

# THE ACQUISITION OF THE ZAI AND BA CONSTRUCTIONS IN MANDARIN CHINESE

LI PING

## 1. Introduction\*

Chinese is well known for its impoverished system of grammatical morphology. However, there are a number of devices that are important to the identification of syntactic and semantic functions of sentence constituents. These devices include word order, semantic features of the noun phrases, and the use of semi-morphological markers such as the object marker *ba*, the passive marker *bei*, and the locative preposition *zai* (Li 1990; Li, Bates & MacWhinney 1993).<sup>1</sup> Previous research has provided us with detailed analyses of the various grammatical functions associated with different devices (e.g., Chao 1968; Li & Thompson 1981; Zhu 1980). In this paper, I will provide a somewhat different perspective

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<sup>1</sup> I call these 'semi-morphological' devices because unlike morphological markers in Indo-European languages, these markers do not form an organic part of the words with which they occur (for example, they are not bound to the words they modify and do not undergo phonological assimilations to the words), but they are functionally equivalent to the morphological devices in Indo-European languages.

to examine the *zai* and *ba* constructions. In particular, I will analyze *zai* and *ba* constructions with respect to the aspectual meaning of the sentence in which they occur. On the basis of this analysis, I will then examine Chinese-speaking children's acquisition of these constructions in data from an elicited production experiment. Extrapolating from these data, I will discuss two different hypotheses concerning semantic acquisition, as advocated by Slobin (1985) and Bowerman (1985, 1989).

## 2. The functions of *zai* and *ba*

### 2.1. The *zai* construction

Before going into detailed linguistic analysis of the *zai* construction in Chinese, the following pair of sentences in German and their corresponding translations in English serve as a useful guide to the problem.

- (1) a. Sie pflanzen die Blumen auf dem Feld.  
       'They plant the flowers *in* the field.'  
       b. Sie pflanzen die Blumen auf das Feld.  
       'They plant the flowers *into* the field.'

Two properties in these sentences are immediately noticeable. Structurally, these sentences differ with respect to Case marking of 'the field' in German: the first one takes the dative Case, whereas the second one takes the accusative Case. Semantically, they differ in their locative meaning: the first indicates a static location where the situation takes place, while the second indicates a locative goal toward which the activity is directed; in the second case, it does not matter for the speaker whether *Sie* ('they') are actually planting the flowers *in* the field or *outside*. Note that the same semantic contrast is represented in English not by morphological marking but by the use of different prepositions, e.g., *in* vs. *into*, as shown in the above English translations (in other contexts maybe *on* vs. *onto*, depending on the meaning). However, this contrast is not a systematic one in English, because *in* and *on* can also be used to convey a directional locative meaning, as in sentences (2a) and (2b).

- (2) a. Bill put the fish in the water.  
 b. John spread the paint on the wall.

In Chinese, the semantic contrast between (1a) and (1b) is systematically represented by the use of the *zai* construction occurring at the preverbal versus the postverbal position.

**Preverbal vs. postverbal.** The morpheme *zai* in Mandarin Chinese conveys a locative meaning. It can be a verb as well as a preposition. Historically, the preposition *zai* is derived from the verb *zai*<sup>2</sup> (Wang 1958). Sentence (3a) is an example where *zai* functions as a verb, in contrast to sentence (3b), where *zai* is a preposition and the main verb is *zhan* 'stand':

- (3) a. Beizi *zai* zhuozi-shang.  
       cup at table-top  
       'The cup is on the table.'  
 b. Xiao houzi *zai* zhuozi-shang zhan -zhe.  
       little monkey at table-top stand-DUR<sup>3</sup>  
       'The little monkey is standing on the table.'

In these examples, *zai* occurs preverbally and the construction indicates a static locative meaning. As a preposition, like in (3b), *zai* is a generic locative marker indicating that NP1 (in this case *xiao houzi* 'little monkey') is located with reference to NP2 (*zhuozi* 'table'). The specific location of NP1 is indicated by the locative nouns that are attached to the end of NP2, e.g., *qian* 'front', *hou* 'back', *shang* 'top', etc. (see Li 1988, for a discussion on the acquisition of these locative terms). Note that the preverbal *zai* has another form that is associated with aspectual meaning and serves as a progressive aspect marker, as in (3a). Of course, the progressive aspect marker *zai* and the locative *zai* are closely related, both diachronically and synchronically, as pointed out in previous studies

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<sup>2</sup> Most Chinese prepositions are historically derived from verbs through a process historical linguists call *xuehua* or, grammaticalization. In this paper I will only be concerned with the morpheme's synchronic meaning.

