For one hour, *One year later* et al.: Melting frozen time in narrative text comprehension

Berry Claus
Psycholinguistics Group, CoLi

Narrated Time

Consider a narrative text describing a sequence of events

Example: short excerpt from Franz Kafka's *Metamorphosis*

Gregor slowly pushed his way over to the door with the chair. Once there he let go of it and threw himself onto the door, holding himself upright against it using the adhesive on the tips of his legs. He rested there a little while to recover from the effort involved and then set himself to the task of turning the key in the lock with his mouth.

Narrative creates for the comprehender an imagined time stream as a dimension of the described world in which the events occur (cf. Aristar Dry, 1983)

<div align="center">
narrative past   narrative *Now*   narrative future

————————————————————————————→
</div>

Narrated time seems to flow steadily forward – just as time in the real world

Simulating Described Events

Print/Sound triggers the perception of time movement → puzzle

Simulation view of language comprehension
(e.g., Barsalou, 1999; Glenberg, 1997; Zwaan, 2004)

Comprehenders understand the description of a sequence of events by mentally simulating each of the events

E1	E2	…

→ **Coherent representation**

Representation captures the flow of narrated time
→ Intrinsically coding of the temporal structure in the described world

This Talk

How do comprehenders mentally represent the temporal structure of described events?

Temporal distance → Is the accessibility of a past event affected by whether it occurred a short or a long time ago in the described world?

Temporal order → How do comprehenders represent a non-chrono-logically described sequence of events?

Manner of description → Does it matter how the temporal distance in the described world is linguistically conveyed?

Temporal Distance

Series of experiments conducted with Stephanie Kelter and Barbara Kaup

➔ **Is the mental accessibility of a past event affected by the temporal distance in the described world between the past event and the current narrative now point?**

Experimental texts: Description of three events (E1, E2, E3)
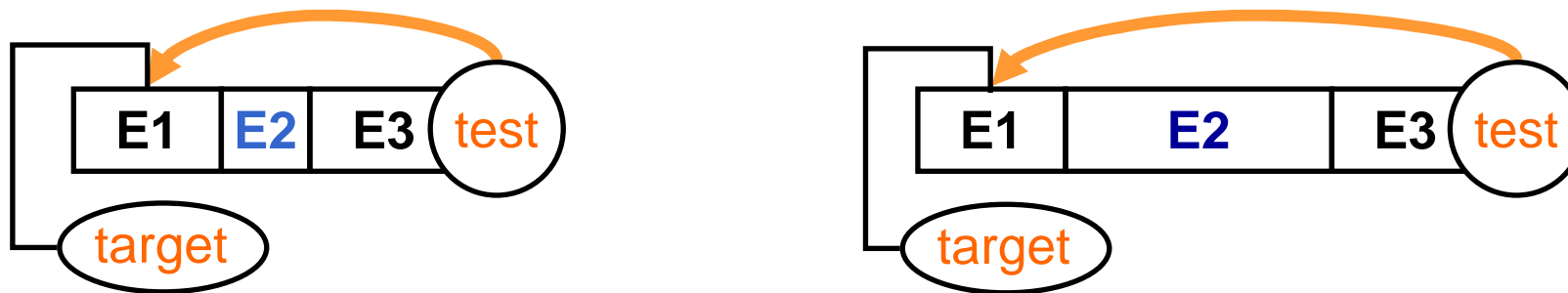
Participants read the texts (experimental and filler) from a computer screen, sentence by sentence, self-paced

Manipulation of duration (**short** / **long**) by means of a durative adverbial (within-subjects)

