

The metaphorical orientation of time in Chinese

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Received 19 August 2011; received in revised form 3 June 2012; accepted 4 June 2012

Abstract

This paper studies the metaphorical time orientation in Chinese along its horizontal and vertical axes. It will focus, however, on the controversy over its horizontal axis, readdressing the issue regarding whether the Chinese ego faces toward the future or past in metaphorical orientation of time. It is interesting to note that there exist three different views on this issue. To reinforce the view that FUTURE IS IN FRONT OF EGO and PAST IS BEHIND EGO in Chinese, the paper argues that in analyzing data it is important to make two crucial distinctions. The first distinction, extensively discussed in the literature, is between Ego-Reference-Point (Ego-RP) and Time-Reference-Point (Time-RP). The second related distinction, which has been largely ignored, is between Time-Referent (Time-R) and Human-Referent (Human-R). The study shows that once these two distinctions are made, the seemingly contradictory linguistic data will fall into places that form a coherent metaphorical system. The purpose of making these distinctions is to avoid confusion between past and future on the one hand and anteriority and posteriority on the other. It is hoped that this study contributes to the recent efforts to build a comprehensive framework of temporal reference frames applicable to the study of spatial construal of time in languages and cultures in general.
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Keywords: Metaphorical time orientation; Ego-Reference-Point; Time-Reference-Point; Time-Referent; Human-Referent; Reference frame; Chinese

1. Introduction

The past few years have witnessed a surge of interest in the investigation of the relationship between space and time with numerous studies focused on experimental, linguistic, and gestural evidence (e.g., Bender et al., 2010; Casasanto, 2008, 2010; Casasanto and Boroditsky, 2008; Cooperrider and Núñez, 2007, 2009; Fauconnier and Turner, 2008; Moore, 2006; Núñez et al., 2006; Núñez and Sweetser, 2006; Sinha et al., 2011; Tenbrink, 2011a; Teuscher et al., 2008; Zinken, 2010). These studies point to the metaphorical nature of this relationship as a widespread tendency across languages and cultures to conceptualize and express time in terms of space.¹ This paper intends to contribute to that growing body of literature by making a further study on Mandarin Chinese, which is known for its metaphorical time orientation extending along both a horizontal and a vertical axis (see, e.g., Traugott, 1975, 1978; Yu, 1998:Chapter 4). While it will add to the characterization of its vertical orientation of time metaphor as a secondary goal, its primary goal, however, is to address the controversy over its horizontal orientation of future and past relative to the ego. The question to ask is: Does the ego face toward the future or past in Chinese?

It is interesting to note that there exist three different views on this issue: (a) the ego faces the past (Alverson, 1994; Huang, 1981); (b) the ego faces the future (Yu, 1998); and (c) the ego faces both the past (the primary, preferred case) and

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¹ See Sinha et al. (2011) for the discussion of an example in the Amondawa language and culture of Amonzonía, which does not utilize its spatial language to express temporal relations. They point out that their findings about Amondawa challenge the widespread assumption that linguistic space-time mapping is universal, but support the universality of the cognitive foundations of linguistic space-time mapping.

the future (the minor case) (Ahrens and Huang, 2002; Zhang, 2003; Zhang and Luo, 2007). This controversy arises from seemingly contradictory linguistic data in the Chinese language. The issue cannot be resolved unless it is placed in a more sophisticated framework of analysis. It is hoped that my study in Chinese will contribute to building a comprehensive framework of reference frames for analyzing spatial construal of time in languages in general.

More specifically, this paper aims to reinforce the view that FUTURE IS IN FRONT OF EGO and PAST IS BEHIND EGO in Chinese (Yu, 1998). I will make my argument in light of the more recent literature on the necessity to distinguish between reference points, and between more comprehensive reference frames, in the analysis of data concerning spatial construal of time (see, e.g., Bender et al., 2010; Kranjec and McDonough, 2011; Moore, 2006, 2011; Núñez et al., 2006; Núñez and Sweetser, 2006; Shinohara and Pardeshi, 2011; Tenbrink, 2011b; Zinken, 2010). I will argue that it is important to make two crucial distinctions in analyzing relevant linguistic data in Chinese, as well as in any other languages. The first is between Ego-Reference-Point (Ego-RP) and Time-Reference-Point (Time-RP) (Moore, 2011; Núñez et al., 2006; Núñez and Sweetser, 2006, etc.). The second and related distinction is between Time-Referent (Time-R) and Human-Referent (Human-R). What I call Referent (R) and Reference Point (RP) are similar to Figure (F) and Ground (G) or *locatum* (L) and *relatum* (R) in the recent literature on a framework, taxonomy, or typology of temporal reference frames (Bender et al., 2010; Tenbrink, 2011b; Zinken, 2010), which have been developed from that of spatial reference frames classified either as intrinsic, absolute, and relative (Levinson, 2003) or as Ground-based, field-based, and projector-based (Talmy, 2000; see pp. 211–214 for a comparison of the two systems of terminology). While the first distinction, i.e. Ego-RP vs. Time-RP, has been the focus of attention in the more recent literature,² the second distinction, I believe, has been largely ignored (but see Yu, 1998) and deserves more attention. I will show that once these two crucial distinctions are made, the seemingly contradictory data concerning the ego's orientation toward the future or past in Chinese will fall into places that form a coherent metaphorical system. In doing so I will also show that owing to the Time-R vs. Human-R distinction, a third reference point, Human-RP, is needed in the temporal reference frames for data analysis.

In what follows, I will lay out the three major views on the metaphorical time orientation in Chinese in section 2, argue for the two necessary distinctions between Ego-RP and Time-RP and between Time-R and Human-R in section 3, and provide further evidence in support of the view that the Chinese ego faces the future at default in section 4. In section 5, I will attempt a summary of the variables and mappings of the TIME ORIENTATION metaphor in Chinese along the horizontal and vertical axes. Section 6 will be the conclusion.

2. Three major views on the time orientation in Chinese

In addition to the often-discussed MOVING TIME and MOVING EGO metaphors, Lakoff and Johnson (1999:140) discuss another “most basic metaphor for time”, the TIME ORIENTATION metaphor, which is the focus of attention for this paper. This metaphor has an ego facing toward either the future or the past depending on the specific language and culture. In English, as well as in most other languages studied, the pair of conceptual metaphor is: FUTURE IS IN FRONT OF EGO and PAST IS BEHIND EGO. The TIME ORIENTATION metaphor combined with the MOVING TIME metaphor gives rise to the following mappings (adapted from Lakoff and Johnson, 1999:142):

LOCATION OF EGO	→	PRESENT
SPACE IN FRONT OF EGO	→	FUTURE
SPACE BEHIND EGO	→	PAST
OBJECTS	→	TIMES
MOTION OF OBJECTS PAST EGO	→	'PASSAGE' OF TIME

Its combination with the MOVING EGO metaphor results in the following mappings (adapted from Lakoff and Johnson, 1999:146):

LOCATION OF EGO	→	PRESENT
SPACE IN FRONT OF EGO	→	FUTURE
SPACE BEHIND EGO	→	PAST

² See e.g., Bender et al. (2010), Kranjec and McDonough (2011), Moore (2006, 2011), Núñez et al. (2006), Núñez and Sweetser (2006), Tenbrink (2011b) and Zinken (2010). Earlier literature that discusses this distinction includes Moore (2000, 2001, 2004), Núñez (1999), Shinohara (2002), and Yu (1998:104–110). There exist in the literature various terms that refer to the Ego-RP vs. Time-RP distinction and similar or related distinctions: e.g., ego-based vs. time-based (Núñez, 1999), ego-perspective vs. field-based (Moore, 2011), perspective-specific (ego-centered) vs. perspective-neutral (SEQUENCE IS POSITION) (Moore, 2006), deictic vs. non-deictic (Kranjec and McDonough, 2011; Shinohara and Pardeshi, 2011), A-series (past and future) vs. B-series (anterior and posterior, or earlier and later) (see Tenbrink, 2011b; Zinken, 2010).

LOCATIONS ON EGO'S PATH OF MOTION	→	TIMES
MOTION OF EGO	→	'PASSAGE' OF TIME
DISTANCE MOVED BY EGO	→	AMOUNT OF TIME 'PASSED'

In contrast with the above, the other parametric setting of the TIME ORIENTATION metaphor is realized in FUTURE IS BEHIND EGO and PAST IS IN FRONT OF EGO. According to Lakoff and Johnson (1999:141), Aymara, an Amerindian language in South America, holds this parametric value (see Núñez and Sweetser, 2006; Moore, 2011 for in-depth studies of Aymara). It has been noted, however, that very few languages actually hold this value, and that many of the claims about languages where FUTURE IS BEHIND EGO seem to be based on the confusion of different reference points for the front-back relation (Moore, 2000, 2006; Núñez, 1999; Núñez et al., 2006; Núñez and Sweetser, 2006).

Now I return to the central question: Does the Chinese ego face toward the future or past? Interestingly, as mentioned above, there are three different answers. In what follows, I present three representative views: Alverson (1994), Yu (1998), and Ahrens and Huang (2002).³

2.1. Alverson (1994)

In his study, Alverson (1994) claims to have discovered two important differences between English and Chinese. First, the English ego takes the front-to-the-future orientation while it is the back-to-the-future for the Chinese. Second, unlike the English ego, who is either stationary facing the future or moving toward the future, the Chinese ego remains stationary all the time facing toward the past. Alverson's judgment, however, is based solely on the interpretation of a pair of Chinese words⁴:

- (1) a. 以前 *yi-qian* (PRT-front) 'before; in the past'
 b. 以后 *yi-hou* (PRT-back) 'after; in the future'

These two temporal words are derived from the head words of locality, 前 *qian* 'front; ahead' and 后 *hou* 'back; behind', preceded by the preposition-like particle 以 *yi* used before words of locality to indicate the limits of time in this case.

