

Spatial time in the West and the East

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1. Introduction¹

The use of spatial expressions for notions of time has been attested in many of the world's languages.² This ubiquitous phenomenon may in part be motivated by our common experience of space and time. As already observed by Kronasser (1968: 158), "in our everyday life, there is no experience of space without time nor an experience of time without space."³ An indication of the merging of space and time can be seen in the ways the distance between two places can be measured. This can be done by either specifying their spatial distance, as in *From Cologne to Vienna it is 600 miles*, or by specifying the travelling time, as in *From Cologne to Vienna it is ten hours by train* (Heine, Claudi and Hünne-meyer 1991: 164).

As a rule, we express time in terms of space but not space in terms of time.⁴ The unidirectional mapping of space to time has, amongst other things, been attributed to the concrete and fundamental experiential concepts of basic spatial

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- 1 This paper is a substantially revised and extended version of an earlier paper on spatialized time: Radden 2006, "Where time meets space." I wish to thank Susannah Ewing Bölke for her valuable comments on the paper as well my native speakers of East Asian languages for providing insights into their languages: Ji-ryong Lim (Korean), Noriko Matsumoto, Rie Nishio, Tayo Takada (Japanese), Shuqiong Wu (Chinese), June Sun (Southern Min), Kim-Chi Hanze (Vietnamese), and Jad Davis (Thai).
 - 2 See e.g. Haspelmath (1997: 140), whose cross-linguistic study of temporal adverbials confirmed "earlier impressionistic statements concerning the ubiquity of conceptual transfer from space to time. There are no languages that depart from this general trend, and in this sense it is truly universal."
 - 3 Kronasser speaks of a "holistic experience of space and time" [ganzheitliche Raum-Zeitlichkeit]. The interdependence of space and time is nicely phrased by Bull (1968: 17): "All events take place in time: All events take time to take place."
 - 4 The mapping of time to space is rare or almost non-existent. Haspelmath (1997: 142) found only one example of a temporal expression used in a spatial sense: the French preposition *depuis* 'since' is now also used in a spatial sense, as in *depuis la fenêtre* 'from the window'.

relations (Boroditsky 2000).⁵ But it would certainly be an overstatement to claim, as Lakoff and Johnson (1999: 139) do, that “it is virtually impossible for us to conceptualize time without metaphor.” Probably any language has expressions that exclusively denote notions of time, such as *during* or *period*. Empirical evidence reported by Evans (2004) also shows that humans directly perceive and “feel” certain aspects of time, such as simultaneity of time, duration of time, and awareness of the present as the time experienced at each moment, the past as the time related to remembered events, and the future as the time related to predicted events.⁶ A further objection to Lakoff and Johnson’s assumption would be that, without a conception of the target domain, metaphorical cross-domain correspondences cannot possibly be established. In the domain of time we typically lack expressions for relational structure, which is not observable, and tend to import relational structure from the world of space, which emerges directly out of physical experience (Boroditsky 2000, 2001). However, lacking an expression of time does not mean that we also lack the corresponding concept of time. It makes more sense to assume that we do have conceptions of time and that we frame at least some of them in terms of a spatial grid that is readily available. When we process time and talk about time in terms of space we are concerned with time and not space. Conceptions of time motivate the choice of particular spatial conceptions and their linguistic expressions: we choose them because they are felt to be economical, and suitable and precise enough to fill a particular ecological niche of the target domain TIME.

Let us, by way of illustration, consider a typical definition of time. *The Free Online Dictionary* defines time as a “nonspatial continuum in which events occur in apparently irreversible succession from the past through the present to the future.” The terms that are relevant in this definition for the motivation of spatial metaphors for time are *irreversible* and *succession*: the temporal notion of succession corresponds to, and motivates, the spatial notion of an ordered sequence of objects along a line, and the temporal notion of irreversibility corresponds to, and motivates, the spatial notion of unidirectionality. At a more specific level, these properties of time also motivate the view of time as an arrow, a highway or

5 Lakoff (1993: 218) assumes that our metaphorical understanding of time in terms of space is biologically determined: “In our visual systems, we have detectors for motion and detectors for objects/locations. We do not have detectors for time (whatever that could mean). Thus, it makes good biological sense that time should be understood in terms of things and motion.”

6 Evans convincingly argues that our experience of time results from internal, subjective responses to external sensory stimuli and that, by imparting spatio-physical “image content” to a subjective response concept, we are able to “objectify” our temporal experience. According to this view of time, our spatial understanding of time is determined by intersubjective, communicative needs. We need metaphors to speak about time in the same way that we need metaphors to speak about other internal states such as emotions or thoughts.

flowing water; and at a more general level, they account for the metaphor of time as one-dimensional and motional.

The present study explores the correspondences between space and time and the motivation of spatial concepts and terms in metaphorical construals of time. Differences in the construal of spatial time are to be expected in view of the different cognitive topologies of space and time: space is three-dimensional while time is one-dimensional; spatial motion is reversible while the passage of time is irreversible; and space relates to objects while time relates to events.⁷ In lexicalizing notions of time, speakers of the same language community, and even more so speakers of different language communities, may exploit the cognitive topologies of space and time differently. This study looks at different linguistic manifestations of the metaphor TIME IS SPACE in languages of the West and the East, in particular English and the East Asian languages Mandarin Chinese, Japanese, Korean, Southern Min, Thai and Vietnamese.

The paper is structured according to topological properties of space and their corresponding properties of time: dimensionality of spatial time (Section 2), orientation of the time-line (Section 3), shape of the time-line (Section 4), spatio-temporal relations (Section 5), deictic time spheres (Section 6), deictic sequences of time (Section 7), and moving time (Section 8). The results of this study and conclusions are presented in Section 9.

2. Dimensionality of spatial time

As noted above, we think of the passage of time as linear, i.e. as being unidimensional. However, in measuring units of time, we can exploit the whole range of dimensions distinguished in physical space. Events and units of time are “located” on a time-line but may internally be conceived of as zero-, one-, two- or three-dimensional. English is a language that makes systematic use of these dimensional possibilities, especially in its use of prepositions. Points in time are, like points in space, described by using the zero-dimensional preposition *at*, as in *at this moment*, and periods of time are described by *on* and *in* or *within*. The one- and two-dimensional preposition *on* is mainly used with days, as in *on my birthday*. The temporal use of *on* is motivated by its two-dimensional spatial sense of ‘supporting contact’. In the same way that book shelves support the books that are shelved *on* them, days are the most prominent periods of time *on* which our routine activities are organized. The temporal uses of *in* and *within*

7 The relationship between events and their time of occurrence may be exploited metonymically. Thus, we often talk about events when the time of their occurrence is meant, as in *I'll see you after class* ('I'll see you after the time of class') and, conversely, use time expressions when events occurring at that time are meant, as in *9/11*, which stands for the terrorist events that occurred in the U.S. on September 11, 2001.

are also motivated by their property of boundedness: in the same way that spatial *in* refers to bounded regions, temporal *in* refers to bounded units of time. Prototypical bounded regions are containers that are bounded at all sides, but spatial regions can also be bounded at two sides, as in *wait in a line*. Likewise, units of time can be bounded at two sides of the time-line, as in *I'll see you in the afternoon*. This is in fact the normal situation of viewing periods of time other than days: they are, irrespective of their length, expressed by the prepositions *in* or *within*, as in *in the third millennium* or *within a second*.

3. Orientation of the time-line

3.1. Horizontal, vertical and lateral axes

A line has of necessity an orientation in space. Of the three geometrical axes, the horizontal axis with its front-back orientation captures our experience of time better than either the vertical or the lateral axis. The frontal axis conforms with our frontal vision when standing upright and moving forward. Its motivation for notions of time derives from the unbounded nature of passing time: the time-line we trace in front of us and behind us is infinite. The vertical axis, with its up-down orientation, is determined by the force of gravity toward the earth. Vertical motion is therefore bounded by the surface of the earth and hence is less suited to express the infinity of passing time (see Haspelmath 1997: 22). The lateral axis is defined relative to the frontal axis and has no independent properties of its own: it is therefore hardly made use of in expressing notions of time.⁸

The front-back orientation of time shows up in expressions such as *the weeks ahead of us* and *the worst is behind us*. It is the default orientation of the time-line. When the orientation of the time-line is not specified, as in *this coming month*, *the days gone by* or *the following week*, we visualize the time units as moving forward or backward rather than up or down or to the right or left. The front-back orientation is probably universally applied in expressing notions of time and is the predominant pattern of oriented time in Western cultures. Eastern cultures, on the other hand, tend to make much more use of vertically oriented time. We will first look at the non-default pattern of “vertical time” and then discuss the complexities involved in the default pattern of “horizontal time.”

3.2. Vertical time

8 Traugott (1975: 219) cites the case of Chinese *left-right* together, which along with *front-back* and *up-down*, is used to express approximate time.

3.2.1. Vertical time in East Asian languages

In many East Asian languages, among them Mandarin Chinese, Southern Min, Korean, and Japanese, but not in Vietnamese, an earlier time in a sequence of times is sometimes described as UP and a later time as DOWN. Thus, ‘ten years ago’ is expressed in Korean⁹ as *sib nyeon wie* (ten years upper) and ‘ten years later’ as *sib nyeon alae* (ten years lower). Since the past is earlier than the future, the past is also described as UP, as in the Mandarin¹⁰ expression for ‘last month,’ *shàn-yuè* (up-month), and the future is described as DOWN, as in the expression for ‘next month,’ *xià-yuè* (down-month). This model of vertically oriented time in East Asian languages is diagrammed in Fig. 1:

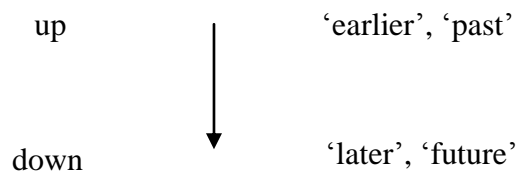


Figure 1. Vertical time in Asian languages.

As illustrated in the examples under (1), vertical time expressions are especially common with well-established, bounded units of time, in particular years, months, days and parts of a day. They are used in reference to the beginning or the first half, and to the end or the second half of that unit. In Korean and Japanese, the month is split into three units (1c).

(1) a.	‘the first half year’	‘the second half year’
Mandarin:	<i>shang-ban-nian</i> (upper-half-year)	<i>xia-ban-nian</i> (lower-half-year)
Korean:	<i>sang-bangi</i> (upper-half period)	<i>ha-bangi</i> (lower-half period)
Japanese: ¹¹	<i>kami-han-ki</i> (up-half-period)	<i>shimo-han-ki</i> (down-half-period)
b.	‘the beginning of the month’	‘the end of the month’

9 I am grateful to Ji-ryong Lim for providing the Korean examples.

10 The Chinese examples have been taken from Yu (1998: 110).

11 The Japanese examples have kindly been provided by Noriko Matsumoto and Rie Nishio.

	Mandarin:	<i>yue-tou</i> (month-head/top)	<i>yue-di</i> (month-bottom)
	Southern Min:	<i>goeh8 thau5</i> (month head)	<i>goeh8 boe2</i> (month tail) ¹²
c.		‘1 st third of the month’	‘2 nd third of the month’
			‘3 rd third of the the month’
	Korean:	<i>sang-sun</i> (upper-ten days)	<i>jung-sun</i> (middle-ten days)
			<i>ha-sun</i> (lower-ten days)
	Japanese:	<i>joo-jun</i> (up-ten days)	<i>chuu-jun</i> (middle-ten days)
			<i>ge-jun</i> (down-ten days)
d.		‘morning, forenoon’	‘afternoon’
	Mandarin:	<i>shang-ban-tian</i> (upper-half-day)	<i>xia-ban-tian</i> (lower-half-day)
	Southern Min:	<i>tin2-poan3-kang4</i> (top-half-day)	<i>e5-poan3-kang4</i> (down-half-day)
	Korean:	<i>sang-o</i> (upper-half-day)	<i>ha-o</i> (lower-half-day)

The notions of upper and lower times may also be expressed metaphorically by means of body parts. Thus, in Chinese, an earlier time is expressed as *shang* (head, top) and a later time as *di* (bottom).