Test of accessibility of target: Anaphoric reference to target incident (element of E1) within the description of E3
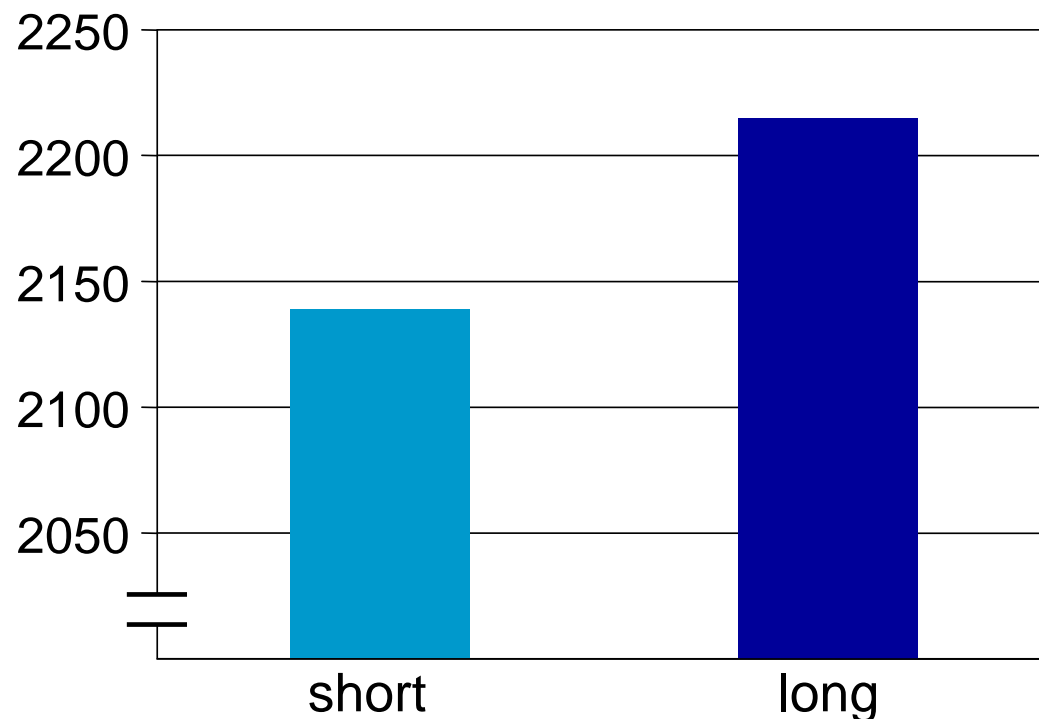
Temporal Distance: Sample Text

[Setting: Heike and Frank are on vacation together in France]

Event 1   They are sitting in a bistro and are very much in love. Frank even promises Heike to give up smoking.

Event 2   Then they go to the boardwalk because they want to enjoy the sunset. But instead they start to argue. **For five minutes** / **For three hours** they quarrel about Frank's mother.

Event 3   Now they're both really angry. They walk back to their hotel without saying a word. Frank regrets his promise to give up smoking.

[translated from German]

Temporal-Distance Effect

Temporal-distance effect → representations of described event sequences mimic temporal structure of the described world with regard to distance

How about temporal order?

Representations of non-chronological descriptions?

Mismatch between order of mention and order of occurrence
→ Structure of representation?

Temporal Order

Series of experiments conducted together with Stephanie Kelter

How do comprehenders represent a non-chronologically described sequence of events – when one of the events is described in a *flashback*?

John poured himself a large glass of whiskey. Just a moment ago he had found his budgie dead in its cage.

Order of occurrence: | finding dead budgie | | pouring whiskey |

→ Mental organization according to temporal order in the described world?

If representation mimics temporal structure → representation according to chronological order → integration of flashback event at chronologically appropriate location

Temporal Order: Methodol. Approach

Does the temporal-distance effect also occur when the target incident is mentioned in a flashback**?**

Non-chronological description of event sequences
Order of occurrence: **E1**-E2-E3
Order of mention: E2-**E1**-E3
         → E1 is mentioned in a flashback

Manipulation of duration of E2: **short** / **long**
Anaphoric reference to incident of E1 within the description of E3

If comprehenders represent the flashback event E1 at the temporally appropriate location, that is, <u>before</u> E2
then: temporal-distance effect on reading times for anaphoric sentence

[setting: Heike and Frank are on vacation together in France.]

Event 2   In the evening, they sit on a bench at the boardwalk and want to enjoy the sunset. But instead they start to argue.
**For five minutes** / **For three hours** they quarrel about Frank's mother. They're both really angry.

Event 1   Before their quarrel, they had been sitting in a bistro and had been very much in love. Frank had even promised Heike to give up smoking.

Event 3   Now they walk back to their hotel without saying a word. Frank regrets his promise to give up smoking.

[translated from German]

