BILINGUAL PUBLISHING GROUP

Forum for Linguistic Studies
https://journals.bilpubgroup.com/index.php/fls

ARTICLE

Temporal Direction and Reference Frames in Chinese and English: A Cross-Linguistic Analysis of Cognitive Framing in Time Expression

Rong Bao *

Department of Chinese Language and Literature, University of Macau, Macao SAR 999078, China

ABSTRACT

This study investigates cross-linguistic differences in temporal direction between Chinese and English by contrasting cognitive reference frames. We found that L1 Chinese speakers prefer the sequence reference frame, whereas L1 English speakers prefer the ego reference frame. These cross-linguistic differences can cause negative transfer for L1 Chinese learners of English. Two questionnaire experiments tested 278 adults: 94 L1 Chinese, 90 L1 English, and 94 L1 Chinese learners of English stratified by proficiency. Responses were scored dichotomously and analyzed with chi-square tests. Native speakers displayed clear, divergent preferences: L1 Chinese participants overwhelmingly employed a sequence reference frame, whereas L1 English participants favored an ego reference frame ($\chi^2 = 184$, $p < 0.001$). L2 learners exhibited substantial L1 transfer: when English items required an ego interpretation, 63.8% of L2 learners selected a sequence reference response ($\chi^2 = 85.24$, $p < 0.001$). Transfer declined with higher English proficiency (significant differences across proficiency groups, $p < 0.001$). When Chinese and English expressions conveyed the consistent temporal direction, negative transfer disappeared. These results indicate that apparent oppositions between Chinese and English arise from differences in dominant reference frame selection rather than from opposite observer orientations. Increased proficiency and targeted instruction that highlight reference-frame contrasts facilitate frame switching and reduce L1-based errors. These findings have implications for theories of temporal cognition and for L2 pedagogy.

Keywords: Sequence Reference Frame; Ego Reference Frame; Ground Preference; Figure Preference

*CORRESPONDING AUTHOR:
Rong Bao, Department of Chinese Language and Literature, Faculty of Arts and Humanities, University of Macau; Email: yc27730@um.edu.mo

ARTICLE INFO
Received: 27 July 2025 | Revised: 12 August 2025 | Accepted: 19 August 2025 | Published Online: 15 October 2025
DOI: https://doi.org/10.30564/fls.v7i10.11289

CITATION
Bao, R., 2025. Temporal Direction and Reference Frames in Chinese and English: A Cross-Linguistic Analysis of Cognitive Framing in Time Expression. Forum for Linguistic Studies. 7(10): 1211–1223. DOI: https://doi.org/10.30564/fls.v7i10.11289

1. Introduction

The temporal orientations of Chinese and English—and the similarities and differences between them—have long been debated in the scholarly literature. Time is often conceptualized metaphorically in spatial terms; when individuals comprehend the flow of time, they project spatial dimensions onto temporal ones, employing spatial frameworks to structure their understanding of temporal phenomena. Drawing on the time-space metaphor, researchers have extensively examined how the concepts of "front" and "back" map onto temporal axes in both Chinese and English. In both languages, the terms 前 (qián) and "forward" can denote either past or future, while 后 (hòu) and "back" likewise may refer to temporal direction [1,2]. Moreover, the alignment of "forward" and "back" with past or future in Chinese and English may converge or diverge depending on context. Therefore, the conditions and underlying mechanisms for the consistency and inconsistency of temporal direction in Chinese and English warrant systematic investigation.

2. Literature review

Clark [1] distinguished two principal metaphoric perspectives on time: the "time-moving" metaphor and the "ego-moving" metaphor. In the time-moving view, time itself advances toward a stationary observer, such that "forward" signifies past and "back" signifies future. Conversely, the ego-moving view posits a traveler self that moves along a fixed timeline from past to future, rendering "forward" as future and "back" as past.

McGlone and Harding [3] provided empirical support for these distinctions, demonstrating that participants adopting an ego-moving perspective interpret "move forward" as postponement, whereas those adopting a time-moving perspective interpret it as advancement. Subsequent studies by Boroditsky [4], Núñez et al. [5], and Guo and Zhu [6] examined cross-linguistic preferences for these metaphoric perspectives among native English and Chinese speakers. Li and Zhang [7] compared these preferences directly, showing that native Chinese speakers exhibit a stronger propensity for the time-moving metaphor, whereas native English speakers favor the ego-moving metaphor—one principal driver of cross-language differences in temporal orientation. Lai and Boroditsky [8] further explored whether Chinese-English bilinguals shift their metaphorical perspective in accordance with the language of response; their findings revealed a cross-language consistency for bilinguals, despite divergent tendencies among monolingual speakers.

Despite the centrality of ego-moving and time-moving perspectives within the time-space metaphor theory, framing temporal cognition exclusively as a binary opposition between observer movement and time movement is limiting. Such a binary model neglects the full range of referential frameworks and cognitive strategies that inform temporal judgment [9,10]. Metaphors that emphasize movement of either the ego or the time are widespread in both Chinese and English, yet the conditions under which each language deploys one metaphor over the other, and the way referential frames are selected and transformed, remain unresolved.

Chen [9,10] argues that movement-based metaphoric models oversimplify the directional cognition between observer and time, overlooking the critical parameter of reference-frame selection. Beyond notions of self-movement or time-movement, temporal orientation is also shaped by the relative configuration between observer and temporal events, varied modes of attentional deployment, and entrenched reference-frame biases.