Sometimes only one expression of a vertical pair is lexicalized. Thus, Southern Min has a vertical expression for ‘last month’ (2a) but not the corresponding antonym for ‘next month’, for which a horizontal term is used: *au7 ko3 goeh8* (behind cl month) ‘behind month’. Korean has a vertical expression for the end of the year (2b) but lacks one for its beginning; conversely, it has vertical expressions for the first day of the month (2c) and the beginning of the winter (2d) but lacks the corresponding vertical terms for the end of the winter and the last day of the month.

(2) a. Southern Min: *tin2 ko3 goeh8* (top cl month) ‘last month’

b. Korean: *se-mit* (year lower) ‘the end of the year’

12 I am indebted to June Sun for providing the data on Southern Min. The metaphoric expressions for the beginning and end of the month by means of body parts are probably based on the zoomorphic model and hence describe time in terms of front and back.

- c. *sang-il* (upper day) ‘the first day of the month’
- d. *sang-dong* (upper winter) ‘the beginning of the winter’

Notions of verticality are also used in reference to eras (3a) and the first, second and third volumes of a book (3b):

- (3) a. Japanese: *jou-dai* (upper-era) ‘era in Japanese history up to the Nara period’
- b. ‘first volume’ ‘second volume’
- Korean: *sang-pyeon* (upper-volume) *ha-pyeon* (lower-volume)
- Japanese: *jou-kan* *chuu-kan* *ge-kan*
 (upper-volume) (middle volume) (lower-volume)

The metaphor HIGH STATUS IS UP/LOW STATUS IS DOWN and the preponderance of vertical time may have jointly motivated the Korean expressions *wi-s-salam* (upper person) for a superior/old person and *alaea-s-salam* (lower person) for a subordinate/junior person. The colloquial Japanese expressions *ue no namae* (up of name) for one’s last name and *shita no namae* (down of name) for one’s first name may be doubly motivated: since names are written top-down, one’s last name is written first and hence the earlier time of writing one’s last name is seen as ‘up’ and the later time of writing one’s first name as ‘down’.

One can only speculate as to the reason why the vertical conception of time should be so widespread in East Asian languages. Possibly the traditional vertical writing direction of Chinese and other East Asian languages may have had an effect on this conceptualization. Possibly it also reflects the river model of flowing time, which may have been reinforced in China by the cultural importance of the Yangtze River. Due to the long cultural predominance of China in East Asia, the Chinese view of time may have spread to its neighboring countries. However, vertical time is not restricted to the East Asian *sprachbund* but is also, although to a lesser extent, found in other languages. It has been suggested that our experience of downward motion on slopes may have motivated the vertical conception of time (see Evans 2004: 235f). Yu (1998: 111) suggests a basic human experience as a possible motivating factor: “When we lie down on our stomach and crawl, we normally move in the direction of head rather than feet. So our heads become fronts just like the fronts of any moving objects, such as cars, trains, ships, planes, rockets, and so forth.” This experience is, of course,

shared by all human beings, and we should expect to find vertical construals of time in other languages as well. Yu (1998: 112) also gives the telling example of the family tree, in which older generations are represented at the top and described as *ascendant*, while younger generations are represented at the bottom and described as *descendant*. The notion of vertical time is thus not completely foreign to Western thought and also shows up in European languages.

3.2.2. Vertical time in English

As in East Asian languages, earlier times in Western languages may be seen as being up and later times as being down. However, the use of vertical time in East Asian languages differs from that of Western languages, such as English, in two respects. Firstly, in East Asian languages, vertical expressions of time are used both non-deictically (as in ‘upper half year’ and ‘lower half year’ in reference to the first and second half of the month, respectively) and deictically (as in ‘up-month’ for ‘last month’), whereas in English, vertical time expressions are used only deictically. Secondly, in East Asian languages vertical time is unidirectional, i.e. it flows from earlier time down to later time, whereas English vertical time is bidirectional, i.e. it may flow down or rise up. The following English examples illustrate the case of events that are moving down:

- (4) a. *The tradition has lasted **down** through the centuries to this day.*
 b. *This is a legacy that has **come down** to us from the past.* (Traugott 1975: 222)
 c. *This is a legacy which will **go down** into the infinity of the future.* (Traugott 1975: 222)

In (4a), the time until which the tradition has lasted, i.e. to this day, is down; hence the earlier time, when the tradition began, was higher up. The deictic present is thus the endpoint of a downward flow of time. We might expect that time continues flowing further down beyond the present into the future. But this is not the case: we can hardly say *?The tradition will last down (into the future)*, but only *The tradition will last into the future*. In (4b), the endpoint of the downward motion to the present is also signaled by the deictic verb *come*, which describes motion to the speaker’s location, and (4c) expresses downward motion to the future, probably due to the deictic verb *go*, which describes motion away from the speaker.¹³

13 These uses of vertical time have to be distinguished from sentences such as *George W. Bush will go down in history as the worst U.S. President ever*. Here, the expression *go down* in a historical context is not understood in a temporal sense but much rather metonymically in the sense of being *written down* in the annals of history, i.e. being recorded.

In English, time may also be conceived of as moving up, as illustrated in the sentences under (5). Here, the time of an event, my “up-coming” birthday or an “up-coming” movie, is thought of as moving up from somewhere down to the present or near future.

- (5) a. My 21st birthday is coming **up**.
 b. A new Harry Potter movie is coming **up** soon.

The examples of downward motion in the examples under (4) had the opposite effect: the motion of time began at some point up and ended down at present time. These three orientations of vertical time in English are diagrammed in Fig. 2, where the bold print indicates profiled elements.

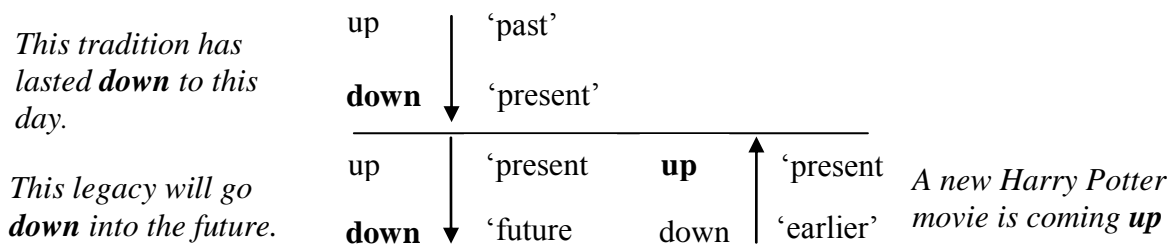


Figure 2. Vertical time in English.

Unlike East Asian languages, where earlier times are always viewed as up and later ones as down, English does not consistently associate the vertical axis with absolute notions of time: both *up* and *down* can mean ‘earlier’ and ‘later’. The seemingly puzzling uses of the particles *up* and *down* can be explained in terms of Lindner’s (1983: Ch. III) notion of “viewer-defined region of interactive focus”. In both perspectives, the temporal region of interactive focus is the deictic present or near future. As in the East Asian languages, earlier times are basically viewed as up and later times as down. This also applies to the descriptions of downward motion in English as in (4), which ends at the interactive focus of present time. Its complementary perspective, which also ends at present time, can only involve upward motion, beginning down at an earlier time and ending up at a later time, as in the examples under (5). This use of the particle *up* is fully in line with similar uses such as *pop up* or *turn up*, which describe a trajector’s entry into a region of interactive focus and hence its accessibility.

All three versions of vertical time in English involve an implicit earlier time and a later time at the present or near future but the perspectives described by *down* and *up* are associated with differences in meaning. The down-flowing perspective applies to the transmission of concrete or abstract things from the past

I owe this observation to Susannah Ewing-Bölke; see also *The Free Dictionary*, s.v. *go down in history*.

to the present or from the present to the future, and the things that are passed “down” remain the same over time. The up-rising perspective pertains to the emergence of things, and the things that emerge are new, like one’s birthday or the new movie in (5). They also tend to occur in the near future, i.e. rather than witnessing their occurrence the observer anticipates their emergence.¹⁴

The use of expressions of vertical time applies to very different situations in East Asian languages and English. In East Asian languages, it is primarily used with well-defined, recurrent units of time, in English it is used with traditions passed down to the present and new things rising up into the future. The latter usage is unique to English, whereas the former usage corresponds to that of East Asian languages: they both refer to bounded periods of time. In accordance with Haspelmath’s observation mentioned in Section 3.1 above, the construal of these bounded concepts of time in terms verticality is thus well-motivated.

4. Shape of the time-line

Only straight lines or full or partial circles are “good” geometrical gestalts that are felt to be better representations of time than irregular shapes. Meandering rivers do, of course, have irregular river beds, but the metaphor of time as a river is motivated by the water that is irreversibly flowing downstream rather than its shape. A straight infinite line provides an ideal template for our understanding of time as continuously passing.

Many experiences of time are based on recurrent phenomena in the world, such as the cycles of day and night, the months, the seasons, and the years. On the basis of observed cycles in time and space many cultures have also developed elaborate cyclic systems, in particular in the domains of religion and cosmology. A classic study of cyclic space and time and their reflection in other domains is Harriet and Manelis Klein’s (1987) study of time in Toba, an

14 An interesting case of lexicalized vertical time has been brought to my attention by Réka Benczes. The Hungarian verb *lemegy* ‘take place, happen’ is composed of *le* ‘down’ and *megy* ‘go.’ It is used in situations such as:

Tegnap lement a vizsga.
 yesterday down.go-3rd pers-sing-past the exam
 ‘The exam took place yesterday.’

The situations in which *lemegy* is used are planned or arranged, such as exams, pre-planned discussions, meetings, and theater or movie performances. The verb *lemegy* thus conflates two notions of time: an earlier time at which a plan or arrangement was formed, and the time at which it was, or would have been, realized. The time of its realization is described as ‘down’, hence the time of its planning is implied to be ‘up’, so that, in accordance with the general pattern of vertical time, the earlier time is viewed as up and the later time as down.

Amerindian language spoken in South America. The system of Toba time is noteworthy for three reasons: the conception of cyclic time neatly matches that of space, the past is in front of the observer and the future behind (which will be discussed in Section 5.2), and the concept of cyclicity also governs other domains of this culture. The model of cyclic space and time in Toba is sketched in Fig. 3, where the temporal senses are listed below the spatial ones. The four notions of space and time are expressed by the same forms.