<sup>3</sup> Capitals in the glosses represent function words in Chinese: LE is the perfective aspect marker, DUR is the durative aspect marker.

(Chao 1968; Chen 1978). In some cases, *zai* may actually perform both functions simultaneously. Chao (1968) has proposed that the construction "zai+V" (the common progressive form) is a contracted form of "zai+LOC+V"; the locative object is left out in the former, as example (4) indicates ((4b) is the contracted form).

- (4) a. Zhangsan zai he-li youyong.  
 Zhangsan at river-inside swim  
 'Zhangsan is swimming in the river.'
- b. Zhangsan zai youyong.  
 Zhangsan at swim  
 'Zhangsan is swimming.'

Both Chen (1978) and Li (1990) have discussed some of the difficulties of Chao's argument with regard to the dual function of *zai* as locative preposition and as aspect marker in modern Chinese, although it is clear that progressive aspect and locative meaning are intimately related, as Comrie (1976) and Vlach (1981) have also pointed out for English and many other languages. We will return to the aspect marker *zai* later.

In contrast to the complexity of the preverbal *zai*, the postverbal *zai* is much simpler. Sentences (5a) and (5b) are examples with the *zai* construction occurring postverbally.

- (5) a. Qingwa tiao-zai yezi-shang le.  
 frog jump-at leave-top LE  
 'The frog jumped onto the leave.'
- b. Laoshu pa-zai chuang-dixia le.  
 mouse crawl-at bed-bottom LE  
 'The mouse crawled (to) under the bed.'

Unlike sentences with the preverbal *zai*, these sentences are associated with a directional locative meaning. The *zai* construction in these examples indicates the locative goal of the action, in which the location denoted by the noun phrase serves as the endpoint of the activity, in contrast to the location where the situation takes place as indicated by the preverbal *zai* construction. Sentences (3b) and (4a,b) differ from (5a) and (5b) structurally with respect to the position of the *zai* construction, and the locative meanings associated with them are also quite different. Thus, the meaning contrast between (1a) and (1b) in German as represented by

different Case markings is represented in Chinese by different word order relations.

**Aspect, aktionsart, and the *zai* construction.** Word order does not always make a difference to the locative meaning of the sentences that contain the *zai* construction. There is a strong interaction between the kinds of meaning conveyed and the types of verb used in these sentences. Compare sentences (3b) (repeated here as (6a) for convenience) and (6b).

- (6) a. Xiao houzi zai zhuo-shang zhan-zhe.  
 little monkey at table-top stand-DUR  
 'The little monkey is standing on the table.'
- b. Xiao houzi zhan-zai zhuo-shang.  
 little monkey stand-at table-top  
 'The little monkey is standing on the table.'

Although the *zai* construction is preverbal in (6a) and postverbal in (6b), the locative meaning of these sentences is essentially the same. Both sentences indicate a static location of the subject, i.e., *houzi* 'monkey' being on the table. What causes such a difference between these sentences and sentences like (4a,b) and (5a) with respect to their locative meaning for the different positions of the *zai* construction? The answer can only be found in the kinds of verbs involved in these sentences. A detailed comparison reveals that the verb *zhan* 'stand' in (6a) and (6b) differs from the verb *youyong* 'swim' in (4a,b) with respect to *aktionsart*, a notion that refers to patterns of verb meanings defined in terms of inherent temporal properties of situations.<sup>4</sup>

According to Vendler (1967), Comrie (1976) and a number of other authors, verbs and verb phrases can be classified into different types with respect to their *aktionsart* features.<sup>5</sup> One common classification is to divide verbs into *process* vs. *stative*, *telic* vs. *atelic*, and *punctual* vs. *durative* (see Li 1990 for discussion). These types of verbs are

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<sup>4</sup> There has been much confusion in the use of the term *aktionsart*. In Li (1990), an effort was made to clarify the problems for the proper use of the term.

