التمثيل الإجرائي للإحالة إلى الماضي في اللغة الصينية

Procedural Representation of Past-Time Reference in Chinese

بافيل جيبكي: قسم اللغة الصينية، جامعة بيلاروسيا الحكومية للغات الأجنبية.

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الملخص:

تبحث هذه المقالة في التمثيل الإجرائي للزمن الماضي في اللغة الصينية ضمن الإطار التصريحي–الإجرائي. ولأن اللغة الصينية تفتقر إلى علم الصرف، تُعبَّر العلاقات الزمنية من خلال وسائل معجمية وسياقية ونحوية. وعلى وجه الخصوص، يمكن إنشاء "تأثير الزمن الماضي"، وهو فاصل زمني يقع بين أحداث ماضية مكتملة ناتج عن تركيب وحدات نحوية متعددة. بالاستناد إلى التراث اللغوي الصيني الياباني والدلالات التركيبية، يحلل البحث دور علامات الأبجدية النحوية مثل أشباه اللواحق 了 (le–) و 过 (guo)، والجسيم المودال 了 (le)، والمضخم 就 (jiù) في إنتاج تأثير العلاقات الزمنية. يستند التحليل إلى 879 جملة من النسخة الإلكترونية للقاموس الصيني–الروسي الكبير، بما في ذلك 215 مثالًا على إنشاء تأثير الزمن الماضي. تتوافق النتائج المرصودة مع الأبحاث السابقة، وتسلط الضوء على تفاعل لم يُدرس بشكل كافٍ بعد بين شبه اللاحقة 了 (le–) و 就 (jiù) والجسيم المودال 了 (le) ودورها في إنشاء تأثير الزمن الماضي. تُسهم الدراسة بشكل أساسي في نظرية النحو الصيني، والدلالات التركيبية، والذكاء الاصطناعي.

الكلمات المفتاحية: اللغة الصينية؛ التمثيل الإجرائي؛ تأثير زمن الماضي؛ النحو؛ أنصاف اللواحق؛ الجسيمات الدالة على الاحتمال؛ الدلالة التركيبية.

Abstract:

This article examines the procedural representation of past tense in the Chinese language within the declarative–procedural framework. As Chinese lacks morphology, temporal relations are expressed through lexical, contextual, and syntactic means. In particular, the "past tense effect" can be created, a temporal interval that occurs between completed past events produced by the combination of multiple syntactic units. Drawing on the Sino-Japanese linguistic tradition and combinatory semantics, the research analyzes the role of syntax alphabet signs such as the semisuffixes 了 (-le) and 过 (guo), the modal particle 了 (le), and the amplifier 就 (jiù) in producing the temporal relations effect. The analysis is based on 879 sentences from the electronic version of the Great Chinese-Russian Dictionary, including 215 examples of the past tense effect creation. The observed findings are consistent with prior research, highlighting a yet underexplored interaction between semisuffix了 (-le), 就 (jiù), modal particle 了 (le) and their role in the past tense effect creation. The study mainly contributes to the theory of Chinese syntax, combinatory semantics and artificial intelligence.

Keywords: procedural representation; syntax; Chinese language; past tense effect; semisuffixes; modal particles; combinatory semantics.

Introduction to article

The distinction between declarative and procedural knowledge is rooted in two broad philosophical and linguistic traditions. Declarative knowledge concerns descriptive statements about objects and phenomena, whereas procedural knowledge concerns sequences of executable instructions, algorithmic steps, or reproducible computational processes (Oxford English Dictionary, n.d.). The contrast is useful for explaining how linguistic meaning may be represented either as explicitly stated information or as an interpretation produced through operations on linguistic units.

The aforementioned conceptual divergence, as our analysis demonstrates, stems from Ryle's epistemological dichotomy. In his fundamental work "*The concept of mind*" Ryle (1949) divided established facts (*knowing that*) from practical skills (*knowing how*) (p. 28). As noted by Belarusian linguist Hardzei (2007), the foundational split between

declarative and *procedural* methodologies in language studies can be traced back to the classical ideas of Humboldt and Saussure, though neither scholar explicitly used these exact terms.