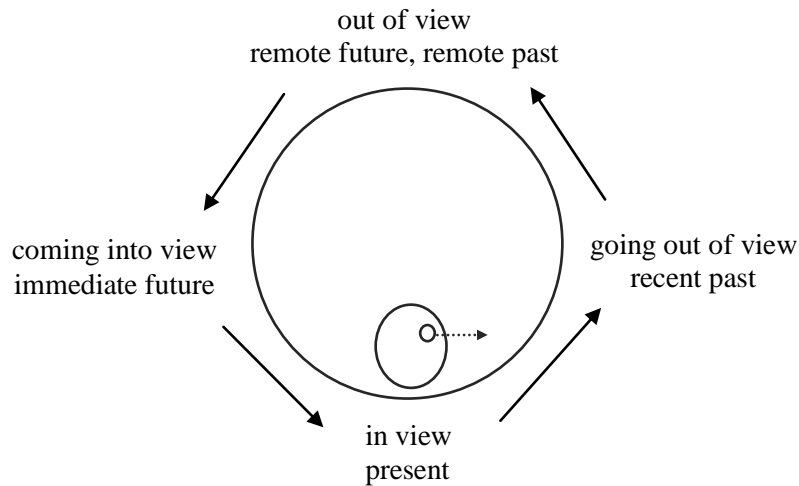


Figure 3. Toba space and time.

The observer is stationary and what is ‘in view’ is also temporally present and known, as in ‘Today is my birthday.’ Things that are going out of view still leave a trace in front of the observer and hence belong to the recent past, as in ‘Yesterday was my birthday.’ Things that are out of view have no visual traces left, can’t be remembered, and belong to the remote past, as in ‘I didn’t see them.’ The remote past coincides with the remote future, which is also invisible, as in ‘When it rains, I will start to sow the cotton.’ Things that are coming into view will proceed into the present, as in ‘Next week I will build a house.’ They belong to the immediate future but are still invisible because they are coming up behind the observer. The same phases of cyclic time characterize the Toba view of Christianity (presence here > moving to death > being dead > coming back to life > presence here), cosmology (presence at the north > soul moving westward to the setting sun > moving into the past to the south > reappearing at dawn in the east > and presence at the north), and the kinship system, where the same terms are used for both future and former relatives, i.e. relatives that are divorced, separated or dead.

The notion of cyclicity is less pronounced in Western cultures. It is, for example, reflected in the proverbial expression *History always repeats itself*. However, very few cyclic phenomena are conceptualized in spatial terms, i.e. as a circle. Among the most common units of time—seconds, minutes, hours, days,

weeks, months, years, and centuries, only years as in (6a) are freely thought of as being round:

- (6) a. *Guided tours are offered year-round.*
 b. *Our shop is open round the clock.*

Days are normally not thought of as round, i.e. we would not describe the idea that someone slept the whole day as **He slept round the day*. In (6b), the use of *round the clock* for ‘a 24-hour day’ is licensed by the metonymy representation for the thing represented. The use of *round* is possibly also motivated iconically by the round shape of the sundial or the clock—although the small hand of a clock normally goes round twice in 24 hours.

While a full temporal circle suggests the repetition of the same time unit or the same event, a partial temporal circle suggests the end of one cycle and the beginning of a new cycle, as in *turn of the century* and *to turn twenty*.

Other than in some very rare cases, East Asian languages do not make use of circular conceptions of time. In Vietnamese, only years are expressed as cyclic: *quanh năm* (year round). In Korean, the notion of year-round is rendered as *yeonjung*, i.e. as ‘middle of the year’, and the notion of time turning as in the turn of the century is coded as *segi-ui kkeut* ‘end of the century’, thus focusing only on the end of a cycle and not on the beginning of a new cycle.

5. Spatio-temporal relations

5.1. Types of spatio-temporal relations

Languages tend to provide a range of spatial configurations that may be exploited for temporal relations. The main distinctions are based on the oppositions of static vs. dynamic relations and non-deictic vs. deictic relations. Static relations may be non-directed or directed. Non-directed static relations in space apply to spatial regions, which correspond to time spheres. Directed relations in space include static sequences and motion, which correspond to temporal successions and passing time. In the following discussion of spatialized time, these three spatio-temporal relations will be referred to as *time spheres*, *sequences (of time)*, and *moving time*. Non-deictic relations have a time-based frame of reference (or field-based frame of reference in Moore 2006), i.e. their reference point (RP) is a time, including the time of an event. Deictic relations have an ego-based frame of reference, i.e. their reference point (RP) is ego, the human observer, who views a given temporal relation from his perspective. Table 1 illustrates the possibilities of construing temporal relations in terms of spatial relations.

Table 1. Types of spatio-temporal relations.

		static relations		dynamic relations
		non-directed relations:	directed relations:	directed relations:
		regions	sequences	motion
		time spheres	sequences of time	moving time
non-deictic relations:			(a)	(b)
time-based			<i>the week after Christmas</i>	<i>the week following Christmas</i>
deictic relations:	(c)		(d)	(e)
ego-based	<i>the week ahead of us</i>		<i>next week</i>	<i>coming week</i>

5.2. Non-deictic temporal relations

Since time is conceived of as a one-dimensional line, times and events can only be ordered in succession with respect to each other.¹⁵ The order between an earlier and later time or event is absolute, i.e. it remains stable, irrespective of its occurrence in the past, present or future. Thus, the sequence (a) *the week after Christmas* and the moving time in (b) *the week following Christmas* describe the same stable temporal relation between the time-based reference point *Christmas* and a later week, irrespective of the time when this temporal relation is said to occur and the speaker who utters this statement.

Moreover, since the time-line is conceived of as being directed, it forms a sequence with the times and events located on it. Sequences are basically static, but due to their intrinsic orientation, they are perceived as having the ability to move, and hence are akin to motion. It is for this reason that the static time expression *the week after Christmas* is referentially synonymous with the dynamic time expression *the week following Christmas*. Like spatial sequences, temporal sequences are, in accordance with their directionality, assigned a front with a head and a back with a tail. Since non-deictic relations are not subject to an observer's perspective, the front and the back of a sequence always remain the same. Thus, in the above example of *the week following Christmas*, the anterior time *Christmas* is viewed as being in front and the posterior week as being behind. Since non-deictic temporal relations necessarily involve directionality (i.e. they are either sequential or motional), non-deictic non-directed relations do not exist.

15 Events may be ordered as successive (E1 *before* E2), simultaneous (E1 *and at the same time* E2) or overlapping (e.g. *during* E1, E2) (see Traugott 1978: 379).

5.3. Deictic temporal relations

Deictic temporal relations have the speaker as a fixed reference point, who is at the same time the observer of the scene described. Due to his presence, deictic temporal relations are more complex. In non-directed static relations, the speaker's fixed, albeit forever changing, position at present time determines the deictic time spheres of the past and future. The time sphere that is in front of the observer is typically understood as representing the future, as in (c) *the week ahead of us*, while the time sphere behind the observer is typically understood as representing the past, as in *the week behind us*. Like non-deictic relations, deictic relations of time tend to imply directionality and hence are viewed as sequences. Thus, the temporal relation expressed by (d) *next week* invokes a sequence of weeks some of which have already passed, and our focus is on the week that follows the present week, which is now in front of us, and hence describes future time. In time conceived of as motion, as in (e) *the coming week*, the moving units of time also form a directed sequence. Both ego-based sequences and ego-based motion in time are subject to the observer's perspective. The intriguing problems surrounding deictic relations will be discussed in Sections 6, 7 and 8.

6. Deictic time spheres

The deictic time spheres of the present, future, and past are subject to the speaker's speech time as a reference point.

6.1. The present time sphere

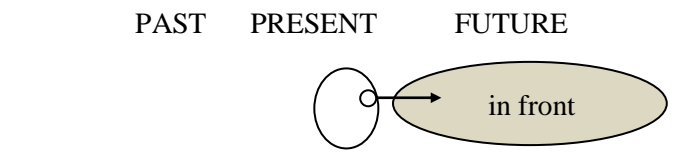
The present time sphere is implicitly defined by the moment of speaking but language users may feel the need to describe it more explicitly. Thus, Chinese has a wealth of expressions at its disposal describing the present time as 'on hand-existing', 'just at-front', 'eye-front', 'eye-below', 'eye-underneath', 'eye-face-front', or 'foot-under' (Yu 1998: 95). Likewise, Korean expresses the present time as 'in front of the eyes', 'front of the nose' and 'below the nose'. These expressions nicely describe people's bodily and sensory experiences when speaking to other people. The present reference point on the time-line allows the speaker to locate events in both the future and the past time spheres. Since the observer assigns front-back orientation to temporal relations, the question is which of the time spheres is to be in front and which one is to be behind the imaginary observer. This decision has, as a rule, been made by the language community.

6.2 THE FUTURE IS IN FRONT, THE PAST IS BEHIND

The pattern predominantly found across languages is that of the future being in front of the observer and the past being behind the observer. This standard Western arrangement of the future and the past is illustrated in the following descriptions of static situations and diagrammed in Fig. 4.

- (7) a. *I can't face the future; Troubles lie ahead; I look forward to seeing you.*
 b. *That's all behind us now; That was way back in 1900; Look back in anger.*

(a) THE FUTURE IS IN FRONT of the observer: *I can't face the future.*



(b) THE PAST IS BEHIND the observer: *The worst is behind us.*

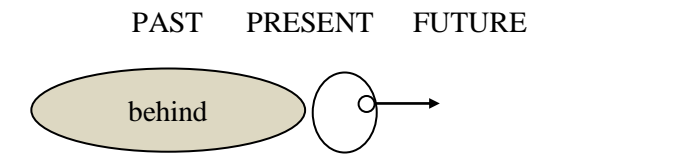
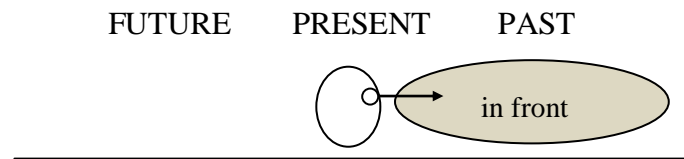


Figure 4. THE FUTURE IS IN FRONT, THE PAST IS BEHIND.

6.3 THE PAST IS IN FRONT, THE FUTURE IS BEHIND

The past may, however, also be seen as lying in front of the observer and the future as lying behind. Aymara, an Amerindian language spoken in the Andean highlands of Bolivia, Peru and Chile that has been studied extensively, is such a language. In Aymara, *nayra*, the word for 'front/eye/sight', is also used to express past time, and *qhipa*, the word for 'back/behind', also expresses future time (Núñez and Sweetser 2006: 402). This view of time is diagrammed in Fig. 5.

(a) THE PAST IS IN FRONT of the observer: Aymara *nayra* ‘front’ and ‘past time’



(b) THE FUTURE IS BEHIND the observer: Aymara *qhipa* ‘back’ and ‘future time’

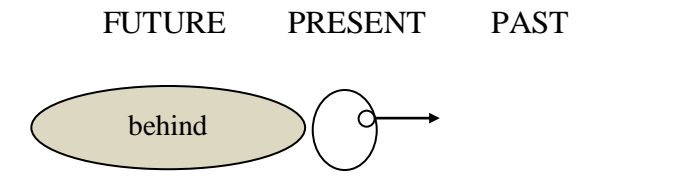


Figure 5. THE PAST IS IN FRONT, THE FUTURE IS BEHIND.

