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## TIME AND SPACE QUESTIONNAIRE

Stephen C. Levinson, Jürgen Bohnemeyer, N. J. Enfield & colleagues

<b>Project</b>	Categories and concepts across language and cognition
<b>Task</b>	Questionnaire; video tasks
<b>Goal of task</b>	To explore the extent to which time is conceptualised on a spatial basis

### **PART A<sup>6</sup>**

#### **Motivation**

In what follows, the general interest is: *to what extent is time conceptualised on a spatial basis?* There is a long tradition of treating this as metaphorical transfer from space to time, and this transfer has been the inspiration for many attempts to see language as massively metaphorical (Lakoff is just the latest version). Note that we don't necessarily have to think of this as metaphorical analogy – we can also think about it as a natural domain for semantic transfer, given that events are located in space-time.

In this project description, there are two parts:

1. An invitation to think about *to what extent the grammar of space and time share lexical and morphosyntactic resources* – the suggestions here are only prompts, since it would take a long questionnaire to fully explore this;
2. A suggestion about how to collect gestural data that might show us to what extent the spatial and temporal domains, have a psychological continuity. This is really the goal – but you need to do the linguistic work first or in addition,

#### **The conceptual basis**

Obviously, to the extent that time is conceived spatially, fundamental adjustments need to be made: time is one dimensional, while space is three-dimensional, and the dimensions have to be collapsed; and because of the one dimension, time may have discontinuities where space has continuities – e.g. while 'there' in space may be anywhere but 'here', 'now' necessarily divides the time line into before and after. Another fundamental issue is how to think about the underlying logical relations in the two domains: most theory treats space as *mereological* (paronymic – a place is part of another containing space), while in temporal semantics time is often conceived of as a linear set of points in precedence relations, allowing set-theoretic rather than paronymic treatments (for a psychological justification of this, see Miller & Johnson-Laird 1976: 457). The major differences though disappear once we think of one-dimensional space, as in motion paths – then ordering relations make equal sense in space and time. In this way motion is what Evans & Wilkins

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<sup>6</sup> This is a reprint from Language & Cognition Group Field Manual 2001, edited by S. C. Levinson & N. J. Enfield.

call a ‘bridging context’, a context in which both spatial and temporal construals are available, making transfer of meaning natural.

In both space and time, reference is relative to reference points. In space, fixed reference points are derived from various sources: speaker’s location, some party’s viewpoint, some dominant ground object. Directions can then be given in the frames of reference – intrinsic, relative or absolute, or radial motions categorised in relation to speaker or protagonist. In time, fixed reference points are harder to find – there is the deictic ‘now’, and there are calendrical specifications (‘Dec 12 1066’), but otherwise events are located in relation to other events – preceding, following or overlapping. Temporal directions are unilinear, by precedence relation.

A nice conundrum is whether there are analogues of the spatial frames of reference in time: Jürgen Bohnemeyer suggests that deictically anchored time (“three years ago”) is like the relative frame of reference, events related only to other events in time (“three years before the Euro became currency”) is like the intrinsic frame of reference, and calendrical anchoring (“three years before January 2002”) is like the absolute frame of reference.

### **The grammatical transpositions from space to time**

On the thesis of *localism*, many other grammatical relations are modelled on spatial language (see Lyons, 1977 *Semantics*, pp. 718ff). One may quarrel with the directionality that is assumed in much of this argumentation (and the current sketch), but (a) there is still a mapping to be explained, (b) there is good evidence in, especially, semantic change and grammaticalisation for the space → time directionality. According to localism, the following kinds of mappings occur between space and time:

- (1) locative relators – like adpositions and cases – almost invariably have temporal uses;
- (2) temporal (and other) oppositions are based on spatial orthogonals (like ‘front’ and ‘back’);
- (3) abstract existence is modeled on spatial location – hence the association between existentials and possessives and locatives;
- (4) relations between first order ontological entities (objects) are the model for second-order entities (like events) – e.g. arriving at a place is the mode! for becoming (inchoative events), state changes are like journeys, etc. (cf. Miller & Johnson-Laird 1976:526ff) – hence such locutions as ‘go to sleep’, ‘be-come alert’, ‘get married’. Similarly causal and logical chains are often expressed as ‘from X, Y’, ‘Y follows from X’
- (5) tense and aspect markers are often grammaticalised from spatial ones (as in the English progressive, and the Germanic and Slavonic Aktionsart prefixes drawn from path markers).
- (6) spatial paths provide a rich template for conceiving of many other relations, like existence, possession, and the temporal unfolding of events.

