Theoretical and empirical approaches to cleft constructions

**Day 2: Where does the exhaustive inference locate in clefts?
An overview of experimental evidence**

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Roadmap for Day 2

- Fundamental experimental methods testing the strength of exhaustivity among different types of focus constructions
    - Pictorial stimuli paradigm (Onea and Beaver, 2011)
    - Acceptability judgment tasks (De Veaugh-Geiss et al., 2015)
    - Event-related potential (ERP) study (Drenhaus et al., 2011)

Conclusion first

Let's try a different strategy today. ;)

The main findings for the experiments we are about to discuss are that in some sense *it*-clefts are less exhaustive than exclusives such as introduced by *only* but more exhaustive than plain narrow focus.

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The main findings for the experiments we are about to discuss are that in some sense *it*-clefts are less exhaustive than exclusives such as introduced by *only* but more exhaustive than plain narrow focus.

- These findings are valid across languages, though the theoretical implications depend somewhat on further properties of the experimental studies.
- Since these studies use different methods, how the strength of exhaustive inferences is translated and how it further contributes to the theoretical debate depend on each study.

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(3)   a.   MARCI fogott meg egy lepkèt.
          Marci   caught PRT a   butterfly
          'Marci caught a butterfly.'   [pre-verbal focus]

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　　　b.　Csak MARCI fogott　meg egy lepkèt.
　　　　　Only Marci　caught　PRT a　butterfly
　　　　　'Only Marci caught a butterfly'　　　　　　　　　　[exclusives]

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　　 c.　Marci meg-fogott　egy lepkèt.
　　　　 Marci PRT-caught　a　butterfly
　　　　 'Marci caught a butterfly.'　　　　　　　　　　　[default intonation]

Pictorial stimuli paradigm

The participants will then see a picture then choose one of the following answers.

(6) a. Yes, and Peter caught a butterfly too.
b. Yes, but Peter caught a butterfly too.
c. No, Peter caught a butterfly too.

Pictorial stimuli paradigm

The participants will then see a picture then choose one of the following answers.

(7) a. Yes, and Peter caught a butterfly too.
b. Yes, but Peter caught a butterfly too.
c. No, Peter caught a butterfly too.

- There is at least one additional person who has the same property in the picture, e.g. *Peter.*

Pictorial stimuli paradigm

The participants will then see a picture then choose one of the following answers.

(8) a. Yes, and Peter caught a butterfly too.
b. Yes, but Peter caught a butterfly too.
c. No, Peter caught a butterfly too.

- There is at least one additional person who has the same property in the picture, e.g. *Peter*.
- It is predicted that the more exhaustive a sentence is judged, the more likely it is that people will choose an answer with *yes, but* and *no*.

Pictorial stimuli paradigm

Predictions:

- *Only* → *No, ...*
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- Default intonation → *Yes, and...*
- If Hungarian pre-verbal focus is not semantically exhaustive, the results for pre-verbal focus sentences are expected to pattern more similarly to sentences with default intonation.

Onea and Beaver tested 6 stimuli for each participant, as well as 6 control sentences and 13 fillers. In total, 25 stimuli was presented in a random order to 19 participants.

Pictorial stimuli paradigm–Results
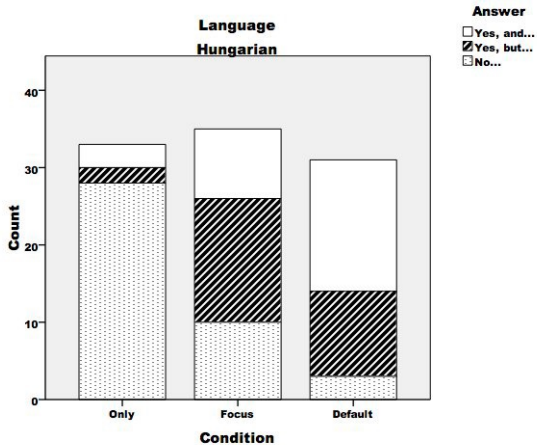
- Pre-verbal focus exhibits an exhaustive effect that is not as weak as compared to the default case, yet not as strong when it is compared with explicitly marked exclusive.