Mean Reading Times (in ms) for the Anaphoric Sentence as a Function of the Duration of Event 2
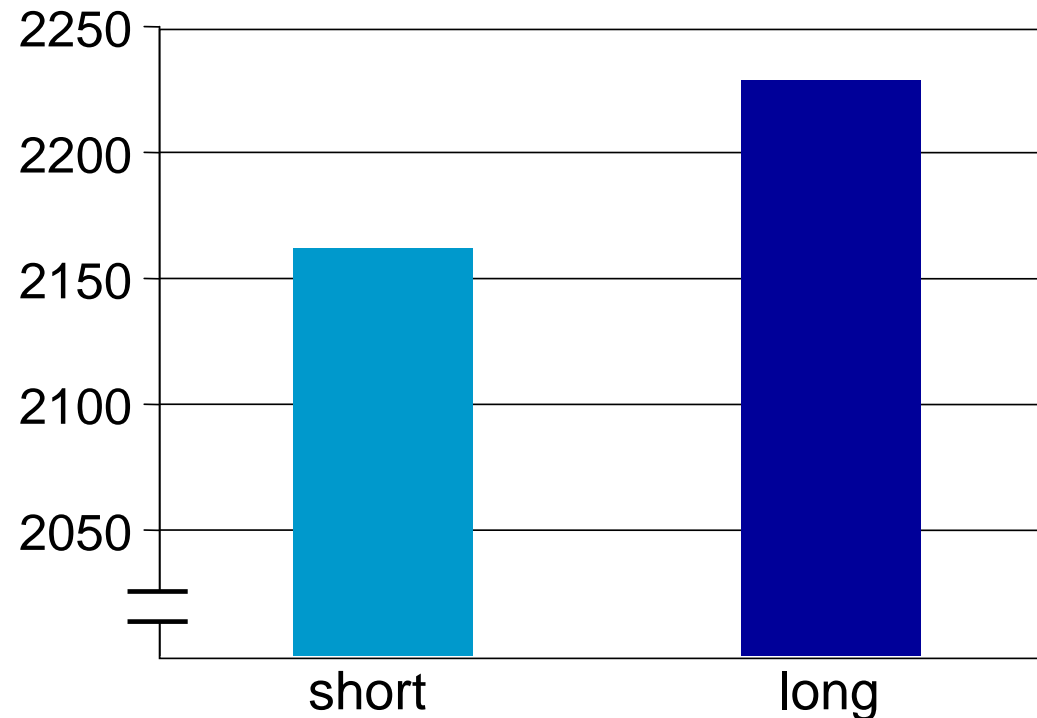
Temporal distance effect with non-chronological descriptions
→ integration of flashback event at chronological location

Chronological Representation

Chronological integration of flashback information may appear surprising from a discourse-linguistic point of view

Discourse-linguistic analyses: a flashback is closely related to the preceding sentence, providing background information (e.g., Lascarides & Asher, 1993; Polanyi & van den Berg, 1996; ter Meulen, 2000)

Discourse function of flashbacks → expectation: comprehenders attach the information about a flashback event as background information to the information of the preceding sentence

Note: Results do not rule out the possibility that comprehenders interpret a flashback as providing background information

Results allow for the possibility that comprehenders store the flashback information as background information and over and above integrate the flashback event at its chronologically appropriate location

Interim Conclusion

Comprehenders' representations of described sequences of events mimic temporal structure of the described world with regard to temporal distance and temporal order

Temporal-distance effect

 obtained with chronological and non-chronological descriptions

 could be replicated in several experiments
 with different materials
 with implicit manipulation of duration: short-lived vs. long-lasting event (e.g., *putting cookies on a plate* vs. *baking cookies*)
 with a different method (probe-recognition task)

 → empirically well-established

BUT: temporal-distance effect seems to be bound to a specific condition

[setting: Grand opening of Maurice's new art gallery.]

At seven o' clock the first guests arrived. Maurice was in an excellent mood. He was shaking hands and beaming.

An hour later / **A day later** he turned pale.

Probe   beaming

Result for the probe-recognition latencies

small time-shift (an hour later) ≈ large time-shift (a day later)

➔ No effect of temporal distance on accessibility

Time Shift vs. Duration

→ Contrasting the two ways of manipulating temporal distance within one experiment

Two duration conditions (as before)
and two time-shift conditions

Time-shift versions of the texts were identical to the duration versions except for two sentences:

No specification of the duration of the intermediate event but a time shift to the moment at which Event 3 started

Numeric values for the small and large time shifts were the same as the values in the respective duration versions

Time Shift/Duration: Sample Text

[setting: Mr. Satorius is a shepherd. … Today, he has learned that he will not have a successor.]

Full of sorrow, he puts the letter containing this message into the saddle bag of his motorcycle with his rain cape.

Duration   He then goes to the pasture and shears sheep for an hour / for six hours. When a young man approaches him, he stops.

Time Shift   He then goes to the pasture and shears sheep. After an hour / After six hours, a young man approaches him, and he stops.

Mr. Satorius looks up in astonishment. He must again think of the letter.

[translated from German]

