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An aspectual account of *ba* and *bei* constructions in child Mandarin

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Abstract

This study examines the *ba* and *bei* constructions in Mandarin using data from the Tong corpus, a new multimedia longitudinal child language corpus. A unified aspectual account of the two constructions is proposed: both require telic predicates, and should thus correlate with the perfective rather than imperfective aspect for learners. Analysis of corpus and diary data reveals that Tong is generally sensitive to the telic requirement when he begins to use the two constructions around 2;0. His *ba* and *bei* sentences occur far more frequently in perfective than imperfective aspect, consistent with the Aspect Hypothesis. However, while the majority of the child's *bei* passives are perfective, the majority of his *ba* sentences are produced without overt aspect markers, among which most are irrealis (imperatives, modal sentences, etc.). The difference mirrors the pattern in adult input. These findings are corroborated by additional child Mandarin corpora. The acquisition of the aspectual properties of the *ba* and *bei* constructions is influenced by inherent knowledge, input and language-specific features of Mandarin, consistent with the multi-factorial account proposed by earlier studies.

Keywords

Aspect Hypothesis, *ba*, *bei*, child Mandarin, telicity, perfectivity, modality

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Introduction

How languages encode temporal properties of events and how relevant language-specific properties are acquired by learners is a captivating topic in acquisition studies cross-linguistically. Temporal properties of events can be captured by theoretical constructs such as TELICITY, BOUNDEDNESS and PERFECTIVITY. Telic events have an inherent natural endpoint, at which a change of state occurs and the event is complete (Smith, 1991, p. 29). In language, telic events are usually encoded in verbs or verb phrases known as ACHIEVEMENTS and, if they include a process in addition to the endpoint, ACCOMPLISHMENTS. Atelic events include STATES and, in the case of dynamic situations, ACTIVITIES ('lexical aspects' or 'situation types', Smith, 1991; Vendler, 1967). A related notion is BOUNDEDNESS: events are bounded as long as they are presented as having temporal boundaries, whether they are signaled by telic verb phrases reaching their potential endpoints or atelic verb phrases terminated by externally imposed endpoints (Depraetere, 1995). On another dimension, events are perfective if they denote a situation which is viewed in its entirety regardless of its internal temporal constituency, otherwise imperfective (Comrie, 1976; P. Li, 1990; Smith, 1991). Both telic and atelic situations can be perfective.

Intuitively, telic events, due to their inherent endpoints, are more likely to be viewed in their entirety than atelic ones. The correlation between situation type and grammatical marking of tense and aspect is formulated as the Aspect Hypothesis (AH) shown in (1) (e.g., P. Li & Shirai, 2000; Shirai, 1991).

(1) a. Learners initially use (perfective) past marking on ACHIEVEMENT and ACCOMPLISHMENT verbs, eventually extending its use to ACTIVITY and STATE verbs.

b. In languages that encode the perfective/imperfective distinction, imperfective past develops later than perfective past.

c. In languages that have progressive aspect, learners first use progressive aspect marking mostly with ACTIVITY verbs, then extend to ACCOMPLISHMENT and ACHIEVEMENT verbs.

d. Learners do not incorrectly overextend progressive aspect marking to STATIVE verbs.

The AH has been tested extensively across languages, resulting in highly consistent findings. French-speaking children, for instance, tend to use present forms (*présent*) for inherently durative events (atelic events) and perfective past forms (*passé composé*) for actions with clear end-results (telic events) (Bronckart & Sinclair, 1973). Mandarin-speaking children are sensitive to the distinction between ACTIVITY and telic verbs in experimental settings (P. Li, 1990; P. Li & Bowerman, 1998), and they use perfective *-le* predominantly with telic verbs in spontaneous speech (Chen & Shirai, 2010).

In child language acquisition, major approaches to language development include the nativist account (e.g., Crain, 1991), the usage-based account (e.g., Tomasello, 2000, 2009) and statistical/distributional learning accounts, some of which integrate innate and input factors (Pinker, 1984; C. D. Yang, 2002). Under these approaches, innate predisposition (e.g., Bickerton, 1981), input patterns (e.g., Shirai & Andersen, 1995) and multifactorial accounts (Aksu-Koc, 1998; Chen & Shirai, 2010; Shirai, 1991, 1998) have been

proposed to account for the development of aspect in children. It is generally accepted that input plays an important role in the acquisition of aspect: Mandarin-speaking children's perfective *le* predominantly appears with telic verbs (Chen & Shirai, 2010), and some English-speaking children occasionally overgeneralize *-ing* to STATIVE verbs (Shirai, 1994), both reflecting patterns in the input; Turkish children's data show interactions between input and universal cognitive predispositions in the emergence of tense–aspect morphology (Aksu-Koc, 1998). Based on Japanese and Mandarin data, Shirai (1998) and Chen and Shirai (2010) proposed a multi-factorial account in which the universal tendencies predicted by the AH are mediated by factors such as language typology and input.

The present study explores the possibility of extending the AH to the *ba* and *bei* constructions in Mandarin, which have been argued to have strong aspectual correlates. We explore whether Mandarin-speaking children are sensitive to the aspectual properties of the *ba* and *bei* constructions, and how verb semantics and input influence their acquisition based on data from a new multimedia longitudinal child language corpus, the Tong corpus, supplemented by diary data and other published corpora.

The *ba* and *bei* constructions and their aspectual properties

The *ba* construction, as in (2a), is a core construction in Mandarin. It departs from the canonical SVO order in Mandarin in that the object, usually a PATIENT/THEME, is preposed from its usual post-verbal position to the pre-verbal position following *ba*. The subject noun phrase (NP), usually an AGENT, stays in the pre-*ba* position, hence the S-*ba*-O-V order. The *ba* construction has long been associated with a disposal meaning (Huang, Li, & Li, 2009, p. 195; C. N. Li & Thompson, 1981; Wang, 1954), and displays properties of clause types with 'high transitivity' by depicting a situation where 'an agent [is] behaving actively, volitionally, and totally upon a definite object' (Hopper & Thompson, 1980). While the *ba* construction seems unique to Chinese (Tsao, 1987), the *bei* construction, as in (2b), is a type of passive construction. *Bei* passives with an AGENT NP following *bei* (e.g., *yu* 'rain' in 2b) are known as 'long passives', those without the AGENT as 'short passives'.

(2) a. Ni ba jimu la-guo-lai.[1]
you BA building block pull-cross-come
'You pull the building blocks here.'

b. San-zhi xiaozhu bei (yu) lin-shi le.
three-CL piglet BEI rain splash-wet LE
'Three piglets were soaked (by the rain).'