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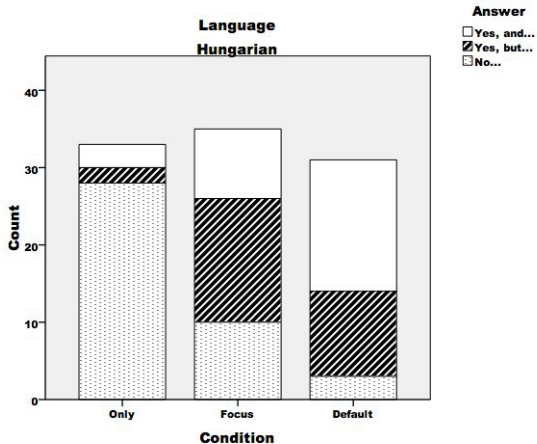
- Pre-verbal focus exhibits an exhaustive effect that is not as weak as compared to the default case, yet not as strong when it is compared with explicitly marked exclusive.
- A statistically significant difference is observed between exclusives and pre-verbal focus, but not between pre-verbal focus and default intonation.

Pictorial stimuli paradigm–Summary

Onea and Beaver (2011) took this to suggest that the exhaustive inference triggered by pre-verbal focus in Hungarian was a pragmatic effect, e.g. a conversational implicature, which they argue obtains from the tendency to interpret answers to *wh*-questions as complete and, hence, exhaustive.

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What are some advantages of using a pictorial stimuli paradigm?

- Why picture? Why not using sentences to describe the contexts?

Acceptability judgment tasks

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Experiment 1: *exclusives* vs. *it*-clefts

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Experiment 1: *exclusives* vs. *it*-clefts
Experiment 2: *exclusives* vs. pseudoclefts

Acceptability judgment tasks

Let's revisit these levels of meaning before putting them under contradictory environments.

(9) Only Sabine visited the zoo.
   a. at-issue: Nobody other than Sabine visited the zoo.
   b. non-at-issue: Sabine visited the zoo.

Acceptability judgment tasks

Let's revisit these levels of meaning before putting them under contradictory environments.

(12) Only Sabine visited the zoo.
   a. at-issue: Nobody other than Sabine visited the zoo.
   b. non-at-issue: Sabine visited the zoo.

(13) It is Sabine who visited the zoo.

Acceptability judgment tasks

Let's revisit these levels of meaning before putting them under contradictory environments.

(15) Only Sabine visited the zoo.
   a. at-issue: Nobody other than Sabine visited the zoo.
   b. non-at-issue: Sabine visited the zoo.

(16) It is Sabine who visited the zoo.
   a. at-issue: Sabine visited the zoo.
   b. non-at-issue: Nobody other than Sabine visited the zoo.

Acceptability judgment tasks

Let's revisit these levels of meaning before putting them under contradictory environments.

(18) Only Sabine visited the zoo.
   a. at-issue: Nobody other than Sabine visited the zoo.
   b. non-at-issue: Sabine visited the zoo.

(19) It is Sabine who visited the zoo.
   a. at-issue: Sabine visited the zoo.
   b. non-at-issue: Nobody other than Sabine visited the zoo.

(20) The one who visited the zoo is Sabine.
   a. at-issue: Person who visited the zoo = Sabine
   b. non-at-issue: Unique person who visited the zoo is Sabine.
      (i.e., Nobody other than Sabine visited the zoo.)

Acceptability judgment tasks

(21) **Contradiction envrionment for exclusives**

   a. Nur Sabine hat den Tierpark besucht und Anna hat den Tierpark besucht.
      Only Sabine has the zoo   visited and Anna has the zoo   visited
      'Only Sabine visited the zoo and Anna visited the zoo'

                                                   [**at-issue**, $exh(p) \wedge \neg(exh(p))$]

   b. Nur Sabine hat den Tierpark besucht und sie hat den Tierpark nicht
      Only Sabine has the zoo   visited and she has the zoo   not
      besucht.
      visited
      'Only Sabine visited the zoo and she did not visit the zoo.'

