Time in Language

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Human experience of time

• Life: stretch between birth and death.
• Path from cradle to grave.
Number line

- Conceptualization of time like the number line:
  - set of instants;
  - ordered by earlier than-relation;
  - directionality.
Time experience in language

• Metaphors in language tell us how we experience time (bodily experience), and provide insight into human cognition.

• Lakoff and Johnson (1987): Metaphors we live by.
Time is like an arrow

• Time is static, directional:
  – From the beginning till the end.
  – Throughout my school years

• Time length is objectively measurable:
  – The concert lasted an hour.
We are moving through time

—Once we get further into the nineties...
—The final exam is before us.
—Walk away from your past.
Time is like a river

• Flow of time: time is always in motion.
• We stand still, but time passes by:
  – Life goes on.
  – In the coming weeks.
  – When midnight rolls around.
• We experience passing time as slow or fast (‘subjective time’):
  – Time flies.
  – Minutes crawled by.

Alan Pierson project: “Time”
Reggy van der Burgt “De tijd staat niet stil”
Time passes by

• Time passing = time gone:
  – It is high time!
  – The time to do this has passed.

• Time is a resource:
  – We spent the summer at the sea side.
  – Spend your time wisely!

Sam Hunt: “Leave the night on”
Dean Brody: “Time”
Objective and subjective time

• MacTaggart (1908): A-series and B-series.
• B-series: numberline.
• A-series: ‘subjective’, for ‘point of view’: central role for speaker/now.
• We find both perspectives in spatial cognition as well.
Time, body and space

• Absolute space: fixed directions ~ time axis runs from left to right (objective).

• Relative space: speaker’s viewpoint ~ time left and right of the body (subjective).

• Non-linguistic representations of time: Mian (Papua New Guinea) vs. Am. English (Fedden & Boroditsky 2012).
Adverbs of time

• Subjective time (deictic, A-series):
  – now, soon, yesterday, ever, a long time ago...

• Objective time (linear ordering, B-series):
  – On April 23 2007, first this then that, a day later...
Cyclic time

- cyclic adverbs:
  - at 6 o’clock, at night, on Monday, in January, in the summer.

- in combination with deixis (‘now’):
  - Next Sunday, last summer.
Measuring and counting time

• Duration adverbials:
  – *For two hours, in a week, during the summer, since, until*

• Iterative adverbs:
  – *Twice, three times, a lot, time and again*

• Frequency adverbs:
  – *Sometimes, often, always, never*

• Counting in cycles:
  – *Three times a week, two vacations a year*
Time and Tense

• **Tense**: linguistic/grammatical expression of time, normally on the verb (verbal tense).

• Comrie (1985): typological study of tense.

• Claim: all cultures conceptualize time, but not all languages have tense. [http://wals.info/](http://wals.info/)

• Compare natural and grammatical gender (*she/he*)
Tenseless languages

‘Tenseless languages’: Mandarin Chinese, Birmese (Myanmar), Dyirbal (Australian Aboriginal language), ..

- Sometimes: modal opposition (realis/irrealis): Burmese, Dyirbal
- Always: lexical expressions like time adverbials.
Mandarin Chinese

• Wo shuaiduan-**le** tui
  I break – LE leg
  ‘I have broken my leg’ (you see the plaster)

• Wo shuaiduan-**guo** tui
  I break.GUO been
  ‘I have broken my leg’ (happened once in the past, healed since)
Verbal morphology

• Most languages realize tense on the verb.
• Verbal morphology (inflection)
  – He works/he worked.
• Auxiliaries
  – It has rained/It will rain/It’s going to rain.
Nominal tense

• Indigenous North American languages:
  • inikw- ihl- ’minih-’is- it- ’i [Nootka]
    fire.in- house-pl- dim-past-nominal
    ‘the former small fires in the house’
Deixis: I, here, now

- ‘Now’ = speech time
- Past-present-future.
- Past, future: stretches of time.
- Present: indivisible moment in time.
Present

• The present has a special status: it is always ‘now’, never a different moment.
• Linked to the ‘now’ of the speaker.
• But: today’s ‘now’ is not the same ‘now’ as yesterday’s ‘now’ of tomorrow’s ‘now’.

Beatles: “Yesterday”
Asymmetry past and future I

We cannot change the past:

– I cannot decide now to go to Paris yesterday.
– Beatles: “now I long for yesterday”

Counterfactuals:

‘If I had worked harder in school, my mother would be proud of me now.’  
Dio “Tijdmachine”
Asymmetry past and future II

• Past is fixed: we know the facts
  —epistemically accessible.
• Future is open: we don’t know
  —epistemically not accessible.
• The future offers possibilities:
  human freedom of action.
  —you can now choose to behave
  differently tomorrow (or not..).

