E/take 3SG<sup>+</sup> E/go see PNC<sub>Tσ</sub> doctor ,  
took her<sup>+</sup> to a doctor,

- ... **comment 2**:  $\top s_2$  culminates in Jiajia getting an injection

*dǎ le zhēn 。*  
E/<sub>↓</sub>do PNC<sub>Tσ</sub> injection 。  
and she<sub>↓</sub> got an injection.

The shift to a new topic chain can also be signaled by the use of an anaphoric pronoun (e.g. *tā*) instead of a zero anaphor. For example, (17i–ii) consists of two topic chains about Xiaoli today. Both topic states are already realized (... PNC<sub>σ</sub>). (17i) is about her state of doing some shopping in town; (17ii) is about her resulting state of fatigue.

- (17) i. introduce **topic state**  $\top s_1$ : Xiaoli today

*Xiǎoli jīntiān*

Xiaoli<sup>T</sup> today |<sup>Ts</sup>

Today Xiaoli

- ... **comment 1**:  $\top s_1$  begins with an event  $e_{1.1}$  of Xiaoli entering town and culminates in an event  $e_{1.2}$  of Xiaoli making some purchases.

*jìn.chéng qù mǎi dōngxi le 。*  
E<sub>Tσ</sub>/enter.town go buy things PNC<sub>Tσ</sub> 。  
went shopping in town.

- ii. introduce **topic state**  $\top s_2$ : Xiaoli after  $e_{1.2}$ -shopping

*Tā*

3SG |<sup>Ts</sup>

When she<sub>T</sub>

- ... **comment 1**:  $\top s_2$  begins with an event  $e_{2.1}$  of X. getting tired of  $e_{1.2}$ -walking

*zǒu lèi le ,*  
E<sub>↓e</sub>/walk tired PNC<sub>Tσ</sub>,  
got tired of walking,

- ... **comment 2**:  $\top s_2$ -time includes an event  $e_{2.2}$  of Xiaoli sitting down to rest a bit

*zuò.xiàlai xiūxi.xiūxi ,*  
E<sub>Tσ</sub>/<sub>T</sub>sit.down rest.a.bit ,  
she<sub>T</sub> sat down to rest a bit.

- ... **comment 3**:  $\top s_2$  includes the progress state  $s_{2.3}$  of Xiaoli sitting (result of  $e_{2.2}$ ) and listening to the radio and culminates in an event  $e_{2.4}$  of X. falling asleep

*zuò zhè tīng shōuyīnjī shuì.zhào le 。*  
E/<sub>T</sub>sit DUR E/<sub>T</sub>listen radio E/<sub>T</sub>sleep.catch PNC<sub>Tσ</sub> 。  
She<sub>T</sub> fell asleep listening to the radio.

### 5. Mandarin aspect features and tenseless temporality

According to the present proposal, each Mandarin  $\circ$ -sentence introduces a new topic state followed by one or more comments. Each comment contains a verbal predicate consisting of a possibly complex eventuality predicate and an aspect feature. The eventuality argument of the predicate is saturated by the aspect feature, which introduces an eventuality into discourse and relates it to the current topic state. The relation to the topic state is established either directly, by an anaphorically anchored aspect feature ( $E_{\tau\sigma}$  or  $S_{\tau\sigma}$ ); or indirectly, via an anaphoric chain consisting of the aspect feature and an anaphorically linked recentering aspect marker that highlights or demotes the eventuality introduced by that feature (e.g. foregrounding chain:  $S/ \dots \text{PNC}_{\tau\sigma}$  or  $E/ \dots \text{PNC}_{\tau\sigma}$ ).

I have outlined how this proposal explains Mandarin-specific verb uses as well as discourse units. I now turn to make a case that it also explains how tenseless Mandarin can express temporal discourse reference as precisely as languages with grammatical tense systems. In tensed languages, discourse reference to salient times is grammatically parallel to discourse reference to salient individuals (see e.g. Partee 1973, 1984; Kamp 1981; Webber 1988). In a typical sentence, the subject introduces a topical individual, tense introduces a topic time, and the rest of the sentence comments on both topics by introducing an eventuality that is centered on the topical individual and temporally located at the topic time. Modal discourse reference, to salient possibilities, is likewise expressed in a parallel way (see e.g. Stone 1997; Stone & Hardt 1999; Bittner 2001; Brasoveanu 2007).