                                                   [**non-at-issue**, $p \wedge \neg(p)$]

Acceptability judgment tasks

(22) **Contradiction envrionment for *it*-clefts**

   a. Es ist Sabine, die den Tierpark besucht hat, und sie hat den Tierpark nicht
      It is Sabine, who the zoo   visited   has, and she has the zoo   not
      besucht.
      visited
      'It is Sabine who visited the zoo and she did not visit the zoo.'

$$[\textbf{at-issue}, p \wedge \neg(p)]$$

   b. Es ist Sabine, die den Tierpark besucht hat, und Anna hat den Tierpark
      It is Sabine, who the zoo   visited   has and Anna has the zoo
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      visited.
      'It is Sabine who visited the zoo and Anna visited zoo.'

$$[\textbf{non-at-issue}, exh(p) \wedge \neg(exh(p))]$$

Acceptability judgment tasks

(11) **Contradiction environment for pseudoclefts**

   a. Diejenige, die den Tierpark besucht hat, ist Sabine und sie hat den
      The.one who the zoo   visited has is Sabine and she has the
      Tierpark nicht besucht.
      zoo   not   visited
      'The one who visited the zoo is Sabine and she did not visit the zoo.'

                                                                 [**at-issue**, $p \wedge \neg(p)$]

   b. Diejenige, die den Tierpark besucht hat, ist Sabine und Anna hat den
      The.one who the zoo   visited has is Sabine and Anna has the
      Tierpark besucht.
      zoo   visited
      'The one who visited the zoo is Sabine and Anna visited the zoo.'

                                        [**non-at-issue**, $exh(p) \wedge \neg(exh(p))$]

Acceptability judgment tasks

Predictions of the ratings:

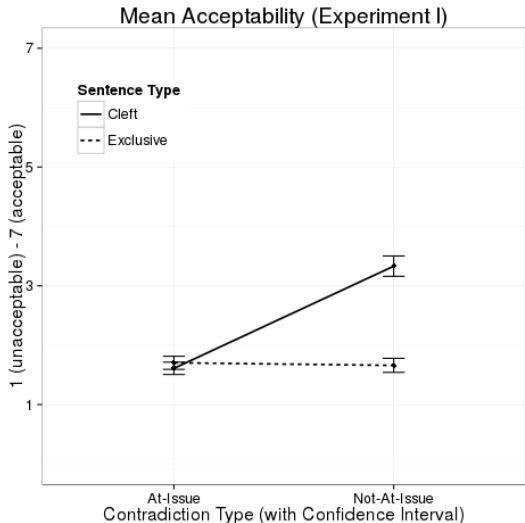# Acceptability judgment tasks

Predictions of the ratings:

- If the exhaustivity of cleft is semantic, in other words, the non-at-issue/presupposition level leads to the exhaustive meaning, the target sentences will show a *similar* pattern across sentence types.   (Experiment I)

Acceptability judgment tasks

Predictions of the ratings:

- If the exhaustivity of cleft is semantic, in other words, the non-at-issue/presupposition level leads to the exhaustive meaning, the target sentences will show a *similar* pattern across sentence types. (Experiment I)

- If the exhaustivity of cleft is pragmatic, then the cleft sentences will show a *different* pattern from exclusives and pseudoclefts with definite descriptions. Additionally, the latter two will show a similar pattern, due to their semantic nature. (Experiment II)

Acceptability judgment tasks

For both experiment 1 and experiment 2, a total of 48 target items per questionnaire are given. There was a 1:1 filler ratio, for 96 sentences total per participant. Thirty-two German native-speakers are recruited for each of these experiments.

Acceptability judgment tasks–Results

Mean Acceptability (Experiment I)

In Experiment I,

- the non-at-issue exhaustivity inference of clefts patterned differently from the not-at-issue prejacent in exclusives.

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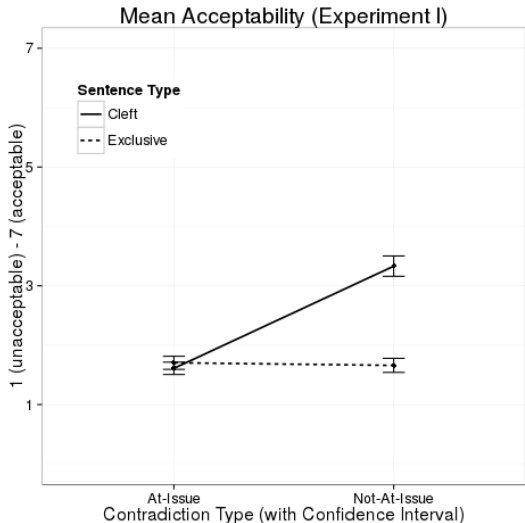
Mean Acceptability (Experiment I)

In Experiment I,

- the non-at-issue exhaustivity inference of clefts patterned differently from the not-at-issue prejacent in exclusives.
- The cleft exhaustivity violation is judged significantly more acceptable than the presupposition failure of the exclusive.

