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## Aspect construal in Mandarin: a usage-based constructionist perspective on *LE*

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**Abstract:** Despite extensive research efforts to explain the Mandarin Chinese particle *le*, confusion persists in the absence of a unitary theory and sufficient empirical evidence. This study provides a unitary account of *le* by adopting a usage-based constructionist approach, one that liberates grammatical aspect from, and is able to accommodate, lexical aspect. We argue that *le* participates in two distinct family resemblance constructions of aspect construal associated with two distinct sentential positions. The clause-internal *le* construction construes the closing or final boundary of an event and the clause-final *le* construction construes the opening or initial boundary of an event. Corpus analysis showed that the two aspect constructions have distinct patterns in natural language uses that are consistent with the proposed construals. Results from elicited response data showed that native speakers paid attention to construction-level formal and semantic cues in making family resemblance judgments about tokens of the two constructions. This study has both theoretical and methodological implications for crosslinguistic research on grammatical aspect in relation to lexical aspect and for usage-based constructionist approaches to grammatical categories beyond aspect.

**Keywords:** aspect marker; construal; usage-based constructionist approach

## 1 Introduction

The Mandarin Chinese particle 了 *le* is one of the most recalcitrant elements in Chinese linguistics and one of the most confusing grammar points in Chinese second language learning. Mair (2019: vi) called it “one of the thorniest conundrums in

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Chinese linguistics”. Chinese Second Language Acquisition research showed that even at the advanced level, English speaking L2 learners continue to have difficulty using *le* properly (e.g., Duff and Li 2002; Su and Tao 2018; Wen 1995; Xu et al. 2019). Indeed, L2 data from Japanese (e.g., Zhou and Ouyang 2014), Korean (e.g., Wang 2015), and Vietnamese (e.g., Liu and Ding 2015) suggests that struggles with *le* are not limited to learners from L1 English background.

However, *le* happens to be one of the most ubiquitous linguistic elements in Chinese. In Xiao, Rayson and McEnery’s (2009) *Frequency Dictionary of Mandarin Chinese*, which is based on a corpus of 49,749,512 word tokens and 73,079,078 Chinese characters from four registers, *le* ranks 5th in normalized frequency and 3rd in dispersion index. To get a sense of what this means, it might be helpful to compare with English where the 5th ranked word is *and* in the Oxford English Corpus<sup>1</sup> and *of* in the Corpus of Contemporary American English (COCA).<sup>2</sup> Like *and/of* in English, *le* is not only frequently used, but also evenly distributed across registers. Research on the development of aspect marking in four Chinese speaking children showed that *le* was the most frequently used aspect marker by the children at the age of 1;4 and remained so in their speech at the age of 3;5, accounting on average for nearly 90% of all aspect markers used at each stage under investigation (Chen and Shirai 2010). The result is consistent with findings on older Mandarin speaking children up to six years of age (e.g., Li 1990). While the corpus and child language data may inspire incredulity that such a common little word could present a case of superlative complexity for professional linguists and L2 learners alike, the data removes any doubt about the inevitability of *le* and the necessity to explain it.

## 1.1 The problem of *le*

What makes *le* such a big problem? First, there seem to be two homophonous and homographic morphemes associated with *le*. One is typically described as a verbal suffix marking perfective aspect. The other is considered a final particle conveying state change.<sup>3</sup> These are respectively illustrated in (1a) and (1b), retrieved from the BCC corpus.

- (1) a. *Wǒ mǎi le hónglí,*                      b. *dùn-shàng le.*  
 1SG buy LE red pear,                      cook-up LE  
 ‘I bought red pears, (they’re) cooking now.’

<sup>1</sup> <https://web.archive.org/web/20111226085859/http://oxforddictionaries.com/words/the-oc-facts-about-the-language>

<sup>2</sup> <https://www.english-corpora.org/coca/>

<sup>3</sup> Traditionally, Chinese grammarians refer to these two subtypes as *le-1* and *le-2*, respectively.

Second, the temporal reference of *le* depends on contextual information (Ren 2008; Smith and Erbaugh 2005). While the default time reference inferred from (1a) is past time, other time references are possible, as in (2) where the event is located in a future time.

- (2) *Jiàn le miàn zài xiàng nǐ jiěshì.*  
 See LE face then to 2SG explain  
 ‘I’ll explain to you when I see you.’

In (3), the situations described in both clauses ending in the final *le* are located in the past.

- (3) a. *Bàn nián qián tāde nǚpéngyǒu gēn*    b. *tā jiù kāishǐ hē-shàng le*  
*rén pǎo le,*  
 Half year ago his girlfriend with                      3SG then start drink-up LE  
 person elope LE,  
 ‘Six months ago, his girlfriend ran off with someone, then he started drinking.’

Third, the particle *le* can be used with adjectives serving as predicates, as in (4).<sup>4</sup>

- (4) a. *Nǐ zhōngyú hǎo le,*    b. *tài hǎo le!*  
 SG2 finally well LE,                      too good LE  
 ‘You’re finally well, that’s so great!’

The adjective *hǎo* in (4a) describes a new physical state and in (4b) it describes the speaker’s subjective state in response to the new physical state. Similarly, the verbal suffix *le* is not always a verbal suffix. It can also attach to an adjective, as in (5b) where it follows the adjective *dà* ‘large’ and precedes a complement of quantity.

- (5) a. *Gūjiè shì yīnwèi wǒ pàng le pàng le pàng le, ...*  
 Guess COP because 1SG fat LE fat LE fat LE...  
 b. *shì bú shì mǒurén bǐ yuánlái dà le yī hào*  
 COP NEG COP someone than before large LE one size  
 ‘I guess it’s because I’m chubbier... Isn’t someone a size bigger than before’

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<sup>4</sup> Chao (1968) described “predicative adjectives” in Chinese that resemble intransitive stative verbs in that they can readily serve as predicates without a copula. This resemblance led to claims that Chinese does not have adjectives as a distinct lexical class (Dixon 1977; McCawley 1992). Opponents of these claims argued that predicative adjectives are a subclass of words that describe properties, which are more adjectival than verbal (Paul 2014; Zhu 1982). A full discussion of this issue is beyond the scope of this study. We use the term “adjective” in this study for notational convenience, given its long-standing uses in the literature (e.g., Lü 1980; Zhu 1982).

Finally, *le* can be used in both positions in the same sentence, as in the second clause of (6) where the perfective *le* precedes a noun of temporal duration and the utterance ends in the particle *le*. The entire sentence is interpreted as having a perfect continuous reading with an inference that the event is perceived as excessive (Chappell 1986).

- (6) *Hái zài xià xuě, xià le yī zhěng tiān le*  
 Still PRG descend.snow, descend LE one whole day LE  
 ‘It’s still snowing, it’s been snowing the whole day.’

Scholarly treatments of *le* fall into two general models, a two-morpheme model and a single-morpheme model, which we now discuss in turn.

## 1.2 Two-morpheme treatments

Most accounts of *le* in Chinese linguistics espouse a two-morpheme view of *le* (e.g., Chao 1968; Li and Thompson 1981; Lü 1980; Sun 2006; Xiao and McEnery 2004; Zhu 1982; Zhu 2019; Zhu and Gao 2013). At first glance, this analysis distinguishes the functions of *le* based on its sentential position, namely clause-internal versus clause-final. This general distinction, however, is not based on a theoretical commitment to form-function pairing that consistently associates the constructional properties of *le* with its functions. Despite what appears to be a constructionist approach, the two-morpheme model is more concerned with the lexical aspects of the predicates than with the larger constructional context of which *le* is a part.

As examples (1)–(6) show, there is no one single lexical class that is uniquely associated with either the clause-internal or the clause-final *le*. A brief summary of how the major treatments of *le* handle the variability of the collocating lexical categories will highlight the inconsistencies and ambiguities that are inevitable on a morpheme-based approach. Wang (1965), Chao (1968), Lü (1980), and Zhu (1982) all treated the verbal suffix *le* as perfective aspect in the sense of “completed action”, which does not account for the adjectival uses such as (5b). Lü (1980: 355) recognized this problem and acknowledged that the adjectival uses denote “deviation of a property from a standard”. However, it is unclear how this meaning can be reconciled with completion.

Li and Thompson (1981), Chappell (1986, 1988), and Sun (2006) emphasized that the perfective aspect should not be understood in terms of completion of an action, but in the sense that a situation is viewed in its entirety, or as a bounded event. The

viewpoint-oriented perspective made it possible to accommodate adjectival uses. That is, the property described by *dà* ‘large’ in (5b) is viewed as bounded by virtue of being quantified. As for the final *le*, Li and Thompson (1981: 244) coined the term “Currently Relevant State” (CRS) as the general semantics with various contextual entailments. These include both propositional meanings, e.g., “changed state” and “what will happen next”, and interactional functions such as correcting a wrong assumption and signaling speaker contribution. However, while CRS can explain many uses of the clause-final *le*, there are exceptions that are analyzed as signaling boundedness, an inconsistency to which we shall return shortly.

Zhu and Gao (2013) and Zhu (2019) treated the clause-internal *le* as a perfective aspect marker and the clause-final *le* as a transformative aspect marker, stating that the former signifies the occurrence or completion of an action and the latter indicates the end of a state. Faced with the same problem of explaining the adjectival uses in terms of completion of an action, the authors treated these uses instead as part of the final *le* category. Their rationale is that the latter normally admits stative lexical input.

Liu (1988) challenged the notion that the perfective *le* denotes completion. He proposed instead actualization of an event to accommodate stative predicates with the perfective *le*, which describe situations that in real-world scenarios do not end after their actualization. Prioritizing a truth-conditional view of verb lexical semantics over construal at the constructional level, Liu insisted that such situations be considered imperfective. The actualization analysis found support among truth-conditionally minded grammarians, leading to the proposal that the atelic uses with the internal *le* denote imperfective aspect (e.g., Jin 1998, 2002; Lin 2003). As we shall argue in this article, the actualization analysis ignores the viewpoint from which different situation types described by different verbs are perceived through the shared lens of a single constructional pattern paired with the construal of that viewpoint. In doing so, it fundamentally misunderstands linguistic representation.