In contrast, I propose that in tenseless languages temporal discourse reference is integrated with, not parallel to, other types of discourse reference. For example, in a Mandarin  $\circ$ -sentence, topic-setting update introduces a topic state as the primary topic. The rest of the  $\circ$ -sentence comments by introducing an eventuality that is related to the topic state itself, not via a reference time (contra Smith 1991/7; Wu 2003; Xiao & McEnery 2004; Smith & Erbaugh 2005; Lin 2006; Ren 2008; etc.). The examples in section 4 illustrate some relations that are commonly found in Mandarin discourse: *central part of*, *start point of*, *culmination point of*, *consequent state of*, etc. Some of these direct relations between eventualities entail temporal relations found in tensed languages, but they are stronger. For example, the mereological relation *central part of* entails temporal inclusion, but it also entails spatial inclusion, centering on the same individual, and realization in the same worlds. In general, eventuality relations found in tenseless languages entail temporal relations along with other types of relations that can hold between eventualities — mereological (e.g. *part of*, *start point of*), spatial (e.g. *spatial inclusion*), causal (e.g. *consequent state of*), modal (e.g. *verifiable from*, i.e. already realized in the same world, *real culmination point of*, *hypothetical culmination point of*), individual-related (e.g. *centered on the same individual*, *central part of*), and so on.

By discourse-initial default, the topic state of a Mandarin  $\circ$ -sentence is anchored to the speech act, so it holds at the speech time in the real world. Past and present eventualities in the real world can be related to this topic state by mereological relations (e.g.

*central part of*, encoded by  $E_{\tau\sigma}$  in (18i)) or via verifiable significant points (i.e. the start point or the real culmination point, highlighted by foregrounding chains  $S/ \dots$  PNC $_{\tau\sigma}$  in (18i) and  $E/ \dots$  PNC $_{\tau\sigma}$  in (18ii)).

(18) i. **topic state**  $^{\tau}s_1$ : Jiajia now

*Jiājiā bìng le, zuótiān wǎnshàng jiù fā shāo.*  
 Jiajia $^{\tau}$  | $^{\tau}s$  S/sick PNC $_{\tau\sigma}$ , yesterday night then  $E_{\tau\sigma}$ /have fever.  
 Jiajia $^{\tau}$  is sick. She $_{\tau}$  ran a fever last night.

ii. **topic state**  $^{\tau}s_2$ : Lisi during last night's fever-episode

*Lìsì dài tā qù kàn le yīshēng, dǎ le zhēn.*  
 Lisi $^{\tau}$  | $^{\tau}s$  E/take 3SG E/go see PNC $_{\tau\sigma}$  doctor, E/ $\perp$ do PNC $_{\tau\sigma}$  injection.  
 Lisi $^{\tau}$  took her $^{\perp}$  to a doctor, and she $_{\perp}$  got an injection.

Reference to the future of the real world involves a future topic state (see (19)) or a future viewpoint (see (20)). In (19), the topic state is located in the future, by the context-setting phrase ‘tomorrow’; and in the real world, by default. Lisi’s departure thus falls within this future state in the real world, ruling out the punctual *le*, which asserts that it is already realized. In (20), the topic state is a present and real state of expectation, while the phrase ‘tomorrow already’ introduces a future culmination point. This can serve as the viewpoint for *le*, which now asserts realization by the time of this future viewpoint.

(19) **topic state**  $^{\tau}s_1$ : Lisi tomorrow

*Lìsì míngtiān líkāi (\*le) Nánjīng.* Wu 2003: (194a)  
 Lisi $^{\tau}$  tomorrow | $^{\tau}s$   $E_{\tau\sigma}$ /leave (\*PNC $_{\tau\sigma}$ ) Nanking.  
 Lisi $^{\tau}$  leaves Nanking tomorrow.

(20) **topic state**  $^{\tau}s'_1$ : Lisi now (present state of expectation)

*Lìsì míngtiān yǐjīng líkāi le Nánjīng.* Wu 2003: (194b)  
 Lisi $^{\tau}$  | $^{\tau}s$  tomorrow already $_{\tau\sigma}^s$  E/leave PNC $_{\perp\sigma}$  Nanking.  
 Lisi $^{\tau}$  will have already left Nanking by tomorrow.

Finally, (21ii) exemplifies reference to a hypothetical future. Here, the topic state is a state of Lisi if and when the hypothetical development of Jiajia’s illness is realized.

(21) i. **topic state**  $^{\tau}s_1$ : Jiajia now

*Jiājiā bìng le.*  
 Jiajia $^{\tau}$  | $^{\tau}s$  S/sick PNC $_{\tau\sigma}$ .  
 Jiajia $^{\tau}$  is sick.

ii. **topic state**  $^{\tau}s_2$ : Lisi if and when hypothetical development of J’s illness is realized

*Yàoshì fā le shāo,*  
 If  $E_{\tau}$ /have PNC $_{\tau\sigma}$  fever,  
*Lìsì huì dài tā qù kàn yīshēng.*  
 Lisi $^{\tau}$  | $^{\tau}s$  PRE $_{\tau\sigma}$  E/take 3SG $^{\perp}$  E/go see doctor.  
 If she $_{\tau}$  starts running a fever, Lisi $^{\tau}$  is going to take her $^{\perp}$  to a doctor.