2.2. Yu (1998)

In contrast, Yu (1998) argues that his study contradicts Alverson's conclusion that the Chinese ego is always stationary facing the past with the future behind. He concludes that the Chinese data largely fall into the patterns outlined by Lakoff (1993) for English: i.e. (a) Chinese also takes the front-to-the-future orientation; and (b) both MOVING TIME and MOVING EGO metaphors exist in Chinese. Yu (1998:Chapter 4) cites ample lexical, as well as sentential and discursive, examples to support his arguments. For instance, the Chinese compound words for future are the 'journey', 'road', or 'scene' ahead of an ego whereas the past is the 'journey' traversed or 'trace' left behind. It is therefore clear that the traveler is facing toward the future. To support his claim, Yu (1998:99–104) also cites independent evidence in the verbs in collocation with the nouns of 'future' and 'past', including the following:

- (2) The verbs in collocation with 'future'
- 展望 *zhan-wang* (spread.out/unfold-gaze.into.distance/look.over) 'look into the distance; look into the future; look far ahead'
 - 瞻望 *zhan-wang* (look.forward-gaze.into.distance) 'look forward; look far ahead'
 - 瞻念 *zhan-nian* (look.forward-think.of) 'look ahead and think of (the future)'
- (3) The verbs in collocation with 'past'
- 回顾 *hui-gu* (turn.around-look.back) 'look back; review'
 - 回首 *hui-shou* (turn.around-head) 'look back; recollect'
 - 回眸 *hui-mou* (turn.around-eye) 'look back; recollect; recall'
 - 回溯 *hui-su* (turn.around-trace.back) 'recall; look back upon'
 - 回忆 *hui-yi* (turn.around-recall/recollect) 'call to mind; recollect; recall'

³ In essence, Huang (1981), written in Chinese, holds the same view as Alverson (1994), Zhang (2003) and Zhang and Luo (2007), also in Chinese, present views similar to Ahrens and Huang's (2002).

⁴ The following abbreviations are used in this article: ASP = aspect; CL = classifier; MOD = modifier marker; PRT = particle.



Fig. 1. Times conceived of as a moving train (Yu, 1998:107).

- f. 回想 *hui-xiang* (turn.around-think) 'think back; recollect; recall'
- g. 回念 *hui-nian* (turn.around-think.of/miss) 'think back; recollect; recall'
- h. 回思 *hui-si* (turn.around-think.of/long.for) 'think back; recollect; recall'

That is, the verbs used exclusively with 'future' are those literally meaning 'look forward', whereas those that collocate only with 'past' include a morpheme meaning 'turn around'. The verbs in (3) unequivocally confirm PAST IS BEHIND EGO since the ego has to 'turn around' first (i.e. to 'look back') before reviewing, recalling, or recollecting the past.

In explaining why there are seemingly contradictory data in Chinese, Yu (1998:106) cites the following pair of compounds containing *qian* 'front; ahead; before':

- (4) a. 前途 *qian-tu* (front/ahead-road) 'future; prospect'
- b. 前天 *qian-tian* (front/before-day) 'the day before yesterday'

It is argued that (4a) instantiates the MOVING EGO metaphor, while (4b) presents an instance of the MOVING TIME metaphor, in which times are construed as a moving sequence of linked objects with their 'intrinsic fronts' facing the direction of motion.⁵ Yu (1998:106–107) uses Fig. 1 for illustration, i.e. to conceive of times, or events that 'go with' times, as a moving train consisting of a series of carriages. Suppose car 3 is 'today', then car 2 is 'yesterday' and car 1 is 'day before yesterday', which is 'ahead of' yesterday and closer to the 'front' of the train. Yu (1998:107) claims that the seemingly contradictory data result from a "difference in the selection of point of reference": the time vs. the ego.

Yu (1998:109) points out that Alverson's (1994) claim that the Chinese ego is always stationary facing the past, with the future coming from behind, is based on a wrong interpretation of the reference point (time vs. ego) regarding the pair of temporal terms in (1) above.

Besides, Yu (1998) discusses the conceptualization that lines up people in tandem spatially according to their temporal order. Thus, for instance, people of earlier/past generations are 'ahead of' the ego whereas those of later/future generations are 'behind' the ego. This does not mean that the ego is facing the past. In such a case, the ego is construed as one of a line of people moving one after another toward the future, which is our experience of lining up in a queue toward the goal according to who comes earlier or later. Thus, parents are ahead of the ego and grandparents are further ahead in the line while children are behind the ego and grandchildren are further behind. For instance, in the English words *forefather*, *forebear*, *forerunner*, *predecessor*, and *precursor*, the prefixes *fore-* and *pre-* both have a primary spatial sense meaning 'front' or 'in front'. In Chinese, this front-back conception of temporal order is a productive one, as illustrated in (5) (Yu, 1998:137).

- (5) a. 前人 *qian-ren* (front/ahead-people) 'forefathers; predecessors'
- b. 后人 *hou-ren* (back/behind-people) 'later generations; descendants'
- c. 前辈 *qian-bei* (front/ahead-generation) 'senior (person); elder; the older generation'
- d. 后辈 *hou-bei* (back/behind-generation) 'younger generation; juniors'

In this way, the history of human evolution can be conceptualized as a special kind of relay race toward the future: Those who run in the front will 'pass the torch' to those who follow them, and then drop out.⁶

⁵ It so happened that I came across a manuscript in which the author suggests that my use of (4a) in Yu (1998) as an example of the MOVING EGO metaphor was mistaken; instead, it should be interpreted as instantiating the LIFE IS A JOURNEY metaphor. The study presented in that manuscript is based on Alverson's (1994) view that the Chinese ego is always static facing the past, and that the MOVING EGO metaphor does not exist in Chinese. My response is that the LIFE IS A JOURNEY and MOVING EGO metaphors are two sides of the same coin, structured by the same SOURCE-PATH-GOAL image schema. As such, the LIFE IS A JOURNEY metaphor cannot exist without the existence of the MOVING EGO metaphor. In fact, in an authoritative Chinese-English dictionary, the compound word in (4a) is defined simply as "future; prospect" (NACED, 2000:1225), rather than 'road or journey ahead' as suggested by the literal meaning of the word.

⁶ This imagery is the one evoked in John F. Kennedy's inaugural speech when he said "the torch has been passed to a new generation of Americans".

In summary, Yu (1998:138) lays out the possible variables and mappings of the TIME AS SPACE metaphor including the following along the horizontal axis:

- (of times) front/ahead → future/past
 (of times) back/behind → past/future
 (of people) front/ahead → earlier
 (of people) back/behind → later

Of these mappings, the first two present the directionality parameters. Whether ‘front’ or ‘back’ is mapped onto ‘future’ or ‘past’ depends on specific languages and cultures.⁷

2.3. Ahrens and Huang (2002)

Ahrens and Huang's (2002) study of time contains a critique of Yu (1998), as well as others. They argue, among other things, that with the MOVING TIME metaphor the Chinese ego faces the past, not the future as Yu (1998) suggests. The only three relevant examples on which this argument rests are cited below (Ahrens and Huang, 2002:499–500), with the Chinese-character versions added:

- (6) a. 前年我到美国去了。
qian-nian wo dao meiguo qu le.
 front-year I to America go ASP
 ‘I went to America two years ago (the year before last).’
- b. 我打算后年结婚。
wo dasuan hou-nian jiehun.
 I plan back-year marry
 ‘I plan to marry two years from now (the year after next).’
- c. 前不见古人，后不见来者。
qian bu jian gu ren, hou bu jian lai zhe.
 front not see ancient people back not see come those
 ‘Before me, I can't see any predecessors; behind me I can't see any followers.’

They conclude that these examples show “what is in front of the speaker is in the past, while what is in back of the speaker is in the future” (p. 500).

Ahrens and Huang (2002) also argue that the commonly accepted and well-established MOVING EGO metaphor is not accurate. Instead, this special case should be formulated as a time-point moving over a landscape with a plural ego attached to it. As a result, the Chinese ego becomes a bifurcated one: i.e. facing the past when standing still, but facing the future when riding on a time-object moving over the time-landscape toward the future. This position has improved somewhat from Huang (1981), who, like Alverson (1994), denies the existence of the MOVING EGO metaphor in Chinese.

3. Necessity for two crucial distinctions in data analysis

As seen in the preceding section, there are three representative views on the issue of metaphorical ego-time orientation in Chinese: (a) the ego facing the past (Alverson, 1994); (b) the ego facing the future (Yu, 1998); and (c) the ego facing both past and future depending on whether the ego is stationary or moving (Ahrens and Huang, 2002).

As becomes clear from looking at their three relevant examples, Ahrens and Huang's (2002) view, as much as Alverson's (1994), hinges entirely on the interpretation of the pair of antonyms: *qian* ‘front; ahead; before’ and *hou* ‘back; behind; after’. That is, when these words refer to a past or future time, they always have the ego's body as the reference point (Ahrens and Huang, 2002:511; see also Zhang, 2003:89). Indeed, Yu (1998) already presented a critique of Alverson (1994), arguing that this may not be and often is not the case. Instead, their reference point can be another time

⁷ It is worth noting that Ahrens and Huang's (2002:515) critique of “Yu's position that the TIME IS MOTION metaphor has an ego facing the future as a *universal* conceptualization of time” (italics mine) is simply a misrepresentation of my view.

that has its metaphorical front and back by virtue of being conceptualized as one of a sequence of linked objects moving unidirectionally. The ‘moving train’ analogy was used to illustrate it.