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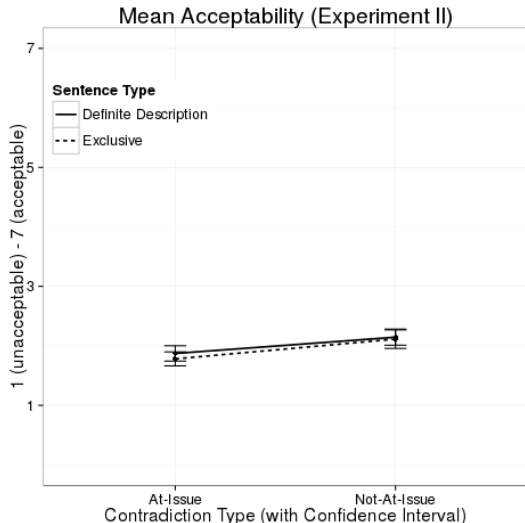
Mean Acceptability (Experiment II)

In Experiment II,

- the contradiction of at-issue content was judged a bit worse than the presupposition failure for exclusives and pseudoclefts.

Acceptability judgment tasks–Results

Mean Acceptability (Experiment II)
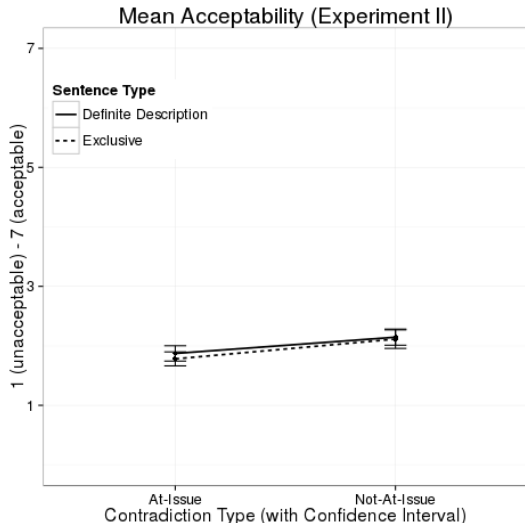
In Experiment II,

- the contradiction of at-issue content was judged a bit worse than the presupposition failure for exclusives and pseudoclefts.
- Judgments of the presupposition failure for exclusives patterned similarly with the uniqueness presupposition failure for pseudoclefts.

Acceptability judgment tasks–Summary

- Based on results from the two experiments, De Veaugh-Geiss et al. (2015) conclude that the hypothesis that cleft exhaustivity is weaker than in exclusives because it is non-at-issue is not supported.

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- Based on results from the two experiments, De Veaugh-Geiss et al. (2015) conclude that the hypothesis that cleft exhaustivity is weaker than in exclusives because it is non-at-issue is not supported.
- The results are compatible with a pragmatic argument of weak cleft exhaustivity.

Event-related potential (ERP) study

The methodology of ERP is employed due to its high temporal resolution for studies that investigate online language processing (Kutas et al., 1994). Several parameters can be measured and processed as ERP effects, e.g. peak latency and amplitude (quantitative), and polarity, topographic distribution (qualitative).