<sup>5</sup> Some of these authors do not use the term *aktionsart* in this context. Their actual terms vary from 'time schemata' (Vendler) to 'situations' (Comrie).

characterized by different syntactic and semantic behaviors. For example, in English, process verbs can take *-ing*, whereas stative verbs cannot. Thus, sentence (7a) is grammatical but (7b) is not, due to the nature of the temporal properties of the verbs involved in the application of the progressive marker.

- (7) a. The man is walking down the street.  
 b. \*The man is knowing the story.

To discuss all of the different types of verbs with respect to aktionsart is beyond the scope of this paper. Relevant here is only the distinction between process and stative verbs. According to Vendler (1967), process verbs (or his "activity verbs") encode situations as dynamic, having distinct successive stages, whereas stative verbs depict situations as homogeneous and undifferentiated. Comrie (1976) further argues that states are seen as continuing effortlessly unless stopped by some external force, whereas processes require a continual input of energy in order to be maintained, either from inside (e.g., volitional control from an agent) or from outside (e.g., electricity for a machine). On the basis of these analyses, *youyong* 'swim' in (4a,b) is a process verb whereas *zhan* 'stand' in (6a) and (6b) is a stative verb. This distinction explains the discrepancy between the locative meaning of the sentence and the position of the *zai* construction: for process verbs, the preverbal versus the postverbal position of *zai* results in the meaning difference between a static location and a locative goal, whereas for stative verbs, the position of the *zai* does not affect the locative meaning of the corresponding sentences.

The position of the *zai* construction may not only affect the locative meaning of the sentence, it may also contribute to the aktionsart of the verb phrase. When the verb in question is a process verb, the position of *zai* makes a difference to the semantic type of the verb. For example, since the postverbal *zai* construction indicates a locative goal of the action, its presence marks an endpoint of the situation (such a situation is called a 'telic' situation and verbs denoting such a situation are telic verbs, see Comrie 1976). The *zai* construction implies a boundary beyond which the same activity can no longer continue, as in sentences (5a) and (5b). In contrast, the presence of the preverbal *zai* construction does not affect the aktionsart of the verb phrase because it indicates the

location where the activity takes place, as in sentence (4a); no endpoint is marked in this case.

Turning to the aspect markers associated with the *zai* construction, we find that there is a strong correlation between the use of aspect markers and the position of *zai* in the sentence. In sentences (5a,b), where *zai* is postverbal, the perfective aspect marker *le* is used. In sentences (3b) and (4a), where *zai* is preverbal, only imperfective aspect is used, as indicated either by the durative marker *zhe*, or by *zai* itself — in (4a), *zai* acts as an aspect marker as well as a preposition.

## 2.2. The *ba* construction

The *ba* construction has received much discussion in the literature. Traditional grammars have termed the *ba* construction *disposal construction* (Wang 1957), due to the original meaning of *ba* as a verb ('take hold of', 'grasp'). Although the main function of *ba* in modern Chinese is to mark the direct object of a sentence, the trace of the 'disposal' meaning can still be seen in that *ba* requires an object that is highly affected by the activity designated in the verb. Structurally, the *ba* construction is associated with SOV sentences. *Ba* cannot be used to mark the object in an SVO sentence. Unlike the *zai* construction which can occur both preverbally and postverbally, the *ba* construction can occur only preverbally.

Two features of the *ba* construction have been widely noted (cf. Chao 1968). First, the object noun phrase must be definite or specific, in contrast to the canonical SVO sentences without *ba* where the object noun phrase is usually indefinite (Li & Thompson 1981). Second, the verb phrase in the sentences with *ba* must be structurally complex (Ding 1961). Single monosyllabic verbs cannot occur with the *ba* construction. Compare the following examples:

- (8) a.     Lisi ba neixie yu diao-qilai-le.  
           Lisi BA those fish hook-up-LE  
           'Lisi caught those fish.'
- b.     \*Lisi ba yixie yu diao-qilai-le.  
           Lisi BA some fish hook-up-LE  
           'Lisi caught some fish.'