Worth thinking about is the following general question: what aspects of the full richness of spatial distinctions are taken over into time, and which are not? For example, spatial adpositions and demonstratives, motion verbs, but perhaps not positional verbs – this may follow from the fact that positionals always have shape and orientation contrasts that would be irrelevant in a one dimensional world. (Note though that some positional uses may transfer, as in *time stood still*) Similarly, only some spatial directions get borrowed into time: e.g. spatial expressions on the sagittal (‘away’) dimension, not on the lateral

(‘across’ dimension) (so one talks in terms of events ‘ahead’ and ‘behind’ but not ‘to the left’, or ‘to the side’).

Although the transfer of spatial discriminations to time is often thought about as ‘metaphor’, it can be conceived of as motivated by the bridging context of motion along a path, where the two domains overlap. For example, if we talk about the moon ‘coming up after’, or ‘following’, the evening star, it is a small step to talking of Easter as ‘following’ Christmas. Localism presupposes a Space → Time mapping in all languages, but perhaps this itself is a typological variable. Jürgen Bohnemeyer suggests that there is a yet-to-be-fully-developed typology of space-based vs. event-based languages, in which only the former lend themselves to a ‘localist’ analysis. The ideal type of a space-based language would have locative and path relations coded independently of events, and thus basically outside the verb – then spatial metaphors transfer to Aktionsart, aspect, event order and causality. Good candidates might be some Australian and Caucasian languages, with Indo-European languages tending in this direction. The ideal type of an event-based language would have basic locative and path information co-lexicalised with events, and thus inside the verb – Aktionsart, aspect and causality are expressed independently of spatial metaphors, and event-order is not coded at all but inferred from aspect. Good candidates would include Yukatek and some North American Indian languages. (Whorf of course speculated in just this area, but Hopi turns out not to be a good example of an event-based language after all.)

The temporal domain has of course grammatical specialisations of its own – especially tense and aspect – which lie partly beyond the present concern, but see Frawley 1992, *Linguistic Semantics*, for a useful review.

## **PART B: QUESTIONNAIRE**

Abbreviations: CT = Coding Time – the time of speaking or writing

RT = Receiving time – the time of hearing (e.g. a recording) or reading.

Here are some basic questions to ask:

### ***Deictic diurnal unite***

How does one describe ‘today’, ‘yesterday’, ‘tomorrow’?

When does ‘tomorrow’ begin – midnight, sunrise, sunset?

How many days forward and backward does the system go, and what are the terms? (Are there symmetries in forward and backward terms – so that X = yesterday OR tomorrow?)

Is there a generative system of the kind ‘7 days ago’? Is it clearly different from ‘7 days before’ (which is non-deictic, but usable deictically)?

Are spatial demonstratives used as in ‘this day’ = today?

What about phases of the day – ‘this morning’, ‘this afternoon’, ‘this evening’, ‘tonight’?

You may find that ‘this morning’ spoken in the afternoon means ‘tomorrow morning’, and so forth.

Note that some languages have diurnal tenses, e.g. a past meaning ‘happened earlier today’, another meaning ‘happened yesterday’ etc. See Frawley op. cit., & Comrie 1985 for a typology.

### ***Temporal ‘demonstratives’***

How does one say ‘now’ vs. ‘then’? (In many languages these are derived from ‘Here’ vs. ‘There’, or ‘this time’ vs. ‘that time’)

### ***Demonstratives and calendrical units*** (see Fillmore 1997,45ff)

(a) First, what are the calendrical units – are there weeks, months, years and so forth, and how are they reckoned? Note that some cultures have competing cycles, e.g. one indigenous,

one imported; or one ritual and the other profane.