Xiao and McEnery (2004) drew on Smith’s (1983, 1991) distinction between situation and viewpoint aspects and provided a two-component approach in an attempt to take care of both situation or lexical aspect and viewpoint or grammatical aspect. They proposed that the perfective *le* signals the “actual” viewpoint in terms of an actualized single whole, “irrespective of the final endpoint of the situation” (p. 17). Their treatment allows the actual viewpoint to be applied to atelic situations, unlike the actualization model that treated these as imperfective. This is a significant improvement. However, this upgrade comes with a tradeoff. Xiao and McEnery rejected the notion of bounding as part of the actual viewpoint, apparently worried that it would undermine the ability of their proposal to accommodate

the atelic uses that they consider “inherently unbounded” (p. 17). Critically, this dilemma arose because boundedness was treated as related solely to situation aspect but not to viewpoint aspect. Thus, although their data showed that *le* is “sensitive to the endpoint of a situation” (p. 19), the authors resisted interpreting that data as evidence of boundedness in the actual viewpoint. Apart from the empirical challenge of compromised data interpretation, it is conceptually problematic to disregard event boundaries from the perspective of cognitive psychology. There is converging evidence that event perception is analogous to object perception whereby segmentation at the location of event boundaries is “a core, domain-general mechanism of cognitive control” with consequences for long-term memory and learning (Zacks et al. 2001a, 2001b; Zacks et al. 2007; Zacks and Tversky 2001: 276). Thus, it is implausible to perceive events without paying attention to the location of event boundaries.

When it comes to the final particle *le*, single verb predicates pose a huge analytical problem. When *le* follows a single verb and occurs in the clause-final position, it apparently has the dual role of a verbal suffix and a final particle. So, what exactly is it? Chao (1968) suggested that this *le* is a fusion of both the perfective *le* and the particle *le*. Lü (1980) and Zhu (1982) contended that it can be a verbal suffix, a final particle, or the fusion of both. Similarly, Zhu and Gao (2013: 425) treated it as either perfective (completion of action) or transformative (end of state), though they added that it “expresses the meanings of both aspects”. Li and Thompson (1981: 195) proposed that this kind of *le* can have three different readings depending on the meaning of the preceding verb: a perfective marker, a CRS marker, or both. They maintained that “some verbs represent specific, bounded events by virtue of their meaning”, such as *sǐ* ‘die/dead’, and that the clause-final *le* denotes perfective aspect rather than CRS when preceded by such verbs. That is, it should be treated in the same way as the clause-internal *le* describing bounded events. Xiao and McEnery (2004) shared this view and glossed this kind of *le* as DBL “double”, allowing for both interpretations. Interestingly, Li and Thompson chose the example in (7) but not the one in (8) to illustrate their argument.

- (7) *Tā qùnián sǐ le*  
 ‘S/he died last year’  
 (Li and Thompson 1981: 195, Ex. 37).

- (8) *Tā sǐ le*  
 ‘S/he is dead’

Note that *qùnián* ‘last year’ is added in (7) to explicitly locate the situation described by *sǐ* ‘die/dead’ in the past to support the inference of a bounded

reading. In a non-past context, e.g., (8), a stative reading, namely “S/he is dead (not alive anymore)” would be natural. This example suggests that *sǐ* ‘die/dead’ possesses what Dahl (1985: 26) calls “aspectual potential” in the sense of being capable of alternative construals. It can be construed as a permanent state, it can also be construed as a bounded event with the extra help of a past adverbial, in the same way the English verb *know* has the aspectual potential to be construed as either state or achievement, as in (9)–(10), respectively, discussed in Croft (2012: 38, ex. 12, 15):

(9) *I know how to do this.*

(10) *I suddenly knew the answer.*

Croft (2012: 38) pointed out the way *know* is interpreted in a sentence depends on the “tense-aspect constructions” in which it occurs. In the Simple Present tense-aspect construction in (9) *know* denotes state. In the Past tense-aspect construction in (10), it can obtain an achievement interpretation but needs the support of the punctual adverbial *suddenly*. Critically, grammatical aspect at the construction level trumps lexical aspect at the verb level, not the other way round. Confusion about multiple readings only arises because these two levels are treated as equal, as we see in the literature on *le*.

### 1.3 Single-morpheme treatments

Chappell (1988) argued against the two-morpheme approach. She maintained that the verbal enclitic *le* and the final particle *le* have a synchronically identical meaning in the sense that both signal boundedness but have different discourse functions. Specifically, the verb-final *le* bounds the main event as a perfective marker and is structurally associated with [V-*le*-NP]. On the other hand, the sentence-final *le*, structurally most clearly identifiable in [V-NP-*le*], signals inception of a state and is used to mark episode boundaries at the discourse level. However, the majority of Chappell’s data on the final *le* has the [V-*le*] pattern without an intervening NP between the verb and *le*. Chappell considered this structure indistinguishable from the perfective *le* following a single verb, thus facing the same problem of ambiguity that troubles the two-morpheme model discussed in the foregoing section. Chappell (1988: 119) recognized that the inceptive final *le* has “the whole clause in its scope of modification” in contrast to the perfective *le* being “constrained by the inherent aspectual meaning of the verb it modified”. Unfortunately, this insight did not lead to what would be a logical conclusion, namely that the inceptive *le* prevails over the perfective *le* in [V-*le*].

Instead, Chappell (1988: 120) maintained that the semantic distinction is neutralized in the sense that the perfective *le* and the inceptive *le* are “one and the same morpheme, identical in semantic content”, and that its function is to be contextually but not structurally distinguished. Because the neutralization proposal does not consistently associate function with form, we believe it suffers the same weaknesses as the two-morpheme studies previously reviewed.

Shi (1990) also criticized the two-morpheme model, arguing that there is just one *le* and that, whether verbal or sentential, it signals relative anteriority rather than perfectivity and inchoativity. When *le* goes with a bounded event, it gives rise to the inference that the event is completed by virtue of being relatively anterior; when it goes with an unbounded event, the resulting inference is inchoativity. However, Shi did not provide independent criteria for boundedness. He took the bounding features of the complement NP, e.g., quantified object, as the criterium in some cases. Whenever this criterium contradicted the assumed verb lexical aspect, he relied on the latter. For example, (11) and (12) both have a quantified object, but he treated (11) as bounded and (12) as unbounded (Shi 1990: 107, Ex. (23a) and (24a)).

- (11) *Tā shā le yī zhī jī.*  
 3SG kill LE one CLF chicken  
 ‘He killed a chicken’
- (12) *Zhāngsān yǒu le yī dà bǐ qián*  
 PN have LE one big sum money  
 ‘John now has a big sum of money’

Shi said that (12) is unbounded because the main verb *yǒu* ‘have’ is a state verb. Essentially, this verb-centered treatment of aspect suffers the same inconsistencies as the other morpheme-based approaches described previously.

The above overview shows that the existing accounts of *le*, whether two-morpheme or single-morpheme oriented, are rife with arbitrariness and ambiguities. Despite the constructionist intuition, especially on the two-morpheme model, that in general the two different positions of *le* are conventionally associated with two different ways of event representation, the analyses are morpheme-based and verb-centered. As such, they get bogged down in the local lexical aspects of the predicates the variability of which gets in the way of a unitary theoretical account that explains the data in its totality. Specifically, when the presumed aspectual type of a predicate is incoherent with the presumed role of *le*, the constructionist intuition is invariably abandoned. Croft (2012: 31) pointed out, “Aspect is manifested both grammatically and lexically”. However, the manifestation of grammatical aspect cannot be represented without some theory that recognizes that



grammatical constructions have meanings independent of lexical input. In the absence of such a theory, a unitary account of *le* remains out of reach.

Finally, the confusion surrounding *le* is as much methodological as it is theoretical. To our knowledge, few of the claims reviewed above have been empirically tested. With the exceptions of Chappell (1988) using a small sample of narrative data and Xiao and McEnery (2004) employing a Chinese newspaper corpus of limited size, previous studies relied on introspective data and an intuition-based analysis. In our opinion, the methodological limitations have impeded theoretical advancements in this area of research. We believe a unitary account of *le* requires a theoretical leap from a morpheme-based and verb-centered analysis to a constructionist framework as well as a methodological leap toward a greater empirical commitment. It is the goal of this study to take these leaps.

## 2 Theory, hypothesis, and research questions

This study draws on theoretical insights from Construction Grammar and the usage-based model of linguistic representation. Construction Grammar views language as a system of form-function pairings called “constructions” that are language-specific and are learned through generalization over recurrent usage events in social interaction, and are stored in memory in connected networks (Croft 2001; Goldberg 1995, 2006). Usage-based linguistics recognizes the mind’s sensitivity to the statistical properties of language and emphasizes the role of patterns of language use in terms of frequency distributions in shaping conceptual representation (Bybee 2006, 2007). A usage-based constructionist approach to *le* focuses on the systematic associations between recurrent perceptual experiences with events from different viewpoints and grammatical constructions as entrenched conceptual representations of those experiences. That is, we examine *le* in its constructional contexts conventionally associated with the construal of aspects.

Comrie (1976: 3) defined aspects as “different ways of viewing the internal temporal constituency of a situation”. For a long time, aspect research was dominated by a verb-based conception of event types, as epitomized in Vendler’s (1967) classification of lexical aspects or *Aktionsarten*, which is aptly described by Langacker (1987b: 79) as a “rigid partitioning of the verbal lexicon”. Dowty (1979), Dahl (1985), Sasse (1991, 2002), Verkuyl (1993) and, most recently, Croft (2012), cast doubt on Vendler’s view that verbs have inherent lexical aspects, as the same verb can acquire different aspects in different contexts. Dahl (1985) argued that verbs have the potential to describe different event types in different grammatical contexts. Smith (1983) described this potential in terms of aspectual choice, as speakers can describe a situation in more than one way. Croft (2012) proposed a usage-based

constructionist approach to aspect that emphasizes the interaction between “tense aspect constructions” and lexical verbs. He argued that verbs have the potential of different ways of aspectual construal, which are not equally conventionalized. Some verbs may have a default aspectual construal “as a result of asymmetries in the frequency of use of one aspectual construal over another”, but others may not have one in the absence of such asymmetries (p. 91). The advantage of this usage-based model becomes clear when there is mismatch between lexical aspect and grammatical aspect. Specifically, it obviates the need to posit polysemy or the need to assume default categories for lexical verbs on a coercion account based on type-shifting of the assumed lexical aspect (e.g., Michaelis 2004).

In this study we eschew an *a priori* conception of lexical aspects and argue that the two positions of *le* are associated with two different aspect constructions that interact with a variety of lexical inputs in construing different viewpoints on events. Following Croft we use the term “event” in its broad sense which includes both process and state. We treat the two aspect constructions as two distinct family resemblance categories in the sense of Rosch and Mervis (1975). True to the definition of constructions as form-meaning pairings, we take into account both formal and functional similarities in our understanding of family resemblance. Given that “events arise in the perception of observers” (Zacks and Tversky’s 2001: 4), our conception of the grammatical construal of events is grounded in the psychological salience of event boundaries as established in the psychology of event perception (e.g., Zacks et al. 2001a, 2001b; Zacks and Tversky 2001).