- c. \*Lisi ba neixie yu diao-le.  
 Lisi BA those fish hook-LE  
 'Lisi caught those fish.'

While (8a) has both a definite object and a complex verb form and is thus a perfect sentence, (8b) has an indefinite object and (8c) a simple verb form and are thus not grammatical sentences. Notice that in addition to the structural difference between the grammatical (8a) and the ungrammatical (8c), there is also a semantic difference. The verb compound in sentence (8a) indicates a resultative meaning whereas the single verb form in (8c) indicates a durative process without an endpoint or end result. The *ba* construction requires the verb or verb phrase to be highly transitive or resultative (Li 1990; Sun 1991), and therefore (8a) is correct but (8b,c) is not. Although simple forms of resultative verbs can occasionally occur with *ba*, e.g., *sha* 'kill' in sentence (9a), process or stative verbs cannot occur with it even if they are structurally complex, as in (9b), because they do not indicate a resultative meaning. This shows that the semantic criterion (resultativity of verb meanings) is more salient than the syntactic criterion (complexity of verb forms) in the use of the *ba* construction.

- (9) a. Zhangsan ba laohu sha-le.  
 Zhangsan BA tiger kill-LE  
 'Zhangsan killed the tiger.'
- b. \*Zhangsan ba ta gege xiang-ji-le.  
 Zhangsan BA he brother resemble-very-LE  
 'Zhangsan looked extremely like his brother.'

With respect to aspect, these sentences are exclusively associated with the perfective marker *le*, as shown in the above examples. The imperfective markers *zai* and *zhe* are not compatible with the *ba* construction. Thus, there is a strong association between the perfective aspect and resultative verbs in sentences with the *ba* construction. The incompatibility of imperfective aspect markers with *ba* follows from the fact that the verbs in *ba* sentences always incorporate a resultative meaning, and that resultative verbs never occur with imperfective aspect (see Li 1990 for a detailed discussion).

Our above analyses indicate that there are strong interactions among the position of the construction, the type of the verb (aktionsart), and the



aspect marker in the sentence. The *zai* construction can occur both preverbally and postverbally, while the *ba* construction occurs only preverbally. Depending on the type of the verb with which *zai* cooccurs, the position of *zai* in the sentence can make a difference with respect to the locative meaning of the sentence (location of activity versus locative goal). The *zai* construction can occur with different types of verbs, but the *ba* construction requires verbs that indicate a resultative meaning. These properties of the *zai* and *ba* constructions in Chinese raise some particularly important questions from an acquisition point of view. In acquiring sentences that contain these constructions, would Chinese-speaking children appreciate from early on the distributional cooccurrence constraints that hold among different components of the sentence? If not, would we find that they use different aspect markers and different verb types that are incompatible with *ba* and *zai*? How do we explain the developmental patterns that are seen in their acquisition of the *zai* and *ba* constructions? For this study, we designed an experiment to tap into these issues by examining children's productive speech from an experimental setting. The study reported here is part of a larger project which investigates Chinese-speaking children's acquisition of aspect markers and verb meanings between 3 and 6 years of age.

### 3. Method

#### 3.1. Subjects

Ninety-nine subjects from the kindergartens of Beijing University and Qinghua University participated in this experiment. All subjects were native Mandarin Chinese speakers growing up in Beijing. Subjects were divided into four age groups: (1) 3-year-olds, ranging from 2;9 to 3;6, mean age 3;2; (2) 4-year-olds, ranging from 3;8 to 4;4, mean age 4;1; (3) 5-year-olds, ranging from 4;11 to 5;4, mean age 5;1; and (4) 6-year-olds, ranging from 5;11 to 6;4, mean age 6;1. Each age group originally comprised twenty-five children, but one 3-year-old child's data were missing due to facility breakdown during the test. Half of the subjects were boys and half were girls. To maximize the differences between age groups, subjects were selected near the mean age of each group with a variation of about three months.

### 3.2. Material and procedures

A collection of toys was used to elicit children's productive speech. These included two dolls, a duck, a rabbit, a turtle, a monkey, a pig, a fish, a penguin with a staircase, a train, a car, a canoe, a bridge, a tree, a pot, a bowl, a garage, a bed, a table, and two chairs. Different kinds of situations were manipulated with these toys for the elicitation of children's descriptions.