Chinese and English use spatiotemporal metaphors to express temporal direction through the ego perspective. Ego reference of figure preference is a cognitive strategy for perceiving temporal direction based on the orientation or movement of the ego, subject or observer. The direction of the ego's facing or movement is projected onto the temporal scene, making time determined by the ego's direction and orientation [11]. Thus, as shown in **Figure 1**, the temporal direction behind the observer or moving towards the observer's back is considered back, while the temporal direction in front of the observer or moving towards the front of the observer is considered forward.

Figure 1. Ego reference frame.

In certain expressions, however, the mapping between motion and temporal direction is less transparent. For instance, in English "a few days back," "back" denotes the past despite no implied self-movement. Similarly, in Chinese 几天前 (jǐ tiān qián, "a few days before"), "before" refers to the past without invoking temporal motion; time simply extends from the present to an earlier interval. How, then, do speakers cognitively represent these directional metaphors?

The prevailing consensus is that native English speakers typically adopt a future-facing orientation in temporal representation [1,3,12]. Debate persists regarding whether the apparent contrast in Chinese reflects a past-facing ego orientation [12–17]. Alverson [18], Guo et al. [19], and Li and Zhang [7] propose that, unlike English, Chinese emphasizes the past, orienting both time and observer toward it. Han and Liu [20] report that native Chinese speakers more frequently adopt a past-facing perspective—coherent with a time-moving view that positions the past in front of the body. Experimental evidence from Li and Zhang [7] corroborates this past-facing tendency in Chinese, contrasting with the future-facing bias of English speakers.

The perspective of Chinese as future-facing and its tendency toward sequence reference frames proposed by Yu [21], along with related theoretical frameworks, has gained extensive support. Yang, Sinha, and Filipovic [22] empirically validated that Chinese speakers prefer sequence-based temporal representations (D-Time and S-Time), rather than past-facing. From this vantage, the use of 前 (qián) to denote earlier times reflects an abstract sequence-based reference frame, dissociated from the observer-centric perspective. Chen [9] further emphasizes that both sequence and ego reference frames function as common modes of temporal direction representation in Chinese and English. Scholars have further raised the question that if Chinese were indeed future-facing like English, why then do analogous spatiotemporal expressions yield ostensibly opposite directional connotations across the two languages?

Prior research has often assumed a binary choice between past-pointing and future-pointing temporal metaphors, thus obscuring the nuanced role of sequence-based frameworks. While some scholars [9,21,23] acknowledge sequence reference frames—where spatial positions in front/back map onto event order—systematic cross-linguistic empirical evidence remains sparse. Beyond the ego-reference frame, Moore [23] identifies a time-reference-point frame, representing events as early or late. This frame accounts for English "before"/ "after" and Chinese " 之前 " (zhī qián, "before") and " 之后 " (zhī hòu, "after").

Through spatiotemporal metaphors, both Chinese and English can represent the sequence of events in time based on the spatial sequence of front and back. Sequence reference of ground preference according to the universal cognitive principle, as shown in **Figure 2**, 前 (qián) and front (early) is near the beginning and 后 (hòu) and back (late) is near to the end, in a sequence of two events, the event that occurs first, positioned at or closer to the beginning of the time series, is at the front in time. The event that occurs later is at the back of the sequence. This reference frame is based on the intrinsic sequence of time itself and is not influenced by the presence or perspective of an observer [11], adhering to the ground-preference temporal sequence direction [9].

Figure 2. Sequence reference frame.

In summary, while English predominantly exhibits a future-oriented (ego-moving) framework, Chinese temporal orientation has been variably characterized as past-facing, future-facing, or sequence-based. Many scholars have noted the existence of sequence reference frames, yet few have empirically investigated cross-language differences in reference-frame selection and conversion. Do native Chinese speakers convert English-style ego references to sequence references when representing time? Under what conditions does such a conversion occur, and when is it unnecessary?

3. Aims and Hypotheses

This study aims to clarify the cognitive and linguistic mechanisms underlying temporal direction representation, thereby contributing to cross-linguistic and cognitive research. Drawing on the theoretical constructs of ground-preference sequence and ego reference frames, it employs empirical methods to investigate whether Chinese 前 (qián) denotes a past-facing orientation or simply indicates an earlier point in time.

The research has three specific objectives: (1) to compare, in unmarked contexts, the dominant use of sequence reference (ground preference) and ego reference (figure preference) by L1 Chinese and L1 English speakers; (2) to examine whether, and to what extent, L2 English speakers with L1 Chinese backgrounds transfer their native reference frame when interpreting English temporal expressions; (3) to identify the contextual conditions that prompt a shift between sequence (ground) and ego (figure) reference frames.

On this basis, three testable hypotheses are proposed:

H1. *L1 Chinese speakers will prefer sequence reference (ground preference) in unmarked contexts, interpreting "前 /qián" as "earlier" in a temporal sequence and "后 /hòu" as "later," whereas L1 English speakers will prefer ego reference (figure preference), mapping "forward" to the future and "back" to the past relative to the observer.*

H2. *L2 English speakers (L1 Chinese) will exhibit transfer of their L1 reference frame, tending to interpret English temporal expressions according to the Chinese sequence reference frame. This transfer effect will be stronger among lower-proficiency learners.*

H3. *Higher L2 English proficiency will correlate with enhanced ability to convert between sequence and ego reference frames. When the appropriate frame is applied, this will result in more accurate temporal interpretation and fewer errors attributable to reference-frame differences.*

These aims and hypotheses inform the questionnaire-based experiments reported below, which contrast sequence-based and ego-based interpretations in both unmarked and contextually marked stimuli, and compare responses from L1 Chinese, L1 English, and stratified L2 English groups.

4. Study 1

4.1. Methodology

4.1.1. Participants

A total of 278 adults participated in this study, comprising 90 native English speakers, 94 native Chinese speakers, and 94 second language speakers of English (L2 English speakers) whose first language was Chinese. The L2 English group was distinct from the native Chinese group in order to minimize any potential carry-over effects related to cognitive inertia, learning strategies, contrastive awareness, or unequal language exposure.