We hypothesize the perfective aspect construction [V/A-*le*-NP] conveys CONSTRUAL OF FINAL BOUNDARY OF EVENT and the inceptive aspect construction [XP-*le*] conveys CONSTRUAL OF INITIAL BOUNDARY OF EVENT. For convenience, we use Bickel’s (1997) notation for the boundary of an event as  $\tau$  and the middle between the boundaries as  $\phi$ . If we represent all stages of an event as  $\tau\phi\tau$ , the construals by the internal *le* and final *le* constructions are represented as  $(\tau\phi\tau)$  and  $(\tau\phi\tau)$ , respectively. That is to say, [V/A-*le*-NP] profiles the closing an event and [XP-*le*] profiles the opening of an event. The profiled boundary is bolded. The form-function mappings of the two constructions are shown in Table 1.

Note that the two construals represented as  $[\tau\phi\tau]$  and  $[\tau\phi\tau]$  are mutually complementary in the sense that one construction profiles the boundary of an event that is ignored by the other construction. Not only is this postulation explicit about event boundaries as salient elements in event perception, in keeping with the psychology of event perception, it also highlights the fact that [V/A-*le*-NP] and

**Table 1:** Two *le* constructions as form-function pairings of aspect construal.

Construction	Form	Function
Clause internal <i>le</i> Construction	[V/A- <i>le</i> -NP]	CONSTRUAL OF FINAL BOUNDARY $[\tau\phi\tau]$
Clause final <i>le</i> Construction	[XP- <i>le</i> ]	CONSTRUAL OF INITIAL BOUNDARY $[\tau\phi\tau]$

[XP-*le*] are constructional variants the functions of which are organized into a system of event boundary construal in which they contrast. Because our model emphasizes construal pertaining to subjective viewpoint on events, it can accommodate a whole continuum of eventualities from factual descriptions of events on one end to affective expressions about events on the other. In this sense, our model is preferable over existing proposals.

To test our hypothesis, we ask the following research questions:

- I. Do the two aspect constructions display distinct usage patterns that reflect their respective functions of aspectual construal?
- II. Can native speakers distinguish instances of the two constructions as two distinct family resemblance categories?
- III. Does lexical input influence the way native speakers perceive and categorize instances of the two constructions?

Our hypothesis predicts that the answers to I and II are affirmative. For III, we predict a greater effect of constructional family resemblance than lexical influence. To test these predictions, we use both corpus and elicited response data, following Wang, Shi and Jing-Schmidt (2021). The corpus data is used to identify the most frequent collocates of *le* in the two aspect constructions and contextualization cues that help distinguish them as community-wide conventionalization. The response data is used to examine native speaker representation of linguistic knowledge to test predictions derived from previous studies which stand in contrast to our model.

## 3 Corpus analysis

### 3.1 Data and methods

The corpus data for this study was retrieved from BCC Corpus developed by the Beijing Language and Culture University Corpus Center (Xun et al. 2016). BCC is a balanced POS tagged corpus with a size of ten billion words collected from various genres including fictions, newspaper articles, popular science texts, microblogs etc. The search platform supports both keyword- and syntax-based retrievals. For example a search for ‘*v* 了 *w*’ (*v*=verb, *w*=punctuations) retrieves all tokens of the utterance final *le* following a verb. The system features a “statistics” function that automatically generates a frequency rank list of all the types of collocates that occupies an open slot of interest in the search syntax. For example, the statistics function ranks all the different verbs returned from the search for ‘*v* 了 *w*’ by their token frequency. For each search, BCC allowed users to download the first 1,000 results of types ranked by token frequency. All of our corpus data was retrieved from the multi-genre domain (多领域) of BCC.

**Table 2:** Search syntax and raw type and token frequencies of the Internal *le* Construction.

Search syntax	Glossing	Type frequency	Token frequency
[v 了 n]	[verb_Le_noun]	1,000	374,751
[v 了 q n]	[verb_Le_classifier_noun]	1,000	23,587
[v 了 m n]	[verb_Le_numeral_noun]	1,000	38,470
[v 了 m q]	[verb_Le_numeral_classifier]	1,000	418,158
[v 了 a n]	[verb_Le_adjective_noun]	1,000	60,779
[v 了 a 的 n]	[verb_Le_adjective_de_noun]	1,000	15,746
[a 了 n]	[adjective_Le_noun]	1,000	62,216
[a 了 q n]	[adjective_Le_classifier_noun]	1,000	1,922
[a 了 m n]	[adjective_Le_numeral_noun]	1,000	4,233
[a 了 m q]	[adjective_Le_numeral_classifier]	1,000	50,383
[a 了 a n]	[adjective_Le_adjective_noun]	1,000	31,475

For the Internal *le* Construction, we first ran two exploratory searches for [v 了 ~] and [a 了 ~] where ‘~’ stands for any word to identify possible subtypes of the NP following *le*. This process identified six subtypes of NP for the verb type, e.g., noun, classifier\_noun, numeral\_noun, numeral\_classifier\_noun, adjective\_noun, and adjective\_de\_noun. The first five of these NP subtypes were also identified for the adjective type, but not the last one. We ran 11 syntax-based searches, as shown in the “search syntax” column of Table 2. A frequency rank list of the automatically identified types in the returned concordances was generated in BCC and downloaded into excel for annotation. Table 2 shows the raw frequencies of the retrieved concordances from the 11 searches.

Manual annotations were performed to identify false positives. For example, *chū le gòngxiàn* ‘out *le* contribution’ was retrieved from searching [v *le* n], though it is an incomplete phrase without a verb because BCC mistakes the resultative *chū* ‘out/exit’ for the main verb, which it is not in this context. So, we went back to BCC to conduct a follow up search for [v *chū le gòngxiàn*] to retrieve the missing verb. We then downloaded the new rank list to replace the false positive type in the master list of concordances of [v *le* n]. This process was performed on all identified false positive items such as this for all eleven searches. A combined rank list of the top 100 most frequent types of [V/A-*le*-NP] was generated.

For the Final *le* Construction, we first ran three exploratory syntax-based searches, shown in the top three rows of the “search syntax” column in Table 3. We then examined the three initial rank lists for noise including identical types with different punctuation marks and incomplete strings due to features of POS tagging in BCC that (1) obscure the distinction between a verb/adjective as predicate and one serving as a directional/resultative suffix and that (2) do not distinguish

**Table 3:** Search syntax and raw type and token frequencies of the Final *le* Construction.

Search syntax	Glossing	Type frequency	Token frequency
[v 了 w]	[verb_ <i>le</i> ]	1,000	1,909,756
[a 了 w]	[adjective_ <i>le</i> ]	1,000	841,907
[v n 了 w]	[verb_noun_ <i>le</i> ]	1,000	68,385
[v v 了 w]	[verb_resultative_ <i>le</i> ]	1,000	738,720
[v a 了 w]	[verb_resultative_ <i>le</i> ]	1,000	217,457
[w v 了 w]	[Verb_ <i>le</i> ]	294	90,989
[w a 了 w]	[Adjective_ <i>le</i> ]	205	35,010
[太 a 了 w]	[too_adjective_ <i>le</i> ]	361	180,955

idiomatic combinations from regular compositions. For example, the [verb\_ *le*] search returned *zōu le* ‘go away\_ *le*’ many tokens of which were a part of *ná-zōu le* ‘take away\_ *le*’ or some other verbal strings where *zōu* is a directional suffix meaning ‘away’. Similarly, the [adjective\_ *le*] search returned *hǎo le* ‘good\_ *le*’ with many tokens being a part of *tài hǎo le* ‘too good\_ *le*’. To sort out ambiguous cases like these, subsequent searches were conducted to identify subtypes, e.g., the bottom five items in the search syntax column of Table 3, to distinguish types that are full utterances from those that are part of larger strings. The results were further manually processed in excel to (1) combine identical types with different punctuations and to (2) retrieve any missing heads, as described in the previous paragraph. A combined rank list of the top 100 most frequent types of [V/A-*le*-NP], totaling 188,041 tokens, was generated in R Studio (Version 1.1.463) with the package *tidyverse*.

### 3.2 Results

Figure 1 visualizes the top 100 types of the Internal *le* Construction [V/A\_ *le* NP].

The data in Figure 1 shows a strong representation (83%) of accomplishments, including physical accomplishments, e.g., *tàn le kǒu qì* (sigh *le* CLF air) ‘heave a sigh’ and abstract accomplishments, e.g., *zuò-chū le gòngxiàn* (make *le* contribution) ‘make a contribution’ and *chōngmǎn le xìnxin* (infuse-full *le* confidence) ‘filled with confidence’. The rest describe achievements, e.g., *chū le mén* (exit *le* door) ‘go out the door’ and *mí le lù* (confuse *le* way) ‘lose orientation’. A third of the top 100 types have a numeral (*yī* ‘one’) and/or a classifier (CLF) in the complement NP whereby 75% of the classifiers are verbal classifiers that quantify actions and activities.