To make the need for descriptions more salient, E(xperimenter)<sup>2</sup> was blindfolded and E1 asked the child to describe to E2 what he saw, a procedure similar to that used by Hickmann (1982) and Hickmann & Liang (1990). The child was told to look carefully at the situations about to be acted out and then make sure that E2 understood what had happened from his descriptions. E1 then acted out the situations, emphasizing occasionally to the child that E2 could not see. After each situation was acted out, E1 said to the child in Chinese: "*gaosu shushu/ayi, X zenme la?*" 'tell that uncle/auntie, what happened to X' (X being the major figure in the enacted situation). Then E2 repeated immediately, "*gaosu wo X zenme la?*" 'tell me, what happened to X?' Subjects practiced with this procedure and it was made sure that they understood the task before the testing began. For each subject there were 18 enacted situations to describe. These situations involved either an action, such as a duck swimming, or a state, such as a monkey standing on a table. The whole testing session took about 15 minutes. Children's descriptions were audio-taped for later analysis.

### 4. Results

Data from the experiment were transcribed and coded by the author and double-checked by the author and James Liang of Leiden University. The coding followed the CHAT format of the Child Language Data Exchange System (CHILDES, see MacWhinney & Snow 1985; MacWhinney 1991). The data were entered into the computer with the Pinyin system rather than Chinese characters. Computational analysis of the data was performed using the CLAN programs designed for CHILDES data (MacWhinney 1991).

A total of 1007 sentences produced by the children in the experiment

was examined in our analysis.<sup>6</sup> Among the 1007 sentences, there were 281 sentences with *zai*, and 296 sentences with *ba*. A preliminary analysis indicates that the children in general displayed a very good command of the use of *zai* and *ba* constructions and made few errors involving incompatible verbs or aspect markers. The difference between the different age groups was minimal. Across different age groups, subjects produced appropriate sentences with both *zai* and *ba* constructions.

Sentences (10)–(11) are some typical examples in which the child used *zai* constructions. In (10a,b), the *zai* construction is preverbal while in (11a,b), it is postverbal. These examples represent the most common utterances of *zai* that children produced in describing the enacted situations.

- (10) a. Xiao baitu zai di-shang pao. (HEP, 3;0<sup>7</sup>)  
 little rabbit ZAI ground-top run  
 'The little rabbit is running on the ground.'
- b. Huoche zai guidao-shang kai. (SHG, 4;11)  
 train ZAI track-top run  
 'The train is running on the track.'
- (11) a. Xiao qiche zuan-zai nei xiao-wuzi-li qu-le.  
 little car move-ZAI that small-room-inside go-LE  
 'The little car moved into that small room.' (LIB, 3;11)
- b. Wugupa-zai chuang-dixia qu-le. (LIY, 5;0)  
 turtle crawl-ZAI bed-bottom go-LE  
 'The turtle crawled (to) under the bed.'

These examples indicate that Chinese-speaking children start to use the *zai* construction appropriately at about 3 years of age. Examined in the context (i.e., the enacted situation) in which the utterances were produced, it is clear that the children could distinguish the different

<sup>6</sup> The actual number of sentences produced by the children is higher, but some sentences were excluded from the analysis because the verbs used in these sentences were rare or idiosyncratic and confined to only one or two children.

<sup>7</sup> The three capitals are an abbreviation of the child's name. The child's age is given after the name in the format: "years;months" (e.g. 3;0 means 3 years, 0 months).

functions associated with the preverbal vs. postverbal *zai* constructions. The verbs and aspect markers in these sentences were also used appropriately. As discussed earlier, the preverbal *zai* construction indicates the location where the situation takes place, while the postverbal *zai* construction indicates the locative goal of the activity. This meaning difference is associated with the use of verb types and aspect markers in the sentence. A clear association is seen in the children's utterances: the preverbal *zai* was used together with process verbs and imperfective aspect, while the postverbal *zai* was used together with telic verbs and perfective aspect. For example, the verbs *pao* and *kai* in (10a) and (10b) are process verbs that do not encode an endpoint of the situation, whereas *zuan* in (11a) is a telic verb that encodes a terminal point of the situation. Although the verb *pa* in (11b) by itself is a process verb, the whole verb phrase is telic because it is combined with the postverbal *zai* construction whose function is to indicate a locative goal. Note that *zai* in (10a) and (10b) plays the role of both a preposition and a progressive marker, whereas in (11a) and (11b) it is purely a preposition and it cooccurs with the perfective marker *le*.