Time Shift/Duration: Result

Mean Reading Times (in ms) for the Anaphoric Sentence
as a Function of Manner of Temporal Manipulation
and Temporal Distance
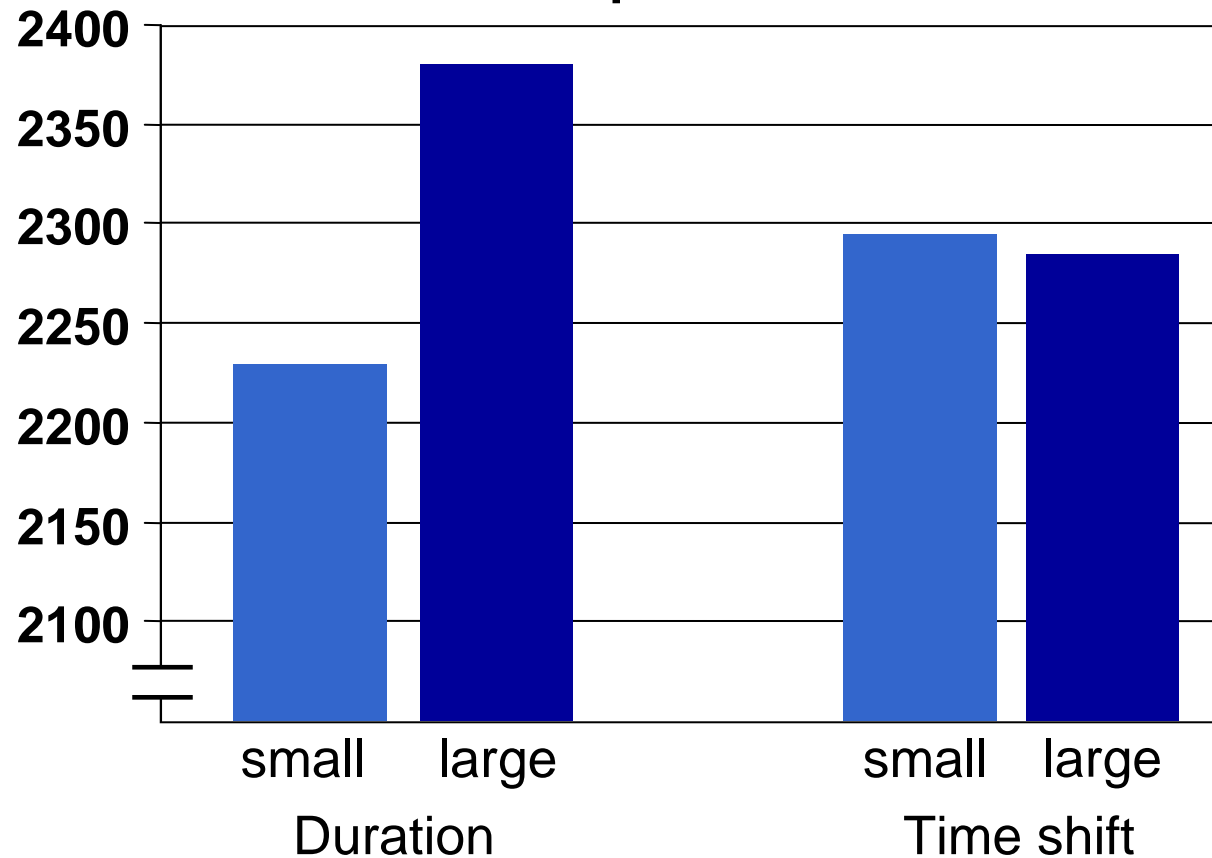
No TDE with Time Shifts: Why not?

Lack of temporal-distance effect with time shifts seems not to be due to

- empty time, i.e., unknown, what happened during the temporal interval skipped by the time shift

    Our experiment: text implied that it was just the continuation of the activity that was described before (*Then he goes to the pasture and shears sheep. After one hour / After six hours a young man approaches him, and he stops*).

➜ Why no temporal-distance effect with time shifts?

Discourse function of time shifts

Empirical findings indicate that sentence-initial time-shift expressions function as discontinuity markers (e.g., Bestgen & Vonk, 1995, 2000)

Time shifts signal a topic shift, prompting the comprehender to break off the hitherto constructed representation and to initiate a new one

Reading times for sentences that imply a temporal shift are prolonged compared with topic-continuity sentences and entities pertaining to the pre-shift situation are less accessible

Considering this discourse function of time shifts:

➔ Is the lack of a temporal-distance effect due to comprehenders focusing on the discontinuity signal of time-shift expressions without paying proper attention to the temporal information?

Does emphasizing the time-shift's size affect the occurrence of a temporal-distance effect?

Experiment

Participants read narratives containing a time-shift sentence that either implied a small or a large temporal shift. The size of the time shift was highlighted by means of the German temporal particles *schon* (*already*) and *erst* (*only*)

→ Reading times for anaphoric sentence
   (referring to a pre-time-shift incident: target incident)