Jodie Connor: “Now or never”
Leonard Cohen: “Future”
Past/present/future in language

- In past tenses often more distinctions, e.g. degrees of distance to now (hodiernal past, recent past, distant past), e.g. Bantu languages.
- Future tense often mixed in with modality:
  - *It will rain/*It is going to rain.*
- Present tense sometimes left unmarked:
  - default
More on time and space I

• Today’s western cultures: the past is behind us, and the future ahead.

• American sign language:
  - https://www.youtube.com/watch?v=2Tgl8
  - https://www.youtube.com/watch?v=XlydE
More on time and space II

• But: ancient Greek philosophers:
  – The past is ahead of you, the way that water already covered is ahead of an oarsman sitting backward. And the future hits you unawares, the way a pylon might hit an inattentive oarsman.

• Maori (Pacific Island language):
  – The word *mua* means “in front,” or “in former times.”
  – The word, *muri* means “the future,” or “behind.”
Theories on Time in Language

• Tense logics: inferences, reasoning.
• Reference point: representing point of view.
• Narrative time: telling a story.
• ...
Micro-variation

• Languages like English, Dutch, German, Norwegian, French, Spanish, Italian, Greek all have a present perfect:

• *Mary has left, Marie is vertrokken, Marie est partie.*

• Auxiliary (*have/be*) + past participle.

• Past event + present state.
Locating time adverbials I

- Present state = perspective ‘now’, time adverbials referring to today.

a. The princess has left the hospital this morning. (En)
b. De prinses heeft het ziekenhuis vanmorgen verlaten. (Nl)
c. María ha salido del hospital esta mañana. (Es)
Locating time adverbials II

- Past event ≠ perspective, so: no time adverbials referring to the past.
  a) *Mary has left the hospital at six o’clock. (En)
  b) Mary left the hospital at six o’clock.
  c) Maria salió del hospital a las seis en punto. (Es)
  d) Marie heeft om zes uur het ziekenhuis verlaten. (Nl)
  e) Marie a quitté l’hôpital à six heures. (fr)
Time in Translation

• Manual research on literary translations


b. Mother died today. Or maybe yesterday, I don’t know. I had a telegram from the home.

c. Vandaag is moeder gestorven. Of misschien gisteren, ik weet het niet. Ik ontving een telegram uit het gesticht.

Albert Camus. L’Étranger/The stranger.
Scaling up translation methodology

- Parallel corpora: Europarl, Open Subtitles.
- Translation equivalents provide us with *form variation* across languages in contexts where the *meaning is stable*.
- [http://timealign.pythonanywhere.com/](http://timealign.pythonanywhere.com/)
Time Align methodology

• Methodology: extract perfects from English, Dutch, German, French, Spanish.
• Align them with their translations in the other 4 languages.
• Create 5 tuples of verb forms (perfect, present, past).
• Map out similarities and differences in two-dimensional space (multi-dimensional scaling).
German Map
French Map
German Map

passé composé, Perfekt, vtt, pretérito pluscuamperfecto, present perfect
Both English and Spanish should allow time adverbials that refer to ‘now’; confirmed in Europarl.

<table>
<thead>
<tr>
<th>French</th>
<th>German</th>
<th>English</th>
<th>Dutch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Les députés sociaux-démocrates danois ont voté (aujourd'hui) contre la proposition visant à porter organisation commune des marchés dans le secteur de la banane.</td>
<td>Die dänischen Sozialdemokraten haben heute gegen den Vorschlag betreffend die gemeinsame Marktorganisation für Bananen gestimmt.</td>
<td>The Danish Social Democrats have today voted against the proposal for a common market arrangement for bananas.</td>
<td>De Deense sociaal-democraten stemmen tegen het voorstel betreffende een gemeenschappelijke marktordening voor bananen.</td>
</tr>
</tbody>
</table>
# Locating Time adverbials

## Source

**Dutch**

Mevrouw de Voorzitter, op 4 december we have hierover gestemd.

## Translations

<table>
<thead>
<tr>
<th>Language</th>
<th>Tense</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>German</td>
<td>Perfekt</td>
<td>Frau Präsidentin, wir haben am 4. Dezember abgestimmt.</td>
</tr>
<tr>
<td>English</td>
<td>simple past</td>
<td>Madam President, we voted on 4 December.</td>
</tr>
<tr>
<td>Spanish</td>
<td>presente</td>
<td>Señora Presidenta, votamos el pasado 4 de diciembre.</td>
</tr>
<tr>
<td>French</td>
<td>passé composé</td>
<td>Madame la Présidente, nous avons voté le 4 décembre.</td>
</tr>
</tbody>
</table>
Subtle differences in what counts as ‘now’

German

Letzte Nacht habe ich davon geträumt, ein Rentner zu sein, denn obwohl ich die italienische Rentnerpartei vertrete, beziehe ich keine Rente.