Recall that sentences with stative verbs do not alternate between the different locative meanings associated with different positions of *zai*, as shown in examples (6a,b). The children in this study mostly used *zai* at the postverbal position for sentences with stative verbs, thus making it difficult to evaluate whether they would conform to the adult standards in using *zai* at the preverbal position of a stative sentence. One reason for the rare occurrences of the preverbal *zai* construction in children's descriptions of stative situations might be the rare occurrences of the durative marker *zhe* in children's utterances, which is obligatory for stative sentences with a preverbal *zai*.

Turning to the acquisition of the *ba* construction, we also found that from about 3 years of age on the child used *ba* appropriately in various contexts in which it was required. The sentences in (12) are some typical examples of the *ba* construction from children's descriptions.

- (12) a. Qiche ba qiao gei zhuang-dao-le. (RAO, 3;3)  
 car BA bridge GEI bump-collapse-LE  
 'The car knocked down the bridge.'
- b. Nei xiao-wawa ba dengzi gei ti-dao-le. (NIU, 4;1)  
 that small-doll BA chair GEI kick-down-LE  
 'The small doll kicked the chair over.'

- c. Wawa ba yizi ti-xiaqu-le. (LIP, 4;11)  
 doll BA chair kick-down-LE  
 'The doll kicked the chair over.'
- d. Xiao-wawa ba douzi dou reng-zai waimian-le.  
 small-doll BA beans all throw-ZAI outside-LE  
 'The small doll threw out all the beans.' (XIE, 6;1)

In these utterances, children most often used resultative verb compounds with the *ba* construction, as is appropriate in the adult language, e.g., in (12a,b,c). In fact, 90% of the 296 sentences in which *ba* occurred contained resultative verb compounds. Only occasionally did they use a single verb with a postverbal *zai* construction, e.g. in (12d). This indicates a clear association between the use of the *ba* construction and the resultative meaning of the verb in children's descriptions. Furthermore, unlike sentences (10)–(11), in which different aspect markers were contingent upon the position of the *zai* construction, the sentences with the *ba* construction in children's descriptions were all associated with the perfective marker *le*. In the whole corpus of 1007 sentences, there were only three exceptions involving the use of the progressive aspect marker *zai* with *ba*, such as in (13):

- (13) Xiao-wawa zai ba shu nong-qilai. (GAO, 4;4)  
 small-doll ZAI BA tree do-up  
 'The small doll is putting up the tree.'

The almost perfect association between the *ba* construction, the perfective aspect, and resultative verbs in children's early productive speech suggests that from age 3 on, Chinese-speaking children are aware of the cooccurrence constraints inherent in these sentences. The same holds true for the acquisition of the *zai* construction, in which *zai* is semantically associated with different types of verbs and different kinds of aspect markers, depending on its position in the sentence. We have thus found no evidence that Chinese-speaking children would confound the use of different verb types and aspect markers in combination with *zai* and *ba* constructions from an early age.

## 5. Discussion

The early acquisition of the semantic functions of the *zai* and *ba* constructions in Chinese can be accounted for from a number of theoretical perspectives. In a somewhat different context (Li 1990), I have examined the acquisition of aspect markers and verb semantics in Chinese from two important lines of research: Bickerton's Language Bioprogram Hypothesis (Bickerton 1981, 1984) and Slobin's Basic Child Grammar (Slobin 1985). In this study, only the latter will be relevant to our results, and thus we will only discuss how Slobin's hypothesis explains our data.