Ahrens and Huang (2002:510–511), however, argue that Yu’s (1998) account involves “an idiosyncratic interpretation” which causes several problems. In the following I will show that my account is not so ‘idiosyncratic’, but instead has become a consensus in the literature. More broadly, I will argue that it is necessary to make two crucial distinctions in data analysis of spatial metaphors for time.

3.1. Necessity for a distinction between Ego-RP and Time-RP

Lakoff and Johnson (1980:41) note that there is an apparent contradiction in English in the metaphorical conceptualization of time, as illustrated below:

- (7) a. In the weeks ahead of us... (future)
 b. That’s all behind us now. (past)
 c. In the following weeks... (future)
 d. In the preceding weeks... (past)

Thus, in (a) and (b), the future is in front and the past is behind us, but (c) and (d) appear to suggest that the future is behind and the past in front of us. Lakoff and Johnson (1980), however, point out there is actually metaphorical coherence here considering that in (c) and (d) times (i.e. ‘weeks’) conceptualized as moving objects receive a front-back orientation, with the front being in the direction of motion (see also Evans, 2003:228–229). In other words, ‘preceding weeks’ take place earlier in the past whereas ‘following weeks’ take place later in the future (cf. *in the weeks preceding the spring break...* and *in the weeks following the spring break...*, both of which are independent of the ego, and as such could take place in the past or future depending on the ego’s ‘location’ relative to ‘the spring break’). Although Lakoff and Johnson (1980) did not explicitly argue for the distinction between a time vs. ego reference point, their discussions on the metaphorical projection of the front-back orientation onto moving objects without intrinsic front and back distinction in particular, and on metaphorical coherence vs. consistency in general, clearly suggest an ego-independent time reference point.⁸

Thus, the reference point of (7a) and (7b) is the ego, but that of (7c) and (7d) is ‘this week’, which happens to be ‘co-located’ with the ego. Applying the ‘moving train’ analogy, we can say that ‘the preceding weeks’ are cars 1 and 2, ‘the following weeks’ are cars 4 and 5, and ‘this week’, the reference point, is car 3. Indeed, the distinction between Time-RP and Ego-RP can account for the seemingly contradictory data, such as in (7), also demonstrated in a single sentence, cited below from Lakoff and Johnson (1980:41) and Moore (2006:224), respectively:

- (8) a. *We’re looking ahead to the following weeks.*
 b. *Christmas is coming and New Year’s is following right behind.*

In (8a), ‘We’re looking ahead’ takes Ego-RP, but ‘the following weeks’ takes Time-RP; in (8b), ‘coming’ takes Ego-RP whereas ‘following right behind’ takes Time-RP. That is, two reference points can be ‘mixed’ in one sentence, each taking care of a part of it, resulting in ‘an apparent metaphorical contradiction’ (Lakoff and Johnson, 1980:41).

Looking back, we see a consensus reached on the necessity for the Ego-RP vs. Time-RP distinction, based on studies in various languages, some of them being unrelated (e.g., Evans, 2003:Chapter 18; Moore, 2000, 2006; Núñez, 1999; Núñez et al., 2006; Núñez and Sweetser, 2006; Shinohara, 2002; Traugott, 1975, 1978; Yu, 1998; see also the latest studies on temporal reference frames: e.g., Bender et al., 2010; Kranjec and McDonough, 2011; Moore, 2011; Shinohara and Pardeshi, 2011; Tenbrink, 2011b; Zinken, 2010). For instance, Núñez (1999) argues for a distinction between ‘time-based’ and ‘ego-based’ metaphors. In time-based metaphors, time is understood in terms of objects in a sequence and motion in space, and a time *A* occurs earlier or later than a time *B* (e.g., in the *preceding* session...; in the days *following* next Wednesday...; the day *before* yesterday...). Ego-based metaphors are then further divided into the MOVING TIME and MOVING EGO metaphors. What is especially relevant is his discussion of two Spanish phrases: *posterioridad a 1988* ‘after 1988’ and *1988 en adelante* ‘from 1988 on’ (p. 50). Both refer to ‘the years in the future relative to 1988’, but literally the former contains ‘back’ and the latter

⁸ It needs pointing out that Ahrens and Huang (2002:497–499) misinterpreted Lakoff and Johnson’s (1980) account in this regard, and argued that the examples in (6c, d) demonstrate that the English ego could sometimes be facing toward the past, in the “wrong” direction, as much as the Chinese ego could be facing toward the future, in the “wrong” direction “in a few cases”. In other words, the front-to-the-future is just the “preferred orientation” for the English ego whereas the front-to-the-past is also the “preferred orientation” for the Chinese ego, but in both languages “there can be exceptions to the preferred orientation” (Ahrens and Huang, 2002:509–510; see also Zhang and Luo, 2007 for a similar view).

'front'. A close look at the underlying conceptual mappings differentiated by time-based vs. ego-based metaphors reveals that the former applies to the 'back' of 1988 as a time-object whereas the latter applies to the 'front' of an ego. Núñez (1999:51) then discusses another French example in which the speaker said something to the effect that her grandmother had been born way before 1930. She used the word *avant*, which has a literal meaning of 'front' while making a gesture quickly moving her hand toward her back, with the palm facing backward. Núñez notes that the speaker was using the time-based metaphor, manifested by her gesture, in which the grandmother had been born much earlier than (i.e. 'in front of') 1930, but she oriented herself toward the future, with the past behind, according to the ego-based metaphor.

Núñez et al. (2006) make the primary distinction between Ego-RP and Time-RP arguing that the Time-RP metaphor is needed because Ego-RP is not always involved. Instead, a time-object of a sequence can be simply oriented 'in front of' another time-object (e.g., *Wednesday follows Tuesday; February comes before March*). Their visual priming experiments provide evidence for the psychological reality of the Time-RP metaphor with no reference to an ego. Núñez and Sweetser (2006) also argue for the Ego-RP vs. Time-RP distinction. While they study a real FUTURE IS BEHIND language, Aymara, by probing into gestural data that provide crucial information unavailable to purely linguistic analysis, they warn against the confusion of futurity with posteriority, and of past with anteriority. Future and past are relative to NOW, 'co-located' with the ego, but posteriority and anteriority are relative to each other with no reference to the ego.

Moore (2000), who focuses on Wolof, a language spoken in Senegal and The Gambia, as well as Japanese data, also discusses in detail the three different metaphors for time: Moving Ego, Ego-centered Moving Time, and SEQUENCE IS RELATIVE POSITION ON A PATH, which is independent of any ego, as illustrated respectively by the following (pp. 64–65; see especially the diagram on p. 65):

- (9) a. *I hope we get a chance to meet in the weeks **ahead**.*
 b. *I hope we get a chance to meet in the **coming** weeks.*
 c. *I hope we get a chance to meet in the **following** weeks.*

Moore (2000:88) points out that many of the claims about languages where FUTURE IS BEHIND and PAST IS IN FRONT seem to be based on the confusion of different reference points for the front-back relation. A telling example is the Japanese sentence *Mae ni asonda koto ga aru* 'We have played **before**', where a FRONT word is used to refer to the past, but if *mae* 'front' appears with a reference point construed as a human experiencer, it does not have a 'past' meaning any more, e.g., *Kurisumsu wa moo me no mae da* 'Christmas is now in front of the eye (i.e. in the near future)'. It is worth pointing out that the word *mae* is the Japanese counterpart of Chinese *qian* 'front; ahead; before', both being represented by the same character (前).

In discussing the possibility of a situation where the 'front' of the time sequence is opposite to the ego's bodily front, Moore (2006:226) uses a 'train' analogy where the ego sitting in the middle car is facing toward the back of the train. In this case, the front-back relation is not determined by the bodily orientation of the ego, but by the train's intrinsic front and back: The car closer to the front of the train is said to be "the car in front". Also very relevant is the example that the front of a queue does not depend on a particular person's bodily orientation in the line (Talmy, 2000:203–204).

In sum, as the review of the literature shows, a consensus has been reached on the necessary distinction between Ego- and Time-RP (and similar or related distinctions) in data analyses of various languages.

3.2. Necessity for a distinction between Time-R and Human-R

Different from the Ego-RP vs. Time-RP distinction, the distinction between Time-R and Human-R, as noted in Yu (1998), has not received its due attention. Ignoring it, I believe, will lead to misinterpretation of a set of data.

Humans live, as much as events unfold, in and through time, which is conceptualized metaphorically in terms of space, as objects, locations and motion in space. All humans, as well as all events, can be 'located' along the imaginary time-line because humans and events alike 'take place' in time. In our conceptual systems, therefore, we place people of various generations or ages in various positions to form a 'spatial' sequence, with earlier ones in front of later ones, on a parallel with the sequence of events, along the time-line. I call this conceptualization the 'human sequence', in contrast with the 'event sequence', both of which are parallel to the 'time sequence'. It follows that in all three cases, namely, time, event, and human, the front-back spatial relationship is mapped onto the earlier-later temporal relationship.

If we place ourselves into the imaginary human sequence, we as the ego become its deictic center, with people of past generations or older ages located in front of us and those of younger ages and future generations located behind us. A consequence of such a mapping with us being the ego is that, for instance, those who lived in the past are located in front of us and those who will be born in the future are located behind us (cf. 5 and 6c above). Does that entail the cultural conceptualization that the ego faces the past with the future behind the back? The answer is 'No', at least in the case of Chinese or English.