Translations

**English**

simple past

I must tell you that **last night** I **dreamt** I was a pensioner.

I do not actually receive a pension although I am the representative of the Pensioners’ Party in Italy.

**Spanish**

pretérito perfecto compuesto

Debo decir que **esta noche** he soñado con que era un pensionista.

En efecto, aunque soy el representante del Partido de los Pensionistas en Italia, no disfruto de pensión alguna.

**French**

passé composé

Je dois dire que **cette nuit** j’ai rêvé que j’étais retraité.

En effet, bien qu’étant le représentant du Parti des retraités en Italie, je n’ai pas de retraite.

**Dutch**

Ik moet u vertellen dat ik **afgelopen nacht** droomde dat ik met pensioen was.

Ik ben weliswaar afgevaardigde voor de Partij van de Gepensioneerden in Italië, maar ik heb zelf geen pensioen.
Language and cognition

• Conceptualization of time in all cultures: words.
• Grammar of time varies: macro/micro-variation.
• Recurring ingredients:
  ➢ subjective/objective time, perspective, states/events.
  ➢ morphology, lexicon, grammar as linguistic expressions of conceptualization of time passing by.
Interdisciplinary research

• The linguistic analysis of time touches upon philosophy (epistemic differences between past and future), biology (biological clock), neurocognition and psychology (experience of time passing by), logic (ontologies, inferences), literature (time in texts).

• And now it is high time to end this talk!
Time, language and logic

- Tense is deictic
- $[[Pp]]^t = 1$ iff $[[p]]^{t'} = 1$ true at $t'$, $t' < t$.
- $[[Fp]]^t = 1$ iff $[[p]]^{t'} = 1$ true at $t'$, $t < t'$.

- Verbal tenses: A-series, analysis in terms of propositional operators.
Verbal tense by Prior

- *Sophie left*: Pp (past tense)
- *Sophie will/is going to leave*: Fp (future tense)
- *Sophie leaves/is leaving*: p (no present operator!)
- *Sophie had left*: PPp (is that right???)
- *Sophie has left*: Pp or p or ????
- Prior’s operators very suitable for tense logics, inference patterns, harder to apply to natural language.
Present, past, future..

• Standard division of TIME in past, present, future.
• So: languages have three TENSES to refer to this three-way division of time (ancient Greek).
• How many tenses does English have? Or Dutch?
• Conclusion: TIME ≠ TENSE
• The verbal tense form systems of natural languages are more complex than we think!
Reichenbach (1924)

- Deictic anchoring: S (‘speech time’)
- Reference to location of event in time: E (‘event time’).
- Additional point: R (‘reference time’) ~ combination of subjective and objective time.
- All verbal tenses represented in configuration of S, E, R.
- More empirical grounding in language, more familiar to linguists.
Reichenbachian system of S, R, E

• Sophie is singing: E,R,S
  (comma = simultaneity)
• Sophie sang: E,R – S
  (– = precedence)
• Sophie has sung: E – R,S
• Sophie had sung: E – R – S
• Sophie will sing: R,S – E or  S – E,R
System of S, R and E

• (I knew that) Sophie would leave R – E and R – S (leaving before/after S)
• Sophie will have left (tomorrow) S – E – R
• Sofie would have left (the next morning) E – R– S
Criticisms of Reichenbach

• ‘Too many’ possibilities: no language has verb forms for configurations like $S \rightarrow R \rightarrow E$, future of the future.
• Distinctions in the future always less fine-grained than in the past (epistemic difference between past and future).
• As long as $S$, $R$ and $E$ are perceived as ‘points’ there is no room for aspect.
Verbal aspect

• Stative verbs: *be hungry, have blue eyes, hate, believe*..
  — True at (indivisible) points on the time axis (‘snapshot’).
• Dynamic verbs: *swim, sing, dance*.
  — True at intervals (‘movie’).
Events anchored to time axis

• Tense is deictic, aspect is non-deictic.
• Aspect leads to more complex ontology: not only points or intervals on the time axis, but events, states; abstract entities.
• Beatles “Yesterday”: what makes the song dramatic are the events, not reference to a time interval preceding the day of the utterance.
• Counting time (‘twice’): counting events.
Default temporal reference in Mandarin Chinese