Other languages that express the past as in front and the future as behind include the South-American Indian languages Toba, Taos, Jaqaru, Kawki and Quechua as well as Maori, Malagasy and Classical, but not Modern, Greek. This arrangement of time is exceptional among the languages of the world; it is, nevertheless, well-motivated by the metaphor KNOWING IS SEEING: we can “see” and hence know the past, but not the future. Thus, in Malagasy past events are expressed as being ‘in front of the eyes’ and future events as ‘behind.’ As nicely put by one of Dahl’s (1995: 198) Malagasy informants, the future is totally unknown and behind because “none of us have eyes in the back of our head.” The logic of this time model requires the observer to turn around if he wants to “see” the future behind him. Interestingly, speakers of Toba and Aymara look over their left shoulders when referring to the future. The “left shoulder phenomenon” has also been reported in an unrelated Native American Indian language, Tao, which is spoken in Taos Pueblo, northern New Mexico in the United States.

Sometimes select time expressions of a language give the impression that speakers of this language conceive of the past as lying in front and the future as lying behind. This view of time seems to be evidenced by some time expressions of East Asian languages. Thus, the Mandarin Chinese expression *ri-qian* (day-front) means ‘a few days ago, the other day’, and *ri-hou* (day-back) means ‘in the future, in the days to come’. However, unlike speakers of Toba, Aymara or Malagasy, speakers of Chinese, Korean, Japanese and Thai do not think of the past as lying in front and the future as lying behind. In their view of time, the future is in front and the past is behind, just as in English. This familiar model of time is reflected in collocations of the Chinese words *qian* and *hou* in describing thinking: *qian* ‘front’ is used in reference to the future meaning of ‘think of the

future’, and *hou* ‘back’ is used in reference to the past meaning of ‘recollect, recall’ (Yu 1998: 100–104). These two conflicting models of time in Chinese are illustrated in (8) and (9). In (8), the mysterious status of the past as being in front and the future as being behind is indicated by the phrase “appears to be”.

(8) Mandarin Chinese: THE PAST APPEARS TO BE IN FRONT, THE FUTURE APPEARS TO BE BEHIND

- a. *ri-qian* (day-front) ‘a few days ago, the other day’
- b. *ri-hou* (day-back) ‘in the future, in the days to come’

(9) Mandarin Chinese: THE FUTURE IS IN FRONT, THE PAST IS BEHIND

- a. *zhan¹-nian qian-tu* (look ahead-think of front-road) ‘think of the future’
- b. *hui-xiang* (turn around-think) ‘think back, recollect, recall’

Similar conflicting uses of past and future time expressions as in (8) versus (9) are also found in other East Asian languages. In order to understand the “logic” behind such time expressions, we need to take into account the fact that static temporal relations are not only conceptualized as deictic time spheres lying in front of, or behind, the observer but also as directed sequences which may also be perspectivized in different ways. Before solving the puzzling case of East Asian past and future times, we first need to look at the interaction of sequences of time and ego’s perspective.

7. Deictic sequences of time

7.1. Interaction of sequences of time and ego’s perspective

Sequences are not out there in the world but are construed by the human observer. The human observer decides whether an arrangement of entities establishes a sequence and in which direction the sequence is headed. This is unproblematic with entities moving in the same direction: they are always seen as constituting a sequence with the first entity heading the sequence in the direction of motion. With static entities lined up, things are more complex. Once the observer interprets the lined-up static entities as a sequence—recall that time is conceived as a line, he imposes a perspective on the sequence: the sequence including himself may be opposed to his gaze or aligned with it. The ego-opposed, or face-to-face perspective is the preferred viewing arrangement for speakers of Western cultures: when they view two objects lined up in front of them, the closer object is seen as being IN FRONT of the more distant object being BEHIND it.

In his classic studies of spatial and temporal orientation in Hausa, Hill (1978; 1982) found that speakers of Hausa as well as other West African languages adopt a face-to-face perspective only when the object that is farther away is hidden behind the closer one, i.e. when it is invisible, like a ball lying behind a tree. When the two objects lined up in front of the Hausa observer are visible and of comparable size, however, they are seen as being aligned, or in tandem with the observer's gaze: the more distant object is seen as being **IN FRONT** and the closer object as being **BEHIND**. Thus, the spatial situation of a spoon lying closer to the observer than a calabash is conceptualized by a speaker of a European language in an ego-opposed way and by a speaker of Hausa in an ego-aligned way, as illustrated in Fig. 6 and exemplified in the Figure-Ground reversed sentences (a) and (b).

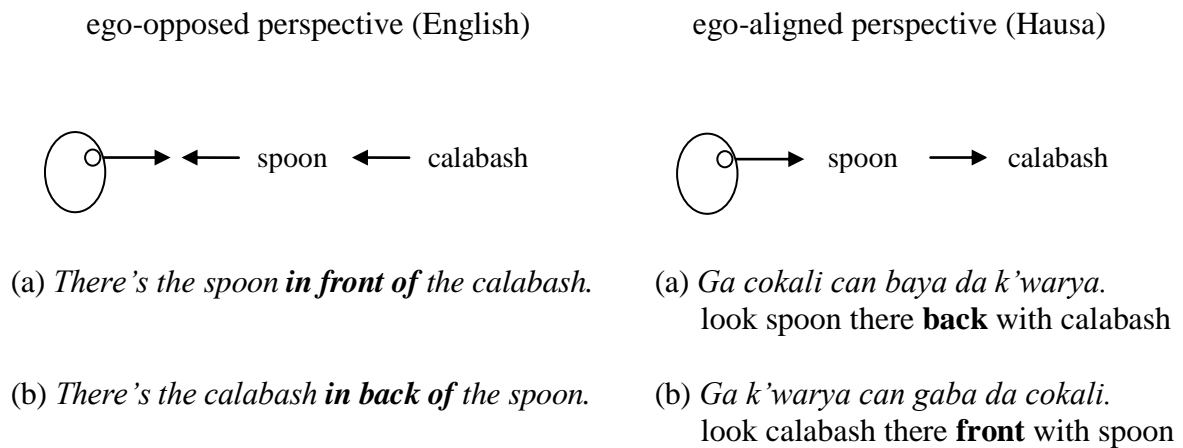


Figure 6. Ego-opposed and ego-aligned perspectives (Hill 1982: 21).

Hill (1978: 528f) also found that the majority of Hausa speakers use the in-tandem perspective with temporal relations. Thus, a later day of the week is viewed by Hausa speakers as being in front of an earlier day, as in (10a).¹⁶ At the same time, Hausa speakers also apply the face-to-face perspective in phrases such as (10b), where later times are located behind earlier times:

16 Likewise, an earlier day is described as being in back of a later one. Thus, 'yesterday' and the 'day before yesterday' are in Hausa positioned relative to each other, as illustrated in the following examples:

- a. *Jiyà tanàa gàba dà sheekaranjiyà.*
yesterday 3SG.F.CONT front PREP day.before.yesterday
'yesterday is in front of the day before yesterday'
- b. *Sheekaranjiyà tanàa baaya dà jiyà.*
day.before.yesterday 3SG.F.CONT back PREP yesterday
'the day before yesterday is behind yesterday'

The data on Hausa has kindly been provided to me by Joe McIntyre.

(10) Hausa: LATER IS IN FRONT OR BEHIND

- a. *Ran Tàlaatà tanàa gàba dà ran Litinîn.*
 day.of Tuesday 3SG.F.CONT **front** PREP day.of Monday
 ‘Tuesday is behind Monday’
- b. *Sauran ràhootòo (ya)nàa baaya*
 rest.of report (3ms)CONT **behind**
 ‘the rest of the report is still to come’

Whichever conditions govern this alteration of temporal perspective in Hausa, the intralinguistic variability in the above examples shows that the typological characterization of a language as using either the face-to-face or the in-tandem perspective may hold for spatial relations but not for temporal relations. This is not surprising in light of the fact that time is understood as being directional and, since the direction of temporal sequences is predetermined, it may be in conflict with the observer’s perspective. In the case of Hausa, the use of ego-alignment in spatial relations motivates an in-tandem perspective of the corresponding temporal relations while our general understanding of directed time motivates an ego-opposed perspective.

Once the observer has imposed an ego-opposed or ego-aligned perspective on a sequence he can locate entities on it. In conceptualizing successions of units of time in terms of sequences, we focus on the endpoints of a sequence, i.e. its head or tail, when referring to future and past times, and on points within a sequence when referring to anterior and posterior times.

7.2. Endpoints of deictic sequences: Future and past times

The observer may adopt two positions relative to the endpoint of a sequence: the sequence as a whole may be in front of him or behind him so that the nearest endpoint is either its head or its tail, or the observer’s position divides the sequence so that its head or its tail stretches beyond his position. These two arrangements will be described as *undivided sequence* and *divided sequence*.

7.2.1. Endpoints of undivided sequences

The head of an ego-opposed sequence of units of time would of course be the first unit. However, although we can non-deictically speak of *the first week of October*, we can only describe the first week of any month deictically as *next*

week. Historically, the word *next* is the superlative form of *nigh* ‘near’ and hence implies a sequence of weeks: the week anterior to the next week is the present week, and the week posterior to it is the week after next, etc. The temporal expression *next week* is doubly motivated in its reference to future time: it forms the head of a sequence and is lying in front of the observer. The weeks posterior to next week are also ego-opposed. The use of *next* also invokes motion of the sequence: the next week is the first week to come. This temporal situation can therefore also be construed in terms of motion as *the coming week*. The spatio-temporal arrangement underlying time expressions such as *next week* is depicted on the right hand side of Fig. 7.

The converse arrangement is illustrated in *last week*, which suggests that a sequence of weeks is lined up behind the observer with its tail closest to the observer. The observer turns his head around, which is indicated by the dotted lines of his head, so that his perspective is aligned with the intrinsic orientation of the sequence and earlier weeks are in front of the last week. The expression *last week* is thus also doubly motivated to refer to past time: the last unit forms the tail of a sequence and is lying behind the observer. As with future time, this situation of past time may also be construed in terms of motion, as in *passed week* (or *past week*). This spatio-temporal arrangement is depicted on the left hand side of Fig. 7.

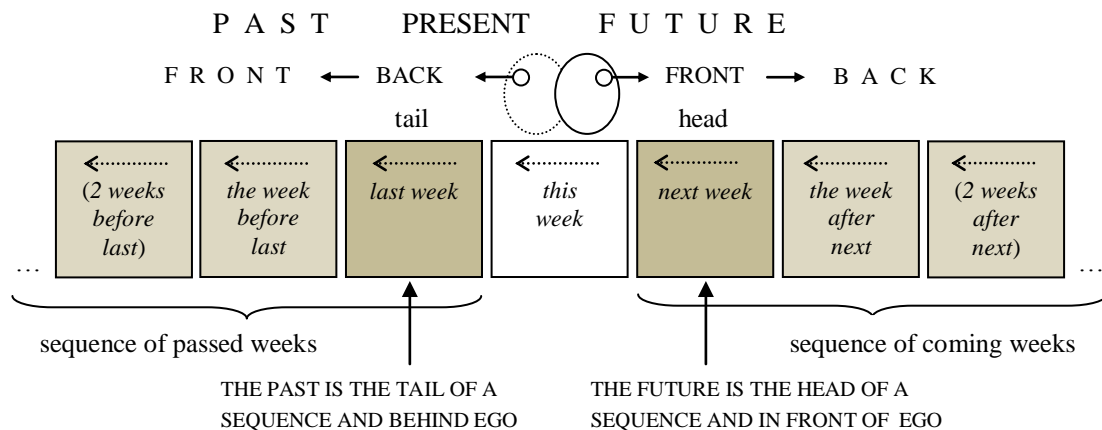


Figure 7. Head and tail of undivided sequences: future and past points in time.