In effect, this spatial conceptualization of temporal order of humans is analogous to our everyday experience of lining up in a queue, which itself is argued as being conceptualized by blending 'a line of people' with 'a linear trajectory'

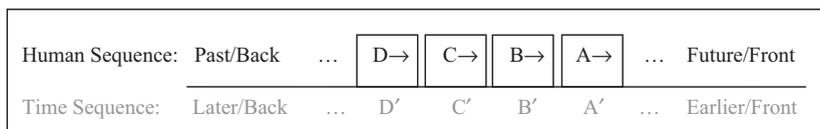


Fig. 2. The queue schema.

(i.e. 'sequential order' or 'directional ordering') (Hutchins, 2005:1559–1562): Earlier comers are in front of me and later comers are behind me, but for me, as well as for everyone in the queue, my 'future' is in front of me, as the 'path' leading to the very front of the queue, and my 'past' is behind me, as the 'path' I *have taken* leading to my current position, my 'present/now'. Specifically, for instance, I *have already spent* an hour waiting and moving in the queue, which *has been in the past* relative to 'now'. It *will* take me about another hour to reach the front, and this another hour is still *in the future* relative to 'now'. This 'queue' situation is one sort of real-life experience that may motivate and ground the MOVING EGO metaphor (as well as the LIFE IS A JOURNEY metaphor). My queuing experience described above actually applies to all the people waiting in the queue, with each of them being a potential moving ego in his/her own right and having his/her own 'past' and 'future' defined by his/her 'current position' in the queue, correlated with his/her 'now'.

Now, let us look more closely at the 'queue' analogy – schematically represented in Fig. 2 – which I utilized above to account for why it is possible in our conceptual systems for our future (time) and past generations (human) to be both located in front of us, and for our past (time) and future generations (human) to be both located behind us. To do this, we have to recognize two levels of frame of reference: primary reference frame and encompassive secondary reference frame. They are two levels of 'scenes' in which what Talmy (2000:203–214) refers to as 'primary reference object' and 'encompassive secondary reference object' are respectively conceptualized (see, also, Moore, 2011). In Fig. 2, the larger rectangle represents the secondary reference frame that encompasses the human sequence (A, B, C, and D) as the secondary reference object, and this human sequence, or the 'queue', is *internally* ordered according to the underlying time sequence (A', B', C', and D'); the primary reference frame refers to those smaller boxes containing the individual letters as primary reference objects. In the diagram, the time sequence is grayed to mean that it is a 'background' structure applicable and relevant only to the *internal* directional ordering of the members of the queue. That is, the sequential order of those in the line is determined by the times at which they join the queue.

It is worth noting in passing that 'Front' (as well as 'Back') in Fig. 2 means different things: For the human sequence it means 'the *space/path in front of* each individual letter and the sequence as a whole', i.e. 'Future' in a temporal metaphor; for the time sequence it means '(closer to) *the front of* the sequence', which in turn means metaphorically 'Earlier' time(s) (e.g., A') *within* the time sequence and, by a metonymic relation, 'Earlier' person(s) (e.g., A) *within* the human sequence. The two metaphorical mappings operate separately in different scopes. In our real-life queuing experience, the concept of time is also crucial along two separate dimensions (sequence vs. motion): first, the time (point) at which I join the queue, which determines my relative position in the directional ordering of the queue, in relation to others along the same line (i.e. those coming *before* me are *ahead of* me, and those coming *after* me are *behind* me, in an earlier-later relation); and second, the time (duration) already spent and still needed for me to reach the very front of the line, which is determined by my current position along the path of motion as well as the speed of motion (i.e. a past-future relation).

As shown in Fig. 2, the queue schema captures the metaphorical conceptualization of humans of different generations or ages, i.e. the spatial sequencing of humans according to their temporal order, with earlier ones ahead of later ones. It is interpreted as follows. The letters A, B, C, and D represent a sequence of people, as found in a queue, while the arrows indicate the direction of their motion. The elliptical dots on both sides suggest that the imaginary human sequence can extend in both directions. The letters A, B, C, and D, which form part of the human sequence, are structured according to A', B', C', and D', which form part of the time sequence, as summarized by the SEQUENCE IS RELATIVE POSITION ON A PATH metaphor (Moore, 2006, 2011). In other words, the times A', B', C', and D', while backgrounded in Fig. 2, have the potential of positioning their corresponding humans A, B, C, and D along the time sequence and therefore setting the 'now' for each of them as a moving ego *within* their respective primary reference frames. In this queue schema, the primary reference frame provides a close-up view of each individual moving ego, one at a time, from a 'proximal perspective', whereas the encompassive secondary reference frame provides a panoramic view of all the potential moving egos from a 'distal perspective' (Talmy, 2000:62). Within each primary reference frame, which sets each moving ego in its own historical, temporal context, the classical MOVING EGO metaphor applies. In contrast, the encompassive secondary reference object, the queue, as a whole is structured *internally* by the SEQUENCE IS RELATIVE POSITION ON A PATH metaphor, displaying all the potential moving egos in the human sequence in their historical, temporal relations with one another.

Note that proximal and distal perspectives are simply ways of conceptualization, namely how we choose to construe a particular phenomenon or situation, physical or abstract. In this respect, we can refer further to Talmy's (2000:70–72) two-way distinction in 'perspectival mode' in spatial description:

- a. Synoptic mode: the adoption of a stationary distal perspective point with global scope of attention (e.g., *There are some houses in the valley.*)
- b. Sequential mode: the adoption of a moving proximal perspective point with local scope of attention (e.g., *There is a house every now and then through the valley.*)

That is, in conceptualizing and describing a physical situation, we can choose to adopt either one of the above perspective points with different scopes of attention. This distinction in perspective point, in effect, is also applicable to the conceptualization and description of an abstract phenomenon such as time, characterizing the contrast between the primary and secondary reference objects within their relevant reference frames in the queue schema. As ‘viewers’, we can choose to mentally enter a particular primary reference frame (a mental space), one at a time, to ‘observe’ an individual moving ego (e.g., *C* at *C'*) more closely, with others (*A*, *B*, and *D*) ‘hidden’ in the background, but at the encompassive secondary level, we also have a ‘holistic picture’ of how they are related to one another historically or temporally, which entails a perspective point from a distance (see example 11 below). Similarities found in our dealing with spatial and temporal domains are always significant in our attempt to establish temporal reference frames on spatial models.

In the queue schema formulated above, ‘future’ lies ahead of each individual moving ego within its own primary frame, but it also lies ahead of the moving human sequence as a whole, which constitutes what Talmy (2000:189) calls “a linear Figure moving coaxially along the same path” relative to a Ground, the goal of the queue or the future of the human sequence as a whole. ‘Future’ in this sense is adopted, for instance, in the understanding of the history of human evolution, with the capital letters representing humans of different generations in different eras forming one ‘linear Figure’. Also, as in Fig. 2, each capital letter in the human sequence can be both ‘individual’ or ‘collective’. In other words, they can represent either an individual person (e.g., the four siblings of a family, with elder *ahead of* younger ones) or a generation as a collective (e.g., *D* for the four siblings, *C* for their parents, and *B* for their grandparents, etc.). Besides, ‘generation’ can be understood in a familial, a communal (e.g., the second generation cognitive scientists), a national (cf. footnote 6 and example 11 below), or even an international scope.

In Chinese culture, for instance, the history of human evolution, the idea that the younger and newer always excel the older, is expressed by a popular old saying of which the following is one of the variants:

- (10) 长江后浪推前浪，世上新人胜旧人。(NACED, 2000:169)
Chang-Jiang hou-lang tui qian-lang, shi shang xin-ren sheng jiu-ren.
 Yangtze-River back-waves push front-waves world on new-people excel old-people
 ‘As in the Yangtze River the waves behind drive on (lit.push) those in front of (or before) them, so the new generation excels the old (in the world).’

As in this old saying, each ‘wave behind’ is mapped onto a ‘newer generation’ while the ‘wave in front’ is mapped onto the ‘older generation’. The waves all keep moving forward with the ‘back’ ones, which have rising force dynamics, pushing the ‘front’ ones, which have waned in power. A similar image is evoked by an idiom found in the following sentence:

- (11) 为了祖国的繁荣富强，多少代人前赴后继，英勇斗争。(NACED, 2000:1223)
Weile zuguo de fanrongfuqiang, duoshao dai ren qian-fu hou-ji,
 for motherland MOD prosperity-strength so-many generations-of people front-go back-follow
yingyong douzheng.
 valiantly struggle
 ‘Generations of the people have *advanced wave upon wave* (lit. the **front** ones go forward and the **back** ones follow) fighting valiantly (against heavy odds) for the prosperity of the country.’

Here the image is that of generations of people striving forward, later-back ones following the earlier-front ones, for the common goal, which is a better future for their country. What is of interest here is that the people of a country are conceptualized as forming one long column striving forward in the direction of future, with earlier generations in front of later ones. It is an example of distal perspective on the human sequence in a national scope. In a familial context, the following two examples are found in two autobiographical writings:

- (12) a. 有时候她对我说父亲的种种好处，她说：“你总要踏上你父亲的脚步。”
You-shihou ta dui wo shuo fuqin-de zhongzhong haochu, ta shuo:
 sometimes she to me said father's various merits she said
 “Ni zongyao ta shang ni fuqin-de jiao-bu.”
 you should stamp on your father's foot-steps
 ‘Sometimes she told me my father's various merits saying, “You should *follow in* (lit. *stamp on*) your father's footsteps.’”

Table 1

The four temporal reference frames.