Lexical aspect

Both *ba* and *bei* constructions require a complex predicate such as *la-guo-lai* 'pull-cross-come' in (2a). The complex predicate contains a main verb, and a complement conveying resultative state and delimiting the event as an endpoint (Liu, 1997; S. Yang, 1995). The resultative state/location is typically encoded by a resultative or directional verb complement in a resultative verb compound (RVC) such as *lin-shi* 'splash-wet' and *la-guo-lai* 'pull-cross-come' in (2) (Chao, 1968; Y. Li, 1990). RVCs overtly encode the underlying

event structure of a telic event, with the main verb (e.g., *lin* 'to splash') denoting an activity/process and the complement (e.g., *shi* 'wet') a resultative state (Y. Li, 1993).

The resultative state can also be realized by other means such as a clause introduced by *de* as in (3a), a locative NP or prepositional phrase (PP) as in (3b), an indirect object introduced by the dative marker *gei* 'to' (3c), a post-verbal partitive, resultant or goal NP (3d), or a post-verbal duration/frequency/verb measurement expression (3e) (Chappell, 2016; A. Y.-H. Li, 2006; Liu, 1997).

(3) a. Lisi bei Zhangsan da-**de** **bi-qing-lian-zhong**
Lisi BEI Zhangsan beat- DE nose-bruised-face-swollen
'Lisi was beaten by Zhangsan to the point that he had a badly beaten face.'
b. Lisi ba yaoshi fang **(zai)** **zhuo** **shang** le.
Lisi BA key put at desk top LE
'Lisi put the key on the desk.'
c. Na shu bei ta na **gei** **mama** le.
that book BEI he take to Mommy LE
'That book was taken to Mommy by him.'
d. Juzi bei ta bo-le **pi**.
orange BEI he peel-Perf peel
'The orange was peeled by him.'
e. Ba zhe chi **yi-kou**.
BA this eat one-bite
'Take one bite of this.'

The predicates in (2) to (3) are all telic. This is evidenced by the fact that they can legitimately take the time adverbial *zai x nei* 'in *x* time' to indicate a change has occurred within an interval, a test widely used in the literature to identify telic predicates (Dowty, 1979; Rothstein, 2004), as exemplified in (4). However, some seemingly atelic predicates (Huang et al., 2009, p. 192; A. Y.-H. Li, 2006) with the pre-verbal adverbials in (5a), and durative *-zhe* in (5b) which do not pass the 'in *x* time' test, form acceptable *ba/bei* sentences.

(4) **Zai** **yi** **xiaoshi** **nei** Lisi ba yaoshi fang zai zhuo shang le.
at one hour inside Lisi BA key put at desk top LE
'In one hour, Lisi put the key on the desk.'
(5) a. Ta zheng zai ba dongxi **wang** **wu-li** ban.
he right ZAI BA things toward room-inside move
'He is moving things into the room.' (Huang et al., 2009, p. 192)
b. Na shi ta ba haizi bao-**zhe**.
that time he BA child hold-DUR
'At that time, he held the child.' (Adapted from A. Y.-H. Li, 2006, p. 444)

Grammatical aspect

Chinese does not have dedicated markers for grammatical tense. Temporal references are signaled or inferred by lexical aspect, aspect markers, temporal adverbs and modal auxiliaries (Wu, 2002). Both *ba* and *bei* constructions are thought to correlate strongly with

perfective aspect (Hopper & Thompson, 1980; S. Yang, 1995). A *ba* sentence sounds incomplete without the perfective aspect marker *-le* if past-time reference is intended, as in (6a), and so does a *bei* sentence (S. Yang, 1995), whereas the corresponding canonical SVO sentence can in fact stand without it, as in (6b).[2]

(6) a. Ta zuotian ba liang-ge huaping da-po *(le).
he yesterday BA two-CL vase hit-broken LE
'He broke two vases yesterday.'
b. Ta zuotian da-po(-le) liang-ge huaping (le).
he yesterday hit-broken(-Perf) two-CL vase LE
'He broke two vases yesterday.'

Nevertheless, the obligatoriness of *le* is more complicated than previously assumed. In certain discourse contexts, some *ba* sentences with past-time reference are well-formed without *le*. In a discourse of multiple events, only the last verb is marked to express perfectivity (Chappell, 2016; R. Xiao & McEnery, 2004, p. 237), and the preceding verb(s) are not marked with aspect markers (i.e., 'aspectless'), as in (7). *Le*-less *ba* sentences are also licensed by progressive *zai*, modal *yao* 'will', etc. (Liu, 1997).

(7) Multiple events
Ni ba pintu si-xialai, huai le ya.
you BA jigsaw puzzle tear down break LE sfp
'You tore down the jigsaw puzzle, and (it) broke.' (Tong corpus)

Liu (1997) proposed that *ba* occurs with predicates that denote bounded events. An event can be bounded (a) on the basis of the situation denoted by the uninflected predicate, or (b) when a situation is presented in perfective aspect. Condition (a) explains why *le* is not obligatory in *ba* sentences. Condition (b) accommodates predicates such as (8a) where *da Zhangsan* 'beat Zhangsan' is atelic, and requires perfective *-le* in the *ba* construction to be bounded. However, the second condition is too permissive in allowing ungrammatical sentences like (8b) whose predicate is atelic but perfective.

(8) a. Lisi ba Zhangsan da *(le).
Lisi BA Zhangsan beat LE
'Lisi beat up Zhangsan.'
b.* Lisi ba men qiao le.
Lisi BA door knock LE
Intended: 'Lisi knocked the door.'

In Mandarin, the phonological form *le* can represent at least three functional elements: an aspect marker signaling perfective aspect when immediately following a verb as the first *-le* in (6b) (Chao, 1968; C. N. Li & Thompson, 1981; Smith, 1991), a sentence-final particle that is closely related to aspect, indicating inchoativity (Chao, 1968) or currently relevant state (C. N. Li & Thompson, 1981) as the last *le* in (6b), and a phonetically reduced form of the resultative verb complement *liao* 'finish' (Lü, 2003, p. 352; Ma, 1982). When sentence-final *le* follows a bare verb, as in (8a), additional effort is required to determine whether it is the complement, the perfective marker, the

sentence-final particle or a fused form of two or even three of them. As (8a) depicts a past event, the sentence-final *le* immediately following a bare verb is actually a fused form: it delimits the process of *da Zhangsan* 'beat Zhangsan' as a verb complement, making the predicate telic, marks the sentence as perfective, and serves as a sentence-final particle. The distinction enables us to see that a delimiter such as the verb complement *le*, rather than the perfective -*le*, is obligatory for the *ba* and *bei* constructions. Telicity rather than boundedness captures the aspectual properties of the two constructions as shown by the contrast between (8a) and (8b).