What seasons are distinguished, and how?

How are the starting points of such units determined, if the deictic centre is not so used (compare ‘next year’ = from Jan. 1 2002 vs. ‘in a year’ = 365 days from now)?

(b) How do demonstratives interact with these calendrical units:

‘This year’ may be ambiguous: it could mean in the span 365 days from now, or in the period Jan. 1 2001-Dec. 30 2001, Compare ‘I’ll do it this week’ – in 7 days, or before next Monday? Note in English: ‘This morning’ = the morning of the diurnal unit which includes CT.

‘This year’ = the calendrical year beginning on Jan. 1 which includes CT.

‘This February’ = the next February to come up.

Also in English, ‘this’ contrasts with ‘next’, but note that ‘next Thursday’ is often ambiguous at the beginning of the week between the next one to come up and the Thursday of next week.

What does ‘that year’ mean (e.g. last year)?

How is ‘Next week/year’ expressed? Again, when does it begin? What does ‘This morning’ mean said in the afternoon? Or at midnight?

(c) Are there any lexicalisations of deictically specified calendrical units, e.g. on the model of

‘today’ (cf. German *Heute*) is there a word ‘toweek’ meaning this week?

### ***Spatial adpositions and cases in the temporal domain***

As mentioned, the mapping from space to time is facilitated through the bridging context of motion. So sources and goals become markers of temporal trajectories, ‘from then to now’ – and both adpositions and cases may be used in this way for both space and time. However, the mapping also occurs from static spatial location to temporal location – where events are locked to a deictic or calendrical time or a sequence of events. Here the collapse of 3D space onto 1D time requires special adjustments, and we find e.g. English *in, on, at, under, over, before*, etc. all used in temporal expressions.

#### ***Motion: spatial paths and temporal paths***

(a) For languages which mark source/goal nominals, check whether source, goal and via-markers transfer from spatio-temporal paths to purely temporal paths, as in ‘She worked *from Monday to Thursday* and right *through* the nights’,

(b) If your language builds these path notions partly into the verb, can these verbs be used in the purely temporal domain: e.g. can one say ‘He entered the new year wealthy, but exited it poor’, or ‘The (time for the) festival arrived’ (incidentally these two sentences express two different ‘world views’ – people moving through time vs. time flowing over people, see below). Note that in Lao to say ‘it got redder’ one says ‘it entered-red

entered-red'. Check all the path verbs: 'enter', 'exit', 'leave', 'return' (as in 'Christmas returned'), 'pass through', 'come here', 'leave here', etc. Also check whether the kind of nominal construction used to name sources and goals (e.g. zero-marked, or with one general relational adposition) carries over to temporal locations, as in (the non-English) 'The festival arrived Monday'.

(c) check how people talk about encountering things along a path: 'Before you arrive at/come to X, you will encounter Y' etc.

(d) Check your language for the two big rival schemes here: is the speaker moving forward through time (in which case the future is 'in front', 'ahead'), or is the speaker still, and time flowing past. On the picture in which we move through time, we talk about 'the week ahead', 'the week behind us', but on the time-flowing-by picture, the direction is reversed and we talk about 'in the following weeks', 'after last week' (Fillmore 1997:46 – as is clear from the examples here, English is mixed!).

#### *Temporal location – spatial topological and projective notions in the temporal domain*

In the collapse from 3D space to 1D time, something has to give: either only some of the spatial axes are brought over into the time-line, or they are neutralised with regards to their axial differences, and used to mark other semantic parameters. Consider what happens to English: (a) not surprisingly, the topological prepositions all have their uses – *on Monday, at the moment, in five minutes, around two, near to nightfall*, (b) the projective prepositions are a bit more restricted, but still, more than one axis is taken over into time – *before lunch, after dinner, (in/for) under five minutes, over an hour*. Note though that the lateral left/right axis seems to have no temporal uses in English, in contrast to Chinese where '8 o'clock left-right' means 'at around 8 o'clock'.