7.2.2. Endpoints of divided sequences

As mentioned in Section 6.3., East Asian languages often use a BACK expression for future time and a FRONT expression for past time. It has, therefore, often been assumed that speakers of these languages conceive of the future as lying behind them and the past as lying in front of them. The notion of a divided sequence of

time allows us to explain these puzzling uses in a straightforward way. Let us reconsider the Mandarin examples (8a) and (8b), where the FRONT expression *ri-qian* (day-front) means ‘a few days ago’ and ‘the other day’ and the BACK expression *ri-hou* (day-back) means ‘in the future’ and ‘in the days to come.’

Both expressions are based on arrangements of time in which a sequence is divided by the position of the observer. The sequence is, as usual, heading from the future into the past, but either its head or its tail is at the other side of the observer, who is the deictic reference point for present time. Fig. 8a illustrates the ego-divided arrangement for a front expression that refers to a past point in time, and Fig. 8b illustrates the ego-divided arrangement for a back expression that refers to a future point in time. The grey-colored boxes represent sequences of time and the darker boxes the head and tail of the sequence.

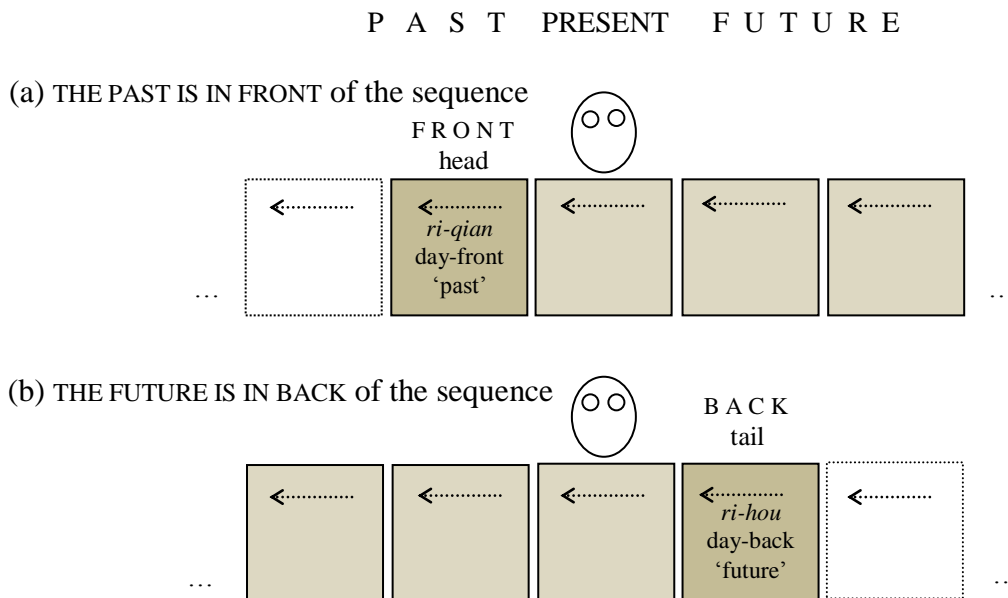


Figure 8. Ego-divided sequence of time: Mandarin *ri-qian* ‘a few days ago’ and *ri-hou* ‘in the future.’

In the spatial arrangements diagrammed in Fig 8, the FRONT and BACK expressions refer to the head and tail of their sequence, while those of deictic time spheres refer to the front and back of the observer, as in Fig. 4. The observer of an ego-divided sequence is neither opposed to the sequence nor aligned with it. His perspective is neutral: he does not determine the front and the back of the sequence, as indicated in the diagrams by the lack of gaze arrows. Thus, the “function” of the observer is to anchor the sequence of time and, by dividing it, single out one of its units.

The construal of ego-divided sequences of time is not as exotic as it may appear. The spatial arrangement underlying the German expression *vorig* ‘before’ as in *vorige Woche* (before-week) as well as its Latin-based English equivalent *previous* in *the previous week* also involve an ego-divided

arrangement of time: they refer to a past week in the same way that the Mandarin Chinese front expression *ri-qian* refers to past days. Notice also that the word *previous* follows the pattern of other expressions prefixed by *pre-*: *prewar*, *preprint*, *pre-Raphaelite*, etc., in which an anterior time is IN FRONT (see Section 5.2). However, in addition to its absolute sense of ‘preceding’, *previous* can also be set within a deictic frame of reference and is then understood in the sense of ‘past time’. This arrangement of ego-divided time is sketched in Fig. 9, using the more systematic German expressions as an illustration. Following the logic of this model, earlier times like two weeks ago are further removed from ego, as in German *vorvorige Woche* (before-before week), while posterior times are lined up IN-BACK of ego and follow the model of undivided sequences (see Fig. 7).

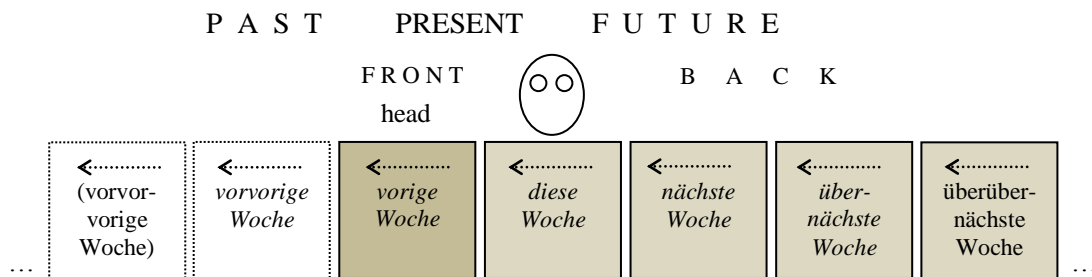


Figure 9. Ego-divided sequence of time: German *vorige Woche* ‘previous week’

We are now also in a position to explain why the antonyms *previous* ‘before’ and *last* ‘behind’ can refer to the same point in immediate past time: *previous* construes the time point as the head of an ego-divided sequence and *last* construes it as the tail of an undivided sequence behind ego. In both German and English, only the front unit of a static ego-divided sequence is used in reference to past time, reflecting the greater salience of the front of a sequence than that of its back. There are no corresponding static expressions for future time, such as **hintere Woche* (back week) or **postvious week*. These temporal concepts are expressed in terms of motion, such as *subsequent*, *ensuing* and *following*.

Like Mandarin, other East Asian languages also tend to have lexicalized forms for both past time IN FRONT and future time IN BACK. Table 2 lists examples of East Asian languages in which this pattern of ego-divided sequences is systematically exploited for past and future days—apart from Southern Min, which lacks a FRONT term denoting past days.

Table 2. THE PAST IS IN FRONT; THE FUTURE IS IN BACK.

	past days are IN FRONT	future days are IN BACK
Mandarin	<i>ri-qian</i> (day-front) 'a few days ago; the other day'	<i>ri-hou</i> (day-back) 'in the future; in the days to come'
Japanese	<i>sen-jitsu</i> (front-day) 'a few days ago; the other day'	<i>go-jitsu</i> (back-day) 'at a later date'
Korean	<i>yo jənnal</i> (this front-day) 'the other day'	<i>twinnal/hunnal</i> (back-day) 'at a later date'
Vietnamese ¹⁷	<i>ngày-trước</i> (day-front/ahead) 'past time'	<i>ngày-sau</i> (day-back) 'future time'
Southern Min		<i>au7 jit8 ah2</i> (behind day particle) 'in the future'

Arrangements of time in which the observer divides a sequence are common in East Asian languages. For example, the Japanese FRONT expressions *saki-goro* (front-time) 'the other day' and *zen-jitsu* (front-statement) 'previous statement' refer to past times, and the expressions *kon-go* (now-back) 'from now on, future' and *ato-ato* (back-back) 'from now' to future times. In Korean, a former generation is described as *jeon-dae* (front-generation), while a future generation is described as *hu-dae* (behind-generation). What is perhaps more puzzling is that construals of time based on ego-divided sequences are often used side by side with construals of time based on deictic time spheres. Table 3 shows that the two construals may result in constructional synonymy and polysemy, i.e. the same expressions can be used to denote opposing concepts of time and the same concepts of time can be expressed by different forms.

Table 3. Construals of deictic time spheres and ego-divided sequences.

Construal	past time	future time
deictic time sphere:	IN BACK	IN FRONT
ego-divided sequence:	IN FRONT	IN BACK

Constructional synonymy occurs in reference to future and past time in Korean and Vietnamese, and to future time in Thai, which is illustrated in the examples under (11). The FRONT construal reflects the default deictic perspective of the future time sphere, whilst the BACK construal is based on the ego-divided sequence with the future time as its tail:

(11) Thai: THE FUTURE IS IN FRONT or IN BACK

- a. 'future days' *wan na* (day face, ahead)
 wan lang (day back)

17 The Vietnamese examples have kindly been provided by Kim-Chi Hanze.

- b. ‘next year’ *bhee na* (year face, ahead)
 bhee lang (year back)
- c. ‘next time, another time’ *kraow na* (time face, ahead)
 kraow lang (time back)

It stands to reason that these different construals of time tend to be associated with different meanings. While the synonyms for future reference in Thai do not seem to convey different meanings, the corresponding Vietnamese expressions apparently do: future times construed in terms of the deictic future time sphere, i.e. as lying in front of the observer, are seen as near and certain, while future times expressed in terms of the ego-divided sequence, i.e. as the tail of a divided sequence, are seen as more distant and uncertain. We may conjecture that the sense of near and certain future of the deictic time sphere expression is motivated by the time unit’s position in front of ego, which makes it visible and immediately accessible (see Fig 4a), while the sense of distant and uncertain future of the past ‘back’ expression is motivated by the indefinitely long sequence of time units preceding the tail of the sequence (see Fig 8b). In sentence (12), the future time expression *ngày sau* (day back) conveys a more distant and uncertain future time and cannot be replaced by the future time expression *ngày đén* (day ahead):

- (12) Vietnamese: *Ngày sau sẽ ra sao?*
 Day back FUT become INTER part.
 ‘What will the future bring?’ (Kim-Chi Hanze)

Constructional polysemy is illustrated in the following usages of Japanese. While, as mentioned above, *saki-goro* (front-time) ‘the other day’ follows the ego-divided pattern and hence denotes past time, *saki-zaki* (front-front) follows the pattern of deictic time spheres and, probably due to its reduplicated form, denotes the distant future. Interestingly, *saki-zaki* originally used to refer to past time.¹⁸ The development of its opposite meaning of ‘distant future’ could have been motivated by its different form and its spatial sense ‘everywhere,’ which corresponds to ‘every time’ and hence includes the past and the future.