Macao SAR was renowned for its cultural diversity and multilingual environment. In Macao, multiple languages were commonly used, including Chinese (both Cantonese and Mandarin), Portuguese, and English. L2 English participants were recruited from the University of Macau, where English serves as the medium of instruction.

To ensure rigorous proficiency validation, all L2 participants submitted official IELTS test reports. Their reported proficiency was cross-verified against multiple independent measures, including academic enrollment status (English-major vs. non-major), national English entrance examination scores for undergraduates, and College English Test Band 6 (CET-6) results for graduate students. Consistency across these indicators confirmed that the IELTS scores provided an accurate and reliable reflection of the participants' English proficiency.

Participants were divided into three L2 proficiency groups: the undergraduate group (n = 34) achieved a mean IELTS score of 6.0 (range: 5.5–6.5), the non-English-major graduate group (n = 30) attained a mean of 6.8 (range:

6.0–7.0), and the English-major graduate group (n = 30) reached a mean of 7.7 (range: 7.0–8.5), reflecting near-native command of English.

The recruitment period for this study was definitively scheduled from October 7 to 11, 2024. Written informed consent was obtained from all participants prior to their involvement, ensuring their voluntary agreement to participate in the experiment and complete the questionnaires. To uphold participant confidentiality, no personal identifying information was collected. Instead, each participant was assigned a unique identifier, used solely for data analysis and reporting purposes. This protocol ensured strict adherence to privacy and anonymity standards throughout the study.

The study received ethical approval from the Research Services and Knowledge Transfer Office at the University of Macau (Ethics Assessment ID: SSHRE24-APP047-FAH). All procedures were conducted in compliance with established ethical guidelines and regulations governing research involving human participants, thereby ensuring the highest standards of research integrity and participant protection.

4.1.2. Materials and procedures

A pilot test was conducted to validate the experimental materials prior to the main study. 30 L1 English speakers and 30 L1 Chinese speakers were presented with 10 sentences drawn from the Corpus of Contemporary American English (COCA) and the BLCU Corpus Center (BCC). These sentences replicated the temporal framing structure employed in the main experiment. Results indicated that 95% pilot participants correctly identified the intended temporal direction in their native languages, with no significant variation in accuracy across the ten items ($p > 0.05$), confirming that the materials elicited consistent comprehension of the target construct.

On the basis of the pilot results, a single, unambiguous paper headline was selected for use in the main experiment: "Fossils push back origin of key plant groups millions of years." The headline format was deliberately chosen to remove potential contextual influences, ensuring that participants could infer temporal direction solely from the target sentence without relying on extended discourse.

The paper-based questionnaire was distributed to the participants on-site, ensuring a hands-on and immediate engagement with the survey material. Clear instructions were provided on how to complete the questionnaire. Any identifying information was removed to ensure confidentiality. Participants completed the questionnaire in their respective target languages: 94 native Chinese speakers filled out the Chinese version, while native English speakers and L2 English speakers completed the English version.

The task of the questionnaire proceeded as **Table 1**:

Table 1. Task structure of Study 1 questionnaire.

Task	Description
Question 1	A discovery of fossils has provided evidence that the origin of key plant groups occurred millions of years earlier.
Option A	Fossils push back origin of key plant groups. (correct response)
Option B	Fossils push forward origin of key plant groups. (incorrect response)
Question 2	Fossils push back origin of key plant groups millions of years.
Option A	The origin occurred earlier than previously believed. (correct response)
Option B	The origin occurred later than previously believed. (incorrect response)

Responses were scored dichotomously (correct/incorrect) based on native-speaker consensus norms established during piloting.

4.2. Results and discussion

Following a debriefing on this study's true purpose, post-interview assessments indicated that no participants were aware of this purpose prior to debriefing. Interviews confirmed that all participants clearly understood the experimental tasks and did not infer the study's underlying objectives. All 278 questionnaire responses were complete and valid, with no exclusions.

Table 2 presents the choices made by L1 English speakers and L2 English speakers regarding the temporal direction of the sentence "the origin occurred earlier" along with the corresponding results of the Chinese version question answered by L1 Chinese speakers.

Table 2. Understanding earlier among L1 and L2 groups.

Participant	前（**qián**）/ **forward**	后（**hòu**）/ **back**
L1 Chinese	100% (N=94)	0% (N=0)
L1 English	0% (N=0)	100% (N=90)
L2 English	63.83% (N=60)	36.17% (N=34)

The responses from both native English speakers and native Chinese speakers demonstrate a clear and unambiguous understanding of the temporal direction in their respective L1. Among the L1 Chinese participants (N=94), 100% utilized the term "前" (qián, forward) to convey the temporal direction, while among the L1 English participants (N=90), 100% employed the contrasting term "back" (后, hòu). Notably, there was a significant difference in the expression of temporal changes from the past to an earlier time between Chinese and English using a chi-square test, Pearson $\chi^2 = 184$, $p < 0.001$. Furthermore, 63.83% of L2 English speakers (N=60) selected the incorrect word "forward" to express temporal direction. There is a significant difference between L2 English speakers (L1 Chinese) and L1 English speakers in their representation of temporal direction, Pearson $\chi^2 = 85.24$, $p < 0.001$.

Based on the results obtained from three English level groups of L2 English speakers (L1 Chinese), as indicated in **Figure 3**, it can be observed that undergraduate students (N=33, 97.06%) and non-English major graduate students (N=22, 73.33%) preferred using the incorrect word "forward" in English sentences, whereas English major graduate students (N=25, 83.33%) are more inclined to use the correct temporal direction "back".

