Temporal processing and shifts in Aktionsart - evidence from ERPs

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Introduction

• Asp[ectual coercion, an instance of asp[ectual semantic reanalysis:
  type shifting the Aktionsart of an argument from one Aktionsart A1 into an
  (ontologically distinct) Aktionsart A2 if A1 is of the wrong type.

• Aktionsarten in the event nucleus representation (Moen[s & Steedman, 1988)

Test Case: AC achievement → accomplishment, a preparation process has to be added based on world knowledge (e.g. searching or even pottering in the house in (2))

Materials: 120 sentences each in three conditions: additive coercion (2) vs. control (1) vs. aspectual mismatch (3) (+ 180 fillers) in three lists

(1) Vor zwei Stunden hatte der Rentner den Schlüssel gefunden, obwohl … One hour ago, the retiree his keys found, although …

(2) In zwei Stunden hatte der Rentner den Schlüssel gefunden, obwohl … in two hours the retiree his keys found, although …

(3) *Ganze zwei Stunden hatte der Rentner den Schlüssel gefunden, obwohl … For two hours the retiree his keys found, although …

Participants: 24 native German speakers

Procedure: sentences presented word by word (800 ms per word). Each sentence followed by a sensicality judgment (sense: nonsense = 1:1)

EEG Recording: 30 EEG electrodes referenced to linked mastoids

ROI: past participle region (gefunden) since aktionsart depends on the verb (e.g. gesucht) which would have lead to an activity.

Analysis: four topographical regions in a 2x2 (hemisphere x anteriority) design

Predictions:
- semantic mismatch (N400 effect?) in (3) vs. (1)
- R&R: mismatch (like in (3)) + repair (WM-LAN) in (2) vs. (1)
- SU: repair in (2) vs. (1); no mismatch effect

Comparison with tense violations

• Since aktionsart items were syntactically identical the P600 was a surprise
  ➢ Do other kinds of temporal violations also elicit a P600?

(4) Gestern früh [rannte] der Junge zur Schule (Yesterday morning ran …)

(5) *Morgen früh [rannte] der Junge zur Schule (Tomorrow morning ran …)

General Discussion

• Different kinds of aspectual coercion can be distinguished:
  a) type shift of the whole nucleus (e.g. via iteration)
  b) adding an eventuality to the nucleus (additive coercion, AC)
  c) subtracting an eventuality from the nucleus (subtractive coercion)

• So far, only a) has been studied psycholinguistically

• Results differ among studies (e.g. Pinango et al. 1999, 2006, Todorova et al. 2000; Husband et al., 2006 find difficulty but Pickering et al., 2006 do not)

• Aim of the present study: investigate additive coercion, two hypotheses:

  Smooth Update (SU)
  In AC, the existing representation is smoothly updated without revising it first.

  Revise and Reanalyze (R&R)
  AC leads to the revision of the aspectual class and subsequent reanalysis.

ERP study Additive Coercion

• Makes sense judgments: control 87.1 % „yes“, coercion 75.4 % „yes“, mismatch 13.9 % „yes“ (→ participants computed coerced meanings)

• ERP-data (no difference before participle):
  ➢ Asp[ectual mismatch leads to a P600
    interaction aspect (cc vs. ccr) • anteriority (F(1,23) = 7.62; p < .01)
  ➢ AC is reflected in a LAN starting about 600 ms post onset and extending into the following word interaction aspect (cc vs. ccr) • anteriority (F(1,23) = 6.28; p < .05)
  ➢ No P600 due to additive coercion
  ➢ ANOVA: only pos. sites; aspect and hemisphere (all Fs<1)

  ➢ No indication of revision
  ➢ Findings support SU-hypothesis

• 80 sentences, each in two versions, 2 lists
• Run together with the aktionsart experiment
• Tense violations also elicited a P600 effect
• P600 indexed breakdown of temporal processing

References

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