[setting: Johann is a gardener. Today he has to work together with his apprentice on a private estate.]
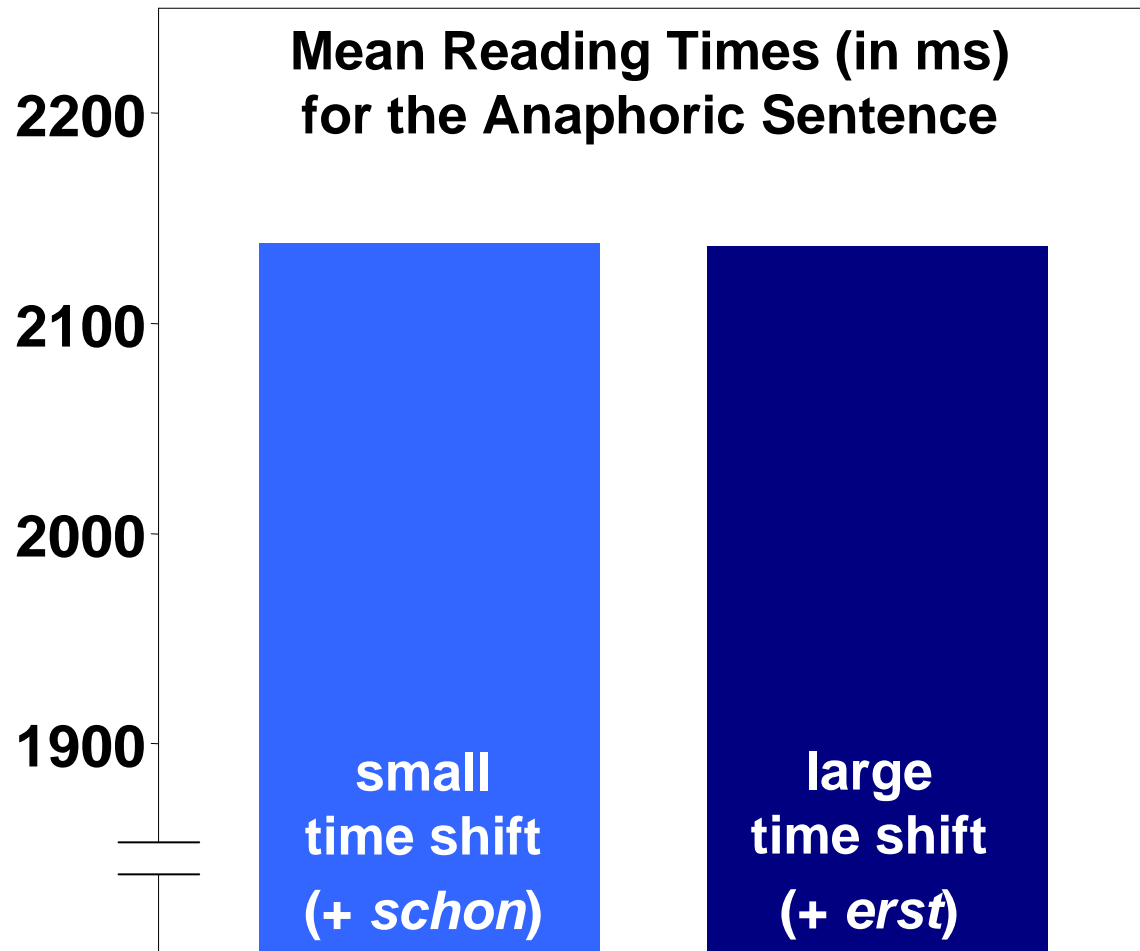
Johann explains the apprentice how to cut hedges. He praises him for his good grasp. Then Johann gets the lawn-mower. He starts to mow the ground.

Time Shift   Already after half an hour / Only after five hours, he is done.

Then he calls for the apprentice who comes running like a lightning.
The praise by Johann has motivated him a lot.

[translated from German]

Emphasizing Size: Result

**Mean Reading Times (in ms)
for the Anaphoric Sentence**

2200

2100

2000

1900

small
time shift
(+ *schon*)

large
time shift
(+ *erst*)

Even when the temporal information of a time shift is linguistically emphasized by a temporal particle, there is no evidence for a temporal-distance effect

Still: Why No TDE with Time Shifts?

Lack of temporal-distance effect with time shifts seems **not to be due to**

- comprehenders not paying attention to the size of time shifts

    still no effect when the size is emphasized by a temporal particle
    comprehenders notice when information is inconsistent with a time shift

Lack of temporal-distance effect with time shifts **may be due to**

➜ Time shifts put a stop to a continuous simulation of the entire event
sequence such that the temporal interval that is skipped by the shift
is not intrinsically coded
→ Discourse function of time shifts: signal a topic shift thereby triggering the
comprehender to break off the hitherto constructed representation and to initiate
a new one

Conclusion (interim II / final)

Mental representations of described sequences capture the flow
of narrated time

→ Comprehenders melt the time that is frozen in a sentence or text

Temporal-distance effect

> Resolving anaphoric reference to a past incident takes more time when the
> temporal distance in the described world between the past incident and the
> current narrative now is large than when it is small

Occurrence of a temporal-distance effect depends on how the temporal
distance in the described world is linguistically conveyed:
Duration vs. time shift

Mental representations mimic temporal structure of described world only if the
text allows for a continuous simulation (i.e., no temporal gaps)

Backward Shift: Flashbacks

Turning back to flashbacks → temporal-distance effect on processing flashback sentences?