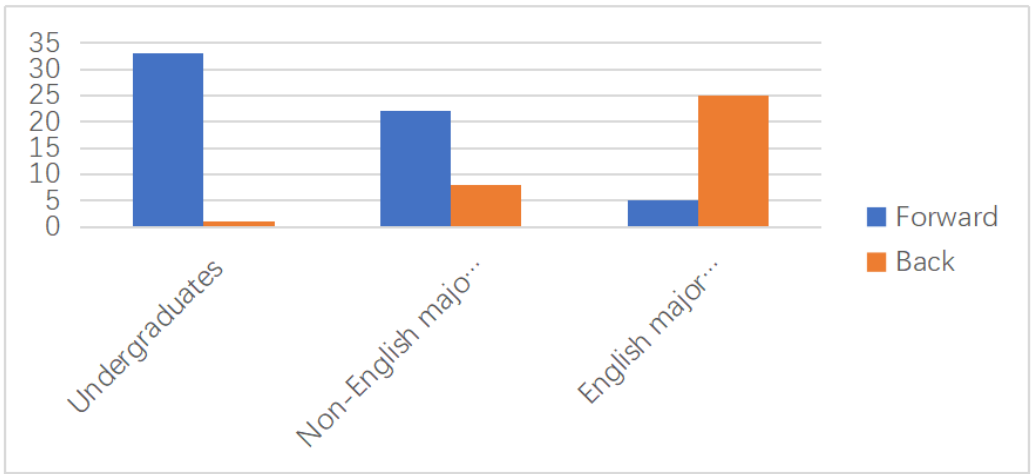

Figure 3. Understanding earlier among different L2 proficiency groups.

With a chi-square test, there was a significant difference between English proficiency level and English temporal direction, Pearson $\chi^2 = 46.34$, $p < 0.001$. Specifically, there was a significant difference in English temporal direction between undergraduate students and non-English major graduate students, Pearson $\chi^2 = 7.42$, $p < 0.01$, between non-English major graduate students and English major graduate students, Pearson $\chi^2 = 19.46$, $p < 0.001$, as well as between undergraduate students and English major graduate students, Pearson $\chi^2 = 42.70$, $p < 0.001$.

Overall, the temporal direction judgments of undergraduate students and non-English major graduate students in English (L2) were more strongly influenced by their L1 rather than the target language. On the other hand, English major graduate students demonstrated an understanding of English preferred temporal direction more similar to that of native English speakers. The judgments of temporal movement direction by non-English major graduate students fell between those of undergraduate students and English major graduate students, indicating that they performed better than undergraduate students but were not as proficient as English major graduate students in the target language.

Table 3 presents the statistical results of the temporal direction choices in the sentence "Fossils push back origin of key plant groups millions of years" by L1 English speakers and L2 English speakers (L1 Chinese). It was observed that 43.62% L2 English speakers (N=41) mistakenly interpreted the phrase "push back" as postpone in this sentence. Through a chi-square test, we identified a significant difference in the selection of temporal direction between L1 English speakers and L2 English speakers, Pearson $\chi^2 = 50.51$, $p < 0.001$.

Table 3. Understanding push back between L1 and L2 English groups.

Participant	Earlier	Later
L1 English	100% (N=90)	0% (N=0)
L2 English	56.38% (N=53)	43.62% (N=41)

The results of the responses from L2 English speakers with different English proficiency levels regarding the temporal direction can be found in **Figure 4**. In a given specific context with unambiguous semantics, 94.12% undergraduate students (N=32) had judgments on the temporal direction opposite to native English speakers, while 80% non-English major graduate students (N=24) and 90% English major graduate students (N=27) had an understanding of the temporal direction consistent with native English speakers, correctly comprehending the direction of temporal movement in English sentences.

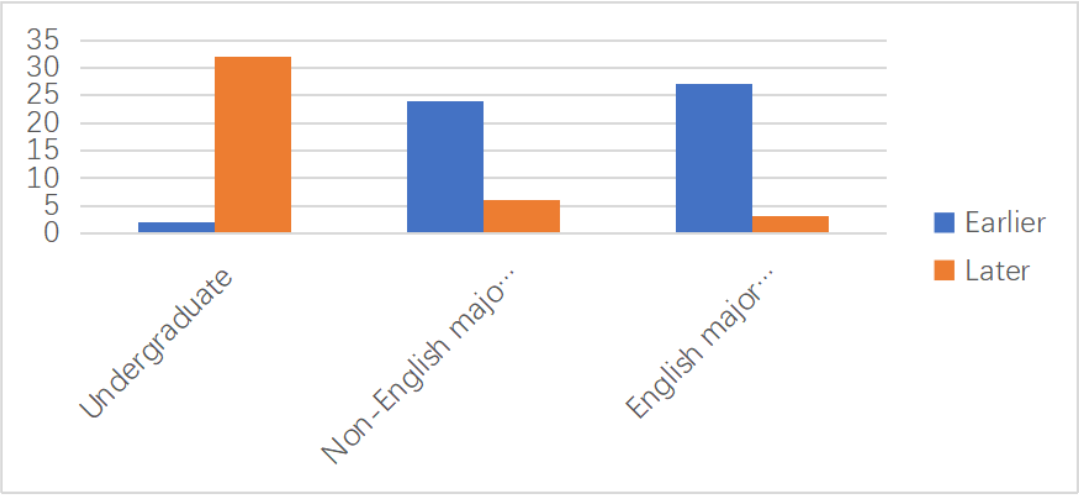

Figure 4. Understanding push back among different L2 proficiency groups.