Acquisition of *ba*/*bei* constructions

The *ba* construction emerges around 2;0 (year; month). G. Zhou and Wang (2001) found that children at 2;0 ($N = 90$) spontaneously produce only two types of delimiters in the *ba* construction, resultative verb complements and locatives, gradually extending to nine types by 4;6. X. Yang and Xiao (2008) reported that around 2;0, a Mandarin-speaking girl begins to use a variety of delimiters, including resultative verb complements, locative and dative PPs, duration/frequency phrases, *le* and -*zh*e. They had the impression that the girl's *ba* sentences are mainly imperatives, conveying unactualized events. On the other hand, Chang and Zheng (2017) found that imperatives only account for 14.6% of the total *ba* sentences produced by the boy that they observed longitudinally from 2;0 to 2;11. The child mainly used *ba* sentences in expressing past events. They also found that resultative verb compounds dominate in various predicates, accounting for 68.1% of the total. Non-target forms (e.g., *ba* incorrectly used as the main verb without a lexical verb) are identified in children at 3;0, suggesting that the *ba* construction has not been fully acquired by this age (Erbaugh, 1982, p. 223).

Passive constructions are acquired early in Sesotho and Inuktitut children, but quite late by English, German or Hebrew-speaking children, and Demuth (1989) and Allen and Crago (1996) attribute this pattern to differences in frequency in the adult input, and more fundamentally, language-specific features of passives. With the emergence of Mandarin *bei* passive, there have been conflicting findings: Zhang (2014, p. 216), in a case study, reported early emergence at 1;10, whereas the children in G. Zhou and Wang (2001, p. 95) only produced it after 3;0.

Corpus-based studies on adult use of the *ba* construction abound. Based on 116 *ba* sentences and 255 *bei* sentences from the Weekly Corpus comprised of written texts from a Chinese newspaper, Z. Xiao and A. McEnery (2004) found that 93.8% and 82% of *ba* and *bei* sentences had telic predicates (in their classification, ACCOMPLISHMENT, ACHIEVEMENT, and ACTIVITY and SEMELFACTIVE followed by the resultative-*de* structure). The frequency of *ba* sentences ranges from 0.226% in a talk show to 0.05% in academic articles and news reports (N. Li & Wang, 2001). These findings, exclusively or partly based on written texts, cannot be readily extended to spoken language. From the Lancaster Corpus of Mandarin Chinese, Xiao, McEnery, and Qian (2006) found that 61.2% of the *bei* passives in the non-embedded position have -*le* and RVCs, and only 28.4% have no aspectual marking or only have sentence-final change-of-state *le*. By collapsing RVC and perfective aspect marker -*le*, and treating sentence-final *le* as not relevant to aspect, their study is not informative enough in revealing the interaction between telicity and perfectivity in *bei* passives. There are some corpus studies of the child and

adult uses of *le* (Sue, 2000; Zhang, 2014), but none has considered verb complement *le* in classifying their data.

In sum, existing studies have shown that *ba* and *bei* constructions are mainly telic and the *bei* construction is mainly perfective in adult language. Children begin by using resultative verb complements and locatives in their *ba* sentences. But studies have not come to agreement on a number of important issues in child Mandarin: the aspectual properties of the predicates in the two constructions and their relation with the adult input, the frequency, and the exact age of emergence of the *bei* passive.

Research questions and hypothesis

This study addresses two questions:

1. What are the aspectual properties of *ba* and *bei* constructions in child Mandarin? Are the predicates telic and marked as perfective?
2. To what extent is children's development of the two constructions shaped by properties of adult input?

Applying the AH in (1) to the two constructions, we predict that Mandarin-speaking children will initially mark the predicates in *ba* and *bei* sentences with perfective, rather than imperfective markers, once they become aware that the predicates in these constructions are telic.

Method

We address these questions by using naturalistic language data from child Mandarin – the Tong corpus (Deng & Yip, 2017), supplemented by diary entries, and additional corpora from the Child Language Data Exchange System (CHILDES) (MacWhinney, 2000).

Corpus-based study

The Tong corpus contains longitudinal Mandarin speech data based on interactions between Tong and his caregivers from 1;7 to 3;4. At the time of the study, Tong was a monolingual Mandarin-speaking boy raised in Shenzhen, China, where Mandarin is the language of the community. The family members all speak Mandarin to the child. The child's spontaneous play was audiotaped and/or videotaped for one hour a week. At present, 22 recordings were transcribed and checked by native speakers of Mandarin with linguistic training (from 1;7 to 3;4, at one-month intervals). The Tong corpus features long hours of recording for a single child, and audio/video-linked transcripts.

Since patterns found in a single child may not generalize to other children, we also examined four corpora in CHILDES: the Beijing and Context corpora (Tardif, 1993, 1996; Tardif, Gelman, & Xu, 1999), the XuMinChen corpus (Chen & Shirai, 2010; Min, 1994), and the Zhou1 corpus (J. Zhou, 2001; J. Zhou & Chang, 2009), summarized in Table 1. The first three corpora in this table contain longitudinal data, while the rest mainly contain cross-sectional data in the form of natural or semi-structured conversations between children and their mothers in activities such as toys, book reading and drawing.

Table 1. Child Mandarin corpora searched.

	Corpus	No. of children	No. of boy	Age range	No. of child utterances	No. of adult utterances
Longitudinal	Tong	1	1	1;7–3;4	9,111	21,247
	Beijing	10	8	1;9–2;3	23,983	52,225
	XuMinChen	5	1	0;11–3;5	9,018	13,992
Cross-sectional	Context	24	12	2;0	3,340	16,144
	Zhou1	46	23	1;2–2;8	2,948	8,609

The KWAL command was used to extract all the sentences with *ba* or *bei*, together with five utterances preceding the target child utterances and two utterances following them to understand the context. Imitation (the exact or partial copy of one of the preceding five utterances not uttered by the child himself), nursery rhymes and unintelligible utterances were excluded. The emergence of each construction is defined as its first clear and spontaneous use.

Diary

Weekly or bi-weekly sampling of the child's speech may not be dense enough to support reliable analyses for low frequency phenomena. We remedy this by using diary data for Tong. The diary was kept by Tong's mother, the first author.

Coding

We coded three types of information in the *ba* and *bei* sentences in the five corpora: (i) predicate types, (ii) perfectivity and (iii) modality. Table 2 presents an overview.

For predicate types, we assigned the *ba/bei* sentences one of the eight codes from *a* to *h* in Table 2. Note that the first seven (*a–g*) are all telic, based on their acceptability with the temporal phrase *zai x nei* 'in *x* time', as discussed with sentences (2) to (4) above.

For perfectivity, we coded *ba* and *bei* sentences based on whether they have an overt marker for perfective aspect ('perfective'), imperfective aspect ('imperfective'), no overt aspect marker ('aspectless') or are ambiguous ('other'). In Mandarin Chinese, the perfective viewpoint is mainly marked by the perfective *-le* and experiential *-guo*, and the imperfective viewpoint by the progressive *zai* and durative *-zhe* (C. N. Li & Thompson, 1981, inter alia).[3] Besides, sentences containing post-verbal resultative clauses with *-de* (as in 3a, see Huang et al., 2009, p. 84), and verb-final *-de* (as in *Tongtong ba ta bai-kai de* 'It was Tongtong who broke it apart', following the analysis of *shi ... de* clefts in Paul & Whitman, 2008) are also coded as 'perfective'.