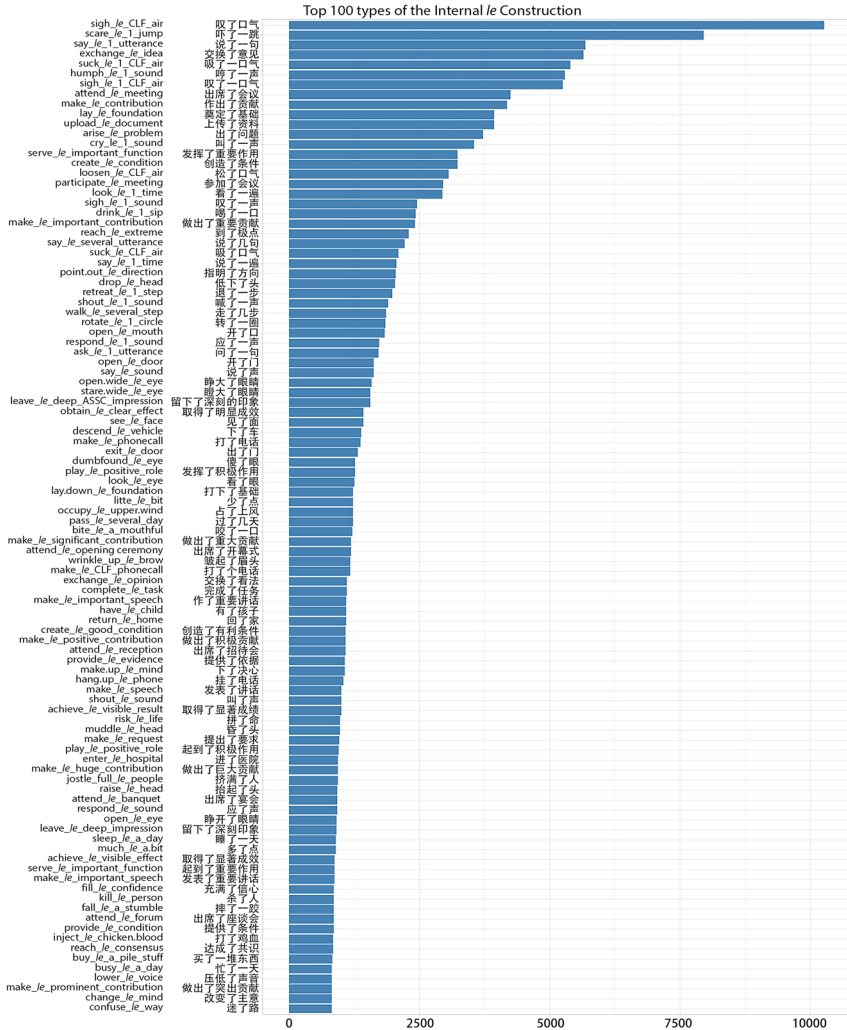


Figure 1: Top 100 types of [V/A\_le\_NP].

Figure 2 shows the top 100 types of the Final *le* Construction, which fall into three subtypes. The first (42%) conveys the inception of speaker intersubjectivity toward what is being evaluated. Of these 88% feature [tài A le] with the intensifier *tài* ‘too, very’ that expresses a heightened excitement about a situation that compels the listener’s attention. Through frequent uses, [tài A le] has clearly become a highly productive formula, as can be seen in its dominance among the

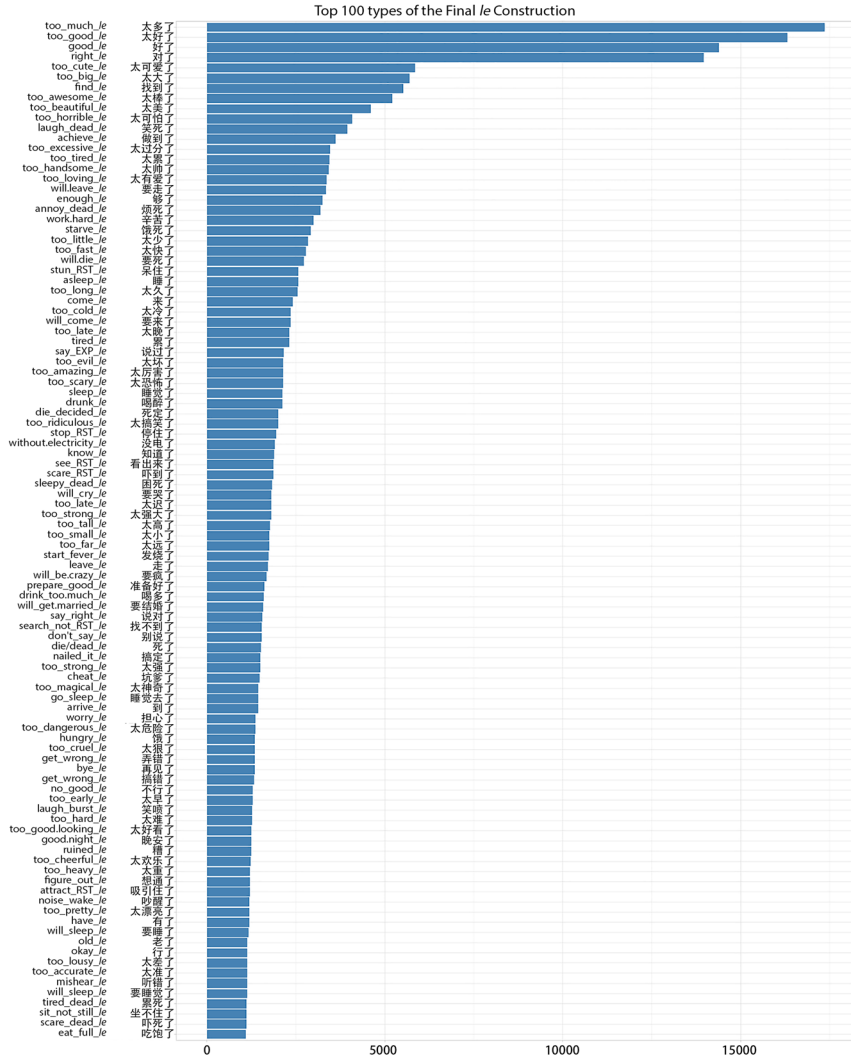


Figure 2: Top 100 types of [XP\_le].

high-frequency types. A second subtype (44%) describes the inception of a new eventuality, e.g., *lèi le* (tired *le*) ‘tired now’, *zhǎo-dào le* (find *le*) ‘found now’. The use of ‘now’ in the glossing makes explicit the initial boundary or inception of the eventualities being described. Depending on the context, *hǎo le* (good-*le*) can describe the inception of a physical state, e.g., ‘well now, recovered, back to normal now’ or convey the inception of an intersubjective state, e.g., ‘it’s alright

now'. A third type (8%) features [*yào V le*] where the epistemic modal *yào* 'going to' announces the high probability of an event to inchoate in the imminent future, as in *yào sǐ le* 'is going to die, is dying', *yào lái le* 'is going to come, is coming', *yào kū le* 'is about to cry, on the verge of tears'. The formulas *wǎn-ān le* (night peace *le*) 'good night' and *zàijiàn le* (again see *le*) 'goodbye' initiate social rituals.

Lexical aspectual collocates have been shown to influence the interpretation of event types (Croft 2012; Vendler 1967). A follow-up analysis was conducted to determine whether the two aspect constructions differ in their preference of such collocates. Specifically, we examined *zhōngyú* 'finally', *yào* 'going to', *yǐjīng* 'already', *kāishǐ* 'begin', and *zǎojiù* 'already' that occur immediately before the verb in [*V le N*] and [*V N le*] in BCC. A Pearson's chi-square test of independence on the association between construction and lexical collocates was significant ( $X^2 = 10948.156$ ,  $df = 4$ ,  $p < 0.0001$ ). As Table 4 shows, [*V N le*] strongly prefers *yào* 'going to' and *kāishǐ* 'begin' and disprefers *yǐjīng* 'already' whereas [*V le N*] strongly prefers *yǐjīng* 'already' and disprefers *yào* 'going to' and *kāishǐ* 'begin'. The results for *zhōngyú* 'finally' and *zǎojiù* 'already' were not as strong.

Given that *yào* 'going to' denotes high probability or imminence of an event and *kāishǐ* 'begin' denotes the inchoation of an event, it is unsurprising that they are preferred by [*V N le*] which construes the INITIAL BOUNDARY OF EVENT. The adverbs *zhōngyú* 'finally', *yǐjīng* 'already', and *zǎojiù* 'already' convey viewpoints relative to the time of speech and speaker expectation. *Zhōngyú* 'finally' conveys a viewpoint from which the event is viewed as occurring later than expected. *Yǐjīng* 'already' conveys that the event in question has occurred by the moment of speech and is perceived as earlier than expected. The glossing of *zǎojiù* as 'already' may suggest it is synonymous to *yǐjīng* 'already'. However, *zǎojiù* explicitly and more strongly conveys a viewpoint from which the event in question is seen as earlier than

**Table 4:** Lexical temporal/aspectual collocates vs. aspectual constructions

CONs	Collocate	<i>yào</i>	<i>kāishǐ</i>	<i>zhōngyú</i>	<i>yǐjīng</i>	<i>zǎojiù</i>	TOTAL
		'going to'	'begin'	'finally'	'already'	'already'	
[ <i>V N le</i> ]	Count	4189	4702	2902	9280	928	22001
	Expected Count	1856.5	2554.8	2956.0	13691.3	942.4	22001.0
	Adjusted Residual	<b>75.4</b>	<b>60.3</b>	<b>-1.4</b>	<b>-81.8</b>	<b>-0.6</b>	
[ <i>V le N</i> ]	Count	54	1137	3854	22012	1226	28283
	Expected Count	2386.5	3284.2	3800	17600.7	1211.6	28283.0
	Adjusted Residual	<b>-75.4</b>	<b>-60.3</b>	<b>1.4</b>	<b>81.8</b>	<b>0.6</b>	
Total	Count	4243	5839	6756	31292	2154	50284
	Expected Count	4243.0	5839.0	6756.0	31292.0	2154.0	50284.0



expected and is indifferent to the actually temporal boundary of the event with which *yǐjīng* ‘already’ is concerned. This explains why *yǐjīng* ‘already’ is strongly preferred by [V *le* N] which CONSTRUES FINAL BOUNDARY OF EVENT whereas *zǎojiù* ‘already’ is compatible with both construals. Similarly, because *zhōngyú* ‘finally’ is more about the perception of deviation from an expectation than the actual temporal boundary of an event, it has the potential to go with either the onset or closing of a long awaited event. Hence its marginal effect, as indicated by the smaller adjusted residual, makes sense.

### 3.3 Event sequencing

Li and Thompson (1981) and Sun (2006) observed that an important indication of boundedness is event sequencing in discourse whereby the event marked by the perfective *le* precedes another event the occurrence of which depends on the perceived closure of the earlier event. Our hypothesis of the two aspect constructions representing two aspectual construals takes this observation a step further and predicts that the Internal *le* Construction that construes closing of event is more likely than the Final *le* Construction to participate in sequencing as the first event regardless of its actual closure in reality. Consider (13) from BCC as an example.

- (13) a. *Nǚrén yǒu le hái zi zhì hòu,*                      b. *pí qì jiù biàn le.*  
 Women have LE child thereafter,                      temperament change LE.  
 ‘After women have children, their temperaments change.’