Further, conducting a chi-square test, we found a significant difference in the selection of temporal direction based on English proficiency level, Pearson $\chi^2 = 55.85$, $p < 0.001$. Specifically, there was a significant difference in the selection of temporal direction between undergraduate students and non-English major graduate students, Pearson's $\chi^2 = 36.30$, $p < 0.001$, as well as between undergraduate students and English major graduate students, Pearson $\chi^2 = 45.51$, $p < 0.001$. However, there was no significant difference in the selection of temporal direction between non-English major graduate students and English major graduate students ($p > 0.05$).

5. Study 2

5.1. Methodology

5.1.1. Participants

Participants in this study were the same as those in Study 1.

5.1.2. Materials and procedures

Similar to Study 1, we ran a corpus-based pilot. 30 L1 English and 30 L1 Chinese speakers judged ten candidate sentences drawn from COCA and BCC. Pilot participants unanimously (100%) identified the intended temporal direction. Based on the pilot, we selected one high-frequency, unambiguous sentence: "Tomorrow's wedding has been pushed back several minutes."

Immediately after Study 1, participants saw this sentence in their language version (English for L1 and L2 English; Chinese for L1 Chinese). They indicated whether the sentence implied the event would occur later (postponed) or earlier (advanced). Responses were scored dichotomously (1 = later; 0 = earlier), using the pilot's native-speaker consensus as the key.

5.2. Results and discussion

Following a debriefing on this study's true purpose, post-interview assessments indicated that no participants were aware of this purpose prior to debriefing. Interviews confirmed that all participants clearly understood the experimental tasks and did not infer the study's underlying objectives. All 184 questionnaire responses were complete and valid, with no exclusions.

As shown in **Table 4**, 96.67% native English speakers (N=87) and 98.94% L2 English speakers(N=93) believed that the sentence "Tomorrow's wedding has been pushed back several minutes" implies a delay in the wedding. There was a consensus among both native English speakers and L2 English speakers regarding the temporal direction indicated by the phrase "push back" in this sentence, and there was no significant difference between these two groups (p >0.05). Furthermore, all native Chinese speakers assumed that "往后推" (wǎng hòu tuī, "push back") meant the wedding would be postponed, aligning with the temporal direction of native English speakers and exhibiting no significant difference (p >0.05).

In this context, where future time points were being adjusted to a later time, the concept of "pushing back" in both English and Chinese corresponded to the same later and future temporal direction without any ambiguity.

Table 4. Understanding push back and wǎng hòu tuī among L1 and L2 groups.

Participant	Earlier	Later
L1 English	3.33% (N=3)	96.67% (N=87)
L2 English	1.06% (N=1)	98.94% (N=93)
L1 Chinese	0% (N=0)	100% (N=94)

6. Discussion

6.1. Utilization of Both Frames in Chinese and English

The experimental results indicate that while the predominant temporal reference frames differ between Chinese and English, both languages use sequence and egocentric reference frames, as shown in **Table 5**.

In both Chinese "五年前" (wǔ nián qián, "five years ago") and English "five years ago", time is conceptualized by counting back five years from the present moment, following a temporal sequence. The distinction lies in English's flexibility, where it can also adopt an egocentric reference frame, as seen in phrases like "five years back." This shift, however, is not applicable in Chinese. Similarly, both Chinese "五年后" (wǔ nián hòu) and English "five years later" calculate time by counting forward five years from the present moment. In English, the temporal sequence can also switch to an egocentric reference frame, as expressed in phrases like "five years forward". These differences are summarized as shown in **Table 6**.

Table 5. Uses of references in Chinese and English.

Direction	Sequence reference	Ego reference
前 qián	前天 qián tiān、前辈 qián bèi、之前 zhī qián、前面 qián miàn	前途 qián tú、前程 qián chéng、前景 qián jǐng
	before, ago, previous, former, prior	from this time forward, look forward, (time) ahead of us
后 hòu	后天 hòu tiān、后辈 hòu bèi、之后 zhī hòu、后面 hòu miàn	往后看 wǎng hòu kàn、后退 (几十年) hòu tuì (jǐ shí nián)
	latter, later, following, next, subsequent	several years back, think back, (time) behind us

Table 6. References used to indicate a time point in Chinese and English.

Language	Sequence reference	Ego reference
Chinese	五年前 (wǔ nián qián) / 后 (hòu)	
English	Five years ago/ later	Five years back/ forward

Although Chinese temporal representation often lacks an egocentric reference frame in numerous contexts, there are indeed egocentric reference frames in other contexts, for example " 前途 " (qián tú)、" 前景 "(qián jǐng), both of which mean "prospect" and reflect a subjective and personal perspective of the future.

In Chinese, the locative words " 前 " (qián) and " 后 " (hòu) exhibit asymmetry, with " 后 " being marked terms and its usage more restricted compared to " 前 " (qián) [24]. " 前 " (qián) can represent earlier time in the temporal sequence reference frame or the future in the egocentric reference frame. However, lexical items formed with " 后 " (hòu) are limited to denoting a later direction in the temporal sequence reference frame [25]. Without specific context and conditions, it is not possible to use an egocentric reference frame to represent the past.

Using " 后 " (hòu) to characterize the past in Chinese is a marked usage, as illustrated in example (1), where the egocentric reference frame is employed to emphasize the observer's subjective viewpoint. In this case, the combination of the locative " 前 " (qián) with the verb " 看 " (kàn, "look") metaphorically indicates the future, while the combination of " 后 " (hòu) and " 看 " (kàn, "look") signifies the past. Similarly, in example (2), the expression " 后退 20 年 " (hòu tuì 20 nián, "fall back 20 years") uses the combination of locative " 后 " (hòu) and the verb " 退 " (tuì, "retreat") to represent movement towards the past, deliberately highlighting the observer's subjectivity and emotional perspective and obscuring the objective reference point.