Le is a multi-functional particle in Mandarin (perfective *-le*, sentence-final *le* and verb complement *le*), as discussed in (8a) earlier. Chen and Shirai (2010), following P. Li (1990), coded all cases with *le* as perfective. In our study, non-perfective occurrences of *le* were carefully teased apart from the perfective ones which were marked as *-le*. The

Table 2. Coding of *ba* and *bei* sentences.

Types	Codes
Predicate	a. V-resultative verb complement b. V-directional verb complement c. V-locative NP/PP d. V-*de* resultative clause e. V-*gei* (dative) f. V-NP (partitive, resultant, goal) g. V-duration/frequency/verbal measurement h. adverbial-V
Perfectivity	i. perfective: *-le, -guo, -de* j. imperfective: *zai*, *-zhe* k. aspectless: zero aspect marking l. other: ambiguous cases
Modality	m. realis: sentences depicting actualized events n. irrealis: imperatives, conditionals, sentences with modal verbs, negative sentences, sentences denoting future events, and yes-no questions

following cases, although containing *le*, did not receive the 'perfective' code in this study: (1) verb complement *le* that follows a bare verb as in (9); (2) sentence-final particle *le* conveying a sense of urgency or warning in imperative sentences (C. N. Li & Thompson, 1981, pp. 207, 210), as in (10); and (3) the inchoative *le* which marks the coming about of a new situation and has been controversial as to whether it is an instantiation of perfective (Klein, Li, & Hendriks, 2000) or imperfective aspect (R. Xiao & McEnery, 2004, p. 25), as in (11).

(9) Na wo ba zhe guan-le ba.[4]
then I BA this close-finish sfp
'Then I (will) close this.'

(10) Ba shouji huan gei baba le!
BA phone return to Daddy LE
'Give Daddy the phone!'

(11) Mama ba jimu shou-qilai le a?
mommy BA building block collect up LE sfp
'(Is it OK if) Mommy begins to put away the building blocks?'

Lastly, we coded whether a sentence expresses irrealis or realis modality. Modality is closely related to tense and aspect as shown in the literature, hence we bring in this dimension in examining the aspectual properties of *ba* and *bei* constructions. We distinguish realis and irrealis situations based on Palmer (2001, p. 5) and Boland (2006, p. 87): situations that are portrayed as actualized are realis, and those that are portrayed as unactualized, irrealis. Thus, sentences portraying actualized past, present and habitual situations are coded as 'realis', others as 'irrealis'. Typical irrealis sentences include those depicting future events, those in the scope of modal auxiliaries, and those in the form of negatives, yes-no questions, conditionals and imperatives.

Table 3. Frequency of *ba* and *bei* in the corpora.

	ba		*bei*	
	Child # (%)	Adult # (%)	Child # (%)	Adult # (%)
Tong (1;7–3;4)	117 (1.28%)	557 (2.62%)	2 (0.02%)	26 (0.13%)
Beijing (1;9–2;3)	15 (0.06%)	402 (0.77%)	0	6 (0.01%)
XuMinChen (0;11–3;5)	56 (0.62%)	415 (2.97%)	3 (0.03%)	2 (0.01%)
Zhou1 (1;2–2;8)	9 (0.31%)	376 (4.37%)	0	4 (0.05%)
Context (2;0)	3 (0.09%)	285 (1.77%)	0	0

% = *ba/bei* tokens divided by total utterances.

The first and second authors independently coded all the *ba/bei* sentences in the Tong corpus, and the inter-coder reliability reached 98%.

Results

A total of 117 *ba* and 2 *bei* sentences were attested in Tong's spontaneous speech. Adopting the first spontaneous use criterion, the *ba* construction was found to emerge at 2;2.16 in the Tong corpus, and the *bei* construction at 2;0.19, slightly later than in the diary (2;1.9 for *ba* and 2;0.1 for *bei*). In the corpus the *ba* construction occurred quite frequently in adult as well as child language (2.63%, 1.28%), whereas the *bei* construction is much less frequent, especially in child utterances (0.02%), as shown in Table 3. These percentages are comparable to those in the other corpora.

We further pooled Tong's data into three observational periods – 2;2–2;3, 2;4–2;11 and 3;0–3;4 – with the first period representing his very early use of the *ba* construction, and the last representing his use of the construction after 3;0. While the child's average mean length of utterance in words remained stable across the three periods (3.6, 3.6, 3.8), the proportion of *ba* increased gradually from 0.97% to 2.41%.

We also did a cross-linguistic comparison of the emergence of the passive and its frequency. The passive emerges early at 2;0 in Mandarin based on Tong's data, as in Sesotho (2;1, Demuth, 1989) and Inuktitut (2;0, Allen & Crago, 1996). However, the frequency of the passive in the speech of Tong and his caregivers is lower than in the other languages. Interestingly, while Tong heard fewer passives in input than English-speaking children (1.2 vs. 2.7 passives per hour, based on Maratsos, Fox, Becker, & Chalkley, 1985), he produced passives earlier than the latter (2;0 vs. 2;8, based on Budwig, 1990). Early acquisition of Sesotho and Inuktitut passives correlates with their high frequency in input, which, however, is not applicable to Mandarin.

Lexical aspect

Among the eight predicate types listed in Table 2, Tong started with three types – V-resultative verb complement (V-RVCO), V-directional verb complement (V-DVC) and V-locative – extending to seven types over the three periods with the adverbial-V

Table 4. Predicates in Tong's *ba* sentences.

Predicate type	Period I		Period II		Period III	
	Child	Adult	Child	Adult	Child	Adult
V-RVCO	5 (71%)	19 (32%)	20 (37%)	82 (39%)	16 (29%)	51 (35%)
V-DVC	1 (14%)	19 (32%)	17 (31%)	75 (36%)	14 (25%)	46 (31%)
V-locative	1 (14%)	10 (17%)	13 (24%)	34 (16%)	21 (38%)	28 (19%)
V-DFM	0	4 (7%)	1 (2%)	4 (2%)	1 (2%)	5 (3%)
V-*de*	0	2 (3%)	1 (2%)	3 (1%)	0	1 (1%)
V-*gei*	0	1 (2%)	0	2 (1%)	1 (2%)	2 (1%)
V-NP	0	2 (3%)	0	1 (0%)	1 (2%)	5 (3%)
adv-V	0	0	0	1 (0%)	0	2 (1%)
Others	0	2 (3%)	2 (4%)	9 (4%)	0	7 (5%)
Total	7	59	54	211	55	147

RVCO = resultative verb complement, DVC = directional verb complement, DFM = duration/frequency/verbal measurement.

type absent throughout, while adults made use of all eight predicate types, as shown in Table 4.[5] In adult speech, the predicates were mostly resultative verb compounds (RVCs) formed by RVCO or DVC. RVCs are also used most frequently by the child (85%, 68% and 54% across the three periods). Among the three most frequent predicate types, there is a decrease in the proportion of V-RVCO and an increase in the proportions of V-DVC and V-locative, a pattern not found in the adult input.