Humboldt stood out among early European philologists for his treating language structures not as random phenomena, but as an inherently rule-governed system. Focusing on language as *Ergon*, modern interpretations rely on Humboldt's specific view, defining it as a *static product* (Humboldt, 1836/1999, p. 49). Such an approach establishes a baseline where meaning is treated as a fixed, durable nature confined to rigid forms and signs. In this view, language serves as an organized collection of predefined elements. Equally important is how these structural pieces cross-reference each other. Consequently, this aspect prepared the ground for the declarative dimension in a language.

Saussure (1977) is known to be the first to conceptualize a deductive theory of language. Furthermore, he defined a human language as an abstract system of signs. It is within this structuralist tradition that basic implicit mechanics of procedural execution started to take shape, mainly reflected in the dichotomy between *langue* (the idealized language system) and *parole* (the individual, dynamic act of speech) (p. xviii).

The explicit formalization of this declarative-procedural divide in linguistics owes much to Winograd's (1975) crucial paper, "Frame Representations and the Declarative/Procedural Controversy". The researcher presented two contrasting viewpoints on the storing and applying data. Adherents of the declarative paradigm conceptualize knowledge as a static, modular record stack handled by general deductive paths. Within such an architecture, data functions as a set of self-contained, verified assertions.

Alternatively, the proceduralists state that knowledge is best expressed when operationalized as a network of runtime routines or action models. Taking this analytical perspective, facts are bound to real-time execution, linked directly to specific tasks. Winograd noted that while declarative systems clearly distinguish structural logic and facilitate the addition of new elements, procedural systems are more efficient for managing intricate problem-solving tasks and well-defined algorithmic procedures.

Fundamentally, these two methodologies are rooted in different conceptual metaphors. Declarative approaches are grounded in symbolic

mathematics, while procedural approaches draw from computer programming principles. This theoretical vocabulary, established during the early debates, continues to drive modern studies spanning theoretical linguistics and artificial intelligence.

Shifting the focus to information theory, in the late twentieth century Winston advanced the study of procedural knowledge representation and its algorithmic implementation. Specifically, Winston (1992) dedicated significant analysis to examine the sharp contrast that separates static declarative data structures from dynamic, procedural code (p. 199). Empirical research findings show that incorporating explicit, domain-specific knowledge into executable algorithms provides better control over exploratory search.

This strategy focused on a specific methodological framework. Rather than depending on compute-intensive reasoning systems, it handled advanced workloads through isolated code paths. This shift in technical design significantly enhanced runtime efficiency. As a result, intelligent systems-maintained stability even in highly unpredictable environments.

The realization of procedural semantics was mostly used in Winston's famous research of structural pattern learning. The author analyzed the structural rules of physical block arrangements to develop an autonomous learning mechanism. This system enabled a machine to independently identify and formulate new visual concepts (Winston, 1970, p. 6).

This milestone was attained through methodical comparison of correctly built cases directly around counterexamples. Instead of falling back on standard statistics, the designed framework relied on executing specialized matching routines and localized, goal-oriented subroutines such (graph-modification pathways, etc.) to adapt its internal logic while executing its setup models. Thus, this opening study delivered a strict operational path that would long govern automated consistency checking, structural description parsing, and classical symbolic AI architectures.

Combinatory semantics[1], using the compositional mechanisms of signs to analyze temporal meaning, forms the bedrock of this study. The

[1] Combinatory semantics is a "linguistic discipline that studies the linguistic mapping of the dynamics of individuals' roles in an event" (Hardzei 2021b, p. 283). See also https://tapaz.by/#/articles.

proposed article is built on the principles of the Sino-Japanese linguistic tradition (Hardzei, 2018, p. 14) and the terminology of *taigens* and *yogens* (Hardzei, 2006), what provides a solid methodological foundation for distinguishing semantic categories in analytical languages.