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- This component reflects the cost of semantic integration of non-stereotypical elements which normally do not fit with the (extra) linguistic context-expectancy (Kutas and Hillyard, 1980, 1983; Nieuwland and Kuperberg, 2008).
- The N400 cannot be taken as an indicator of truth-value violations (Fischler et al., 1983).
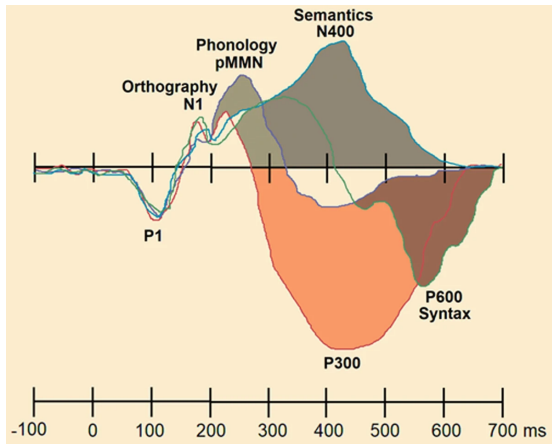
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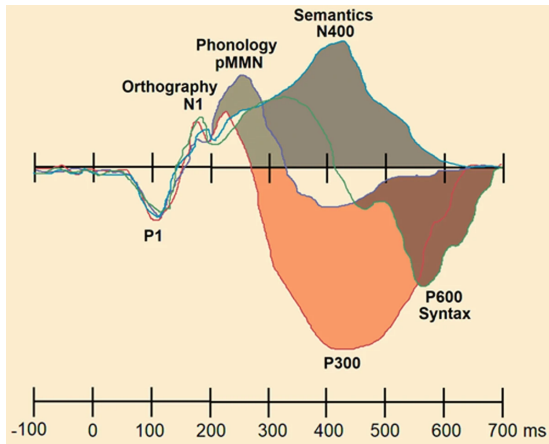Keep in mind that the negative voltages are plotted upward in most ERP studies.

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Some basic components which you would be looking at later (Proverbio, 2023).

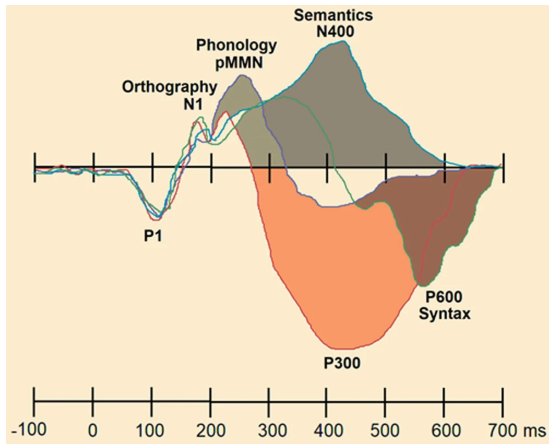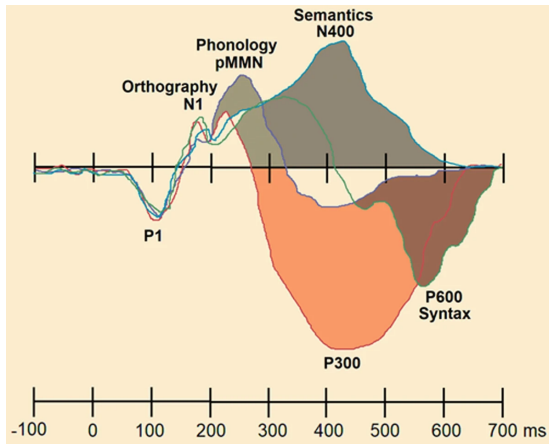# Event-related potential (ERP) study

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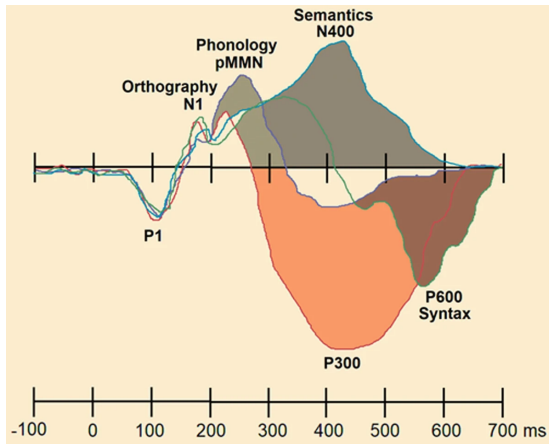
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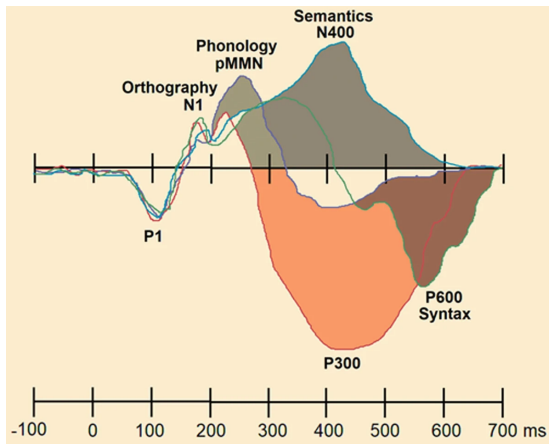
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- A centro-parietal negativity at about 400 ms (**N400**)