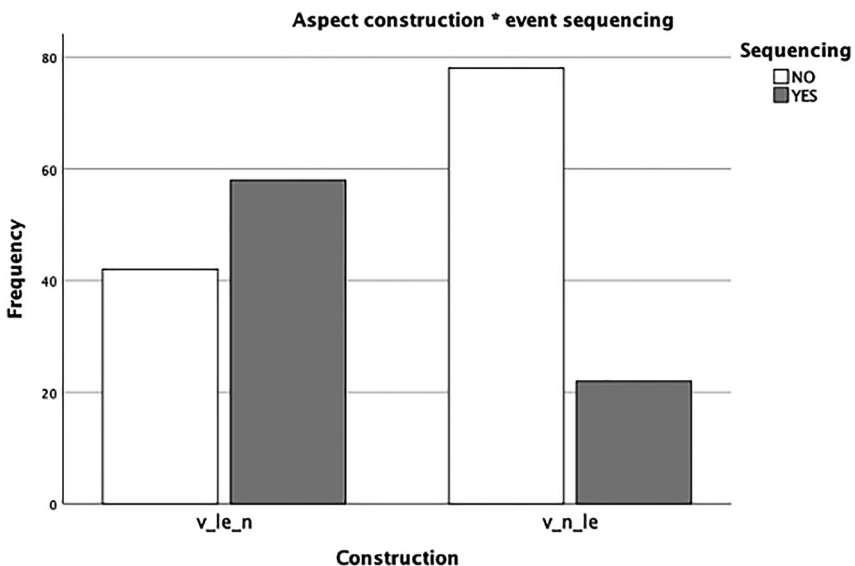
Here the event ‘have a child’ takes the internal *le* in (13a). As such it is given a final boundary after which another situation begins, namely temperament change, described with the final *le* in (13b). Note that it is equally felicitous to describe ‘have a child’ with the final *le* to mark the inception of parenthood. In fact, there are 355 uses of *yǒu hái zi le* (have child *le*) in BCC. However, none collocates with *zhì hòu* ‘thereafter’ or *yǐ hòu* ‘after’, which, as (13a) shows, explicitly separates the first episode from the subsequent situation. By contrast, of 1,208 tokens of *yǒu le hái zi* (have *le* child), 29 collocate with *zhì hòu* ‘thereafter’ and 62 with *yǐ hòu* ‘after’. The preference of the internal *le* clause is due to the CONSTRUAL OF FINAL BOUNDARY whether or not such a boundary makes any sense in reality.

To further test our hypothesis, we examined a sample of 100 concordances each of [v\_ *le* \_n] and [v\_ *n* \_ *le*] from BCC within a search window of 30 characters on each side of the target to include usage context. The samples were independently coded for sequencing (YES, NO) by two researchers based on the criteria: if the *-le* clause precedes and stands in any of three relationships (temporal, conditional,

causal) to another clause such that the occurrence of the event in this second clause presupposes the event in the *le* clause, a YES coding was obtained, otherwise NO. Cohen's Kappa was calculated for intercoder reliability ( $k = 0.898$  for [v\_le\_n] and  $k = 0.786$  for [v\_n\_le]). Intercoder discrepancies occurred with the coding of 11 items (5 in [v\_le\_n] and 6 in [v\_n\_le]). These items were coded by a third coder not aware of the other two's results. The discrepancies were resolved in favor of the majority coding decisions.

A chi-square of independence on the association between construction and sequencing was statistically significant ( $X^2 = 27.00$ ,  $df = 1$ ,  $p < 0.0001$ ). As shown in Figure 3, [v\_le\_n] is significantly more frequently involved in sequencing as an antecedent than [v\_n\_le], confirming our prediction based on the functions of the two aspect constructions.

To summarize the corpus analysis, the Internal *le* Construction [V/A\_le\_NP] is overwhelmingly used to describe accomplishments with a propensity for event quantification, bounding adverbials, and event sequencing. The Final *le* Construction [XP\_le] is used to convey the inception of an event, be it at the intersubjective, the perceptual, or the social level, prefers inchoative adverbials, but is incompatible with event sequencing. These distributions are consistent with their respective functions of aspectual construal: namely the CONSTRUAL OF FINAL BOUNDARY and the CONSTRUAL OF INITIAL BOUNDARY.



**Figure 3:** Frequencies of sequencing by construction.

## 4 Response data analyses

To understand native speakers' linguistic knowledge of the two aspect constructions, we investigated responses to a series of sentence sorting tasks and two similarity judgment tasks using online surveys. The survey research has been reviewed by the University of Oregon Research Compliance Services and determined to qualify for exemption under Title 45 CRF 46.104(d)(2).

### 4.1 Sentence sorting tasks

#### 4.1.1 Stimuli

Ten sorting tasks were designed as the total combinations of five distinct verbs and two aspect constructions. We chose intransitive verbs and predicative adjectives that can be used in both [V/A-*le*-NP] and [XP-*le*], but vary in the sense of Vendler's (1967) lexical aspect: *shòu* 'thin, to lose weight', *lèi* 'tired', *lǎo* 'old, to age', *shuì* 'to sleep', *pǎo* 'to run'. Each task had four sentences obtained by crossing two verbs with two constructions, as shown in Table 5 (see Appendix for Chinese original survey in simplified script). All the sentences have subjects with typical male personal names. In keeping with the usage patterns identified in our corpus analysis, sentences in the Internal *le* Construction category have a complement of quantity.

Each sorting task was created as a separate anonymous online survey in Qualtrics with a setting that randomized the order of the four sentences each time the survey was accessed. Each survey had a simplified and a traditional version. Each survey instructed participants to sort the four sentences into two groups based on perceived similarity and drag them into two separate boxes. Assuming that both formal and semantic cues inform the perception of family resemblance constructions, our instruction did not specify the kind of similarity participants should pay attention to, nor did it say whether the sorts should be of equal number. Participants were asked to provide a brief verbal statement of their sorting strategy.

#### 4.1.2 Participants and procedure

The 10 links to the 10 Qualtrics surveys were shared by members of the research team on the Chinese social media platform WeChat and the Taiwan platform Line with volunteers in closed groups of friends with an age range between 25 and 65 as well as with closed groups of college students of non-language majors at three Chinese universities. All the participants were native speakers of Chinese and each had

**Table 5:** Sentence sorting tasks 1–10.

<b>Task 1</b>	<b>Verb 1</b>	<b>Verb 2</b>
Final <i>le</i> Construction	<i>Lǐ Xiǎoqiáng shòu le.</i> PN1 thin LE	<i>Shí Xiǎotāo lèi le.</i> PN2 tired LE
Internal <i>le</i> Construction	<i>Wáng Xiǎojūn shòu le wǔ gōngjīn</i> PN3 thin LE five kilo	<i>Hú Xiǎobīng lèi le yī zhěngtiān.</i> PN4 tired LE one whole day
<b>Task 2</b>	<b>Verb 1</b>	<b>Verb 2</b>
Final <i>le</i> Construction	<i>Lín Xiǎomín lǎo le.</i> PN5 old LE	<i>Gāo Xiǎolín shuì le.</i> PN6 sleep LE
Internal <i>le</i> Construction	<i>Yú Xiǎosōng lǎo le shí suì.</i> PN7 old LE ten year	<i>Zhōu Xiǎoyǒng shuì le sān xiǎoshí.</i> PN8 sleep LE three hour
<b>Task 3</b>	<b>Verb 1</b>	<b>Verb 2</b>
Final <i>le</i> Construction	<i>Zhào Xiǎohǔ pǎo le.</i> PN9 run LE	<i>Shí Xiǎotāo lèi le.</i> PN2 tired LE
Internal <i>le</i> Construction	<i>Zhāng Xiǎohuī pǎo le qī quāner.</i> PN10 run LE seven lap	<i>Hú Xiǎobīng lèi le yī zhěng tiān.</i> PN4 tired LE one whole day
<b>Task 4</b>	<b>Verb 1</b>	<b>Verb 2</b>
Final <i>le</i> Construction	<i>Lǐ Xiǎoqiáng shòu le.</i> PN1 thin LE	<i>Gāo Xiǎolín shuì le.</i> PN6 sleep LE
Internal <i>le</i> Construction	<i>Wáng Xiǎojūn shòu le wǔ gōngjīn</i> PN3 thin LE five kilo	<i>Zhōu Xiǎoyǒng shuì le sān xiǎoshí</i> PN8 sleep le three hour
<b>Task 5</b>	<b>Verb 1</b>	<b>Verb 2</b>
Final <i>le</i> Construction	<i>Zhào Xiǎohǔ pǎo le.</i> PN9 run LE	<i>Lín Xiǎomín lǎo le.</i> PN5 old LE
Internal <i>le</i> Construction	<i>Zhāng Xiǎohuī pǎo le qī quāner.</i> PN10 run le seven lap	<i>Yú Xiǎosōng lǎo le shí suì.</i> PN7 old LE ten year
<b>Task 6</b>	<b>Verb 1</b>	<b>Verb 2</b>
Final <i>le</i> Construction	<i>Lǐ Xiǎoqiáng shòu le.</i> PN1 thin LE	<i>Zhào Xiǎohǔ pǎo le.</i> PN9 run LE
Internal <i>le</i> Construction	<i>Wáng Xiǎojūn shòu le wǔ gōngjīn</i> PN3 thin LE 5 kilo	<i>Zhāng Xiǎohuī pǎo le qī quāner.</i> PN10 run LE seven lap
<b>Task 7</b>	<b>Verb 1</b>	<b>Verb 2</b>
Final <i>le</i> Construction	<i>Lín Xiǎomín lǎo le.</i> PN5 old LE	<i>Shí Xiǎotāo lèi le.</i> PN2 tired LE
Internal <i>le</i> Construction	<i>Yú Xiǎosōng lǎo le shí suì.</i> PN7 old LE ten year	<i>Hú Xiǎobīng lèi le yī zhěng tiān.</i> PN4 tired LE one whole day

Table 5: (continued)

Task 8	Verb 1	Verb 2
Final <i>le</i> Construction	<i>Gāo Xiǎolín shuì le.</i> PN6 sleep LE	<i>Shí Xiǎotāo lèi le.</i> PN2 tired LE
Internal <i>le</i> Construction	<i>Zhōu Xiǎoyǒng shuì le sān xiǎoshí.</i> PN8 sleep LE three hour	<i>Hú Xiǎobīng lèi le yī zhěng tiān.</i> PN4 tired LE one whole day
Task 9	Verb 1	Verb 2
Final <i>le</i> Construction	<i>Lǐ Xiǎoqiáng shòu le.</i> PN1 thin LE	<i>Lín Xiǎomín lǎo le.</i> PN5 old LE
Internal <i>le</i> Construction	<i>Wáng Xiǎojūn shòu le wǔ gōngjīn.</i> PN3 thin LE five kilo	<i>Yú Xiǎosōng lǎo le shí suì.</i> PN7 old LE ten year
Task 10	Verb 1	Verb 2
Final <i>le</i> Construction	<i>Gāo Xiǎolín shuì le.</i> PN6 sleep LE	<i>Zhào Xiǎohū pǎo le.</i> PN9 run LE
Internal <i>le</i> Construction	<i>Zhōu Xiǎoyǒng shuì le sān xiǎoshí.</i> PN8 sleep LE three hour	<i>Zhāng Xiǎohuī pǎo le qī quāner.</i> PN10 run LE seven lap

access to one survey in a script familiar to them. The number of initially collected responses to the 10 surveys ranged between 31 and 100. After excluding two blank responses, a total of 300 valid responses from the first 30 complete responses to each survey were included in the analysis plus 291 verbal strategies. Two of the authors counted the sorting results: verb-based (VERB), construction-based (CONS), and mixed (OTHER), and annotated the strategies in each sort as meaning-focused (e.g., references to what a sentence describes or emphasizes), form-focused (e.g., references to structural terms and grammatical concepts), and other (e.g., ‘feeling’).