Reference frames	Referent	Reference point
(a) The sequential time frame	Time	Time
(b) The deictic time frame	Time	Ego
(c) The sequential human frame	Human	Human
(d) The deictic human frame	Human	Ego

- b. 我为老二，前面有一个姐姐，大我三岁。

Wo wei lao-er, qian-mian you yi-ge jiejie, da wo san-sui.

I was second-child front-side had one-CL elder-sister older-than me three-years
'I was the second child, and I had an elder sister *in front* (of me), three years older than I was.'

In (12a), Hu Shih, a modern philosopher, talked about how his mother urged him to emulate the example of his late father; in (12b), Lu Buxuan, a writer, talked about his childhood. In both examples, apparently, the elder is construed as being in front of the younger. Just to mention in passing that the vertical conceptualization is also very common in Chinese. An example in the familial context is the idiomatic expression 上有老下有幼 *Shang you lao xia you xiao* (**Above** have elderly, **below** have little) 'I have the elderly (parents) to take care of **above**, and the young (children) to raise **below**'.⁹

The linguistic examples that instantiate the metaphorical conceptualization of a directional ordering of humans include those given in (5). Note that those examples may or may not involve an ego. Thus in (5a), for instance, the 'front people' are either in front of an ego or in front of the 'back people' (5b). Similarly, the 'back people' in (5b) are either behind an ego or behind the 'front people' (5a). Thus, there arises the need to distinguish between Ego-RP and Human-RP in addition to Time-RP, giving rise to a three-way distinction in reference point.

I want to emphasize the importance of distinguishing between Time-R and Human-R because, if we do not, we may misinterpret the data involving human referents (e.g., 6c). For instance, when we refer to our ancestors as our 'forefathers' and say that we need to 'follow in their footsteps', we do not mean that the past, where our ancestors should be 'located', is in front of us. We know that English is a PAST IS BEHIND language. However, if we are investigating another language that has not been studied before, a confusion between Time-R and Human-R may lead to a wrong interpretation and conclusion. For instance, Núñez and Sweetser (2006) convincingly show that in Aymara PAST IS IN FRONT OF EGO and FUTURE IS BEHIND EGO, supporting their argument with a thorough analysis of gestural data on top of linguistic evidence. However, some of their gestural evidence is not particularly suggestive because it indicates that 'past generations', as well as 'past times', are in front of the speakers. But we know that in both Chinese and English, where FUTURE IS IN FRONT OF EGO and PAST IS BEHIND EGO, past generations are also conceptualized as being in front of the ego (see Yu, 1998:Chapter 4). In other words, past generations (Human-R) should be distinguished from past times or events (Time-R) and should not be treated as if they were the same.

In sum, it is important to distinguish between Time- and Human-R. This distinction, with the help of the 'queue' analogy, can help us understand seemingly paradoxical relations between future times and past generations being both in front of the ego, and past times and future generations being both behind the ego. While waiting in a queue, we move *forward* toward our goal. The time still needed for us to reach our goal, which is the *future* time to us, is determined by the *path* (and number of people on it) *in front of* us whereas the time already spent in the queue up to 'now' is already in the *past*, as the *path behind* us. At the same time, those people who come *before* us are *ahead of* us while those who come *after* us are *behind* us. With the distinction between Time- and Human-R, and between Time-, Human-, and Ego-RP, we can distinguish the following four frames of reference: (a) the sequential time frame (earlier times preceding later times), (b) the deictic time frame (future and past divided by 'now', co-located with the ego), (c) the sequential human frame (humans of older ages or earlier generations preceding those of younger ages or later generations), and (d) the deictic human frame (the in-tandem human sequence divided by the ego in an ego-aligned fashion). These four distinct cases are shown in Table 1.

It needs pointing out that, although the in-tandem 'queue' construal should be applicable to both Chinese and English, or even widespread, it is not universal. For instance, Radden (2003:233) discusses an interesting counter example in French. In the French kinship system, the third generation is seen as being 'behind' the second one on both the ascending and descending sides, in a mirror-image fashion. Thus, *arrière*, literally meaning 'behind', is used with both earlier and later third generations: e.g., *arrière petits-enfants* (behind-small-children) 'great-grandchildren'; *arrière-grands-parents*

⁹ It is worth mentioning that humans are not necessarily always ordered conceptually according to their ages. For example, it is possible that the founder of a theory is younger than his or her 'followers'. In this and other similar cases, the 'leader' either starts the course of activity first (i.e. earlier in time) or moves along the course faster (i.e. in less time), and is therefore more 'advanced' than or 'ahead of' others. Such cases can be accounted for by the LIFE IS A JOURNEY metaphor or more generally Event Structure Metaphor system, but the spatial construal of time is still involved.

(behind-grand-parents) 'great-grandparents'. That is, the ego, the deictic center, looks at both front and back sides of the line using the same ego-centric, mirror-image perspective. It would be interesting to ask if this construal is limited to, or applicable beyond, the third generations along the line. If it is the former, it may suggest that the second and third generations on the ascending side are still 'close' enough in the line to 'turn around' to 'interact' with the ego. In other words, the ego-opposed, mirror-image construal is 'local', in the 'intimate' proximity of the ego. It would also be of great interest to investigate other languages and cultures 'along this line' because it is a real case of relative frame of reference for the analysis of temporal relations (Bender et al., 2010; Tenbrink, 2011a,b; Zinken, 2010).

4. Further study of the front-back time orientation in Chinese

Having laid out the two crucial distinctions in the preceding section, I now return to the controversy over the front-back time orientation in Chinese so as to examine it in a new light. Another look will be taken at Ahrens and Huang's (2002) three representative examples in (6) because, it so happens, they straddle on the confusion between the two crucial distinctions discussed above. I will then add a diachronic perspective on the issues involved in response to Ahrens and Huang's (2002) argument that the static ego facing the past is the only metaphorical conceptualization of time available in ancient China, which, I will show with further evidence, actually rests on the confusion between Ego- and Time-RP.

Now, we first go back to look at Ahrens and Huang's (2002) three sentences in (6) as evidence showing PAST IS IN FRONT OF EGO AND FUTURE IS BEHIND EGO in Chinese. In (6a) and (6b) the time words *qian-nian* (front-year) 'year before last' and *hou-nian* (back-year) 'year after next' have Time-RP, i.e. 'front' and 'back' refer to the front and back of other times rather than the ego. They are similar to the English temporal words *before* and *after*, and apply only to year and day (i.e. *qian-tian* [front-day] 'day before yesterday' and *hou-tian* [back-day] 'day after tomorrow'), but not month and week. Further, in the phrases below, nobody would think that *qian* 'front; before' and *hou* 'back; after' have anything to do with an ego, or past and future:

- (13) a. 三点前 *san-dian-qian* (three o'clock-front) 'before three o'clock (lit. in front or ahead of three o'clock)'
 b. 圣诞后 *shengdan-hou* (Christmas-back) 'after Christmas (lit. behind Christmas)'

Ahrens and Huang's third example (6c) is a case of Human-R in relation to Ego-RP in the deictic human frame discussed in section 3.2. That is, people earlier or later in time are construed respectively as preceding or following the ego. This metaphoric conceptualization is grounded in our experience of lining up in a queue, facing and moving toward the future-goal, the front, with earlier comers closer to the front than later comers.

Ahrens and Huang (2002:511) claim that "the moving time metaphor with the static ego facing the past is the traditional and primary conceptualization of time in Mandarin and the only one that has been diachronically consistent for over two thousand years", and furthermore that the metaphors where the ego faces the future "are modern conceptualizations of time that have only recently entered the language". In saying so, Ahrens and Huang (2002) ignore my lexical evidence as cited in (3) in contrast to that in (2). The compound words in (3) show clearly that whenever we recall, recollect, or review the past, we have to 'turn around' our head first in order to do so. Do these words only exist in modern Chinese or have they developed senses related to past only in modern times? The answer is 'No'. Look at the following examples from *Hanyu Da Cidian*, an authoritative dictionary of Chinese:

- (14) a. 回首 *hui-shou* (turn.around-head) '(1) turn one's head around; turn back one's head and look; ...
 (3) recall; recollect' (HYDCD, 2000:871)
 b. 回头 *hui-tou* (turn.around-head) '(1) turn one's head backward; turn one's face around; ...
 (3) review; recall' (HYDCD, 2000:870)

As can be seen, both compound words literally mean 'turn around one's head' in sense (1), but in (3) they mean 'review', 'recall', or 'recollect'. The important fact is that the two examples cited to illustrate the metaphorically extended senses in (3) are both from the poems by well-known ancient poets, Du Fu of the Tang Dynasty (618–907) and Su Shi of the Song Dynasty (960–1279):

- (15) a. 春风回首仲宣楼。唐代杜甫《将赴荆南寄别李剑州》
Chun-feng hui-shou Zhongxuan lou. (Du Fu, Tang Dynasty)
 spring-breeze turn.around-head Zhongxuan tower
 (I can only recall [lit. look back at] you on the Zhongxuan Tower in spring breeze.)¹⁰

¹⁰ The English translations of the lines from the classical poems here and hereafter are my own; they are rough, and therefore placed in the parentheses instead of more conventional single quotes.

- b. 回头乐事总成尘。宋代苏轼《至济南李公择以诗相迎次其韵》
Hui-tou *leshi* *zong cheng chen.* (Su Shi, Song Dynasty)
 turn.around-head happy-things always become dusts
 (When I *look back at* the happy things, they always seem to have turned into dusts.)

These two lines show that as early as the Tang and Song Dynasties, the ego was already facing toward the future. Therefore, the ego has to ‘turn around’ first when reviewing, recalling, or recollecting the past. They contrast with the following lines in a poem by another poet of the Tang Dynasty, Gao Shi.