Sticking to impact of manner of description

Three experiments conducted together with Stephanie Kelter
Is the processing of a flashback sentence affected by how long ago the mentioned event occurred in the described world?

Narrative texts that contained a flashback

Manipulation of the temporal distance (small/large) between the event mentioned in the flashback and the narrative now point

Measuring reading times for flashback sentences

Temporal distance was manipulated in different ways in the three experiments

Processing Flashbacks: Expt 1

Experiment 1: The temporal distance between the event mentioned in the flashback and the narrative now point was specified in the flashback sentence by a temporal adverbial

Sample Text (Excerpt)

[setting: 18-year old Guido goes on his first long ride on his new motorcycle.]
At a motorway junction he is caught up in a traffic jam.
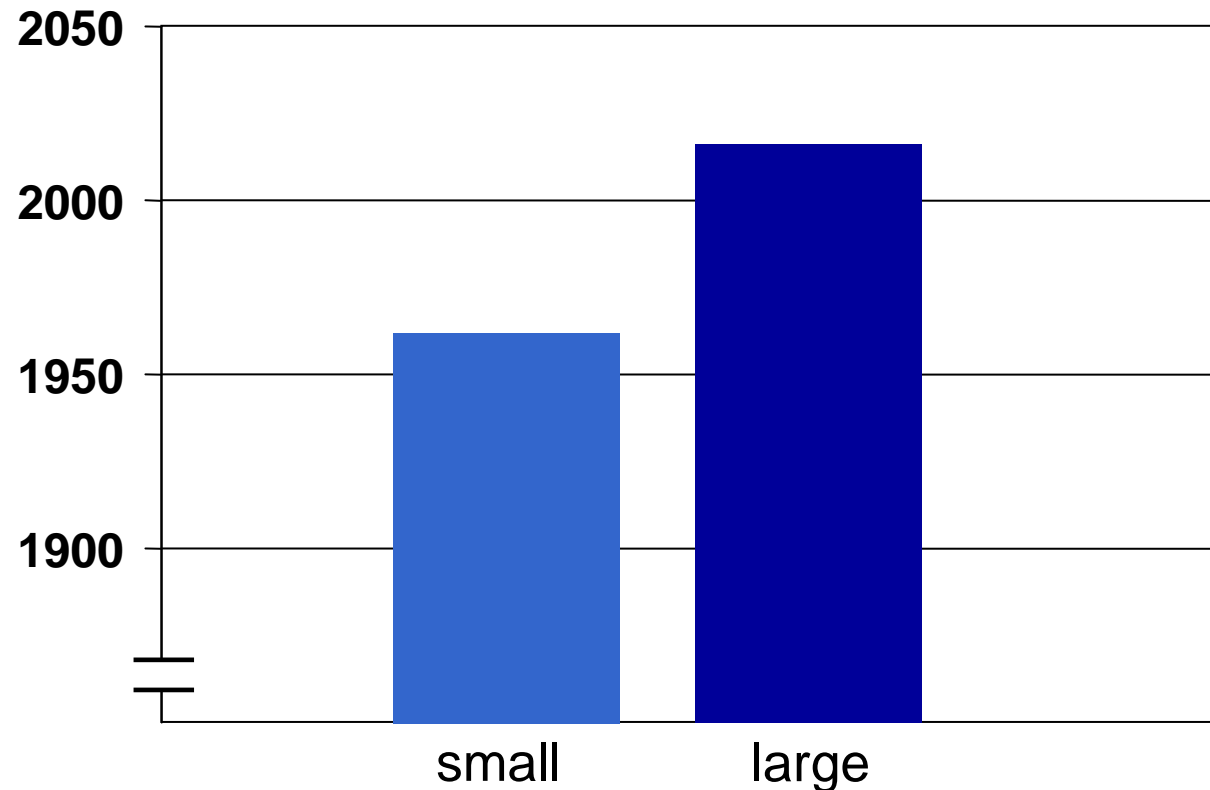Further ahead of him he spots a red Ferrari.
Ten minutes / Two hours ago he had already seen the Ferrari. (flashback)
…

[translated from German]

Processing Flashbacks: Expt 2

Experiment 2: The time of the event mentioned in the flashback was specified by referring to the beginning of a before-mentioned event X

The temporal distance was manipulated by ascribing either a short or a long duration to event X

Sample Text (Excerpt)