#### 4.1.3 Results

Out of the 300 responses, more participants sorted by CONS ( $N = 224$ , 75%) than by VERB ( $N = 72$ , 24%) or OTHER ( $N = 4$ , 1%). The 1% in the OTHER category produced mixed sorts (with three sentences in one group and a fourth in its own group). The frequencies of the three sorting decisions across the 10 tasks are shown in Table 6.

A Pearson’s chi-square of goodness of fit on the differences in proportions of the sorting decisions was statistically significant  $X^2 = 253.76$ ,  $df = 2$ ,  $p < 0.0001$ . The result suggests that significantly more participants demonstrated a knowledge of constructions and relied on this knowledge to sort the sentences, resisting the bias toward verb meaning. A Pearson’s chi-square of independence was conducted to test the association between sorting decision and sorting task, focusing on the two

**Table 6:** Sorting results from 10 sentence sorting tasks.

	VERB	CONS	OTHER	Total
Task 1	8	21	1	30
Task 2	9	21	0	30
Task 3	6	23	1	30
Task 4	6	24	0	30
Task 5	6	24	0	30
Task 6	7	23	0	30
Task 7	10	19	1	30
Task 8	8	22	0	30
Task 9	7	23	0	30
Task 10	5	24	1	30
Total	72	224	4	300

decisions based on VERB and CONS ( $N = 296$ ). The result was not statistically significant,  $X^2 = 4.048$ ,  $df = 9$ ,  $p = 0.908$ . The null hypothesis that there was no association between task and sorting decision was confirmed. This suggests that the sorting decisions were consistent across the 10 tasks involving different lexical verbs and therefore could not have been an artifact of the selection of verbs for the stimuli.

In the collected protocol of the 291 verbal strategies, 218 were provided by CONS-based sorters and 72 by VERB-based sorters, which is highly consistent with the proportions of the two sorts in the sorting sample ( $X^2 = 0.020$ ,  $df = 1$ ,  $p = 0.887$ ). 96% of the CONS-based sorters stated a construction-based reason (36% citing construction meaning and 60% citing construction form including 6% citing sentence length and 2% citing both construction form and sentence length), 1% stated time/tense, and the remaining 3% mentioned ‘feeling’ as a strategy. One meaning-related cue that was repeatedly mentioned was whether the sentences described quantity. Participant #29 in Task 2 described this as “exact time length”. Similarly, participant #12 mentioned “duration of the action”. For participant #30 in Task 5, the quantity difference was simply “the degree of detail of what is being described”. Meaning-based strategies referred to perception of event structure. For example, participant #16 in Task 1 stated that the finale *le* group “describes a state” whereas the internal *le* group “describes a result”. Participant #20 in Task 8 described the difference as one between “momentary state” and “state within a time span”. Form-based strategies also recognized quantity, as can be seen in recurrent references to “measure words”. Participants also generally identified two types of grammatical relations: the final *le* group was recurrently characterized as a “subject-predicate” structure and the internal *le* group as “with an added complement” or as a “subject-predicate-object” structure. Despite the misnomer “object” applied to the complement, it is clear that the participants

perceived a difference in syntactic relationship. Of the 72 strategies provided by the VERB-based sorters, 87% stated verb meaning as the basis and 13% referred to ‘feeling’ or ‘subjectivity’ as strategy. Overall, the sorting results along with the verbal strategies suggest that the majority of the participants systematically recognized semantic and formal differences between tokens of the two constructions across varied lexical types.

## 4.2 Similarity judgment task I

Li and Thompson (1981: 195) argued that when the final *le* collocates with a verb with an “inherent bounded meaning”, it does not denote CRS, but boundedness. This hypothesis would predict that native speakers, when given two choices to match this kind of use in a similarity judgment – one with the internal *le* that describes a bounded event and the other with the final *le* that describes CRS, would choose the former and reject the latter. Other scholars (e.g., Chao 1968; Lü 1980; Sun 2006; Xiao and McEnery 2004; Zhu and Gao 2013) claimed that *le* used in this way is a fusion of both the perfective *le* and the particle *le*. This claim would predict that participants are equally likely to choose one or the other sentence as similar to the target sentence. Our constructionist hypothesis predicts that participants will make a family resemblance judgment by picking the final *le* choice as similar to the final *le* target.

### 4.2.1 Stimuli

Five target sentences were designed in the form of [Sub\_Verb\_Le], using as predicates the five verbs described in Li and Thompson (1981: 195) as having “inherent bounded” meanings: *sǐ* ‘die/dead’, *miè* ‘(of fire) go out/extinguish’, *huài* ‘break/be damaged’, *diào* ‘drop’, and *shuìzháo* ‘fall asleep’. For each target sentence, two choice sentences, one with a final *le*, and one with an internal *le*, were provided for a similarity judgment. The three sentences in each judgment task were unitary in terms of the type of subject nouns: male personal nouns for task 1, inanimate nouns in tasks 2–4, 3rd person female pronoun in task 5, as shown in Table 7. The design of the choice items with the internal *le* was informed by our corpus data that shows a strong presence of quantized NP following *le*, which is consistent with Li and Thompson’s (1981: 185) observation that a quantified event is a bounded event. The selection of the choice items with the final *le* was based on Li and Thompson’s examples of *le* as a CRS marker (1981: 251–263, 280, 289).

An anonymous online Qualtrics survey with the five tasks was created (original survey in Chinese in Appendix B). For each judgment item, the survey instructed participants to look at the target sentence and choose from the two choice items the one that is of the same kind as the target and drag it into a box below the target sentence. Participants were instructed to briefly state the basis of

**Table 7:** Similarity judgment tasks.

Items	Target sentence	Choice 1: Internal <i>le</i> Construction	Choice 2: Final <i>le</i> Construction
1	<i>Kē Xiǎogāng sǐ le.</i> PN die/dead LE	<i>Xú Xiǎomíng xǐ le ge zǎo.</i> PN wash LE CLF bath	<i>Lǐ Xiǎoqiáng lái le.</i> PN come LE
2	<i>Làzhú miè le.</i> Candle extinguish LE	<i>Mén kāi le ge fèng.</i> Door open LE CLF crack	<i>Yīfu gān le.</i> Clothes dry LE
3	<i>Yǐzi huài le.</i> Chair break LE	<i>Shù kāi le duǒ huā.</i> Tree open LE CLF flower	<i>Mífàn shóu le.</i> Rice cooked/done LE
4	<i>Gāizi diào le.</i> Lid drop LE	<i>Xié pò le ge dòng.</i> Shoe break LE CLF hole	<i>Yèzi huáng le.</i> Foliage yellow LE
5	<i>Tā shuìzhǎo le.</i> She asleep LE	<i>Tā shuāi le yī jiāo.</i> She fall LE one stumble	<i>Tā hūndǎo le.</i> She faint LE

their judgment. A randomization setting in Qualtrics was used so the two choice items appeared in random order each time the survey was activated.

#### 4.2.2 Participants and procedure

The Qualtrics survey link was shared with three WeChat groups of Chinese university students who were native speakers of Chinese. A total of 72 responses were returned and downloaded from Qualtrics. Three blank responses were eliminated as invalid and the 69 remaining responses (each to 5 items) along with 233 verbal strategies were coded by two of the authors. Responses that selected items in the same constructional pattern with the final *le* were coded as FIN and those that selected items with the internal *le* as INT. Annotation of the strategies followed the same procedure described in 4.1.2.

#### 4.2.3 Results

Respondents ( $N = 64$ ) who judged FIN sentences as similar to the target sentences outnumbered those ( $N = 5$ ) who judged INT sentences to be similar to the target sentences. A Pearson's chi-square of goodness of fit on the differences in the average proportions of the two similarity judgment decisions was statistically significant  $X^2 = 17.09$ ,  $df = 1$ ,  $p < 0.0001$ . Therefore, we reject the null hypothesis and conclude that the difference was significant. The result shows that the final *le* uses with verbs thought to have “inherent bounded” meanings were overwhelmingly judged to be similar to final *le* uses with adjectives denoting CRS. The result suggests that participants recognized family resemblance in terms of the larger constructional pattern and used this information to guide their judgment despite verb meaning. The similarity judgment based on constructional family resemblance disconfirmed Li and Thompson's (1981) verb-centered claim about



the meaning of the final *le* used with verbs with presumed “inherent bounded” meaning. Also rejected by this result is the fusion hypothesis that *le* used with these verbs signals both perfective and CRS.

Of the 223 verbal strategies 92% came from participants who passed an FIN judgment and 8% came from those who made an INT judgment. These proportions are not significantly different from the overall proportions of the two similarity judgments ( $X^2 = 0.028$ ,  $df = 1$ ,  $p = .867$ ). Of the FIN-associated strategies, 61% referred to sentence form (including four citing the number of characters), 24% to sentence meaning, 2% to both sentence meaning and form, and 3% to “feeling”. Form-focused decision makers repeatedly referred to constructional differences between “subject-predicate” and “subject-predicate-object” to distinguish the FIN and INT *le* sentences. Some distinguished between “adjective” and “verb” in telling the two types apart. For example, for S 3, two participants stated that *huài* ‘break, be damaged’ and *shóu* ‘done, cooked’ are adjectives but *kāi* ‘open’ is a verb. The meaning-oriented strategies focused on “state of the subject” or “change in form and state” shared by the FIN sentences. Some stated that the FIN tokens were all about “*x zěnme le (what’s the matter with x)*”. Critically, no one indicated that the final *le* was ambiguous between two event types.