The children in the other corpora also used RVCs most frequently: 60% (9 tokens) in Beijing corpus, 66% (37 tokens) in XuMinChen, 89% (8 tokens) in Zhou1 and 100% (2 tokens) in Context corpus, similar to the frequency percentages in the adult speech in these corpora. The proportion of V-RVCO is much higher than that of V-DVC and V-locative (71% vs. 28%) in Tong's earliest observation period (before 2;4). The pattern is also found in children younger than 2;4 in Beijing (53%, 8 tokens vs. 27%, 4 tokens) and Zhou1 (67%, 2 tokens vs. 33%, 1 token).[6]

Turning to the *bei* construction, we found 2 *bei* sentences by Tong in the corpus and 34 in the diary, totaling 36 tokens. However, one in the corpus is non-target-like in lacking complement and aspect marker. Among the complete 35 tokens, 74% are in the form of RVCs, mirroring the pattern in the input (73% for adults). Similarly in the XuMinChen corpus, 67% (2 tokens) of *bei* passives have RVCs as predicates. The RVCs in Tong's earliest *bei* sentences before 2;4 overlap with those in the *ba* sentences in the same period (listed in Appendix).

Grammatical aspect and modality

Table 5 summarizes the aspect marking of the *ba* construction in the Tong corpus. Surprisingly, zero marking ('aspectless') as exemplified in (12) is most frequent in both the child (from 81% to 92.7% across three periods) and his caregivers (from 74.6% to 84.4%), followed by perfective -*le* (from 5.5% to 14.8% in the child, and from 12.9% to

Table 5. Aspect marking in Tong's *ba* sentences.

	Period I		Period II		Period III	
	Child	Adult	Child	Adult	Child	Adult
Perfective						
-le	1 (14.3%)	12 (20.3%)	8 (14.8%)	41 (19.4%)	3 (5.5%)	19 (12.9%)
-de	0	2 (3.4%)	0	1 (0.5%)	0	3 (2.0%)
-guo	0	0	0	0	0	0
Imperfective						
zai	0	0	1 (2%)	1 (0.5%)	0	0
-zhe	0	0	0	2 (0.9%)	0	0
Aspectless						
zero	6 (85.7%)	44 (74.6%)	44 (81%)	159 (75.4%)	51 (92.7%)	124 (84.4%)
Other	0	1 (1.7%)	1 (1.9%)	7 (3.5%)	1 (1.8%)	1 (0.7%)
Total	7	59	54	211	55	147

20.3% in adults). The caregivers also produced imperfective *zai* and *-zhe*, and perfective *-de* (see the Coding section) at very low frequency. The experiential *-guo* is not found, a pattern also reported in Chappell's (2016) corpus study based on adult data. The child did not produce *-zhe*, *-de* or *-guo*, but produced one *ba* sentence marked by *zai*. Even though the perfective *ba* sentences are less frequent than expected, they far outnumber the imperfective ones marked by *zai* and *-zhe* in the child and adults.[7] The same is true for Tong's *bei* sentences: among his 35 complete *bei* sentences, 83% are marked by perfective *-le*, while none is imperfective. Among the 3 *bei* sentences found in XuMinChen, all are with perfective *-le*.

(12) Zero marking
  a. Modal auxiliary
     Ni yao ba zhe-ge xiu-hao a.
     you need BA this-CL repair-good sfp
     'You need repair this.'
  b. Conditional
     Mama ba mama-de xie fang dao ni tou shang,
     Mum BA Mum-Gen shoe put to your head top
     ni gaoxing ma?
     you happy sfp
     '(If) Mum put Mum's shoe on your head, would you be happy?'

In the corpus, Tong produced 5 non-target zero-marked *ba* sentences, exemplified in (13). The sentence was produced after Tong had used his toy gun to shoot the light onto the ceiling, hence the obligatoriness of perfective *-le*.

(13) * Ba qian-mian de che da dao shang-mian. (2;6)
     BA front DE car shoot to top
     Intended: '(I) shot the car in front to the top (of the ceiling light).'

Table 6. Perfective *ba* and *bei* sentences in the corpora.

	ba		*bei*	
	Child # (%)	Adult # (%)	Child # (%)	Adult # (%)
Tong (1;7–3;4)	12/116 (10%)	112/557 (20%)	29/35 (83%)	23/25 (92%)
Beijing (1;9–2;3)	7/15 (47%)	63/402 (16%)	0	5/6 (83%)
XuMinChen (0;11–3;5)	14/56 (25%)	92/415(22%)	3/3 (100%)	2/2 (100%)
Zhou1 (1;2–2;8)	4/9 (44%)	12/376 (3%)	0	3/4 (75%)
Context (2;0)	0/2 (0)	28/285 (10%)	0	0

Note: Perfective *bei* sentences by Tong were from diary and corpus.

Table 7. Cross-analysis of modality and aspect in *ba* sentences (Tong/caregiver).

	+Perfective	−Perfective	Total
Realis	12/96	13/25	25/121
Irrealis	0/16	91/420	91/436
Total	12/112	104/445	116/557

+ perfective = overt perfective marking; −perfective = without overt perfective marking.

Table 6 compares the percentages of perfective *ba* and *bei* sentences across five corpora. Only 10% of the *ba* sentences produced by Tong are perfective, but 83% of his *bei* sentences are perfective, a contrast also found in adults (20% vs. 92%), and in children and adults in the other corpora.

To understand the low frequency of perfective *ba* sentences, we performed an analysis of modality and perfective marking as shown in Table 7. Perfective *ba* sentences are less frequent than expected because many *ba* sentences express unactualized events: irrealis sentences account for 78% of both adult (436 out of 557 tokens) and child *ba* sentences (91 out of 116) in the Tong corpus. These include imperatives, future and conditional *ba* sentences, and so on. The most frequently used type is imperative: 45% (253/557) of the adult sentences and 29% (34/116) of the child sentences are imperatives. While using fewer imperatives than adults, the child used many irrealis *ba* sentences to express that he would do something soon. We find an even higher proportion of imperatives in XuMinChen (46% in children, 62% in adults). Children's perfective *ba* sentences are all realis, while adults also rarely use perfective *ba* sentences as irrealis conditional clauses, future perfective sentences and yes-no questions.

Discussion

Theoretical analyses of the *ba* and *bei* constructions have generally agreed on the predicates in these constructions being mainly telic or bounded, and the two constructions strongly correlating with the perfective aspect. Our study contributes to the

understanding of these constructions and their acquisition by teasing apart telicity and boundedness, and fine-tuning the coding of perfectivity. The new insights are achieved by adopting more fine-grained analyses of verbal predicates and grammatical particles in Chinese (e.g., the three-way analysis of *le*), and incorporating a new dimension – modality. This approach allows us to give a more accurate characterization of the aspectual properties of Mandarin *ba* and *bei* sentences in child and adult Mandarin in (14), and to show that the low frequency of perfective *ba* sentences, in comparison with aspectless ones, can be explained by the modality of *ba* sentences in Mandarin Chinese. The findings will be discussed in greater detail below.