A categorical separation between declarative meanings, which require explicit lexical indication and procedural values, derived through placement and hierarchy, serves as the foundation for our theoretical paradigm (Hardzei, 2021a). Turning to the Chinese language structure, we assume that morphology and formal markers of tense are completely absent. Declaratively temporal relations are directly indicated by lexical units and their combinations. Procedurally temporal meaning is shaped by the pairings of syntax alphabet signs[1] (Hardzei, 2007).

Suchwise, combinatory semantics demonstrates that in Chinese the combination of semi-affixes is used to create a specific "temporal relations effect", referring to the procedural representation of tense (Hardzei, 2007), including past, present, future and future-in-the-past[2].

The past tense effect is understood as a temporal interval that occurs between completed events in the past (Gibkij, 2023, p. 94), expressed through a combination of syntactic units, none of which individually functions as a temporal marker. It is primarily produced by such configurations of syntax alphabet signs, as semisuffixes[3] 了 (-le), 过 (guo) and modal particle[4] 了 (le). However, this role can also be performed by

[1] Syntax alphabet signs – "auxiliary means of syntax (at the macro level – prepositions, postpositions, conjunctions, particles, etc., at the micro level – inflections, prefixes, postfixes, infixes, etc.), serving to connect or separate the constituents of language structures and the formation of morphological paradigms" (Hardzei, 2007).

[2]See the articles about all the studied varieties of the temporal relation effect in the post at the link: https://t.me/gibkit/738.

[3] The *semi-* component within this term indicates that the lexical meaning of the linguistic unit has not been completely neutralized (Hardzei, 2007).

The morpheme *suffix* indicates that all the listed linguistic signs play a specific role in word formation (Hardzei, 2007): 听 tīng – 听了 tīngle (‘to look’ – ‘looked’), 看 kàn – 看过 kànguò (‘to look’ – ‘have looked’).

[4] The modal particle 了 (le) primarily signals a change in the state of situations, indicating not only that a process has already been completed but also that it will be carried out in the future (Wang, 1954/1954).

the pairings of extensifiers[1] 又 (yòu) and 再 (zài), the amplifier[2] 就 (jiù), etc. Below in the table are examples illustrating this Chinese syntax phenomenon.

Table: Procedural Representation of the Past Tense in Chinese Using Combinations of Syntax Alphabet Signs

Source Chinese text	Translation	Analysis of the Procedural Representation of the Past Tense
1. 我不太清楚 <…> 圣教骑士来了，他们要洗劫军营 <…> 战斗很快就开始了 .... (Da BKRS, n.d.).	"I am not quite sure … The paladins arrived; they intended to plunder the camp … The battle began very quickly."	The first event in the past ('the paladins raided') precedes both the second and third ones ('the battle started' and 'they wanted to scour the camp')." The past tense effect is generated through a combination of the semi-suffix 了 (-le), which marks the brevity and completion of the described processes *(raided, started)*, the amplifier 就 (jiù) to indicate a rapid succession of events, and the modal particle 了 (le), which denotes a structural shift in the situation ('the battle started').

[1] Both 又 (yòu) and 再 (zài) denote the iteration (re-execution) of an incomplete process, as well as a process that will no longer be performed and, consequently, will not be completed in their negative forms.

Based on the procedure for differentiating between intensive and extensive yogens, these auxiliary means are defined as extensifiers, since they denote a multiple (at least twofold), repetitive, and therefore extensive process (Hardzei, 2008, p. 23).

[2] An amplifier is defined as a sign of the syntax alphabet that highlights the semantics of a language sign in its role as a sentence constituent. The amplifier 就 (jiù) can emphasize a rapid succession of events, causal-consecutive relations between them, etc. (Hardzei, 2007).