English temporal adverbials offer a huge range of options, in part because the spatial patterns are complemented by special temporal patterns (Quirk et al (1985:526) say "no other type of adjunct has such a wide range of grammatical realisations as has the adjunct of time"). For example, English allows preposition drop in (especially) deictically anchored temporal expressions (*He met her last week/Monday/a while ago/today*. Very roughly, English has the following patterns:

#### *Time position*

the choice of prepositions seems to depend on the size of the time interval, and thus on temporal precision: exact: *at five o'clock*, fairly exact: *on Monday*, imprecise: *in the last century*

proximity: *around 1.0 p.m., near to midnight*

#### *Time spans and durations*

Forward spans use spatial prepositions like *up to, over (the weekend), by* as well as *until*. Backward spans use *since (1980), for (three years)*. Durations with spatial prepositions: *far (into the night), on into, etc.* (But see Quirk et al. for the full gory story).

Projective relations tend to use the egocentric or AWAY dimension of space as the source of discriminations on the time-line. Motion forward makes it natural to have the future in front and the past behind, but Fillmore reports some cases of the reverse, perhaps related to the Hausa style reversal of 'in front' and 'behind' (so the cat is said to be 'behind' the tree when it is between the tree and the viewer). There may also be important intrinsic frame of reference transfers: one may find locations like 'at the festival's front', where the festival is thought of as facing us.

(a) Containment:

How does one use containment adpositions (or cases) in the temporal domain.

Cf, English ‘in two hours’ = two hours from CT, vs. ‘inside two hours’ = in any span less than 2 hours from CT.

There are also of course non-deictic time-span uses, as ‘He did it in two hours’, which contrasts with the durational ‘He did it for two hours’; within time-span uses there is a contrast between punctual and durative events as in ‘The bomb exploded in two hours’ vs. ‘He wrote the paper in two hours’.

(b) Coincidence and Superposition:

English, Dutch, etc. use ‘on’ to indicate a temporal coincidence with a diurnal unit, e.g. ‘on Monday’, while using ‘at’ for more precise points (‘at 5.00’ not ‘on 5.00’ – although one can say ‘on the ring of the bell, ran’). Languages with locative cases may use the locative for both such cases. The vertical dimension has its uses too: *in under five minutes, vs. for over 2 hours*

(c) Projective adpositions:

*from the relative frame of reference:*

‘we reach Hannover before Berlin’

*from the intrinsic frame of reference:*

arguably English ‘Before Wednesday’, ‘After the feast’, are intrinsic in inspiration.

But note that we can’t say ‘at the side of Wednesday’, although with demonstratives this becomes possible: ‘this side of the New Year’

*from the absolute frame of reference:*

‘uphill of the feast’ (Tzeltal, = before the feast)

(On the transfer of the frames of reference more generally, see the note above).

## PART C: COLLECTING GESTURES ABOUT TIME

### Background

A matter of special interest is how people gesture about temporal relations, compared to spatial ones. It may of course not always be easy to dissociate time and space in gesture – e.g. in motion description gestures indicate not only spatial direction, but also analog temporal properties like speed and acceleration. Similarly, lack of motion may coincide with the passing of time - as in “he stayed there” with held flat hand. Still, there may be ‘time only’ gestures, as when people talk about such and such an event happening long ago (e.g. pointing backwards), or before another event (pointing leftwards). For those gestures, it would be very interesting to see whether some of the same spatial primitives recur in the temporal field, as in this (highly simplified) table:

<b>gestural type</b>	<b>spatial meaning</b>	<b>temporal meaning</b>
index finger point	locus treated punctually	point in time
flat hand horizontal	spatial area	extended period in time
bimanual flat hand	delimited, measured area	delimited, measured time, span
raised arm with point	distant in space	distant in time
circular motion of hand	extended area	extended time-course repetition

Calbris (1985, 1990) has outlined a tentative taxonomy of minimal gestural ‘morphemes’ with respect to space-time much along the same lines as above; and she also discusses the directions of the time axes, as in Emmorey below.