- (16) 莫愁前路无知己，天下谁人不识君。唐代高适《别董大二首》
Mo chou qian-lu wu zhiji, tian-xia shuiren bu shi jun.
 don't worry front-road there-are-no bosom-friends under-heaven who not recognize gentleman
 (Don't worry about not being able to meet bosom friends on *the journey ahead*; who under heaven does not recognize a [real or true] gentleman?)

In (16), which uses the MOVING EGO metaphor (and, of course, the LIFE IS A JOURNEY metaphor as well), the future is the ‘road or journey ahead’ of a moving ego. These examples show that ancient Chinese already had both MOVING TIME and MOVING EGO metaphors, and that the ego in ancient Chinese was already facing the future with the past behind. Indeed, a search in the Center for Chinese Linguistics (CCL) corpus at Peking University yielded many classical Chinese examples with *hui-shou* (turn around one's head) meaning ‘recall; recollect’. Those given in (17) are just a few examples:

- (17) a. 相思不可见，回首故人情。唐代李白《寄当涂赵少府炎》
Xiangsi bu-ke-jian, hui-shou guren qing.
 miss unable-to-see turn.around-head beloved-person affection
 (Yearning but unable to meet, I can only *recall* [lit. *turn around my head and look back*] the affection of my beloved one.) (Li Bai, Tang Dynasty)
- b. 别后空回首，相逢未有期。唐代张籍《留别江陵王少府》
Bie-hou kong hui-shou, xiangfeng weiyou qi
 after-parting in-vain turn.around-head getting-together there-is-no date
 (My *recollection* [lit. *turning around my head to recall* the past] has always been hopeless after our parting, and our reunion is nowhere in sight ahead.) (Zhang Ji, Tang Dynasty)
- c. 闭门生白发，回首忆青春。唐代高适《秋日作》
Bi-men sheng bai fa, hui-shou yi qingchun.
 closed-door grow white hair turn.around-head recall youth
 (Behind the closed door I am growing gray hair; *turning around* I am *recalling* my youth.)
 (Gao Shi, Tang Dynasty)
- d. 解珰回首忆前欢，见无缘，恨无端。宋代刘仙伦《江神子/江城子》
Jie dang hui-shou yi qian-huan, jian wu yuan, hen wu duan.
 remove earrings turn.around-head recall front-lover see no chance hate no cause
 (Removing my earrings I started *recalling* [lit. *turning around my head to recall*] my *former* [lit. *front*] lover; absolutely nowhere to meet and simply impossible to hate.) (Liu Xianlun, Song Dynasty)

Note that (17d) is a very interesting and telling example. The lady has to ‘turn around her head’ to recall her ‘former (lit. front) lover’. That is, the ‘front lover’ in the past is not ‘in front of’ the ego. All these examples clearly show that even in ancient Chinese the ego was facing the future ‘at default’, and had to ‘turn around’ first before being able to ‘look back’ at the past. The moral we take away from the preceding discussions is that it is crucial to distinguish, especially, between two reference points: Ego-RP vs. Time-RP. Thus, for instance, such examples as *before three o'clock* and *after Christmas* (13a, b) are ego-free, but instead have a specific time as their reference point. In contrast, the Chinese words in (18) below clearly suggest an Ego-RP, and therefore the times they refer to are either in the future, or at present, or in the past.

- (18) a. 前途 *qian-tu* (front-road) ‘future; prospect’
 b. 前景 *qian-jing* (front-view) ‘future; prospect; vista’
 c. 前瞻 *qian-zhan* (front-look.forward) ‘preview; predict’
 d. 眼前 *yan-qian* (eye-front) ‘at the moment; at present; now’

- e. 脚下 *jiao-xia* (foot-beneath) ‘at present; now’
- f. 回顾 *hui-gu* (turn.around-look) ‘look back; review’
- g. 回首 *hui-shou* (turn.around-head) ‘look back; recollect’
- h. 回眸 *hui-mou* (turn.around-eye) ‘look back; recollect; recall’

In (18a) the ‘front road’ is the road ahead of the ego; in (18b) the ‘front view’ is the view in front of the ego; in (18c) it is the ego who ‘looks forward’ to the future lying in front. The present is what the ego sees right ‘in front of the eye’ (18d), or is right beneath the ego’s feet (18e). In (18f–h), it is the ego who ‘turns the head or the eyes around to look’ at the past.¹¹ All these examples suggest an Ego-RP with overt or covert references to human action, perception, or body parts. They contrast with *qian-tian* (front-day) ‘day before yesterday’ in (4b), *qian-nian* (front-year) ‘year before last’ in (6a), or *san-dian-qian* (three-o’clock-front) ‘before three o’clock’ in (13a), which take a Time-RP. It is precisely because of Ego-RP that in the following Chinese examples, for instance, it is only possible for ‘look forward’ to mean ‘look to the future’, and ‘look back’ to mean ‘look at the past’, but not the other way around.

- (19) a. 我们要团结起来向前看。
Women yao tuanjie-qilai xiang qian kan.
 we should be-united toward front look
 ‘We should be united and *look forward*.’
- b. 若干年后人们回头看, ……
Ruogan nian hou renmen hui-tou kan, …
 a-few years after people turn.around-head look
 ‘After a number of years people *look back*, …’
- c. 在所有这些问题上, 我们要往前而不是往后看。
Zai suoyou zhexie wenti shang, women yao wang qian er-bushi wang hou kan.
 at all these issues on we should toward front rather-than toward back look
 ‘With regard to all these issues, we should *look forward* rather than *backward*.’

In these examples, ‘front’ and ‘back’ refer to those of the ego. Note that in contrast to *回头看 hui-tou-kan* (turn-head-look) ‘look back; review or recall the past’ in (19b), which can only refer to the past due to an overt reference to the ego’s head, *往后看 wang-hou-kan* (toward-back-look) in (19c) can be ambiguous, referring to the opposite orientations. That is, *hou* ‘back’ can refer either to the back of the ego, which is the past, or to the back of the ego-opposed time-sequence that lies in front of the ego in the future, as illustrated by the following pair of examples:

- (20) a. 我这个人有个特点, 决不往后看, 不走回头路, 不吃回头草。
Wo zhe ren you ge tedian, jue-bu wang-hou-kan, bu zou hui-tou lu, bu chi hui-tou cao.
 I this person have a distinctive-characteristic never toward-back-look not walk turn-head road not eat turn-head grass
 ‘I (as a person) have a distinctive characteristic: I never *look backward*, never take the road of regression (i.e. never backtrack), and never turn back to graze on an old pasture (i.e. never turn back).’
- b. 20年前谁能想到会有今天的局面? 再往后看, 两国经济关系的大发展是在意料之中。
20 nian qian shui neng xiang-dao hui you jintian-de jumian? zai wang-hou-kan, liang guo jingji guanxi-de da fazhan shi zai yiliao zhi-zhong.
 20 years ago who could think-of would have today’s situation further toward-back-look two countries’ economic relation’s great development is at expectation inside
 ‘20 years ago who could have thought of the situation today? *Looking further ahead* (lit. *Looking further toward the back*), the two countries’ economic relationship should enjoy great development as expected.’

¹¹ Readers are invited to compare the examples in (18) with Moore’s (2000) very telling pair of Japanese examples involving the spatial word *mae* ‘front’, cited in this paper right below (9) in 3.1. The point there is that *mae* ‘front’ can refer to past when no Ego-RP is involved, but can only refer to future when an Ego-RP is suggested, e.g., with the presence of the body-part term for ‘eye’. As already noted there, Japanese *mae* ‘front’ and Chinese *qian* ‘front’ share the same written character 前, which appears in (18a–d) here and many others. Readers are also referred to Shinohara (2002:289) for a similar argument with regard to Japanese.

Here, (20a) is a clear case of MOVING EGO metaphor with the ego's body as the reference point (Ego-RP). Thus, *wang-hou-kan* (toward-back-look) in it means 'look back' or 'look backward', suggesting the past time. In contrast, (20b) illustrates *wang-hou-kan* (toward-back-look) as referring to the back of the ego-opposed time sequence, which is the future *in front of* the ego. Vague with respect to whether the MOVING EGO OR MOVING TIME metaphor is involved, (20b) can be accounted for by both. In the former, the ego has traveled from '20 years ago (the front of the trip)' to 'today (the middle point of the trip)' and is looking forward to the 'future lying ahead (the back of the trip)'. The MOVING TIME case can be explained by the 'moving train' oriented in an ego-opposed fashion. The ego is side-by-side, i.e. co-located, with 'today (car 3)' and 'looking further toward the back (car 5)' of the train. This construal can be further illustrated by the following two examples, one literal and one metaphorical. Due to their relative length, only a literal English translation is provided following their original in Chinese characters. In both cases, the relevant expression is *wang-hou-kan* (toward-back-look).

- (21) a. 老洪挺挺的象铁人一样蹲在那里，眼睛直盯着驰过的车皮，一辆，两辆，三辆……当他往后看一下，看到后边只有三四节车的时候，他拨开树丛，窜上路基……《铁道游击队》
Lao Hong was squatting there, his upper body straight up, like an iron man, his eyes fixed on the railway carriages speeding past, one, two, three, ... As he *looked toward the back* and saw only three or four carriages left, he parted the bushes and jumped out to the railway bed. ... *Guerrillas on the Railway*
- b. 他已到古稀之年，人生这部大书他已翻阅到最后的章节，越往后看，他越感到孤独寂寞……
He already reached seventy, having turned to the final chapters of his thick book of life; the more he *read toward the back*, the more he felt lonely. ...