18 I owe this observation to Noriko Matsumoto. She found that *saki-zaki* has been used in reference to the past since the 9th or 10th century at the earliest and is currently still used in this sense in literary works, as in:

saki-zaki kara no junbi
 front-front from gen preparation
 ‘the preparation in which I have invested a lot of time’

7.3. Points within a deictic sequence: Anterior and posterior deictic times

The position of units of time relative to each other within a sequence is, of course, invariable, irrespective of whether the sequence is non-deictic or deictically anchored. However, the assignment of front and back to a sequence depends on the perspective adopted by the observer. We normally view temporal sequences as unidirectional, i.e. as having a future-to-past orientation (7.3.1); more rarely, sequences may be also seen as bidirectional with respect to the observer, i.e. as being opposed to ego from both sides (7.3.2).

7.3.1. Unidirectional sequences: Ego-opposed and ego-aligned

In unidirectional sequences, sequences of time approaching the observer are ego-opposed so that an anterior time unit is IN FRONT “facing” the observer and posterior time units are lined up later on the time-line, i.e. BEHIND that time unit. Thus, in a sequence of days, the deictic time *tomorrow* is seen as facing us and the day posterior to today, *the day after tomorrow*, as lying behind *tomorrow*. Following the logic of ego-opposed sequences, *the day after tomorrow* is then two days posterior to today, and analogously, *two days after tomorrow* is three days posterior to today. The ordered sequence of days continues into the past: the day anterior to today is *yesterday*, two days anterior to today is *the day before yesterday*, three days anterior to today is *two days before yesterday*, etc. The sequences of days are diagrammed in Fig. 10.

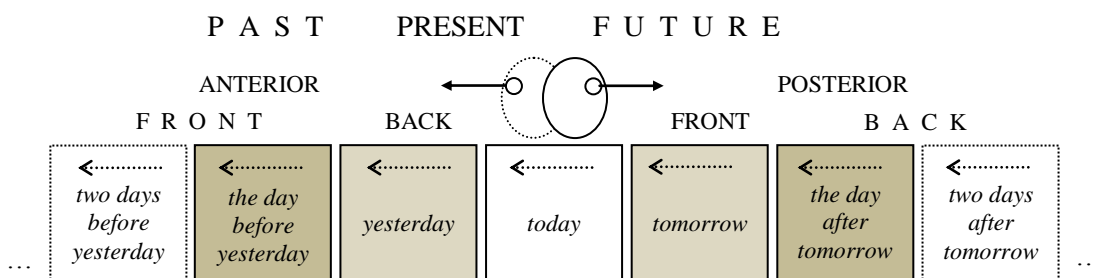


Figure 10. POSTERIOR FUTURE IS BEHIND, ANTERIOR PAST IS IN FRONT: *the day after tomorrow* and *the day before yesterday*.

In viewing anterior days in the past, the observer turns his head around, as in the arrangement depicted in Fig. 7. The sequence of days in the past is thus no longer opposed to him but is aligned. The shift from an ego-opposed to an ego-aligned perspective is necessary in order to preserve the directionality of the sequence. Such shifts in perspective are in fact the default strategy of coding sequences of deictic time across languages, including East Asian languages. Table 4 lists a selection of unrelated languages in which ‘the day after tomorrow’ and

‘the day before yesterday’ are expressed in a fashion similar to English. The Japanese expressions only reveal these spatio-temporal arrangements in their written Kanji forms, not in their morphological compositions.

Table 4. Codings of ‘the day before yesterday’ and ‘the day after tomorrow.’

	‘the day before yesterday’	‘the day after tomorrow’
Hungarian	<i>tegnapelőtt</i> (yesterday- before)	<i>holnapután</i> (tomorrow- after)
Mandarin	<i>qian-tian</i> (front , or before day)	<i>houtian</i> (back , or after day)
Thai	<i>wan seuun nee</i> (day before that one)	<i>wan ma reuun nee</i> (day behind that one)
Southern Min	<i>cho5-jit8</i> (?-day)	<i>au7-jit8</i> (behind -day)
Japanese	<i>ototoi</i> (one -yesterday-day)	<i>asatte</i> (tomorrow- back -day)
Korean	<i>jənjənal</i> (front-front -day)	

7.3.2. Bidirectional sequences: Double-sided ego-opposed

In what will be called *double-sided perspective*, the observer occupies a towering position in the middle of the time-line, from where he can look into both the future and the past. He observes opposed sequences of time lined up at both sides. This perspective underlies the Italian expressions for ‘the day after tomorrow’ and ‘the day before yesterday,’ in which the equally distant units of time are expressed by *altro* ‘other’.¹⁹

- (13) a. *domani l’altro* (tomorrow the other) ‘the day after tomorrow’
 b. *l’altroieri* (the other-yesterday) ‘the day before yesterday’

The day after tomorrow is also expressed as *dopodomani* (after-tomorrow) and the day before yesterday as *avantiieri* (before-yesterday), which correspond to the traditional viewing arrangement as found in English. The symmetric pattern with *altro* is not restricted to days but is also used with years, as in *l’altro anno*, which may refer to either next year or last year.

Double-sided ego-opposed arrangements are also used in the French kinship system, where the third generation is seen as being behind the second one in both ascending and descending generations.

- (14) a. *arrière-petit-fils* (behind-small-son) ‘great-grandson’
arrière-petite-fille (behind-small-daughter) ‘great-granddaughter’
arrière-petits-enfants (behind-small-children) ‘great-grandchildren’
 b. *arrière-grand-père* (behind-grand-father) ‘great-grandfather’
arrière-grande-mère (behind-grand-mother) ‘great-grandmother’

19 The Italian and French examples have been pointed out to me by Maria Radden.

arrière-grands-parents (behind-grand-parents) ‘great-grandparents’

The use of *arrière* with later generations in (14a) conforms to the normal front perspective of ego-opposed sequences, as in *the day after tomorrow* in Fig. 10. With the earlier generations in (14b), however, the perspective is not ego-aligned, as in *the day before yesterday*, but also ego-opposed. This double-sided ego-opposed arrangement is sketched in Fig. 11.

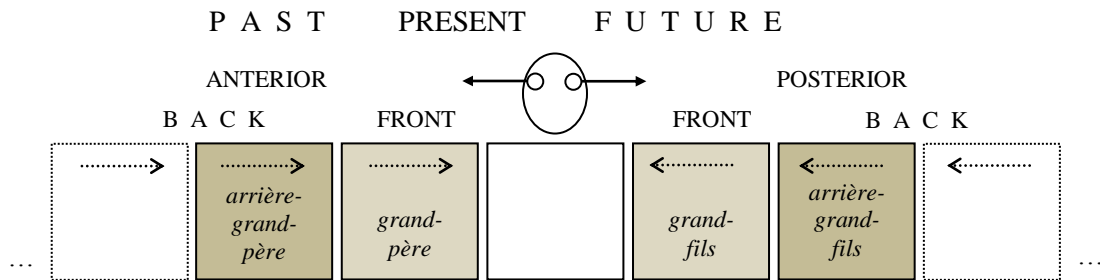


Figure 11. POSTERIOR FUTURE IS BEHIND, ANTERIOR PAST IS BEHIND: French kinship terms.

Future posterior and past anterior days may also be conceived of as double-sided ego-opposed sequences. This is the case in Samoan, where ‘the day before yesterday’ is expressed as *talaatu ana-nafi* (beyond yesterday) and ‘the day after tomorrow’ as *talaatu taeao* (beyond tomorrow) (Mosel 1991: 156).

8. Moving time

8.1. Sequences of time and motion

Due to their intrinsic orientation, sequences of time tend to imply potential motion. Conversely, a moving unit of time tends to be seen as forming part of a sequence. Thus, in the motional expression *My birthday is coming up*, the date of my birthday evokes a sequence of days, weeks or months between my birthday and the present. Sequences and motion are thus closely interrelated conceptually but are different construals of spatial time that need to be distinguished.

The distinction between sequences and motion is also blurred in language. Many expressions denoting static relations of time are bleached participles of motion verbs, such as *preceding*, *coming*, *following*, *succeeding*, *ensuing*, and *subsequent* (derived from Latin *sequi* ‘follow’).²⁰ These participles of motion

20 The use of motion terms for static relations of time is in line with Svorou’s (1993: 22) claim that a stative interpretation of a reference frame like an aligned reference frame is a consequence of the movement reference frame as a more general reference frame.

verbs express static temporal relations for which no static expressions are available. As shown in Section 7.3 above, a word such as **postvious* as the antonym of *previous* is missing in the English system of anterior/posterior times. Japanese provides an interesting case in some of its words for anterior and posterior units of deictic time: earlier weeks and months are expressed in terms of sequences and the corresponding later weeks and months in terms of motion, as shown in (15a) and (15b). However, this asymmetric pattern no longer applies to earlier and later years (15c), both of which are conceptualized in terms of motion.

- (15) a. *sen-shuu* (before-week) ‘last week’
 rai-shuu (come-week) ‘next week’
 b. *sen-getsu* (before-month) ‘last month’
 rai-getsu (come-month) ‘next month’
 c. *kyo-nen* (gone-year) ‘last year’
 rai-nen (come-year) ‘next year’

Static relations of time may thus be construed in terms of either sequence or motion. The preference for the use of motion terms for future notions of time in Japanese may be motivated by the greater impact or imminence that the future, in particular future events, have on us.

8.2. TIME PASSING IS MOTION

Viewing time as motion seems to capture people’s intuition about the essence of time best. Motion is part of our daily experience of the physical world. According to Newton’s first law of motion, every object continues in uniform motion in a straight line, unless compelled to change that state by forces at work upon it. There is no force that changes the straight motion of time, so time keeps moving forever. Physical motion thus lends itself to the notion of time and events as arising and passing. Expressions of time such as *the passage of time* or *time is flying* are, therefore, among the most natural ways of talking about passing time. People may even think of passing time as literally, rather than metaphorically, moving. This folk view of time is not as naïve as it may appear. “Motion is understood in terms of changes, and changes imply the passage of time. Time and movement, therefore, are almost inseparable experientially” (Svorou 1993: 209).

The fact that time constitutes a defining element of motion poses a serious problem for the validity of the metaphor TIME IS SPACE, specifically with respect to its submetaphor TIME PASSING IS MOTION: if the source domain MOTION contains an element of the target domain TIME, it is not independently defined, and the mappings are circular. Moore (2006: 201) suggests that “an understanding of

motion metaphors of time lies not in abstract concepts like MOTION and TIME, but in the interplay of spatial and temporal aspects of specific scenarios of motion.” Motion and time could thus be seen as parts of a holistic frame or ICM that can be accessed metonymically via either motion or time. This analysis comes close to people’s intuition of moving time and to the frequently noted interplay of space and time within a holistic view of “space-time”, which was already hinted at in Section 1. Since, as observed by some scholars,²¹ metonymy and metaphor form a continuum with metonymy shading over into metaphor at more specific levels of description, we can account for both the metonymic basis of moving time in general and the strongly metaphorical flavor associated with specific, in particular novel, expressions of moving time, such as the examples given by Lakoff and Johnson (1999: 149):

- (16) *The precious seconds **oozed** through my fingers. The deadline **sneaked** by me. The deadline was **marching** towards me like a brass band. The days **cascaded** by.*

These examples illustrate a type of metaphor of time that is usually described as *Moving Time metaphor*, in which time moves from the future, through the present and into the past relative to the observer as a stationary reference point.