(1)没有人不喜欢向前看 , 因为前方代表着希望 ; 没有人总喜欢向后看 , 因为后方铺就的不都是鲜花 .

méi yǒu rén bù xǐ huān xiàng qián kàn, yīn wèi qián fāng dài biǎo zhe xī wàng; méi yǒu rén zǒng xǐ huān xiàng hòu kàn, yīn wèi hòu fāng pū jiù de bù dōu shì xiān huā.

No one dislikes looking forward, as the future represents hope; no one always likes looking back, as the past is not always paved with flowers.

(2)西欧车市 2012 年销售业绩将后退 20 年 , 2013 年或将回暖 .

xī ōu chē shì 2012 nián xiāo shòu yè jì jiāng hòu tuì 20 nián, 2013 nián huò jiāng huí nuǎn.

The Western European car market's sales performance in 2012 will fall back by 20 years, though it may recover in 2013.

Both Chinese and English employ the temporal sequence reference frame and the egocentric reference frame, reflecting the universality and consistency of these reference frames across languages. However, it is also evident that there are significant differences within this universality, as the two languages exhibit distinct preferences in their use of reference modes.

6.2. Motivations of Inconsistent Representation in Chinese and English

These experiments show that the inconsistency in temporal direction representation between Chinese and English is due to different perspectives and reference frames. Chinese predominantly uses a sequence-based reference

frame, while English uses an egocentric reference frame. Chinese prioritizes the sequence direction, corresponding to the egocentric perspective in English, leading to differences in temporal direction representation [9,10].

Native speakers of both languages can correctly choose the temporal direction based on context, despite the differences in dominant reference frames, which cause inconsistent representation. However, these opposite temporal directions confuse second language learners, with 63.83% (N=60) of Chinese English learners wrongly believing that "push forward" should be used to indicate an earlier time, rather than "push back". Furthermore, 56.38% (N=53) of Chinese English learners wrongly interpreted "push back" as moving the origin time to a later point rather than an earlier one. Some participants even suggested that the use of "push back" in the question was incorrect, which means they believed "push forward" should be used in this context, demonstrating that errors were due to differences in reference frames rather than low proficiency.

Second language learners with professional-level English proficiency can correctly represent temporal directions and acquire the target language's reference frame. Our findings show significant differences in accuracy among groups with varying English proficiency levels. Most English major graduate students could accurately choose the temporal direction representation corresponding to both reference frames, with accuracy rates close to those of native English speakers. Undergraduate students had low accuracy in converting between reference frames, often transferring their native reference frame to the target language, resulting in errors. Non-English major graduate students had intermediate accuracy, closer to undergraduates but leaning towards the professional group in understanding and representing temporal directions in English.

Li and Zhang [26], and Han and Liu [20] point out that the temporal sequence in Chinese aligns with the cognitive subject's orientation, where the Chinese " 前 " (qián) is consistent with the ego's orientation toward the past. This paper similarly suggests that Chinese native speakers less use use " 前 " (qián) when conceptualizing the future. We argue that Chinese tends to represent the past with " 前 " (qián), not facing towards the past, but rather because "early" and "past" represent the same temporal direction in many contexts. While "early" and "past" are both expressed with " 前 " (qián) in Chinese, they are distinguished by different reference points.

Despite partial overlap and intertwining in their mappings on the timeline, "early" can refer to both past and future time categories, depending on the specific context and reference point. Similarly, the temporal representation of "past" does not always refer to an earlier time; in certain contexts, it may indicate a time later than a previously established past reference point.

When the cognitive subject is not explicitly indicated in a context, " 前 " (qián) typically represents an earlier point in time relative to a given temporal reference point within the temporal sequence reference frame. If the reference point is the present or a past time, the "earlier" time it represents falls into the past time category, without implying that the observer is oriented toward the past. In this case, there is no issue of whether the observer is facing the past or the future.

When representing time from the observer's perspective, both Chinese and English show cross-linguistic consistency, with observers facing toward the future [9]. In Chinese, terms like " 前途 " (qián tú, "future") and " 前景 " (qián jǐng, "prospects") use the observer as a reference, where " 前 " (qián) refers to the direction the observer is facing—the future. Chinese is thus typically future-oriented as English. In the expression " 起源时间往前推 " (qǐ yuán shí jiān wǎng qián tuī, "pushing back the origin"), " 前 " (qián) indicates an earlier time and coincides with the past, which might seem as if the observer is facing the past, but in fact, the observer is not present. Because the dominance of the temporal sequence reference obscures and transcends the subjective perspective of the observer, the objective sequence is used to represent an earlier point on the timeline. Similarly, the expression " 五年前 " (wǔ nián qián, "five years ago") refers to the past, but this does not imply that the observer is facing the past. Instead, it uses the temporal sequence reference, calculating back five years from the current point in time [9,10].

Therefore, the commonality between Chinese and English in representing time through the egocentric reference frame lies in the observer's future orientation. The difference between how " 前 (qián)/ forward" and " 后 (hòu)/ back" represent temporal direction in Chinese and English does not stem from a Chinese orientation toward

the past versus an English orientation toward the future. Rather, it results from the distinct dominant reference frames each language employs when representing time direction.

Therefore, in the process of second language acquisition, understanding the underlying dominant reference frames and cognitive differences can help reduce negative transfer from the native language. By comparing the cognitive, cultural, and philosophical differences between Chinese and English, we can mitigate the impact of cognitive transfer on temporal direction representation in the second language.