(14) Aspectual properties of *ba* and *bei* sentences in child and adult Mandarin
a. the predicates are virtually all telic;
b. realis predicates with past time reference are predominantly marked as perfective;
c. the majority of *ba* sentences take zero aspect marking, and most of them are irrealis.

Telicity

By examining the predicates in Tong's *ba* sentences, we found that he started with the RVC (85%), which transparently encodes the process and result state/location in a telic event in two verbal elements, and relied heavily on it in subsequent developmental stages (68% to 54%). The same is true for his *bei* sentences. By 3;4 the child had not produced *ba* sentences with the 'adverbial-V' predicate or durative *-zhe* as shown in (5), claimed to be atelic in some analyses (Huang et al., 2009; A. Y.-H. Li, 2006), and adults also rarely used them, lending support to our claim in (14a). We further contend that events encoded by the two structures are potentially telic: a pre-verbal adverbial as in (5a) implies the goal of the action, and durative *-zhe* indicates a STATE which is the result of an action (Cheng, 1988; Pan, 1996; Smith, 1991, pp. 115–116). In this sense, the generalization in (14a) can be extended further: only telic predicates are allowed in the *ba* and *bei* constructions (see Liu, 1997; S. Yang, 1995). In this light, children associate the two constructions with telicity from the beginning.

Two factors can be argued to have led to this early association. First, telicity is a basic semantic feature (Smith, 1991, p. 19), and thus acquired early; second, children's telic predicates reflect the distributional pattern in the adult input. Acquisition can be driven by inherent knowledge and/or input evidence. Although our data do not allow us to calculate the weight of each factor in this acquisition outcome, we noticed some patterns in Tong's production that go beyond the input. During the first observational period (2;2–2;3), Tong's *ba* predicates mainly have the resultative verb complement, the proportion of which is considerably larger than that in adult input (71% vs. 32%). The following two periods witnessed the increase of the proportion of directional verb complements and locatives, while the proportions remain constant in adult input. The shift from resultative verb complement to directional verb complement and locative reflects a developmental pattern not found in input. Our speculation is that the former, mainly encoded by one morpheme, is formally less complex than the latter two, usually encoded by more than one morpheme, which explains the comparative ease of the former for the child.

Perfectivity and modality

Extending the AH to *ba* and *bei* constructions, we predicted that Mandarin-speaking children should mark the *ba/bei* sentences as perfective, rather than imperfective, given that their predicates are telic. Our data showed that perfective *ba* and *bei* sentences far outnumber imperfective ones in child utterances, lending support to our extension of the AH to *ba* and *bei* constructions.

Even though both constructions require telic predicates and share some of the same predicates, Mandarin-speaking children do not produce as high a proportion of perfective *ba* sentences as perfective *bei* sentences. The difference can be attributed to input effects: children used perfective *-le* far more frequently with *bei* than *ba* because adult input shows this pattern. The low frequency of child perfective *ba* sentences indicates the effect of input on children's use of aspect marking (Chen & Shirai, 2010; Shirai, 1994).

Adult Mandarin speakers frequently use aspectless *ba* sentences to convey irrealis situations. For instance, they tend to use the *ba* construction in an imperative to request the addressee to carry out an action in the (immediate) future. Although there is no entailment relationship between irrealis mood and aspectlessness or between realis mood and perfectivity as shown by Table 7, there are strong correlations between them. Input, or more fundamentally, the language-specific property of Mandarin in terms of the modality of *ba* sentences, explains the low frequency of perfective *ba* sentences in child Mandarin.

Lastly, a few non-target aspectless *ba* sentences suggest that children are not so sensitive to the perfective requirement in (14b) initially. The omission of perfective *-le* in obligatory contexts may be explained by the low frequency of *le*-marked *ba* sentences in adult input.

Input

The examination of *ba* and *bei* sentences sheds new light on the role input plays in child language acquisition. Firstly, the distribution of perfective aspect in children's *ba* sentences cannot be explained without considering the input. Mandarin-speaking children use considerably less perfective aspect in the *ba* construction than in the *bei* construction, even though both constructions share telic predicates, mirroring the distributional pattern in adult input. Other effects of input include children producing RVCs in the *ba* and *bei* constructions, as well as perfective *bei* sentences, at a rate similar to that of adults.

On the other hand, adult input cannot explain the emergence of the *bei* construction, the development of different predicate types in the *ba* construction, or children's non-target *ba* sentences, which can only be attributed to children's inherent knowledge of *ba* and *bei* constructions. Our longitudinal data show that despite its low frequency in adult input (0.13% shown in Table 3) compared with the *ba* construction (2.62%), *bei* emerges as early as *ba* in child language (2;0, cf. G. Zhou & Wang, 2001). It is difficult to explain the early emergence of the *bei* passive with input frequency as in Sesotho and Inuktitut (cf. Allen & Crago, 1996; Demuth, 1989). Tong's development of different predicate types in the *ba* construction differs from the input. He started with three prototypical predicate types and extended to seven types, while his caregivers made use of eight predicate types throughout

the same period. Among the three prototypical delimiters, he predominantly used resultative verb complements in the first observational period, but the following two periods witnessed an increase in the proportion of directional verb complements and locatives, a developmental pattern that does not match the input pattern. Lastly, Tong produced a few non-adult-like zero-marked *ba* sentences, a pattern not found in the input.

Conclusions

Based on new data from the Tong corpus and additional corpora, we found that Mandarin-speaking children, like adults, mainly used RVCs in the *ba* and *bei* constructions, which transparently express telic events, suggesting early sensitivity to the telicity of both constructions. Their *ba* and *bei* sentences occur far more frequently in perfective than imperfective aspect, confirming telicity's affinity with perfectivity in learners' grammar, in line with the AH.