## 6. Conclusion

The typological profile of Mandarin, as a topic- and aspect-prominent language, is amenable to a unified analysis. In this paper I outlined the analysis proposed in my forthcoming book (Bittner 2014), where I argue that both topic- and aspect-prominence involve discourse reference to the current *topic state* (situation under discussion).

More precisely, I propose that a Mandarin  $\circ$ -sentence (unit marked by  $\circ$ ) is an aspectual topic-comment sequence. It begins with a topic-setting update that introduces a new topic state. This update terminates in a pause and is followed by a verbal predicate and/or one or more clauses that all comment on this topic state. Crucially, the verbal predicate in each comment anaphorically refers to the topic state by means of the verb's *aspect feature* (eventive  $E_{\tau\sigma}$  or stative  $S_{\tau\sigma}$ ), or by means of an aspectual chain consisting of the aspect feature and an anaphorically dependent *aspect marker* (e.g.  $S/ \dots PNC_{\tau\sigma}$ ).

This proposal explains some otherwise puzzling and seemingly unrelated facts about Mandarin. First of all, unlike English sentences, Mandarin  $\circ$ -sentences are units of discourse, not syntax. When presented with a Mandarin text with the boundary markers ( $\circ$ ) removed, native speakers disagree how many there are and where to restore them (see e.g. Tsao 1990; Chu 1998; Li 2005). On the proposed analysis, Mandarin speakers disagree how many topic states there are and where one topic state ends and the next one begins. Mandarin  $\circ$ -sentences are thus more like English paragraphs, which are likewise units of discourse with flexible boundaries, and unlike English sentences, which are units of syntax with grammatically fixed boundaries.

Secondly, assuming this analysis of a Mandarin  $\circ$ -sentence, we can reconstruct the related notion of a *topic chain* (see descriptions by Tsao 1979; Chu 1998; Li 2005). This consists of one or more  $\circ$ -sentences whose topic states are centered on the same *topical individual* and are viewed by the speaker as a single 'tracking shot', following that individual. The speaker signals this view by referring to the topical individual by means of zero anaphors (missing subjects, objects, or possessors) throughout the topic chain.

Third, various uses of Mandarin verbs that are unattested in English — e.g. *serial verb constructions* (SVC), and preposition-like and adjective-like uses — can be understood if we analyze Mandarin verbs into two components: a predicate of an eventuality argument and aspect feature (E/ or S/) that saturates this argument and introduces an eventuality referent (event or state) into discourse. Preposition-like and adjective-like uses involve just eventuality predicates, without aspect features. An SVC is a series of eventuality predicates sharing the same aspect feature. This introduces a single eventuality, which is co-specified by all the predicates in the series. An SVC is thus a complex predicate that can only have one subject (the central individual of the shared eventuality) and its shared aspect feature can only antecede one aspect marker, marking the entire SVC.

Finally, the proposed analysis explains how tenseless Mandarin can express temporal discourse reference as precisely as English. In a typical English sentence, the subject and tense introduce a *topical individual* and a *topic time*, respectively. The verb phrase comments on both topics by introducing an eventuality that is centered on the top-

ical individual and located at the topic time. In contrast, in a Mandarin *o*-sentence the topic-setting update introduces a *topic state* as the primary topic. Every comment (verbal predicate or clause) then introduces an eventuality that is itself related to this topic state by a relation that depends on the aspect feature and pragmatics.

In Bittner (2014) this proposal is formally implemented in a framework that combines Categorical Grammar with a new dynamic logic called *Update with Centering*. This implementation builds on recent advances in dynamic semantics and the intuitive insights of a handful of Mandarin scholars who argue against the standard practice of analyzing Mandarin in terms of English-based categories. Instead, they insist that a proper analysis of Mandarin requires Mandarin-based categories, such as *o*-sentences, topic chains, and Mandarin-specific aspectual classes (see e.g. Chao 1968; Henne *et al.* 1977; Tsao 1979, 1990; Tai 1984; Chu 1998; Li 2005). In my view, evidence from actual Mandarin texts clearly favors Mandarin-based categories, although the predictions are difficult to work out in the absence of a formally precise implementation. By proposing such an implementation, I hope to encourage research that analyzes Mandarin in terms of its own categories, without assimilating it to English, and is formally precise enough to enable researchers who do not speak Mandarin (such as this author) to work out the predictions.