Another way to look for space/time mappings, is to first note cultural peculiarities in spatial gestures, and then see if these same patterns carry over into temporal gesture. There is important cross-linguistic work to be done here on the direction of time axes, since there is a lot of conjecture and little empirical data in the literature. Here are some examples (see Kita et al. in Gattis, 2001 for exposition of the last two cases):

	<b>Spatial gestures</b>	<b>Temporal gestures</b>
Tzeltal	absolute – main axis uphill	future is uphill, past is downhill
Yucatec	relative and absolute	time-line is indicated right to left
Mopan	intrinsic (on ‘away’ axis)	time-line on away axis

Another area to look for inspiration is sign language, where space is necessarily used to indicate time. In ASL, three distinct time-lines are maintained (Emmorey in Gattis 2001):

- (1) deictic time: on the ‘away’ axis, so that the future is ahead (e.g. ‘next week’ is signed with basically the same sign as ‘week’, except it is done with motion away from signer, while ‘last week’ is done with motion backwards).
- (2) sequence time: events are related to other (e.g. calendrically specified) events across the lateral axis, from left to right.
- (3) temporal anaphora line: on the horizontal diagonal from near left to far right, this seems to be used to indicate purely relative ordering within narrative.

In addition, there is a flat vertical plane parallel to the torso used to indicate calendrical time, using upper-left to lower-right timeline.

## Tasks

To collect relevant gestural data we recommend:

- (1) Do the ‘locally situated narrative’ collection described (with preferred camera angles) under GESTURE recommendations. Note that temporal reference is here likely to be bound up with spatial reference, but still you may find pure temporal gestures occurring.
- (2) Ask consultants to describe the annual economic cycle – e.g. agricultural year, from planting to harvest to preparing the fields for planting. Try also ritual cycles, like the Christian year (from Advent to Christmas to Easter), or the series of local festivals. Ask what happens within these festivals, to see if containment relations as well as precedence relations are gestured. Note that one wants to avoid a simple progression (“x, then y, then z...”) - one needs to elicit references that jump backwards and forwards, e.g. by asking “But what happens before that? ”, “what exactly is the relation between the planting and the harvest festivals? ”, “In the old days, was the new year always after or before the X festival? ”, and so forth.
- (3) Another kind of sequential series of events that may be interesting are “rites de passage” – that is rituals attending birth, marriage and death, etc. One could get consultants to describe how funerals used to be arranged: e.g. first come the mourners, then the body is buried, then there is a funeral feast, then the bones are exhumed and put in the mortuary, etc. Contrasting this with current arrangements will give the jumps backwards and forwards in time which may be especially interesting for gestures.



Consider also marriages: depending on the culture, something like the following sequence occurs: first the pair must agree to go ahead, then seek the bride's parents' approval, then the groom's, then announce a betrothal, then prepare for the marriage (e.g. collecting bride-price or dowry), then comes the marriage, etc. Marriages too are likely to have changed in style in the last 30-50 years, so you can then ask: how was it different before? To avoid the direct temporal succession, ask questions of the kind, "Yes, but how did they prepare for that? ", "What happens if it turns out there was a prior lover? ", "What happens if the girl is already pregnant, or later proves infertile? ", etc.

If you have any snapshots of marriages or funerals, you could use these to launch the discussion in the middle of the sequence of events, requiring both a backwards and forwards progression – this is a technique used in 2<sup>nd</sup> Language Acquisition work by e.g. Clive Perdue or Christine Dimroth.

- (4) Ask consultants to describe the birth order of their siblings, their children, or of other individuals in important local families. One could also ask about when and how these children were educated, later married, etc., and by jumping between families one might get discussions about which sons were educated or married first, etc.
- (5) Ask consultants to tell you everything they did in a chosen span – e.g. this year, or this week. You can also try asking about future plans – e.g. travels, pilgrimages, house improvements, etc. Autobiographies can be great data for all sorts of purposes – see if people are willing to tell you 'the story of my life': promising consultants would be those who had unusual pasts, e.g. sent into exile, or much traveled, or spent time as prisoners of war or exiles, or serfs on plantations, etc.

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