• Lisi hen jushang.
  Lisi very depressed
  ‘Lisi is very depressed.’
  – Default: unmarked states hold now
• Zhangsan dapuo yi-ge huaping
  Zhangsan break one-Cl vase
  ‘Zhangsan broke a vase.’
  – Default: unmarked events hold in the past
• Lin (2003)
Compositional aspect: verb + argument

- John ate a sandwich
  (object indicates endpoint of event: telicity)
- John ate sandwiches
  (object does not indicate endpoint: atelicity).
- John ate a sandwich in five minutes.
- John ate sandwiches for hours.
- # John ate a sandwich for hours.
- # John ate sandwiches in vijf minuten.

Verkuyl (1972)
Grammatical aspect

• John ate a sandwich (sandwich finished)
• John was eating a sandwich (eating started, but sandwich not finished yet).
• English Progressive takes the ‘middle’ from an event (without beginning- and endpoint).
• No stative verbs:
  – *I am knowing English.
  – I’m loving it! (McDonald slogan)
Russian aspect

• On čita-l knigu.
  ‘He was reading a book.’ (Past Imp)

• On pročita-l knigu.
  ‘He read a book.’ (Past Perf.)

• On čita-et knigu.
  ‘He is reading a book.’ (non-past Imp)

• On pročita-et knigu.
  ‘He will read a book.’ (non-past Perf)
Aspect in discourse

• We do not speak in isolated sentences, but coherent sequences of sentences: discourse (monologue/dialogue/text/stories).
• Central notion: discourse coherence.
‘Natural’ order

• Jimmy woke up, stretched out, and jumped out of bed. He took a shower, ate breakfast, and got on his bike at 8 o’clock to go to school.

• ??? Jimmy stretched out, ate breakfast, and jumped out of bed. He woke up, got on his bike at 8 o’clock to go to school, and took a shower.

• Sentences in text (S1, S2, ... Sn) mirror temporal order (e1 < e2 < e3, ... e_n).
Events and states

• Jimmy woke up, and stretched out. The sun was shining, a bird was singing, and the air smelled of spring. He jumped out of bed, and went downstairs to have breakfast.

• $e_1 < e_2$, $e_2 \in \{s_3, s_4, s_5\}$, $e_2 < e_6 < e_7$.

• States/activities do not express a sequence, but overlap in time.

• Change in order has no consequence for coherence (no change in temporal sequencing).

• New event later in time than last mentioned event.
Perspective

• States do not lead to progress in time.
• What is their role in discourse?
• Background, perception, perspective.

Hanna woke up, and opened the curtains. The sun was shining, a bird was singing, and the air smelled of spring.
Neo-Reichenbachian analysis

- Use S, R and E, but define E and R as intervals or even separate ontological entities (states, events).
- Static, atelic, progressive, imperfective: $r \subseteq s$
- Event, telic, perfective: $e \subseteq r$
- Event introduces a new $r$ later in time.
- Narrative time moves on with events, but not with states (overlap with current $r$).
Grammatical aspect: Russian

• In Russian, perfective sentences indicate narrative and temporal sequence (progress in story time).

• Он вошел, открыл окно, и вышел. He came\textsuperscript{perf} in, opened\textsuperscript{perf} the window, and went\textsuperscript{perf} outside.

• Smith (1991/1997)
Grammatical aspect: French

- Anne came in. Jean was in the kitchen. He offered her a cup of tea.
- entra \(\subseteq\) était; entra < offrit
- Passé Simple: progress in time, event, dynamic.
- Imparfait: static description, temporal overlap with a given moment (anaphoric), background information.
Telling a story in the PERFECT

• Narrative perfect in French, not in English:
  a) La garde s’est levée et s’est dirigée vers la sortie. [Passé Composé]
  b) The nurse stood up and went towards the door. [Simple Past]

• Camus. L’étranger/the stranger
Time in Translation

- New research project starting at Utrecht University.
- Using large parallel corpora to map out perfect use across languages (Europarl, Open Subtitle corpus, literary corpora).
- Create temporal maps: geographical representations of tense distribution.
- [http://timealign.pythonanywhere.com/](http://timealign.pythonanywhere.com/)
Dissimilarity matrix

- **Distance function**: we define a pair of source and translations to be maximally similar (d=0) if all tenses match up.

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<td>Pasado receinte</td>
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Dissimilarity matrix

- Using the distance function, we can create a dissimilarity matrix.

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Multidimensional Scaling

- **Multidimensional scaling (MDS)** tries to create a low-dimensional representation of the data, while respecting distances in the original high-dimensional space.