## REFERENCES

- BITTNER, MARIA. 2001. Topical referents for individuals and possibilities. *Proceedings of Semantics and Linguistic Theory XI*, edited by Rachel Hastings, Brendan Jackson, and Zsotia Zvolensky, 36–55. Ithaca, NY: CLC.
- BITTNER, MARIA. 2008. Aspectual universals of temporal anaphora. *Theoretical and cross-linguistic approaches to the semantics of aspect*, edited by Susan Rothstein, 349–85. Amsterdam: John Benjamins.
- BITTNER, MARIA. 2011. Time and modality without tenses or modals. *Tense across languages*, edited by Renate Musan and Monika Rathert, 147–88. Tübingen: Niemeyer.
- BITTNER, MARIA. 2014. *Temporality: Universals and variation*. Oxford: Wiley-Blackwell.
- BRASOVEANU, ADRIAN. 2007. Structured nominal and modal reference. PhD thesis. New Brunswick, NJ: Rutgers University.
- CHAO, YUEN REN. 1968. *A grammar of spoken Chinese*. Berkeley: University of California Press.
- CHU, CHAUNCEY CHENG-HSI. 1983. *A reference grammar of Mandarin Chinese for English speakers*. New York: Peter Lang.
- CHU, CHAUNCEY CHENG-HSI. 1998. *A discourse grammar of Mandarin Chinese*. New York: Peter Lang.

- DEFRANCIS, JOHN. 1976. *Beginning Chinese*. Second revised edition. New Haven: Yale University Press.
- DEFRANCIS, JOHN ed. 2003. *ABC Chinese-English comprehensive dictionary*. Honolulu: University of Hawai'i Press.
- HENNE, HENRY; OLE BJØRN RONGEN; and LARS JUL HANSEN. 1977. *A handbook on Chinese language structure*. Oslo: Universitetsforlaget.
- KAMP, HANS. 1981. Evènements, représentations discursive et référence temporelle. *Languages* 64.39–64.
- LI, CHARLES N., and SANDRA A. THOMPSON. 1981. *Mandarin Chinese: A functional reference grammar*. Berkeley: University of California Press.
- LI, WENDAN. 2005. *Topic chains in Chinese*. München: Lincom.
- LIN, JO-WANG. 2006. Time in a language without tense: The case of Chinese. *Journal of Semantics* 23.1–54.
- PARTEE, BARBARA H. 1973. Some structural analogies between tenses and pronouns in English. *Journal of Philosophy* 70:601–9.
- PARTEE, BARBARA H. 1984. Nominal and temporal anaphora. *Linguistics and Philosophy* 7.243–86.
- REN, FEI. 2008. *Futurity in Mandarin Chinese*. PhD thesis. Austin: University of Texas at Austin.
- ROSS, CLAUDIA, and JING-HENG SHENG MA. 2006. *Modern Mandarin Chinese grammar*. London: Routledge.
- SMITH, CARLOTA S. 1991/7. *The parameter of aspect*. Dordrecht: Kluwer.
- SMITH, CARLOTA S., and MARY ERBAUGH. 2005. Temporal interpretation in Mandarin Chinese. *Linguistics* 43–4.713–56.
- STONE, MATTHEW. 1997. The anaphoric parallel between tenses and modals. Technical Report IRCS 97–6. <http://www.cs.rutgers.edu/~mdstone>.
- STONE, MATTHEW and DANIEL HARDT. 1999. Dynamic discourse referents for tenses and modals. *Computing meaning*, vol. 1, edited by Harry C. Bunt and Reinhard Muskens, 301–20. Dordrecht: Kluwer.
- TAI, H.-Y. JAMES. 1984. Verbs and times in Chinese: Vendler's four categories. *Papers from the parasession on lexical semantics*. Proceedings from the 20th annual regional meeting of the Chicago Linguistic Society, edited by David Testen, Veena Mishra, and Joseph Drogo, 289–96. Chicago: CLS.
- TSAO, FENG-FU. 1979. *A functional study of topic in Chinese: The first step towards discourse analysis*. Taiwan: Student Book.
- TSAO, FENG-FU. 1990. *Sentence and clause structure in Chinese: A functional perspective*. Taiwan: Student Book.
- WEBBER, BONNIE. 1988. Tense as discourse anaphor. *Computational Linguistics* 14.61–73.
- WU, JIUN-SHIUNG. 2003. *Modeling temporal progression in Mandarin*. PhD thesis. Austin: University of Texas at Austin.

BITTNER: TOPIC STATES IN MANDARIN DISCOURSE

- XIAO, RICHARD, and TONY McENERY. 2004. *Aspect in Mandarin Chinese: A corpus-based study*. Amsterdam: John Benjamins.
- YIP, PO-CHING, and DON RIMMINGTON. 2004. *Chinese: A Comprehensive Grammar*. London: Routledge