Source Chinese text	Translation	Analysis of the Procedural Representation of the Past Tense
2. 拉斯卡尔从小船里拿了两只皮袋子，然后上了岸 (Da BKRS, n.d.).	'Raskal pulled two large leather knapsacks out of his boat and then came ashore'.	The first past event ('Rascal pulled out two bags') chronologically precedes the second ('he went ashore'). Here, the past tense effect is achieved via a paired combination of the semi-suffixes 了 (-le), indexing the concise and concluded nature of the processes *(pulled out and went ashore).*
3. 他又回到了小船那里。我看到了豺狼人……他遇到了豺狼人 (Da BKRS, n.d.).	'He returned to the boat again. I saw the gnolls... he stumbled upon them'.	The first event ('the speaker lost her compass') precedes the second ('she lost herself') in the past. The past tense effect is created by the paired combination of the semi-suffix 了 (-le), marking the conciseness and concluded nature of the processes *(saw the gnolls and stumbled upon).*
4. 我丢了指南针，也迷失了自我 (Da BKRS, n.d.).	'I lost my compass and also lost myself'.	The first event ('the speaker lost her compass') precedes the second ('she lost herself') in the past. The past tense effect is created by the paired combination of semi-suffixes 了 (-le), indexing the conciseness and concluded nature of the processes *(lost the compass and himself).*
5. 走丢了……西比……塔宾斯……喝茶……迟了 (Da BKRS, n.d.).	'Got lost... Sibby... Tabins... Drinking tea... Late…'.	The speaker *got lost* in the past (the utterance provides no explicit linguistic marker that the result of that event is important for the present). The speaker is late, but this is presented as a past or completed fact relative to the narrative frame, not as an action happening at the moment of speech. The past tense effect is produced by the semisuffix 了 (-le) attached to the jogen 走丢 (zǒu diū), marking a completed action and a sentence-final 了, that marks a change of state that has already

Source Chinese text	Translation	Analysis of the Procedural Representation of the Past Tense
		occurred (see the phrases 走丢了 (zǒu diū le) and 迟了 (chí le)).

Thus, despite the absence of inflection and declarative tense-aspect forms in Chinese, the language has its own specific syntactic means of past tense indication: paired combinations of syntax alphabet signs that serve to create the past tense effect. An analysis of 879 sentences from the electronic version of the Large Chinese-Russian Dictionary yielded 215 instances of the past tense effect creation.

The search was conducted using the key phrases 开始了 (kāishǐ le), 上了 (shàng le), 开了 (kāi le), 流汗 (liú hàn), 回来 (huí lai), 发急了 (fā jí le), 到了 (dào le), 来了 (lái le), 时候 (shí hou), 醒了 (xǐng le), 看到了 (kàn dào le).

The following previously unexamined combination of syntax alphabet signs that create the past tense effect in Chinese have been identified: the combination of the semi-suffix 了 (-le), the amplifier 就 (jiù) and the modal particle 了 (le).

Furthermore, the results of previous studies have been confirmed, according to which the past tense effect in Chinese can be created by the following sequences: two semisuffixex 了 (-le) (Gibkij, 2022b); the semisuffix 了 (-le) and the modal particle 了 (le) (Gibkij, 2022a); the intensifier zai (再) and the semisuffix 了 (-le) (Gibkij, 2025), as well as combinations involving the semisuffix 过 (guo) (Gibkij, 2023).

Conclusion:

In conclusion, Chinese past-time reference is not expressed through obligatory tense inflection but emerges from the interaction of lexical, contextual, and syntactic resources. The study has shown that verbal 了 (-le), 过 (guo), sentence-final 了 (le), and 就 (jiù) may jointly contribute to the interpretation of completed events. Their functions cannot be understood in isolation, since discourse sequence and narrative context are essential to temporal interpretation. The analysis therefore supports a procedural approach that treats temporal meaning as an outcome of combinatory operations among linguistic signs. The corpus examples also demonstrate the need to distinguish carefully between aspectual marking, change-of-state meaning, and genuine past-time reference. This distinction improves the description of Chinese syntax and offers a more precise basis for computational representations of temporal meaning. Further research should test the proposed configurations in larger, independently compiled corpora and across different discourse genres.

Future research should examine past-time reference in larger and more diverse Chinese corpora, including spoken, literary, and digital discourse. It is also recommended that researchers compare the contribution of aspectual markers and contextual cues across different genres and communicative settings. Finally, the proposed procedural model may be developed for use in computational linguistics, machine translation, and Chinese language teaching.

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