Example (21a), from a classic contemporary Chinese novel, is a description of what was happening in space, a freight train with many wagons speeding past. When Lao Hong 'looked toward the back' of the train, he saw its last few wagons, which were yet to pass him at the moment. Differing from (21a), (21b) instantiates a metaphor for one's life, LIFE IS A BOOK, with its chapters, pages, lines and words metaphorically parallel to the periods and moments of one's life. A book has its intrinsic front and back so that one 'reads it from the front toward the back' (the Chinese verb *kan* means 'read' as well as 'look/see'). The same is true of a film, for another example, which one 'sees toward the back' too.

The examples in (20) and (21) were collected through a keyword search of *wang-hou-kan* (toward-back-look) in the CCL corpus of Peking University. The search brought up 52 tokens with one of them invalid. Out of 51, 34 (66.7%) use the phrase in a spatial sense, 12 (23.5%) use it in a temporal sense with *hou* 'back' referring to the past; and 5 (9.8%) use it temporally with *hou* 'back' referring to the future. That is, while *wang-hou-kan* (toward-back-look) is ambiguous between a 'past' and a 'future' sense of *hou* 'back', the 'past' sense is used more frequently than the 'future' one (70.6% vs. 29.4%).

To end this section, I would like to cite a very interesting and illuminating example with respect to the preference in rendering into Chinese the English sentence in (22a):

- (22) a. *The best days are still ahead.*
- b. 大好时光还在前面。
Dahao shiguang hai zai qian-mian.
the-best days/time still on front-side
'The best days are still **ahead**.'
- c. 大好时光还在后头。
Dahao shiguang hai zai hou-tou.
the-best days/time still on back-end
'The best days are still **ahead** (lit. The best days are still **behind**).'

As Zhang (2003:89) rightly points out, citing another source, (22c), which literally means 'The best days are still **behind**', sounds more idiomatic in Chinese than (22b), which is a more literal translation of the English original *The best days are still ahead*.

The English original and the two Chinese translations are meant to show that in English the future is 'ahead of' the ego whereas in Chinese the future is 'behind' the ego. Indeed, in Chinese *houtou* means 'behind'. But we have to ask the crucial question that Núñez and Sweetser (2006:404) asked: "Behind what?" In Chinese, we can say, for instance, 好日子在苦日子后头 *Hao rizi zai ku rizi houtou*, which means 'Good times are **behind** hard times' or 'Good times will **follow** hard times'. But we cannot say *好日子在我们后头 *Hao rizi zai women houtou* (lit. good times are **behind** us) to

Table 2
Variables and mappings of the TIME ORIENTATION metaphor in Chinese.

Frame of reference			Horizontal orientation		
No.	Referent	Reference point	Source: SPACE		Target: TIME
1	Time	Ego	Front/Ahead	→	Future
2	Time	Ego	Here/Co-location	→	Present/Now
3	Time	Ego	Back/Behind	→	Past
4	Time	Time	Front/Ahead	→	Earlier
5	Time	Time	Back/Behind	→	Later
6	Human	Human/Ego	Front/Ahead	→	Earlier
7	Human	Human/Ego	Back/Behind	→	Later
Frame of reference			Vertical orientation		
No.	Referent	Reference point	Source: SPACE		Target: TIME
8	Time	Time	Upper	→	Earlier
9	Time	Time	Middle	→	Later/Earlier
10	Time	Time	Lower	→	Later
11	Time	Ego	Upper	→	Past
12	Time	Ego	Here/Co-location	→	Present/Now
13	Time	Ego	Lower	→	Future
14	Human	Human/Ego	Upper	→	Earlier
15	Human	Human/Ego	Lower	→	Later

mean 'Good times are still in the future', simply because in Chinese the future is not 'behind' us and would not 'come to us from behind'. The contrast between what is acceptable and unacceptable suggests that the answer to the crucial question is 'behind days/times' (Time-RP) rather than 'behind us' (Ego-RP). Therefore, the better Chinese translation of the English original is no evidence in support of the view that in Chinese the future is behind the ego. Instead, it only suggests that 'good (future) times would come to us behind/following hard times', in an ego-opposed fashion.

5. A summary of the TIME ORIENTATION metaphor in Chinese

On top of the discussions in Yu (1998:Chapter 4) and the previous sections, Table 2 provides a comprehensive summary of the variables and mappings of the TIME ORIENTATION metaphor in Chinese along both the horizontal and vertical axes. It is hoped that this table can serve as a reference point for studying spatial conceptualizations of time with respect to possible parametric variables and mappings in languages in general. On the left half of the table, the two columns list the possible variables in the configurations of the two basic elements in the temporal frames of reference, Referent (R) and Reference Point (RP), in Chinese. The right half of the table provides the resultant metaphorical mappings with the configurations to the left. The top part (No. 1–7) presents the variables and mappings along the horizontal axis, and the bottom part (No. 8–15) the vertical.

The first five horizontal mappings (No. 1–5) all have Time-R, but they are differentiated by two reference points: Ego-RP vs. Time-RP. The first three with Ego-RP constitute the mappings of the 'ego-centered' deictic time frame. In Chinese, as much as in English, the orientation of future and past is FUTURE IS IN FRONT OF EGO and PAST IS BEHIND EGO. With respect to this metaphorical orientation, whether 'front' or 'back' is mapped onto future or past is a parameter at which languages may differ. Most languages studied share the front-to-the-future orientation, with very few languages taking a back-to-the-future orientation. A confirmed such language is Aymara. Notably, a front-to-the-past language like Aymara can only have a static ego since, based on our bodily experience, it would be difficult for the ego to walk 'backward'.¹² It has been found so far that languages take either one of the two parametric settings, but not both, on contrary to what was claimed about

¹² Moore's (2011) analysis of the Aymara Ego-RP as a case of the ego being aligned with a field-based reference frame is a very interesting proposal. With this proposal for a 'static system' of time, the Aymara ego is located within the reference frame or 'encompassive secondary reference object' (represented by the rectangular in Diagram 5, p. 771) in metaphorical motion, but the times or events lined up within it are all static. It would be of interest to find out if the Aymara ego is ever aware that 'tomorrow' will become 'today' and 'today' will become 'yesterday'. The results will be different if the answer is 'yes' or 'no'. With the 'moving train' analogy, it would be the difference between the case of a static ego standing facing the front of a train *passing by her/his side* and the case of a static ego *sitting inside* the middle car of a moving train facing toward its front.

Chinese by Ahrens and Huang (2002), Zhang (2003), and Zhang and Luo (2007). In Chinese, as well as in other languages that express temporal relations with spatial metaphors, PRESENT IS LOCATION OF EGO (No. 2).

The horizontal mappings No. 4 and 5 constitute the ‘field-based’ sequential time frame with Time-RP. The mappings of this kind represent an anteriority–posteriority relationship between two times or events in the sequence in terms of spatial relations: A ‘precedes’ or ‘is ahead of’ B, or B ‘follows’ or ‘is behind’ A, which means that A happens before B, and B happens after A. I have argued in this paper that the controversy over the metaphorical orientation of the ego relative to future and past arises in part from a lack of Time-RP in the analysis of seemingly contradictory linguistic data. It is worth mentioning in passing, however, the difference between two kinds of temporal sequence. One is a series consisting of, for instance, the days of a week or the months of a year, which is ego-independent; the other has a deictic center, like *jintian* ‘today’ and *jinnian* ‘this year’ in Chinese, which entails the presence of the ego. Thus, while the former is the sequential time that can be accounted for by No. 4 and 5 in Table 2, the latter is the deictic time that involves all No. 1–5. This difference can be illustrated as below, where (A) is a ‘today-centered’ sequence (i.e. day before yesterday, yesterday, today, tomorrow, and day after tomorrow) and (B) a ‘weekday’ sequence without a particular deictic center.

A. ←DBY←YTD←TDY←TMR←DAT
Past-----Back/Ego/Front-----Future

B. ←MON←TUE←WED←THU←FRI

In both cases, the day to the left is ‘ahead of’, i.e. ‘earlier than’, the day to its right (No. 4 and 5) owing to the ‘intrinsic’ front and back of the sequence (indicated by the arrow signs). In (A), however, because the ego is co-located with ‘today’, it also entails the mappings in No. 1–3. Using again the ‘moving train’ analogy, we can say that in (A), which entails a proximal perspective, the ego is standing at the side of car 3 (today) facing toward the back (future, i.e. DAT) of the train. In (B), which suggests a distal perspective, the ego is looking from a distance at the moving train as a whole, and for that reason is not associated with any particular car of it.

The last two horizontal mappings (No. 6 and 7) have not received due attention in the literature, but they need to be brought into the equation because in our conceptual systems humans, as much as events, are spatially arrayed according to their temporal relations. As shown in Table 2, while both of them have the human referent (Human-R), they can have either ‘Human’ or ‘Ego’ as the reference point (Human-RP vs. Ego-RP), the latter necessarily entailing the former. When it is Human-RP, which suggests the sequential human frame, the spatial construal of temporal relations between humans (i.e. Human-R + Human-RP) is analogous to that of the relations between times or events in the sequential time frame (i.e. Time-R + Time-RP); they represent the earlier-later relationship. Therefore, the line of humans has an intrinsic front and back which determine the order of the individuals in it. The generic Human-RP sometimes can be replaced by a specific Ego-RP, as illustrated by (6c). When this happens, the human sequence is split into the ‘front’ and ‘back’ halves determined by the bodily orientation of the ego as the deictic center, which constitutes the deictic human frame. In section 3.2, this conceptualization was accounted for by the ‘queue’ analogy, where people are lined up with earlier ones in front of later ones. With the ego as a deictic center, those who arrive earlier are ahead of the ego whereas those who arrive later are behind the ego, but the whole queue is moving toward its goal, in the direction of future for everyone in the queue.