6.3. Pedagogical Implications for L2 Acquisition

Recognizing the dominant reference-frame differences between Chinese and English is crucial for enabling L2 learners to acquire the target language's temporal direction and to reduce errors from negative transfer. Empirical evidence of cross-linguistic divergence in temporal framing therefore calls for targeted pedagogical intervention. Negative transfer occurs when learners automatically apply L1 cognitive schemas to L2 temporal expressions, producing systematic misinterpretations.

To correct such a transfer, instruction must first make the mismatch explicit. Contrastive tasks that present Chinese and English exemplars side by side help learners notice the gap. This metalinguistic awareness promotes interlanguage restructuring: learners learn to inhibit automatic activation of the L1 frame and to activate the L2 frame when decoding temporal metaphors.

Noticing must be followed by repeated, contextualized practice so that new mappings become proceduralized. Activities should be multimodal and task based. Timelines with movable tokens render abstract relations visible and kinesthetic. Role-plays involving scheduling, reporting, or planning place metaphors in authentic communicative contexts. Frame-switching drills that require converting sentences between sequence and ego reference build cognitive flexibility. Keep tasks short and scaffolded so learners can attend to one diagnostic cue at a time. Provide immediate, explicit feedback that identifies the specific reference frame error and clarifies why it produced a wrong inference.

Finally, future research should examine the long-term effects of frame-aware instruction on interlanguage restructuring and investigate whether sustained training yields measurable changes in psycholinguistic processing or neural indices of L2 temporal cognition.

7. Conclusion

Through a comparative analysis of temporal direction representation among native Chinese and English speakers, this study reveals significant differences in dominant reference frames between these two languages. Native Chinese speakers are more inclined to use the sequence reference of ground preference, using temporal sequence itself as a reference for representing time, while native English speakers prefer the ego reference of figure preference, using the observer's perspective as a reference.

Questionnaire results show that advanced English as a second language learners are influenced by their native Chinese cognitive frames in understanding temporal direction, especially in the absence of a clear context, making them more likely to adopt the reference frame of their native language. However, English major graduate students whose English proficiency is close to native levels can more accurately use the temporal reference frame of the target language, demonstrating temporal direction cognitive abilities similar to native English speakers.

This paper emphasizes the importance of understanding the reference frames and cognitive differences behind different languages for second language acquisition. For second language learners, correctly identifying and using the temporal reference frames of the target language and reducing the influence of negative transfer from the native language are key to improving the accuracy of temporal direction representation. By comparing and analyzing the cognitive differences in time between Chinese and English, this paper provides useful references for second language teaching and learning, promoting cross-cultural communication and understanding.

The study has several limitations. It examined only Chinese and English, so its typological generalizability is limited. Data came mainly from written questionnaires and controlled stimuli, which may not reflect real-time processing or natural discourse. Future work should broaden the language sample to include typologically diverse languag-

es to test whether sequence vs. ego dominance generalizes. It should also combine corpus work with psycholinguistic methods (e.g., ERP, eye-tracking, reaction-time paradigms) to probe real-time processing and cognitive depth. Finally, longitudinal pedagogical interventions are needed to assess whether contrastive instruction produces durable changes in L2 temporal cognition.

Funding

This work received no external funding.

Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Committee of the Research Services and Knowledge Transfer Office at the University of Macau (protocol code: SSHRE24-APP047-FAH, date of approval: 3 October 2024).

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

All data for this study have been made publicly available via OSF and can be found at https://osf.io/gx-3zh/?view_only=f9479df26fc44bca8e574d8b8300abc8.

Acknowledgments

We thank all participants for their valuable questionnaire responses, and acknowledge the editors and reviewers for their expert insights, which greatly improved this manuscript.

Conflicts of Interest

The author declares no conflict of interest.

References

[1] Clark, H. H., 1973. Space, time, semantics, and the child. In: Moore, T. E. (ed.). Cognitive Development and the Acquisition of Language. Academic Press: New York, NY, USA, pp. 27–63. DOI: https://doi.org/10.1016/B978-0-12-505850-6.50008-6

[2] Lakoff, G., Johnson, M., 1980. The metaphorical structure of the human conceptual system. Cognitive Science. 4, 195–209. DOI: https://doi.org/10.1207/s15516709cog0402_4

[3] McGlone, M.S., Harding, J.L., 1998. Back (or forward?) to the future: The role of perspective in temporal language comprehension. Journal of Experimental Psychology: Learning, Memory, and Cognition. 24(5), 1211–1223. DOI: https://doi.org/10.1037/0278-7393.24.5.1211

[4] Boroditsky, L., 2000. Metaphoric structuring: understanding time through spatial metaphors. Cognition. 75(1), 1–28. DOI: https://doi.org/10.1016/S0010-0277(99)00073-6

[5] Nunez, R.E., Motz, B.A., Teuscher, U., 2006. Time After Time: The Psychological Reality of the Ego- and Time-Reference-Point Distinction in Metaphorical Construals of Time. Metaphor and Symbol. 21(3), 133–146. DOI: https://doi.org/10.1207/s15327868ms2103_1

[6] Guo, Y., Zhu, L., 2023. The effect of mode integration in sight translation: Psychological evidence from the left-right space-time metaphor. Journal of Foreign Languages. 46, 82–90. Available from: https://jfl.shisu.edu.cn/en/article/id/730 (cited 1 May 2025). (in Chinese)

[7] Li, H., Zhang, J. J., 2017. Chinese and English speakers' preferences of "front/back" spatio-temporal metaphors and their motivations. Foreign Language Teaching. 1, 42–48, 146–147. Available from: https://www.cnki.net/KCMS/detail/detail.aspx?dbcode=CJFD&dbname=CJFDLAST2017&-filename=WYWJ201701006&uniplatform=OVERSEA&v=WkKwzbVQMz6rRx8oDaV3jn3g7sGILAyDHINUtw7vlSDaaattlj3NxESaRcv7fxYP (cited 1 May 2025). (in Chinese)