Another type of motion metaphor of time is known as *Moving Ego metaphor* or *Moving Observer metaphor*, in which the observer moves over a stationary landscape, as in the following examples, the first four of which are taken from Lakoff and Johnson (1999: 146).²²

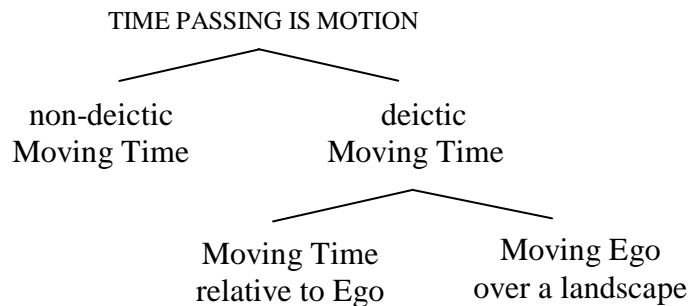
- (17) *We’re **coming up on** Christmas. We are **getting close to** Christmas. We’ve **reached** June already. We **passed** the deadline. We are **approaching** golden times.*

These two metaphors of deictic Moving Time are opposed to the metaphor of non-deictic Moving Time, as in *Good Friday precedes Easter*. Table 5 lists these three types of the overall metaphor TIME PASSING IS MOTION, which are usually distinguished in the literature on metaphorical time:

21 Arguments for a continuum between metonymy and metaphor are presented, amongst others, in Barcelona (2000) and Radden (2002). For example, at the general level, the mapping between UP and MORE is correlational and hence metonymic, as in *high temperature*, whereas it is metaphorical at the more specific level, as in *high quality*.

22 Like many scholars, Lakoff and Johnson (1999) do not distinguish between static and truly motional terms and include under their moving observer metaphor cases such as *Will you be staying a long time or a short time?* and *He’ll have his degree within two years*, which are static situations whose duration may be conceived of in terms of fictive motion.

Table 5. Motion metaphors of time.



8.3. The two deictic versions of TIME PASSING IS MOTION

The two deictic versions of TIME PASSING IS MOTION have been explored extensively (Yu 1998, Lakoff and Johnson 1999; Evans 2004; Moore 2004, 2006; Núñez, Motz and Teuscher 2005; Núñez and Sweetser 2006). The following discussion will, therefore, be confined to select issues of these metaphors, in particular their motivation as well as some modifications that have been proposed. The two deictic versions of passing time are sketched in Fig 12, where the moving entities are printed in bold, and illustrated in the sentences under (18).

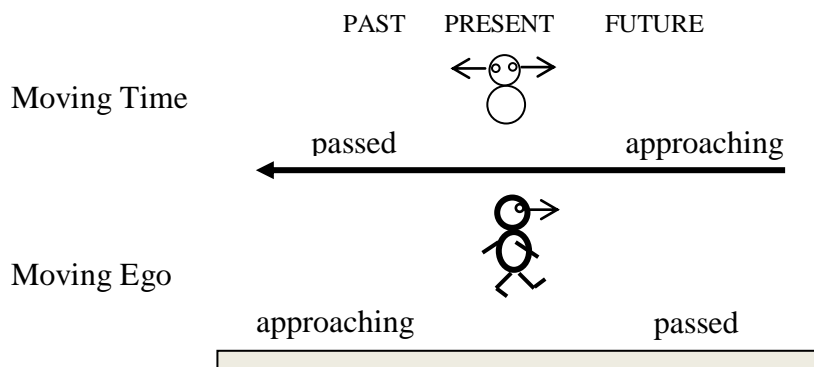


Figure 12. Moving Time and Moving Ego.

- | | | | |
|------|----|--------------------------------------|---------------------------|
| (18) | a. | <i>The New Year is coming.</i> | (Moving Time approaching) |
| | b. | <i>The New Year has arrived.</i> | (Moving Time has arrived) |
| | c. | <i>We are entering the New Year.</i> | (Moving Ego approaching) |
| | d. | <i>We have entered the New Year.</i> | (Moving Ego has arrived) |

Sentences (18a) and (18b) illustrate Moving Time, sentences (18c) and (18d) Moving Ego; sentences (18a) and (18c) are near-synonymous, as are sentences (18b) and (18d). Both metaphorical versions of deictic passing time are also available in East Asian languages. They shall, therefore, not be subjected to a contrastive analysis. Instead, the following discussion will concentrate on the temporal meanings associated with these four metaphorical construals of passing time.

The metaphor underlying the Moving Time model will be described as TIME PASSING IS A THING MOVING RELATIVE TO EGO, where the term *thing* is meant to comprise both objects and substances like water flowing. In this model, moving units of time or events approach the stationary observer from the future, pass him in the present and proceed into the past. The meanings and expressions of time associated with this model derive from the way we experience things approaching and passing us. The nearer something is drawing to us, the more imminent is its arrival, i.e. its occurrence. Thus, in (18a), *The New Year is coming*, the “arrival” of the New Year is imminent. The aspectual time in which such advancing unbounded situations are set will, therefore, be described as *imminent future*. Situations involving the imminent future contain achievement verbs and focus on the unbounded culminating activity preceding the terminal point,²³ in this case the build-up phase before the arrival of the New Year.

When the moving time or event has arrived at its terminal point, i.e. ego’s place at present time, it is seen as an achievement, i.e. a punctual and terminative situation that invokes a preceding culminating phase of motion. Thus, (18b), *The New Year has arrived*, describes the terminal point of the New Year’s arrival following a preceding build-up phase of time. The aspectual time in which such punctual, terminal events are set will be described as *terminative present*. In English, situations in the terminative present are expressed in the present perfect.

The Time Moving model also comprises times and events that are passing the observer at the present moment (*The days are flying by*) and times and events that have just passed the observer in the recent past but are still in his view (*The good old days have passed*), which, however, will not be discussed here.

Let us now turn to the Moving Ego metaphor, which will be specified more precisely as TIME PASSING IS OUR MOTION ALONG A PATH. This model construes time as people’s self-motion over a landscape of time, from the present to the future, as in (18c), *We are entering the New Year*. Future-directed motion has no analogue in static sequences of time. The only force that can bring about a reversal of the natural orientation of time is the human being. However, the moving ego is not an individual person. Ahrens and Huang (2002) have observed an

23 Following Radden and Dirven (2007: 187–9), *achievements* are defined as bounded punctual telic events and *culminating activities* as unbounded durational telic events.

interesting restriction on the use of the Moving Ego model of time with achievement verbs like *enter* in Chinese: the subject of such sentences denotes a plural entity, a group of people, a country or mankind, i.e. it describes a “non-referential, generic ego.” This constraint also holds for English, where sentences with plural subjects can hardly be paraphrased with a singular subject: *?I am entering the New Year* or *?I am approaching Christmas*. Ahrens and Huang suggest that the Moving Ego model also involves moving time and the observer only moves by virtue of being attached to a moving time point. This makes perfect sense in the above examples: reaching the New Year is, of course, neither an individual’s nor a group’s personal achievement, as the pronoun *we* might suggest, but an “achievement” of passing time in general. As in the Moving Time version *The New Year is coming*, the time referred to in the Moving Ego version *We are entering the New Year* is the imminent future.

The aspectual meaning underlying the terminal event in (18d), *We have entered the New Year*, corresponds to that of (18b), *The New Year has arrived*: both describe achievements in the present, but the Moving Ego version construes the generic achievement of time in terms of an individual’s achievement. Also here we cannot paraphrase the subject by using *I*: *?I have entered the New Year*.

The observer’s participation in Ego-Moving Time from the present to the future may also invite various implicated future meanings, in particular the grammaticized constructions of the *intentional future*, as in *I am going to do it*, and the *contingent future*, as in *I am going to be a grandmother soon*, which, however, cannot be dealt with. There are, in fact, many more spatio-temporal complexities involved in the two versions of the TIME PASSING IS MOTION metaphor in English and other languages that have not been explored in this study. For example, the two metaphorical versions exhibit puzzling cross-linguistic differences with respect to their frequencies. A Google search has shown that, in English, the metaphor TIME PASSING IS MOTION tends to be conceived of in terms of the Moving Time version, whereas in Chinese and Japanese, it tends to be conceived of in terms of the Moving Ego version.²⁴

24 The following table lists Google hits for the sentences (a) *The New Year is coming*, (b) *The New Year has arrived*, (c) *We are entering the New Year*, (d) *We have entered the New Year* and their closest equivalents in Chinese and Japanese, which have kindly been provided by Shuqiong Wu and Tayo Takada. The highest frequencies, i.e. the default uses, are highlighted by bold print.

	English	Chinese	Japanese
(a) Moving Time approaching	1,760,000	201,000	8,970
(b) Moving Time has arrived	197,000	44,900	54,100
(c) Moving Ego approaching	142,000	1,830,000	365,000
(d) Moving Ego has arrived	74,000	162,000	337,000

8.4. Experiential motivation of the two metaphors of deictic motion

8.4.1. The deictic Moving Time metaphor: TIME PASSING IS A THING MOVING RELATIVE TO EGO

The model of Moving Time from the future to the past relative to the observer may have been motivated by the following experiential factors.

- *Independence of time*: We experience time as having an independent existence: time is measurable and hence assumed to have an objective existence. Moreover, the course of time may interfere with our lives: time may pass rapidly or drag on, or it may appear to be planned or unexpected.
- *Unidirectionality of time*: We constantly experience the unidirectional passage of time, for example when the future dates noted in our diary draw near and become the present, and the present dates become the past.
- *Egocentricity*: Viewing time as approaching and passing us conforms with our egocentric view of the universe: we like to see ourselves as the unchanging center of the universe and the world around us being in a constant state of flux.

There may, of course, be inconsistencies in the metaphorical mappings from motion in space onto passing time. Moore (n.d.) has pointed out that Moving Time as in *Winter is coming* involves an “impossible grounding scenario”: in the physical world, an entity moving along a trajectory starts out at an earlier time and arrives at a later time, whereas a unit of time moving along the time-line starts at a later time and “arrives” at an earlier time. Moore argues that the mapping is licensed due to the expectation-of-arrival frame shared by spatial and temporal motion. A psychologically more plausible explanation might be that people see the decreasing distance between the moving entity and ego as crucial in both the spatial and temporal scenario. Whichever explanation is correct, the inconsistencies are not relevant enough to be detrimental to the mapping. The above-mentioned motivational factors of the Moving Time model are powerful enough to overrule potential internal inconsistencies between space and time.

8.4.2. The Moving Ego metaphor: TIME PASSING IS OUR MOTION ALONG A PATH

The Moving-Ego model involving time moving from the past through the present to the future corresponds to the definition of time given in Section 1. Factors motivating this model of time include:

- *Dependence of time*: We often experience time in connection with goal-directed motion and actions, developments and progress, which are directed toward the future: we make plans, we are born and grow up, we are “going” to be promoted, a project is moving ahead, etc.
- *Directionality of time*: We experience changes in time as occurring in the same direction as our own forward motion. The Moving-Ego model is thus consistent with our sensori-motor experience of self-motion.
- *Impact of time*: We experience time as exerting a powerful impact on our lives: expressions with “generic plurals” such as *We are coming up on Christmas* show that we see ourselves as members of a group that time takes along on its course.