[setting: In Greece: Panos has to see about the flock of sheep today.]
He rounds up the sheep in the meadow in front of the house.
Then he sheers sheep **for an hour** / **for eight hours**. (event X)
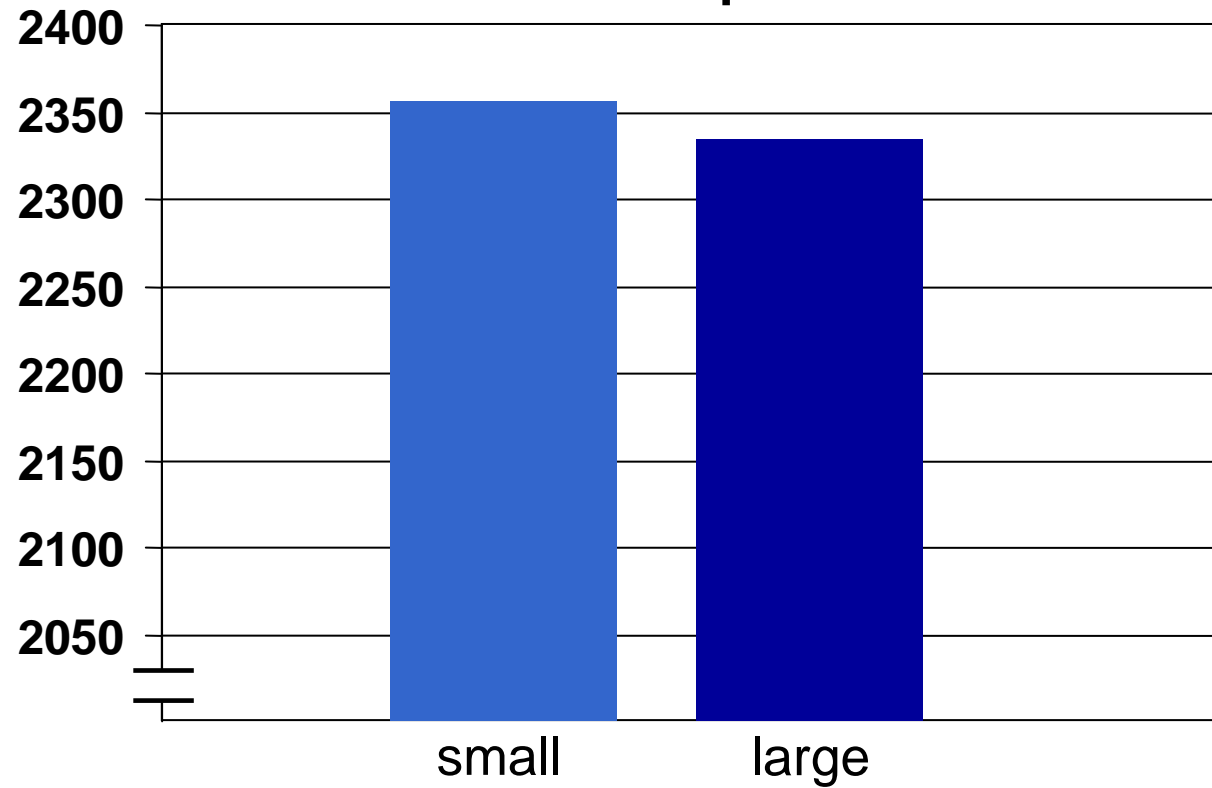Then two tourists walk across the meadow.
Before he had started sheering, they had already passed by. (flashback)
…

[translated from German]

Crucial factor in Expt 1?

Why did the effect occur in Expt 1 but not in Expt 2?
What was the crucial factor in Expt 1?

The time of the flashback event was specified relative to the narrative now point

The flashback sentence contained a numerical temporal expression

The particular point in time of the flashback event was not already established in the hitherto constructed representation → required a "translation" of numerical statements in terms of time intervals in the described world ("measuring")

To gain some insight: → Expt 3

Processing Flashbacks: Expt 3

Experiment 3: modified versions of the texts of Expt 2
same flashback sentences as in Expt 2

But: The temporal distance was manipulated by stating that event X has been lasting for a short or a long time (→ *seit*-duration adverbial)

Sample Text (Excerpt)

[setting: In Greece: Panos has to see about the flock of sheep today.]
He stands in the meadow in front of the house.
Since an hour / Since eight hours he is sheering sheep.* (event X)
Then two tourists walk across the meadow.
Before he had started sheering, they had already passed by. (flashback)
…

*Unlike the English *since*, the German *seit* allows for a duration complement

[translated from German]

Expt 3: *seit*-duration adverbial

Sample Text (Excerpt)

[setting: In Greece: Panos has to see about the flock of sheep today.]

He stands in the meadow in front of the house.

Since an hour / Since eight hours he is sheering sheep. (event X)

Then two tourists walk across the meadow.