While our construction-based hypothesis has been confirmed, the similarity judgment across the five target sentences was not entirely consistent. A Pearson’s chi-square of independence test on the association between similarity judgement and target sentence was statistically significant  $X^2 = 15.525$ ,  $df = 4$ ,  $p = 0.004$ , suggesting that similarity judgment was associated with target sentence. The largest contribution to the association came from the choices made on target sentence 4 (adjusted residuals of  $-3.6$  for FIN,  $3.6$  for INT), with a larger than expected number of participants choosing ‘shoe break *le* hole’ over ‘foliage yellow *le*’ as similar to ‘lid drop *le*’. The verbal strategies referred to “result”, “physical change”, “state change”, and “action with result” in the INT choice versus “slow” change in the FIN choice. It appears that at least some participants paid attention to the kind of change involved.

### 4.3 Similarity judgment task II

Recall the disagreement in the literature on the status of the internal *le* used with adjectives that precede an NP of quantity. Some grouped it under the perfective aspect (e.g., Chao 1968; Lü 1980; Xiao and McEnery 2004) and others treated it as equivalent to the final *le* describing state change (e.g., Zhu and Gao 2013). A third view held that the internal *le* can denote both perfective and imperfective aspects depending on the type of verbs (Jin 1998; Lin 2003, 2017). For this last school, the

verbs that trigger an imperfective reading of the internal *le* include also activity verbs in addition to adjectives. The sorting task in 4.1 has confirmed that participants overwhelmingly grouped sentences by construction by resisting verb meaning. The first similarity judgment task targeted verbs with a final *le*. It remains unclear from a statistical perspective if native speakers perceive sentences with an internal *le* suffixed to adjectives and activity verbs as similar to (1) internal *le* sentences that denote boundedness, or to (2) final *le* sentences that signal a new state. Similarity judgment task II was designed to test these competing hypotheses.

### 4.3.1 Stimuli

Six target sentences were designed as stimuli. Sentences 1–4 instantiate the construction [Sub]<sub>inanimate</sub>–Adj–*le*–NP<sub>quantity</sub>], as described in Lü (1980) and Zhu and Gao (2013); items 5 and 6, examples taken from Lin (2017), instantiate [Sub]<sub>human</sub>–Verb<sub>activity</sub>–*le*–NP<sub>quantity</sub>], with quantified objects and male personal nouns as subjects. As shown in Table 8, each pair of choice sentences differ in terms of the boundedness of the event described. Choice 1 sentences all have a process verb followed by the internal *le* and a quantity NP, and Choice 2 sentences all share the final *le*. An anonymous online Qualtrics survey with the six judgment tasks was created (See Appendix C for original survey in Chinese). For each task, the survey instructed participants to look at the target sentence, choose from the two choice items the one that is of the same kind as the target, drag it into a box below the target and briefly state their judgment strategy. The instruction did not

**Table 8:** Similarity judgment II stimuli sentences.

Items	Target sentence	Choice 1: INT <i>le</i>	Choice 2: FIN <i>le</i>
1	<i>Jiàoshì kōng le xiē wèizi</i> Classroom empty LE some seats	<i>Yīfu suō le jǐ cùn</i> Clothes shrink LE several inch	<i>Yīfu suōshuǐ le.</i> Clothes shrink LE
2	<i>Chuānglián duǎn le yī chǐ.</i> Curtain short LE one <i>chǐ</i>	<i>Jiàgé xiàjiàng le 20%.</i> Price drop LE 20%	<i>Jiàgé piányi le.</i> Price cheap LE
3	<i>Lǚtú shǎo le xiē lèqù.</i> Trip less LE some fun	<i>Hángbān tuīchí le jǐ xiǎoshí.</i> Flight delay LE a few hour	<i>Hángbān wǎdiǎn le.</i> Flight late LE
4	<i>Qìwēn gāo le hǎo jǐ dù.</i> Temperature high LE several grade	<i>Wùmái zēngjiā le bùshǎo.</i> Smog increase LE quite a bit	<i>Wùmái gèng yánzhòng le.</i> Smog more serious LE
5	<i>Xiǎobǐng yǎng le yī zhī gǒu.</i> PN raise/keep LE one CLF dog	<i>Xiǎomíng xiě le yī fēng xìn.</i> PN write LE one CLF letter	<i>Xiǎozhuàng jiéhūn le.</i> PN marry LE
6	<i>Xiǎoqǎng zū le yī jiān gōngyù.</i> PN rent LE one CLF apartment	<i>Xiǎogāng dào le yī bēi jiǔ.</i> PN pour LE one glass alcohol	<i>Xiǎoliàng zhǎngdà le.</i> PN grow.up LE

specify what kind of similarity participants should pay attention to. The survey was designed to randomize the order of the two choice items each time the survey was accessed. Suppose Zhu and Gao (2013) and Lin (2017) were right, we would predict that participants will choose the FIN *le* sentences as similar to the targets. Our constructionist hypothesis of aspectual construal predicts the opposite result in favor of family resemblance at the constructional level.

### 4.3.2 Participants and procedure

The Qualtrics survey link was shared on WeChat with five groups of Chinese university students, all native speakers of Chinese. A total of 103 responses were returned and downloaded from Qualtrics. 16 with one or more missing judgments were excluded from the analysis and the remaining 87 responses (each to 6 items) along with 242 verbal strategies were coded by two of the authors. Responses that selected items in the same constructional pattern with a final *le* were coded as FIN and those that selected items with the internal *le* as INT. Annotation of the strategies followed the same procedure described in 4.1.2.

### 4.3.3 Results

Respondents ( $N = 81$ ) who judged INT sentences as similar to the target sentences outnumbered those ( $N = 6$ ) who judged FIN sentences to be similar to the target sentences. A Pearson's chi-square of goodness of fit on the differences in the average proportions of the two similarity judgment decisions was statistically significant  $X^2 = 64.655$ ,  $df = 1$ ,  $p < 0.0001$ . Therefore, we reject the null hypothesis and conclude that the difference was significant.

Of the 242 verbal strategies collected, 95% were from INT-based judges and 5% from FIN-based judges. These proportions are not significantly different from the overall proportions of the two similarity judgments ( $X^2 = .966$ ,  $df = 1$ ,  $p = .326$ ). Of the INT-associated strategies, 42% were based on sentence form and 47% on sentence meaning, 3.5% on both form and meaning, and 7.5% on "feeling". Form-based strategies included general structural similarity, number of words, the position of *le*, as well as specific structural concepts. For example, Participant #5 stated that the INT choice for S4 is the same as the target in that "the predicate verbs are both followed by predicatives that are quantity words", but the FIN choice "is only subject plus adjective structure". Participant #98 described what they perceived as the shared form of S1 and its INT match as "noun – transitive verb – noun". Understandably, some of the concepts are technically incorrect (e.g., "predicative", "transitive") in characterizing the syntactic categories in question. Despite the inaccuracies, the characterizations show that the participants

perceived and drew on constructional-level relationships in making their decisions. Especially telling is the reference to “transitive verb” by the participant in describing the adjective *kōng* ‘empty’ in S1 *Jiàoshì kōng le xiē wèizi* ‘classroom empty *le* some seats’. Clearly, what the participant was sensitive to was the overall relationship between the verb slot and the noun slot in the construction, not the particular lexical aspect of the verb in isolation.

Similarly, the strategies based on construction meaning pertained to relational properties. For example, Participant #88 noted that both S1 and its INT match “emphasize that the subject is short of something”. Participant #37 stated regarding S6 and its INT match, “the quantity complement after the predicate makes the meaning more clear” whereas the FIN sentence “conveys a vague meaning, not concrete”. Overall, the written protocols in the INT group suggest that in the absence of specific instructions about sorting criteria the participants paid attention to the relational properties of the sentences, structural or semantic.

In the FIN group, 85% strategies were meaning-oriented. Two participants mentioned emphasis on the “state” or “property” of the subject for viewing S1 and S3 as similar to their respective FIN choices. Three referred to “vagueness” of quantity in justifying their decisions, a point to which we will return shortly. One participant (#25) considered ‘raise/keep *le* a dog’ in S5 as an equivalent type to ‘be married *le*’, noting that both are “durative action”; but the same participant considered ‘rent *le* an apartment’ as similar to ‘pour *le* a glass alcohol’, stating that both describe “instantaneous” actions.

While the prediction based on our constructionist hypothesis was confirmed, the similarity judgments across the five target sentences were not entirely consistent. A Pearson’s chi-square of independence test on the association between similarity judgement and target sentence was statistically significant  $X^2 = 17.937$ ,  $df = 5$ ,  $p = 0.003$ , suggesting an association between similarity judgment and sentence. The largest contribution to the association came from S3, reintroduced here as (14a), for which a larger than expected number of participants chose the FIN form (14c) (adjusted residual = 3.5) over the INT form (14b) (adjusted residual = -3.5).

- (14)
- a. *Lǚtú shǎo le xiē lèqù.*  
Trip little/short *le* some fun.
  - b. *Hángbān tuīchí le jǐ xiǎoshí.*  
Flight delay *le* a few hour.
  - c. *Hángbān wǎdiǎn le.*  
Flight late *le*.

Four of the nine verbal strategies explained this decision in terms of (14a) and (14c) sharing underspecification of quantity. This is interesting because it shows that these participants perceived the quantity NP *xiē lèqù* ‘some fun’ in (14a) as

dissimilar to *jǐ xiǎoshí* ‘a few hours’ in (14b) even though both involve an NP signaling unspecified quantity. There are two explanations for this. First, *lèqù* ‘fun’ is non-countable but *xiǎoshí* ‘hour’ is a count noun.<sup>5</sup> It is possible that countability has an effect on the perception of quantity. This possibility is confirmed by comparing S3 to S1, in (15a).

- (15) a. *Jiàoshì kōng le xiē wèizi.*  
Classroom empty *le* some seat.  
b. *Yīfu suō le jǐ cùn.*  
Clothes shrink *le* several inch.  
c. *Yīfu suōshuǐ le.*  
Clothes shrink *le*.

Notice that the noun *wèizi* ‘seat’ in (15a) shares with *lèqù* ‘fun’ in (14a) the same quantifier *xiē* ‘some’ that denotes unspecified quantity, but differs from it in countability. The judgments by the participants on (15), unlike (14), did not significantly deviate from the expected result. Thus, it appears that countability made a difference in how participants perceived quantity. Second, (14a) may have been treated as an unanalyzed whole in the sense of ‘The trip is boring’ whereby the quantity element would have been unanalyzed.