The vertical orientation mappings (No. 8–15) in Table 2 have not been discussed in this paper, but in this section I would like to further develop my previous study in this regard (Yu, 1998:Chapter 4) so that Table 2 can serve as a concise yet comprehensive summary that accounts for Chinese data better. In general, the conceptual mappings along the vertical axis are EARLIER IS UPPER and LATER IS LOWER. In Chinese two- and three-level vertical conceptions of a period of time are common, as illustrated by Table 3, where ‘month’ is the example. On the left, ‘upper’ is earlier than ‘lower’ and vice versa; on the right, ‘middle’ is later than ‘upper’ but earlier than ‘lower’. That is how No. 9 in Table 2 concerning ‘middle’ (→Later/Earlier) should be interpreted. Both of these cases are ego-free.

In some specific cases, the ego is co-located with the ‘here/middle’ level in the vertical orientation, which accordingly results in the mappings PAST IS UPPER (No. 11), PRESENT IS HERE/MIDDLE (No. 12), and FUTURE IS LOWER (No. 13). The sentence in (23) shows how the Chinese can place future and past along a vertical axis with the ego as its deictic center.

(23) 阅读可以上溯远古下及未来。

Yuedu keyi **shang** su yuan-gu xia ji weilai.
reading can up trace remote-ancient.times down reach future

‘Through reading one can trace *back* (lit. **up** trace) to the remote antiquity and reach *forward* (lit. **down** reach) to the future.’

As part of conventionalized temporal expressions the examples provided in Table 4 are confirmed in the CCL corpus. In most of them a generic classifier *ge* can be and often is added between the spatial or deictic and the temporal word

Table 3
Two- and three-level conceptions of a month in Chinese.

YUE 'MONTH' AS A PERIOD OF TIME	
Two-Level	Three-Level
上半月 <i>shang-ban-yue</i> upper-half-month first half of a month	上旬 <i>shang-xun</i> upper-ten.days (of a month) first ten days of a month
下半月 <i>xia-ban-yue</i> lower-half-month second half of a month	中旬 <i>zhong-xun</i> middle-ten.days (of a month) second ten days of a month
	下旬 <i>xia-xun</i> lower-ten.days (of a month) last ten days of a month

Table 4
Cases where PAST IS UPPER and FUTURE IS LOWER in Chinese.

Level	Week ₁	Week ₂	Month	Semester	Century
Upper2	上上星期 <i>shangshang xingqi</i> upper.upper week week before last		上上月 <i>shangshang yue</i> upper.upper month month before last		
Upper1	上星期 <i>shang xingqi</i> upper week last week	上周 <i>shang zhou</i> upper week last week	上月 <i>shang yue</i> upper month last month	上学期 <i>shang xueqi</i> upper semester last semester	上世纪 <i>shang shiji</i> upper century last century
Here/Middle Ego	这星期 <i>zhe xingqi</i> this week	这周 <i>zhe zhou</i> this week	这月 <i>zhe yue</i> this month	这学期 <i>zhe xueqi</i> this semester	这世纪 <i>zhe shiji</i> this century
Lower1	下星期 <i>xia xingqi</i> lower week next week	下周 <i>xia zhou</i> lower week next week	下月 <i>xia yue</i> lower month next month	下学期 <i>xia xueqi</i> lower semester next semester	下世纪 <i>xia shiji</i> lower century next century
Lower2	下下星期 <i>xiaxia xingqi</i> lower.lower week week after next		下下月 <i>xia.xia yue</i> lower.lower month month after next		

(e.g., 这个月 *zhe-ge yue* [this-cl month] 'this month'). In Chinese there are three terms for 'week', but only two of them are included in the table (the third one being *libai*), and only one of the two included has a five-level structure according to the CCL corpus. The other word that has a five-level structure is the term for 'month'. As can be seen, the 'upper2' and 'lower2' levels are reached through duplication, i.e. the spatial terms are duplicated to 'raise' or 'lower' the time for an extra spatial level. The 'here/middle' level, marked by the deictic term *zhe* 'this' (which can be, and sometimes preferably is, replaced by *ben* 'this'), is where the ego is supposed to be located and, for that reason, is the ego's 'present' time.

The last two vertical mappings (No. 14 and 15) in Table 2 are analogous to, but less productive than, those in No. 6 and 7 on the horizontal axis. The examples include the following:

- (24) a. 上辈 *shang-bei* (upper-generation) 'ancestors; forebears; elder generation of one's family; one's elders'
 b. 平辈 *ping-bei* (level-generation) 'people of the same generation'
 c. 下辈 *xia-bei* (lower-generation) 'future generations; offspring; younger generation of a family'
 d. 上人 *shang-ren* (upper-people) '(dial.) parents or grandparents'
 e. 下人 *xia-ren* (lower-people) '(dial.) children or grandchildren'

- f. 堂上 *tang-shang* (main.room.of.a.house-upper) 'parents'
- g. 长上 *zhang-shang* (elder-upper) 'elder member of a family; elder; senior'
- h. 祖上 *zu-shang* (ancestral-upper) 'ancestors; forefathers; forebears'

It is noteworthy that the conceptual mappings EARLIER IS UPPER and LATER IS LOWER in temporal relations are correlated with and parallel to ELDER IS UPPER and YOUNGER IS LOWER in familial and social relations organized in hierarchical structures, to which much importance is attached in traditional Chinese culture.

6. Conclusion

In this paper I started to answer the controversial question regarding whether the Chinese ego faces toward the future or past as part of the TIME AS SPACE metaphor. I have presented three different views, which are (a) the front-to-the-past, (b) the front-to-the-future, and (c) a mixture of both (a) and (b) with (a) reflecting the traditional, primary and preferred value. I have argued for (b), reinforcing my earlier view (Yu, 1998) that the metaphorical orientation of time in Chinese is realized by the pair of conceptual metaphors FUTURE IS IN FRONT OF EGO and PAST IS BEHIND EGO, which happens to be the parametric setting held by most of the languages studied. I have also argued that to avoid confusion by seemingly contradictory data in Chinese it is important to make two crucial distinctions with regard to Reference Point (RP) and Referent (R) in temporal reference frames for data analysis. The first distinction, which has been extensively discussed in the literature in the past decade or more, is between Ego-RP and Time-RP. The error of views (a) and (c) mentioned above comes in major part from the lack of Time-RP in data analysis which will lead to the confusion of past with anteriority and of future with posteriority. Without Time-RP, the spatial words *qian* 'front' and *hou* 'back' in Chinese can only refer to the front and back of the ego, and times or events cannot have their own 'front' and 'back'. Nevertheless, times or events do have their own 'front' and 'back', which exist not only in linguistic evidence, but in psychological reality as well (see, e.g., Núñez et al., 2006).

The second distinction between Time-R and Human-R, in my opinion, has not yet drawn due attention. It is nonetheless crucial to the analysis of spatial construal of time. Both humans and events 'take place' in time, and humans live, as well as events unfold, in and through time. They should, therefore, be treated equally to make our study complete. Also, more importantly, our study of metaphorical orientation of time may confound the evidence if Human-R is not distinguished from Time-R. In the Chinese cultural conceptualization of time, for instance, while the future is in front of us, people of past generations are also in front of us. Without the distinction between Time-R and Human-R, the linguistic expression manifesting the latter would be used mistakenly as evidence in support of the claim for PAST IS IN FRONT OF EGO and FUTURE IS BEHIND EGO. As I have explained with our everyday experience of waiting in a queue, there is no contradiction in conceptualizing the future and people of the past generations as being both in front of us if we recognize two levels of frame of reference: (1) the primary reference frame, in which individual moving egos as primary reference objects are viewed separately within their own historical and temporal context, one at a time; and (2) the encompassive secondary reference frame, in which the primary reference objects are viewed collectively as forming one encompassive secondary reference object, a linear Figure moving along the same path, with an *internal* structure of directional ordering among those primary reference objects. In the final analysis, the Ego-RP vs. Time-RP and Time-R vs. Human-R distinctions help us avoid the confusion between past/future and anteriority/posteriority, and between past/future times and earlier/later people, which leads to misinterpretation of seemingly contradictory data.

In Chinese, the temporal sequences of events and humans are construed spatially along two orientations – horizontal and vertical – crossing each other, and in four directions – front and back, and upper and lower – diverging from the center of the cross. This complex metaphorical system for time orientation, with its variables and mappings, is summarized in Table 2, which I believe can serve as a reference point for studying possible parametric variables and mappings in spatial conceptualization of time in other languages as well. Although this paper focuses on the metaphorical orientation of time in Chinese, I hope that my study of referent and reference point will contribute to building a comprehensive framework of temporal reference frames applicable to the study of languages and cultures in general.

Finally, it needs to be pointed out that this is a linguistic study, based on the linguistic evidence in Chinese, aimed at revealing cognition at a cultural level. It says nothing about psychological reality in the individual minds of speakers of Chinese. The fact that some Chinese speakers may think the past is in front of them is not surprising, given the opposing views on this issue even among Chinese linguists. I believe that the difference stems from the seemingly contradictory linguistic data in Chinese discussed in this paper, and my objective is to explain that seeming contradiction with a more coherent, comprehensive, and systematic account.

Acknowledgments

I wish to acknowledge the insightful and helpful comments from two reviewers for *Journal of Pragmatics*. I have also benefited enormously from my personal communication with Kevin Ezra Moore, who deserves my special thanks. Needless to say, I take sole responsibility for all errors and deficiencies that may remain.

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