**Before he had started sheering, they had already passed by.** (flashback)

seit-**duration adverbial** expresses that the sheering lasted for the specified time and reaches up to the now→ extended now

Beginning of event X is not explicitly mentioned

► Time of flashback event is not specified relative to narrative now

► Flashback sentence does not contain a numerical temporal expression

► The particular point in time of the flashback event is not already established in the hitherto constructed representation

   → requires setting up the beginning of event X according to the information of the *seit*-duration adverbial

Expt 3: Result

Mean Reading Times (in ms) for the Flashback Sentence as a Function of Temporal Distance
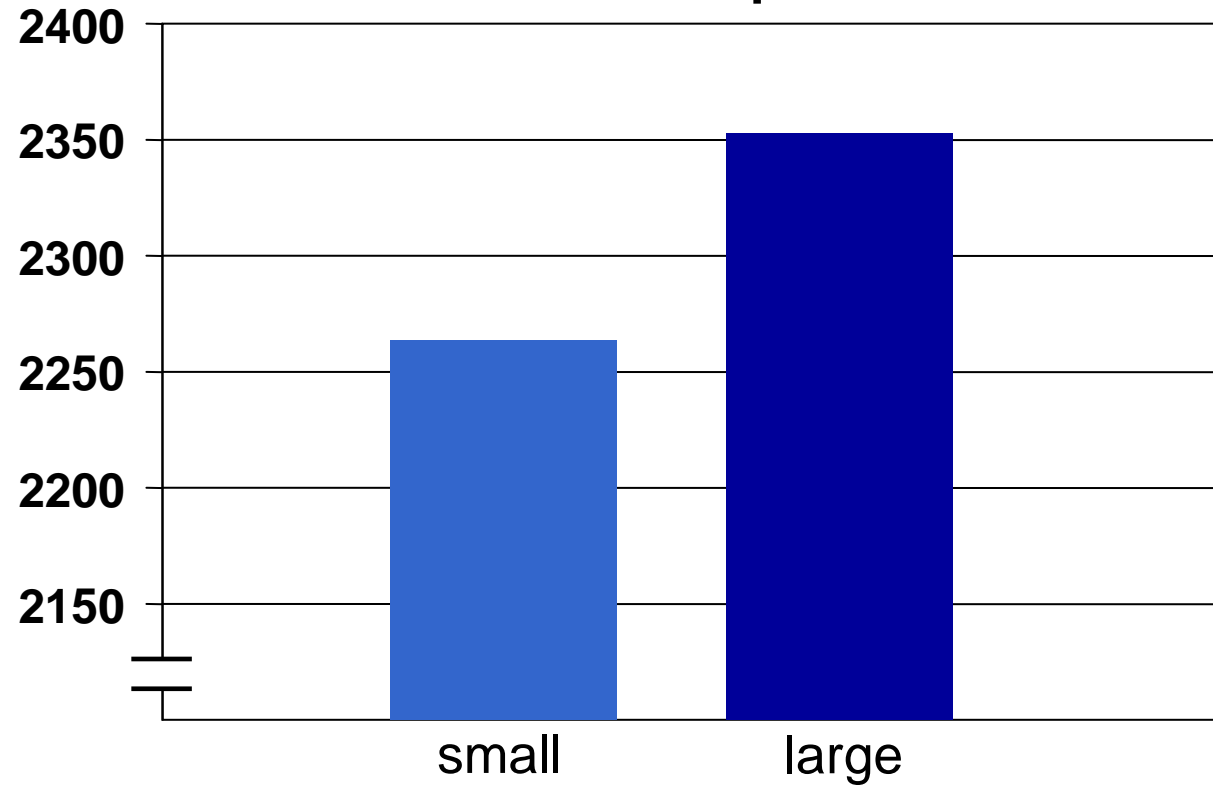
Processing Flashbacks

Results of the three experiments indicate that reading times for flashback sentences are affected by how long ago the event mentioned in the flashback occurred in the described world

… under a certain condition

A temporal-distance effect obtained only if the particular time of the flashback event was not already established, i.e., if a time interval needed to be "measured" in the representation of the described world in order to determine the time of the flashback event

Conclusion

Effect of temporal distance on accessibility of past events with chronological and non-chronological descriptions

→ Comprehenders' representations of described event sequences mimic the temporal structure of the described world with regard to temporal distance and order

However, it does matter how the temporal distance is linguistically conveyed

Occurrence of temporal-distance effect on accessibility depends on manner of description

Manner of description is also crucial with regard to whether or not temporal distance affects the reading times for flashback sentences

That's it

Thanks to

  Phil Büttner, Yvonne Flory, Norma Köppe, Guido Liebe,
  Matthias Lickfett, Alexandra Peters, Kalina Petrova,
  Alexander Richter, and Alexander Specht

for their assistance in collecting the data

and to you for your attention