## 5 Discussion

This study filled a persisting gap in the research on the Mandarin aspect marker *le* by providing a unitary analysis on a usage-based constructionist approach. We treat *le* as an integral part of two distinct aspectual construals associated with two distinct grammatical constructions that accommodate rather than succumb to lexical aspect. We provided converging evidence from corpus and response data to support this theoretical account.

Our corpus data showed that the two aspect constructions demonstrate distinct patterns in natural language use that are consistent with the hypothesized construals: CONSTRUAL OF FINAL BOUNDARY OF EVENT by the Internal *le* Construction and CONSTRUAL OF INITIAL BOUNDARY OF EVENT by the Final *le* Construction. We have affirmed the view that meaning does not reside in objective reality (Croft 2012; Langacker 1987a, 1987b). It is particularly noteworthy that many intransitive events such as sighing, breathing, yelling, speaking, frowning, falling, getting startled, and getting lost are described in Chinese with the Internal *le* Construction as

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<sup>5</sup> In Chinese, a language without grammatical number, a non-count noun cannot collocate with a numeral classifier when quantified (Sun 2006).

accomplishments involving two participants whereby the complement noun is construed as a quantified object, e.g., *tā tàn le yī kǒu qì* (s/he sigh *le* a mouthful air). This is not unique to Chinese. In English *S/he heaved a sigh of relief* construes sighing as a transitive event, an accomplishment. It is not the case that the transitive construal is the only way of conceptualize these events. But when it is used to describe an event, it imposes a “particular image on its domain”, to use Langacker’s (1987b: 56) words.

Similarly, aspect construal can impose a final boundary on atelic events despite their real-world continuous extension. As our data on event sequencing has shown, the same reality, e.g., *yǒu hái zi* ‘have child’, can be described with either *le* construction. It is construed as having a closure when used with the internal *le* and as a new state when used with the final *le*. To serve as an antecedent, an event is construed as having a final boundary. This finding challenges the truth-conditional argument that uses of [*yǒu le* N] are always imperfective because having something is a continuous state (e.g., Jin 1998, 2002; Lin 2003, 2017; Liu 1988; Shi 1990). It is ironic that *yǒu le xī fù wàng le niáng* (have *le* wife forget *le* mother) has been used in some of these studies to support the imperfective analysis of the perfective *le*. This example shows the same kind of temporal sequencing discussed here and in 3.3 that illustrates what it means for the verb *yǒu* ‘have’ to be capable of alternate aspect construals. Unlike truth-conditional semanticists, a disgruntled mother accusing her son of being unfilial does not focus on his marriage as a continuous extension. She views it as a critical boundary that marks the abrupt shift from his premarital to his postmarital attitude towards the mother, as an end to his filiality. This example exposes as well the weakness of the argument that an atelic situation used with the internal *le* is actualized but unbounded (e.g., Xiao and McEnery 2004). When viewing an event as coinciding with an abrupt shift, the speaker not only takes it as actualized, they impose a perceptual boundary on it. Evidence from psychology suggests that event segmentation correlates with actors’ goals and inferences about those goals (Zacks 2004; Zacks et al. 2007). In the case of the aggrieved mother, her way of segmenting the two events construes the first event as the cause of the second.

But a phrasal level construal of final boundary can be undone when it meets a clausal level construal that disregards the final boundary of an event. This is the case of (6), introduced in 1.1, where the temporally quantified event of ‘snow a whole day’ gets a perfect continuous reading ‘has been snowing for a whole day’ when the final *le* follows the VP with the internal *le*. This conventional embedding of the verb-level aspect construal [V/A-*le*-NP] in the clause level aspect construal [XP-*le*] provides a language-specific solution to describing an event that has its course over a time span to the moment of speech and shows no sign of ending.

Our response data demonstrated native speaker sensitivity to construction-level cues, both formal and semantic. The agreement across participants and across tasks was robust. The type of verbs made no significant difference in family resemblance perception. Instead, participants paid attention to the overall structure and event internal relations in making family resemblance judgment. This finding is consistent with the observation by Medin et al. (1987: 264) that attention to “interproperty relationships” lead to increased family resemblance categorization. More generally, the finding suggests stimulus generalization in the categorization of multidimensional perceptual stimuli based on exemplar similarity (Medin and Schaffter 1978; Nosofsky 1984, 1986). In particular, event quantification associated with the internal *le* sentences was a key element for participants in constructing family resemblance sorts and in making similarity judgment, suggesting the salience of quantification in the perception of boundedness (Langacker 1987b).

On the other hand, there was a significant association between task design and judgment for one task item in each of the two similarity judgment tasks. Verbal strategies from participants whose judgments differed from expectations suggest a gradation of perceived boundedness in the internal *le* sentences. Specifically, a sentence with a non-count noun as complement was more likely than one with a count noun to be judged as similar to a final *le* sentence, which does not profile the final boundary of an event. This finding lends empirical support to Langacker’s (1987b) conception of the schematic distinction between count and mass nouns as an analog to the distinction between perfective and imperfective aspects. This finding is also consistent with evidence of the graded structure of family resemblance categories (e.g., Battig and Montague 1969; Dry and Storms 2010; Rosch and Mervis 1975; Storms et al. 2000; Verheyen et al. 2007). That a small number of participants noticed semantic differences between instantaneous and slow changes and used this information in making similarity judgment suggests individual variability in selective attention, as predicted in exemplar-based categorization of multidimensional perceptual stimuli (Nosofsky 1986).

Our task design differed from Bencini and Goldberg (2000), which focused on the extent to which constructional meaning contributed to sentence meaning. Ours left it open as to what kind of similarity participants should focus on in all three tasks. This probably explains the more robust effect of constructions on family resemblance judgment in our results.

Taken together, our study based on the corpus and response data does not support morpheme-based and verb-centered approaches to *le*, nor does it support the view that the function of *le* can only be distinguished contextually but not structurally. Rather, the function of *le* is associated with the grammatical construction in which it occurs.

## 6 Conclusion

Chinese has grammaticalized aspect in the sense that semantic distinctions of viewpoints are systematically represented by grammatical distinctions. Morpheme-based and verb-centered approaches to *le* suffer conceptual contradictions and descriptive difficulties that endure in the absence of empirical evidence. This study has provided theoretical clarity and empirical support for the analysis of *le* within a usage-based constructionist framework as an explicit theory of grammar as cognitive construal.

Our study has clarified the controversies and contradictions in the literature by liberating construction-level aspectual construal from verb-level lexical aspect. In doing so it offers maximal generality consistent with the insight that patterns of experience is generalized in patterns of grammar (Goldberg 1998). Our analysis also shows psychological plausibility in that it aligns with well-established cognitive processes in family resemblance and exemplar-based categorization, as well as in the psychology and neuropsychology of event perception.

Finally, we conclude by drawing both theoretical and methodological implications from our study. Theoretically, our study has implications for cross-linguistic research on grammatical aspect in relation to lexical aspect and for constructionist approaches to grammatical categories beyond aspect. Methodologically, our study has demonstrated the power of converging data in supporting theoretical arguments.

## Abbreviations

1INCL	first personal plural inclusive
1PL	first person plural
1SG	first person singular
2SG	second person singular
3SG	third person singular
A	adjective
ASSOC	associative
CLF	classifier
COP	copula
CRS	currently relevant state
DUR	durative
FIN	Final <i>le</i> Construction
INT	Internal <i>le</i> Construction
LE	<i>le</i>
NEG	negater
NP	noun phrase



NUM	numeral
PN	proper noun
PRG	progressive
V	verb
VP	verb phrase
XP	phrasal structure

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**Supplement:** The underlying data for this article are available at <https://osf.io/mk6wx/>.

## Appendix A: Sorting tasks 1–10 (simplified script version)

		Verb 1	Verb 2
Task 1	Final <i>le</i> Construction	李小强瘦了。	石小涛累了。
	Internal <i>le</i> Construction	王小军瘦了五公斤。	胡小兵累了一整天。
Task 2	Final <i>le</i> Construction	高小林睡了。	林小民老了。
	Internal <i>le</i> Construction	周小勇睡了三小时。	余小松老了十岁。
Task 3	Final <i>le</i> Construction	赵小虎跑了。	石小涛累了。
	Internal <i>le</i> Construction	张小辉跑了七圈儿。	胡小兵累了一整天。
Task 4	Final <i>le</i> Construction	李小强瘦了。	高小林睡了。
	Internal <i>le</i> Construction	王小军瘦了五公斤。	周小勇睡了三小时。
Task 5	Final <i>le</i> Construction	林小民老了。	赵小虎跑了。
	Internal <i>le</i> Construction	余小松老了十岁。	张小辉跑了七圈儿。
Task 6	Final <i>le</i> Construction	李小强瘦了。	赵小虎跑了。
	Internal <i>le</i> Construction	王小军瘦了五公斤。	张小辉跑了七圈儿。
Task 7	Final <i>le</i> Construction	石小涛累了。	林小民老了。
	Internal <i>le</i> Construction	胡小兵累了一整天。	余小松老了十岁。
Task 8	Final <i>le</i> Construction	高小林睡了。	石小涛累了。
	Internal <i>le</i> Construction	周小勇睡了三小时。	胡小兵累了一整天。
Task 9	Final <i>le</i> Construction	林小民老了。	李小强瘦了。
	Internal <i>le</i> Construction	余小松老了十岁。	王小军瘦了五公斤。
Task 10	Final <i>le</i> Construction	赵小虎跑了。	高小林睡了。
	Internal <i>le</i> Construction	张小辉跑了七圈儿。	周小勇睡了三小时。

## Appendix B: Similarity judgment task I

Items	Target sentence	Choice 1: Internal <i>le</i> Construction	Choice 2: Final <i>le</i> Construction
1	科小钢死了。	徐小明洗了个澡。	李小强来了。
2	蜡烛灭了。	门开了个缝。	衣服干了。
3	椅子坏了。	树开了朵花。	米饭熟了。
4	盖子掉了。	鞋破了个洞。	叶子黄了。
5	她睡着了。	她摔了一跤。	她昏倒了。

## Appendix C: Similarity judgment task II

Items	Target sentence	Choice 1: Internal <i>le</i> Construction	Choice 2: Final <i>le</i> Construction
1	教室空了些位子。	衣服缩了几寸。	衣服缩水了。
2	窗帘短了一尺。	价格下降了20%。	价格便宜了。
3	旅途少了些乐趣。	航班推迟了几小时。	航班晚点了。
4	气温高了好几度。	雾霾增加了不少。	雾霾更严重了。
5	小兵养了一只狗。	小明写了一封信。	小壮结婚了。
6	小强租了一间公寓。	小刚倒了一杯酒。	小亮长大了。

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