Input, and more fundamentally, the language-specific property of Mandarin that *ba* sentences are frequently used to express irrealis events, account for the low frequency of perfective *ba* sentences in child Mandarin in comparison with perfective *bei* sentences. The proposed strong link between telicity and perfectivity following the AH is conditioned by language-specific features and input. The acquisition of the aspectual properties of the *ba* and *bei* constructions is influenced by inherent knowledge, input and language-specific properties of Mandarin, consistent with the multi-factorial account proposed by Shirai (1991, 1998) and Chen and Shirai (2010).[8]

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Notes

1. In this study, BA = marker of the *ba* construction, BEI = marker of the passive, CL = classifier, DUR = durative aspect marker, Gen = genitive, Perf = perfective marker, sfp = sentence-final particle, LE = sentence-final *le*.
2. *Ba* sentences denoting past events are also compatible with imperfective aspect as shown by (5b). However, apart from the adverbial-V and V-*zhe* predicates in (5) (proven to be rare in our corpus study), other predicates are unnatural in imperfective aspect if denoting past events.
3. C. N. Li and Thompson (1981, p. 206) proposed some perfectivizing expressions: directional phrases, locative phrases and indirect object phrases. We did not treat them as perfectivizing aspect marking, because our informants felt the need to have *le* in sentences containing these expressions. We did not discuss *ne* which is a sentence-final particle indicating ongoing situations in dialogues (see P. Li, 1990, p. 25), as it is extremely rare in our data.
4. *Le* in (9) is verb complement rather than perfective marker because it follows a bare verb, and the sentence conveys an unactualized event which the speaker did not present as a whole including the endpoint, as indicated by the context. For all the examples after this point, those with age information were produced by Tong, and others by his caregivers.
5. There are minor discrepancies between the number of *ba* and *bei* sentences across tables. For instance, there is a total of 117 child *ba* sentences in the Tong corpus in Table 3, but the total number of Tong's *ba* sentences included for analysis in Tables 4 to 6 is 116. Some *ba* and bei sentences are excluded for analysis because they are incomplete, having main verbs but lacking complements and aspect markers, and thus cannot be analyzed in terms of predicate type or aspect marking.
6. The pattern is not confirmed in XuMinChen (25%, 1 token vs. 75%, 3 tokens) and Context (50%, 1 token vs. 50%, 1 token) corpora. These two exceptions may be explained by the small sample size.
7. Imperfective aspect also includes the habitual aspect (Comrie, 1976). In the Tong corpus, habitual sentences are very low in frequency, so we did not discuss them.
8. We are non-committal about the nature of this kind of inherent knowledge (innate or acquired after birth, domain-general or domain-specific).

References

Aksu-Koc, A. (1998). The role of input vs. universal predispositions in the emergence of tense-aspect morphology: Evidence from Turkish. *First Language*, *18*, 255–280.

Allen, S. E. M., & Crago, M. B. (1996). Early passive acquisition in Inuktitut. *Journal of Child Language*, *23*, 129–155.

Bickerton, D. (1981). *Roots of language*. Ann Arbor, MI: Karoma.

Boland, J. H. J. (2006). *Aspect, tense and modality: Theory, typology, acquisition* (Doctoral dissertation). University of Amsterdam, Amsterdam, The Netherlands.

Bronckart, J. P., & Sinclair, H. (1973). Time, tense, and aspect. *Cognition*, *2*, 107–130.

Budwig, N. (1990). The linguistic marking of nonprototypical agency: An exploration into children's use of passives. *Linguistics*, *28*, 1221–1252.

Chang, H., & Zheng, L. (2017). Ertong putonghua *ba*ziju fazhan [The development of *ba* constructions in a Mandarin-speaking child: A longitudinal study]. *Yuyan Wenzi Yingyong*, *1*, 98–106.

Chao, Y. (1968). *A grammar of spoken Chinese*. Berkeley: University of California Press.

Chappell, H. (2016). Major non-canonical clause types: *Ba* and *bei*. In C.-R. Huang, & D. Shi (Eds.), *A reference grammar of Chinese* (pp. 746–796). Cambridge, UK: Cambridge University Press.

Chen, J., & Shirai, Y. (2010). The development of aspectual marking in child Mandarin Chinese. *Applied Psycholinguistics*, *31*, 1–28.

Cheng, L. (1988). Aspects of the *ba*-construction. In C. Tenny (Ed.), *Studies in generative approaches to aspect* (pp. 73–84). Cambridge, MA: MIT Working Papers in Linguistics.

Comrie, B. (1976). *Aspect*. Cambridge, UK: Cambridge University Press.

Crain, S. (1991). Language acquisition in the absence of experience. *The Behavioral and Brain Sciences*, *14*, 597–650.

Demuth, K. (1989). Maturation and acquisition of Sesotho passive. *Language*, *65*, 56–81.

Deng, X., & Yip, V. (2017). A multimedia corpus of child Mandarin: The Tong corpus. *Journal of Chinese Linguistics*. Advance online publication. doi:10.1353/jcl.2017.0025

Depraetere, I. (1995). On the necessity of distinguishing between (un)boundedness and (a)telicity. *Linguistics and Philosophy*, *18*, 1–19.

Dowty, D. (1979). *Word meaning and Montague grammar*. Boston, MA: D. Reidel.

Erbaugh, M. S. (1982). *Coming to order: Natural selection and the origin of syntax in the Mandarin-speaking child* (Doctoral dissertation). University of California, Berkeley.

Hopper, P. J., & Thompson, S. A. (1980). Transitivity in grammar and discourse. *Language*, *56*, 251–299.

Huang, C.-T. J., Li, Y.-H. A., & Li, Y. (2009). *The syntax of Chinese*. Cambridge, UK: Cambridge University Press.

Klein, W., Li, P., & Hendriks, H. (2000). Aspect and assertion in Mandarin Chinese. *Natural Language and Linguistic Theory*, *18*, 723–770.

Li, A. Y.-H. (2006). Chinese *ba*. In M. Everaert, & H. V. Riemsdijk (Eds.), *The Blackwell companion to syntax* (pp. 374–468). Malden, MA: Blackwell.

Li, C. N., & Thompson, S. A. (1981). *Mandarin Chinese: A functional reference grammar*. Berkeley: University of California Press.

Li, N., & Wang, X. (2001). *Ba* zi ju de yuyong gongneng diaocha [Investigation into the pragmatic functions of *ba* sentences]. *Hanyu Xuexi*, *1*, 55–62.

Li, P. (1990). *Aspect and aktionsart in child Mandarin* (Doctoral dissertation). Leiden University, Leiden, The Netherlands.

Li, P., & Bowerman, M. (1998). The acquisition of lexical and grammatical aspect in Chinese. *First Language*, *18*, 311–350.

Li, P., & Shirai, Y. (2000). *The acquisition of lexical and grammatical aspect*. Berlin, Germany: Mouton de Gruyter.

Li, Y. (1990). On V-V compounds in Chinese. *Natural Language and Linguistic Theory*, *8*, 177–207.

Li, Y. (1993). Structural head and aspectuality. *Language*, *69*, 480–504.

Liu, F.-H. (1997). An aspectual analysis of BA. *Journal of East Asian Linguistics*, *6*, 51–99.

Lü, S. (Ed.). (2003). *Xiandai hanyu babai ci* [800 words in modern Chinese]. Beijing, China: The Commercial Press.

Ma, X. (1982). Guanyu dongci *liao* de ruohua xingshi/·lou/ [On the reduced form of the verb *liao*: /·lou/]. *Zhongguo Yuyan Xuebao*, *1*, 1–14.

MacWhinney, B. (2000). *The CHILDES project: Tools for analyzing talk* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum.

Maratsos, M., Fox, D. E. C., Becker, J. A., & Chalkley, M. A. (1985). Semantic restriction on children's passives. *Cognition*, *19*, 167–191.