On the basis of a rich set of cross-linguistic data, Slobin (1985) hypothesizes that there is a Basic Child Grammar which reflects the underlying ideal form of the human language and which all children arrive at in the form-meaning mapping processes. This hypothesis assumes that children come to the language acquisition task with a pre-structured *semantic space* containing a universal, uniform set of semantic notions that are at first neutral with respect to language-specific categories. According to Slobin, these semantic notions are 'privileged' to be mapped onto grammatical forms of individual languages in the process of children's acquisition. That is, prior to children's experience with specific properties of the grammar, these notions strongly attract grammatical forms of the input language in the form-meaning mapping processes. Two important 'temporal perspectives' in this semantic space are *process* and *result*. They function early to define a semantic contrast in children's acquisition of tense and aspect systems. Slobin emphasizes that *result* is particularly salient and it provides an early mapping point for salient speech segments associated with content words referring to actions; specifically, whenever a language has an acoustically salient past tense or perfective marker on the verb, its first use by the child seems to be to comment on an immediately completed event that results in a visible change of state, such as situations denoted by the verbs *drop*, *fall*, *break*, and *spill*.

Our results from Chinese-speaking children's productive speech are consistent with the predictions of Slobin's hypothesis that the two temporal perspectives, *process* and *result*, play an important role in children's early language acquisition. In describing the enacted situations, children tend to associate the preverbal *zai* construction with process verbs, and associate the postverbal *zai* construction with telic verbs. Furthermore, the preverbal *zai* cooccurs with imperfective aspect,

whereas the postverbal *zai* cooccurs with perfective aspect in children's utterances. By contrast, children associate *ba* constructions exclusively with resultative verbs and perfective aspect. These patterns of association between positions of the preposition, aspect markers, and verb meanings seem to suggest that the kinds of temporal perspectives proposed by Slobin are acting as organizing principles in helping the child find out the cooccurrence constraints on the sentences with *zai* and *ba* constructions.

The semantic space in Slobin's Basic Child Grammar assigns a significant role to the child's innate knowledge, since it assumes that children are sensitive to semantic notions such as *process* and *result* prior to their experience with specific properties of the target grammar. However, the extent to which Chinese children's speech conforms to the distributional patterns in the adult language implies another equally plausible explanation without invoking innate semantic categories as Slobin does. There is now good evidence that children are influenced at a very early age by the input to which they are exposed (see Snow 1977, for discussion).

In contrast to Slobin, Bowerman (1985, 1989) argues that children are sensitive to the characteristics of the input patterns from early on, and that their speech reflects their efforts in the analysis of the distributions of form-meaning mappings. Bowerman points out that, before appealing to pre-linguistic categories as explanations of child language data, one needs to explore the patterns displayed in the target language and consider how the input might influence the child's linguistic inferences. Often, on suitable reanalysis, phenomena that have been proposed as evidence for innate categories are better seen as the result of children's observational analysis. For example, German children sometimes confuse the locative meaning of *zu* 'to' with a possessive meaning. Slobin interprets this confusion as stemming from children's inherent tendency to conflate possession and location. However, as Bowerman notes, in adult German, there are contexts in which *zu* marks a possessive-like rather than a strictly locative meaning. The child's errors may stem from his observation of this input pattern and his overly productive application of the pattern in his own speech.

Bowerman's argument seeks explanation for child language data with reference to the input rather than by invoking *a priori* conceptual structures. Several cross-linguistic studies (e.g. Stephany 1981 in Modern Greek; de Lemos 1981 in Brazilian Portuguese) provide strong support

to her argument in the domain of the acquisition of tense and aspect. The present findings are also consistent with her argument. In adult Chinese, the resultative verb compound is particularly used to encode events with an end result, and thus the resultative meaning for verbs figures prominently in the structure of the input language. Moreover, as discussed earlier, there are cooccurrence constraints among the position of the construction, the verb type, and the aspect marker in the input language. These constraints show up most clearly in the correlation between process and imperfective aspect, and between result and perfective aspect. Chinese children's sensitivity to the distinction between process and result in their acquisition of sentences with *zai* and *ba* constructions may well reflect their analysis of these properties in the input language, rather than the guidance of pre-structured semantic categories as Slobin would like to argue. Of course, the present study has not directly examined the relationship between children's speech and the role of input, so more detailed research will be needed before decisive conclusions can be drawn on the role of input versus semantic predispositions.

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