[8] Lai, V. T., Boroditsky, L., 2013. The immediate and chronic influence of spatio-temporal metaphors on the mental representations of time in English, Mandarin, and Mandarin-English speakers. Frontiers in Psychology. 4, 142. DOI: https://doi.org/10.3389/fpsyg.2013.00142

[9] Chen, Z., 2021a. Variables underlying Chinese-English contradictory conceptualization of temporal

direction: From cognitive style to culture-specific philosophic notion. Contemporary Linguistics. 23, 259–276. Available from: https://www.cnki.net/KCMS/detail/detail.aspx?dbcode=CJFD&dbname=CJFDLAST2021&filename=DDYX202102007&uniplatform=OVERSEA&v=N9e_XqtBrDGQFSl2BGCjJlOXtxChgaFAHISqRm6f2ufbMCcqxk6zVyeDtrDOi_aK (cited 1 May 2025). (in Chinese)

[10] Chen, Z., 2021b. A Comparative Study on Cognition of Temporal and Spatial Direction between Chinese and English. Beijing University Press: Beijing, China. (in Chinese)

[11] Núñez, R., Cooperrider, K., 2013. The tangle of space and time in human cognition. Trends in Cognitive Sciences. 17(5), 220–229. DOI: https://doi.org/10.1016/j.tics.2013.03.008

[12] Walker, E. J., Bergen, B. K., Núñez, R. E., 2017. The spatial alignment of time: Differences in alignment of deictic and sequence time along the sagittal and lateral axes. Acta Psychologica. 175, 13–20. DOI: https://doi.org/10.1016/j.actpsy.2017.02.001

[13] Yu, N., 1998. The Temporary Theory of Metaphor: A Perspective from Chinese. John Benjamins: Amsterdam, Netherlands.

[14] Liu, Z., Yan, K., Lü, Y., 2018. Differing conceptualizations of time in English and Chinese and the time reference of qian and hou. Modern Foreign Languages. 42, 608–620. Available from: https://www.cnki.net/KCMS/detail/detail.aspx?dbcode=CJFD&dbname=CJFDLAST2018&filename=XDWY201805003&uniplatform=OVERSEA&v=tt-AR_Y5tjvY-P82r2R_PcEawgbtrEOY3P1fE7CA7MS5hQxokTfwXrTdMJjSEkXr (cited 1 May 2025). (in Chinese)

[15] Gu, Y., Zheng, Y., Swerts, M., 2019. Which Is in Front of Chinese People, Past or Future? The Effect of Language and Culture on Temporal Gestures and Spatial Conceptions of Time. Cognitive Science. 43(12), e12804. DOI: https://doi.org/10.1111/cogs.12804

[16] Callizo-Romero, C., Tutnjević, S., Pandza, M., et al., 2020. Temporal focus and time spatialization across cultures. Psychonomic Bulletin & Review. 27(6), 1247–1258. DOI: https://doi.org/10.3758/s13423-020-01760-5

[17] Wu, S., 2022. A corpus-based study of the time orientation of qian "front" and hou "back" in Chinese. Corpus Linguistics and Linguistic Theory. 18(3), 447–475. DOI: https://doi.org/10.1515/cllt-2020-0019

[18] Alverson, H., 1994. Semantics and Experience: Universal Metaphor of Time in English, Mandarin, Hindi, and Sesotho. Johns Hopkins University Press: Baltimore, MD, USA.

[19] Guo, T., Ji, L.-J., Spina, R., et al., 2012. Culture, Temporal Focus, and Values of the Past and the Future. Personality and Social Psychology Bulletin. 38(8), 1030–1040. DOI: https://doi.org/10.1177/0146167212443895

[20] Han, Y. Q., Liu, B., 2007. Cognition of "front" and "back" in Chinese spatial metaphors of time. Contemporary Rhetoric. 4, 15–20. Available from: https://chn.oversea.cnki.net/KCMS/detail/detail.aspx?dbcode=CJFD&dbname=CJFD2007&filename=XCXX200704005&uniplatform=OVERSEA&v=sB2Hai6HadYzh4GOZuLwGftqH0Tv5-LfCkj7c6f9jH-0RdM3MiF8ej9zwJ7cYSaH (cited 1 May 2025). (in Chinese)

[21] Yu, N., 2012. The metaphorical orientation of time in Chinese. Journal of Pragmatics. 44(10), 1335–1354. DOI: https://doi.org/10.1016/j.pragma.2012.06.002

[22] Yang, Y., Sinha, C., Filipović, L., 2023. Sequential time construal is primary in temporal uses of Mandarin Chinese qian 'front' and hou 'back'. Language Sciences. 95, 101511. DOI: https://doi.org/10.1016/j.langsci.2022.101511

[23] Moore, K.E., 2006. Space-to-time mappings and temporal concepts. Cognitive Linguistics. 17(2), 199–244. DOI: https://doi.org/10.1515/COG.2006.005

[24] Shen, J. X., 1999. Asymmetry and Markedness Theory. Jiangxi Education Press: Nanchang, China. (in Chinese)

[25] Lv, S. X., 1984. Chinese Miscellaneous. Shanghai Education Press: Shanghai, China. (in Chinese)

[26] Li, H., Zhang, J., 2016. Chinese native speakers' processing of different time sentences in auditory tasks. Acta Psychologica Sinica. 48(6), 617. DOI: https://doi.org/10.3724/SP.J.1041.2016.00617 (in Chinese)