9. Results and conclusions

9.1. Results

The topological properties of space and time that have been interrelated in the course of this paper include: (i) dimensionality of spatial time, (ii) orientation of the time-line, (iii) shape of the time-line, and (iv) spatio-temporal relations.

(i) Space is conceived of as three-dimensional, time as one-dimensional. However, all three dimensions of space may be exploited for notions of time. In English, two-dimensional *on* is used for “supporting” periods (days) and three-dimensional *with(in)* for bounded periods.

(ii) The orientation of the time-line is conceived of as frontal and, more rarely, as vertical. Vertical construals of time are commonly found in East Asian languages, especially with recurrent units of time like months. Earlier times are viewed as UP, later times as DOWN. In English, transmissions are viewed as moving DOWN, emergences as moving UP to the present.

(iii) The shape of the time-line is normally straight; very few concepts of time are thought of as round in English and even less so in East Asian languages.

(iv) Spatio-temporal relations are distinguished by two types of opposition: static vs. dynamic (i.e. as motion) and non-deictic vs. deictic. The main spatio-temporal relations that have been reviewed in the preceding discussion are listed in Table 6. Vertical and ego-opposed divided times are omitted.

Table 6. Spatio-temporal relations.

Static relations		<i>example</i>		<i>example</i>	
1. Non-deictic					
Sequence	ANTERIOR	<i>May is before June.</i>	POSTERIOR	<i>June is after May.</i>	
2. Deictic					
(i) Time sphere					
a) default	FUTURE	<i>the days ahead of us</i>	PAST	time sphere behind ego	<i>the days behind us</i>
b) non-default	time sphere in front of ego	<i>Aymara qhipa (back)</i>	time sphere in front of ego	<i>Aymara nayra (front)</i>	
(ii) Ego as RP:					
a) undivided sequence					
	FUTURE	<i>next week</i>	PAST	ego-aligned: tail behind ego	<i>last week</i>
b) divided sequence	ego-opposed: head in front of ego	Mand. <i>ri-hou (day-back)</i>	ego-divided: head behind ego	Mand. <i>riqian (day-front)</i>	
(iii) Time as RP:					
a) unidirectional sequence					
	POSTERIOR	<i>day after tomorrow</i>	FUTURE	ego-aligned: time in front of tail is behind ego	<i>day before yesterday</i>
b) bidirectional sequence	ego-opposed: time behind head in front of ego	Fr. <i>arrière-petit-fils</i>	ego-opposed: time behind head behind ego	Fr. <i>arrière-grand-père</i>	
Dynamic relations					
1. Non-deictic					
Moving Time	ANTERIOR	<i>May precedes June.</i>	POSTERIOR	<i>June follows May.</i>	
2. Deictic					
(i) Moving Time					
	IMMINENT FUTURE	<i>The New Year is coming.</i>	TERMINATIVE PRESENT	ego-aligned time has reached ego	<i>The New Year has arrived.</i>
(ii) Moving Ego	ego-opposed time is approaching ego	<i>We are entering the New Year.</i>	Ego has reached aligned time	<i>We have entered the New Year.</i>	

Table 6 shows that static types of spatio-temporal relations outnumber dynamic types and, among static relations, deictic types of spatio-temporal relations by far outnumber non-deictic types. Due to the interaction between deictic time sphere, sequence, and ego's perspective, static deictic relations of time allow for more and more complex spatial arrangements than dynamic relations. This mainly applies to deictic time spheres and ego-divided sequences.

Deictic time spheres: Due to his position on the time-line coupled with his frontal perspective, the observer can define time spheres in front of him and behind him in static, but not motional, relations. In a given language the assignment of the future and the past to one of two time spheres is fixed.

Ego-divided sequences: Static, but not moving, sequences of time can be divided by the position of the observer so that the head or tail of a sequence of time and its remainder end up in different time spheres, as in *the previous week*,

where the head of the sequence is in the past and the remainder of the sequence in the present and future.

On the other hand, dynamic, but not static, relations, construe time as passing. Finally, the same temporal notions can be construed as either static or dynamic relation.

Anterior and posterior times can be expressed in terms of position (*May is before June*) or motion (*May precedes/comes before June*).

Undivided sequences: The head or tail of an undivided sequence can be construed in terms of position (*next week, last week*) or in terms of motion (*coming week, past week*).

We can, finally, depart from the target domain TIME and look at the way or ways notions of time are metaphorically construed in terms of the source domain SPACE. As argued at the beginning of this paper, this perspective conforms with our processing of spatial construals of notions of time.

Table 7. Spatial construals of notions of time.

time	spatial construal	static relations	dynamic relations
ANTERIOR/ POSTERIOR	time-based sequence or time-based motion	<i>June is after May.</i>	<i>June follows May.</i>
FUTURE/ PAST time sphere	or vertical time either in front/ behind or behind/ in front of ego	Chin. month-top <i>days ahead of us</i> Aym. back 'future'	
FUTURE/ PAST time point	ego-opp'd/ al'd sequence or ego-divided sequence or motion approaching/ passed ego	<i>next/ last week</i> <i>previous week</i>	<i>coming/</i> <i>past (passed) week</i>
POSTER. FUTURE/ ANTERIOR PAST time point	ego-based opposed seq./ ego-based aligned seq.	<i>day after tomorrow/</i> <i>day before</i> <i>yesterday</i>	
IMMINENT FUTURE	moving time is approaching or moving ego is approaching		<i>The New Year is</i> <i>coming.</i> <i>We are entering the</i> <i>New Year.</i>
TERMINATIVE PRESENT	moving time has arrived or moving ego has arrived		<i>The New Year has</i> <i>arrived.</i> <i>We have entered the</i> <i>New Year.</i>
PASSING TIME IN PROGRESS	moving time passing ego or moving ego passing time point		<i>The deadline</i> <i>passed.</i> <i>We passed the</i> <i>deadline.</i>

(i) *Anterior and posterior non-deictic times* can be construed in terms of time-based position (*before/after*) or time-based motion (*precede/follow*). In

East Asian languages, bounded periods of time are construed in terms of verticality, with anterior time being UP and posterior time being DOWN.

(ii) *Future and past time spheres*: In most languages of the world, the future is seen as IN FRONT of the observer and the past as BEHIND the observer. Only very few languages like Aymara construe the future as IN BACK and the past as IN FRONT of the observer. A given language can only decide on one of these alternatives, indicated in Table 7 by *either... or*.

(iii) *Future and past points in time* are positioned relative to the observer on a sequence of time that is oriented from the future to the past. The sequence may be construed as ego-opposed in the future (*next week*) and ego-aligned in the past (*last week*), or it may be construed as ego-divided with its tail in the future (Chinese back-day ‘future’) and its head in the past (*previous week*), or it may be construed as in motion approaching (*coming week*) or having passed ego (*past week*).

(iv) *Posterior future and anterior past*: The posterior future is a future time point behind a future deictic reference point on an ego-opposed sequence (*day after tomorrow*) and the anterior past is a past time point in front of a past deictic reference point on an ego-aligned sequence (*day before yesterday*).

(v) *Imminent future and terminative present*: Both these aspectual times involve deictic motion (Moving Time or Moving Ego) as achievements. The imminent future is expressed in the present progressive and focuses on the culminating phase preceding the terminal point of motion, the terminative present is expressed in the present perfect and focuses on the terminal point.

(vi) *Passing time in progress* is not bound to any particular time or aspect. Atelic events described as being in progress may be located in all three time spheres (*The deadline is/was/will be passing*).

9.2. Conclusions

The present study has been concerned with the correspondences between time and space and the motivation of spatial concepts in metaphorical construals of time. Special attention has been devoted to the oppositions of static vs. dynamic and non-deictic vs. deictic relations in time, which are usually not carefully distinguished. The opposition between static and dynamic relations in time is reflected in the distinction between deictic time spheres and sequences of time on the one hand, and moving time on the other.

Static deictic relations of spatial time give rise to particularly intriguing arrangements due to the interaction of time spheres and sequences of time with the observer. A time sphere may be seen as being in front of or behind the observer (Fig 4 and 5), a sequence may be seen as opposed to, or aligned with, the observer’s gaze (Fig. 7, 10, 10), a sequence may also be seen as a whole (Fig 7) or

as divided by ego, with its head or tail being separated from the rest of the sequence (Fig 8 and 9), the observer may look forward or turn his head around to look backwards (Fig. 7 and 10) or may not look in any direction at all (Fig. 8 and 11). As a rule, the spatial expressions of a language do not neatly distinguish between these different temporal concepts. For example, a term like FRONT may refer to the deictic sphere lying in front of the observer or, as the head of a sequence, to a past point in time (Chin. day-front ‘a few days ago’). Since the same forms are used to mark different spatio-temporal arrangements, people, including scholars, sometimes confuse the opposing uses of ‘front’ and ‘back’ and hence are, for instance, led to believe that, for speakers of Chinese, the past is in front and the future is behind.

Dynamic deictic relations of spatial time are based on the interaction between time and ego, one of which moves and one of which is stationary. There thus can be no more than two spatio-temporal arrangements: time moving relative to ego or ego moving relative to time. The two versions of the metaphor TIME PASSING IS MOTION are described here as TIME PASSING IS A THING MOVING RELATIVE TO EGO and TIME PASSING IS OUR MOTION ALONG A PATH. In the latter submetaphor, the entity that moves is usually expressed as the plural pronoun *we*—hence the use of the form OUR in the metaphor—but is non-referential. The meanings associated with these two types of metaphorical motion are aspectual tenses: an imminent future, as in *The New Year is coming*, and a terminative present, as in *We have entered the New Year*.

In order to gain deeper insights into the potential range of spatial construals of concepts of time, different, in particular East Asian, languages have been included in the study. European and East Asian conceptualizations of time tend to differ with respect to the following properties of spatial time.

Orientation of time-line: East Asian languages make more use of vertical conceptions of time than European languages, which has often been noted especially for Chinese. East Asian vertical times predominantly pertain to periods of bounded units of time such as years and months, where earlier times are conceived of as UP and later times as DOWN. Vertical time in English, by contrast, pertains to particular areas: transmission as motion DOWN to the present or the future (*pass down*), and emergence moving UP to the present (*coming up*).

Deictic sequences of time: East Asian languages make systematic use of ego-divided sequences separating their head or tail from the rest of the sequence. In this way, a past time is expressed as ‘day-front’ and a future time as ‘day-back.’ This pervasive phenomenon has received much less attention in the literature and has not been accounted for in terms of its underlying spatial structure. Expressions such as *previous* show that this construal of time is also found in European languages.

On the other hand, European, but apparently not East Asian, speakers conceptualize time as round (*round the clock*) or semicircular (*turn twenty*) and use

double-sided ego-opposed times, as in Italian *domani l'altro* 'day after tomorrow' and *l'altroi* 'the day before yesterday.'

Most of the East Asian languages considered in this study display very similar behavior in their use of vertical time and ego-divided temporal sequences. These areal features may be due to centuries-long contact between China and its neighboring countries and their large share of vocabulary of Chinese origin, especially in Japanese and Korean. More distant East Asian countries have apparently been less subject to Chinese linguistic influences. For example, Vietnamese does not use vertical time.

This study of spatial time, especially of East Asian languages, could only remain exploratory in nature. It is to be hoped that the framework developed in this paper will stimulate further cross-linguistic research on this intriguing topic.

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