Min, R.-F. (1994). *The acquisition of referring expressions by young Chinese children: A longitudinal study of the forms and functions of early noun phrases* (Doctoral dissertation). Catholic University of Nijmegen, Nijmegen, The Netherlands.

Palmer, F. R. (2001). *Mood and modality* (2nd ed.). Cambridge, UK: Cambridge University Press.

Pan, H. (1996). Imperfective aspect *zhe*, Agent deletion, and locative inversion in Mandarin Chinese. *Natural Language and Linguistic Theory*, *14*, 409–432.

Paul, W., & Whitman, J. (2008). *Shi . . . de* focus clefts in Mandarin Chinese. *The Linguistic Review*, *25*, 413–451.

Pinker, S. (1984). *Language learnability and language development*. Cambridge, MA: Harvard University Press.

Rothstein, S. D. (2004). *Structuring events: A study in the semantics of lexical aspect*. Malden, MA: Blackwell.

Shirai, Y. (1991). *Primacy of aspect in language acquisition: Simplified input and prototype* (Doctoral dissertation). University of California, Los Angeles.

Shirai, Y. (1994). On the overgeneralization of progressive marking on STATIVE verbs: Bioprogram or input? *First Language*, *14*, 67–82.

Shirai, Y. (1998). The emergence of tense-aspect morphology in Japanese: Universal predisposition? *First Language*, *18*, 281–309.

Shirai, Y., & Andersen, R. W. (1995). The acquisition of tense-aspect morphology: A prototype account. *Language*, *71*, 743–762.

Smith, C. S. (1991). *The parameter of aspect*. Dordrecht, The Netherlands: Kluwer Academic Publishers.

Sue, S. (2000). *Mandarin* le *in linguistic, interlanguage and sociolinguistic contexts* (Doctoral dissertation). The University of Hawaii at Manoa, Honolulu, HI.

Tardif, T. (1993). *Adult-to-child speech and language acquisition in Mandarin Chinese* (Doctoral dissertation). Yale University, New Haven, CT.

Tardif, T. (1996). Nouns are not always learned before verbs: Evidence from Mandarin speakers' early vocabularies. *Developmental Psychology*, *32*, 492–504.

Tardif, T., Gelman, S. A., & Xu, F. (1999). Putting the 'noun bias' in context: A comparison of Mandarin and English. *Child Development*, *70*, 620–635.

Tomasello, M. (2000). Do young children have adult syntactic competence? *Cognition*, *74*, 209–253.

Tomasello, M. (2009). The usage-based theory of language acquisition. In E. Bavin (Ed.), *The Cambridge handbook of child language* (pp. 69–88). New York, NY: Cambridge University Press.

Tsao, F. F. (1987). A topic-comment approach to the *ba* construction. *Journal of Chinese Linguistics*, *15*, 1–53.

Vendler, Z. (1967). *Linguistics in philosophy*. Ithaca, NY: Cornell University Press.

Wang, L. (1954). *Zhongguo yufa lilun* [Theories of Chinese syntax]. Beijing, China: Zhonghua Shuju.

Wu, R.-J. R.(2002). Discourse-pragmatic principles for temporal reference in Mandarin Chinese conversation. *Studies in Language*, *26*, 513–541.

Xiao, R., & McEnery, T. (2004). *Aspect in Mandarin Chinese*. Amsterdam, The Netherlands: John Benjamins.

Xiao, R., McEnery, T., & Qian, Y. (2006). Passive constructions in English and Chinese. *Languages in Contrast*, *6*, 109–149.

Xiao, Z., & McEnery, A. (2004). A corpus-based two-level model of situation aspect. *Journal of Linguistics*, *40*, 325–363.

Yang, C. D. (2002). *Knowledge and learning in natural language*. Oxford, UK: Oxford University Press.

Yang, S. (1995). *Ba* and *bei* constructions in Chinese. *Journal of the Chinese Language Teachers Association*, *30*(3), 1–36.

Yang, X., & Xiao, D. (2008). Xiandai hanyu *ba*ziju xide de ge'an yanjiu [A case study of the acquisition of the *ba* construction in modern Chinese]. *Dangdai Yuyanxue*, *10*(3), 200–210.

Zhang, Y. (2014). *Hanyu ertong zaoqi yuyan de fazhan* [Chinese-speaking children's early language development]. Beijing, China: The Commercial Press.
Zhou, G., & Wang, B. (2001). *Ertong jushi fazhan yanjiu he yuyan xide lilun* [The study of construction development in Chinese children's speech and the theory of language acquisition]. Beijing, China: Beijing Language and Culture University Press.
Zhou, J. (2001). *Pragmatic development of Mandarin-speaking children: From 14 months to 32 months* (Doctoral dissertation). The University of Hong Kong, Hong Kong, China.
Zhou, J., & Chang, C. (Eds.). (2009). *Hanyu ertong yuyan fazhan yanjiu: Guoji ertong yuliaoku yanjiu fangfa de yingyong yu fazhan* [Research on the language development of Chinese children: The application and development of the research method of international child language corpora]. Beijing, China: Educational Science Publishing House.

Appendix

Predicates in Tong's *ba* and *bei* sentences before 2;4 (diary+corpus).

No.	*ba*	*bei*
1	**na-zou** 'take-walk (take away)' (1)	**na-zou** 'take-walk (take away)' (1)
2	**na**-shanglai 'take-ascend-come (take up)' (1)	ca-**zou** 'erase-walk (erase)' (1)
3	**nong**-dao 'do-fall (knock over)' (1)	*__nong__ 'do' (1)
4	**nong**-de 'do-DE' (1)	**nong-huai** 'do-broken (break)' (1)
5	da-**huai** 'hit-broken' (1)	gao-**huai** 'manipulate-broken (break)' (1)
6	ba-**diao** 'pull-drop' (1)	chi-**diao** 'eat-drop (eat up)' (1)
7	na-**diao** 'take-drop' (1)	dang-zhu 'block-stop (block)' (1)
8	ti-**diao** 'kick-drop' (1)	cai-si 'stamp-die' (1)
9	guan-**diao** 'close-drop (turn off)' (1)	**ya** 'press' (1)
10	**ya**-dao 'press-fall' (1)	**ya**-bian'press-flat (crush)' (1)
11	xi-hao 'wash-good' (1)	yao (le) 'bite' (1)
12	*shuai-dao 'fall' (1)	
13	tui-dao 'push-fall' (2)	
14	fang (zai) 'put (at)' (1)	
15	qie (zai) 'cut (at)' (2)	
16	kai-da 'open-loud (turn up)' (1)	
17	tiao-xiao 'turn-small (turn down)' (1)	
18	ba-xialai 'pluck-descend-come (pluck out)' (1)	
19	da-qilai 'build-rise-come (build up)' (1)	

Note: Token number in brackets; overlapping morphemes underlined.