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- P300 component is between 300 and 500 ms, triggered by the comprehension of meaningful sentences that reaches consciousness;

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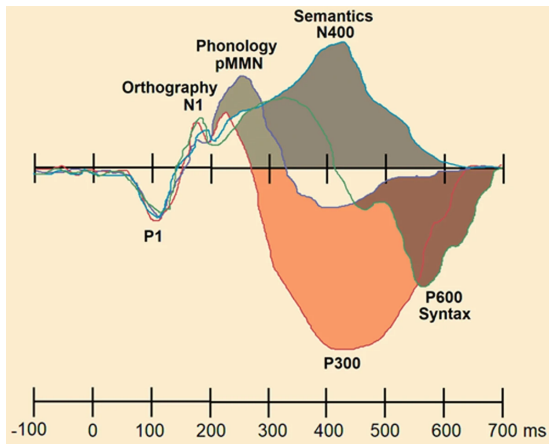
- P300 component is between 300 and 500 ms, triggered by the comprehension of meaningful sentences that reaches consciousness;
- **P600** is indexed by the appearance of a late positive deflection at about 600 ms post-stimulus latency

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- *es* 'it'-cleft and *nur* 'only' exclusives are compared against each other.
- For each type of these sentences, two kinds of additive phrases are added, either following the exhaustivity (+exh) or violating the exhaustivity (-exh) of the focus.

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We have four conditions now.

conditions	construction	continuation
a.	*it*-cleft	+exh
b.	*it*-cleft	-exh
c.	exclusives	+exh
d.	exclusives	-exh

Event-related potential (ERP) study

Here are some stimuli that are used in the experiment.

(23) a. Es ist Maria, die das Klavier spielen kann und außerdem noch <u>die Geige</u>,
   It is Maria, who the piano play can and furthermore additionally <u>the violin</u>,
   sagte...
   said
   'It is Maria that plays the piano and the violin, said...'   [*it*-**cleft, +exh**]

   b. Es ist Maria, die das Klavier spielen kann und außerdem noch
   It is Maria, who the piano play can and furthermore additionally
   <u>Luise und Jana</u>, sagte...
   <u>Luise and Jana</u>, said
   'It is Maria that plays the piano and, Luise and Jana, said...'   [*it*-**cleft, -exh**]

Event-related potential (ERP) study

(24) a. Nur Maria kann das Klavier spielen und außerdem   noch   <u>die Geige</u>, sagte...
         only Maria can   the piano   play   and furthermore additionally the violin, said
         'Only Maria can play the piano and the violin, said...'

                                                                    [**exclusives, +exh**]

      b. Nur Maria kann das Klavier spielen und außerdem   noch   <u>Luise und Jana</u>,
         only Maria can   the piano   play   and furthermore additionally Luise and Jana,
         sagte...
         said
         'Only Maria can play the piano and, Luise and Jana, said...'

                                                                    [**exclusives, -exh**]

Event-related potential (ERP) study

Three time windows are selected for analysis:

- 400-600ms for the N400;
- 600-800ms for the P600 and
- 300-800ms for the purpose of comparing differences between two sentences type in the same time window.

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Three time windows are selected for analysis:

- 400-600ms for the N400;
- 600-800ms for the P600 and
- 300-800ms for the purpose of comparing differences between two sentences type in the same time window.

For each participant, the time window is computed with an average of 1200 ms starting from the critical item, in this case 'die Geige', *the violin*, and 'Luise und Jana' *Luise and Jana*.
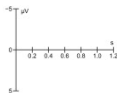
Event-related potential (ERP) study–Results

Please open the two diagrams separately.

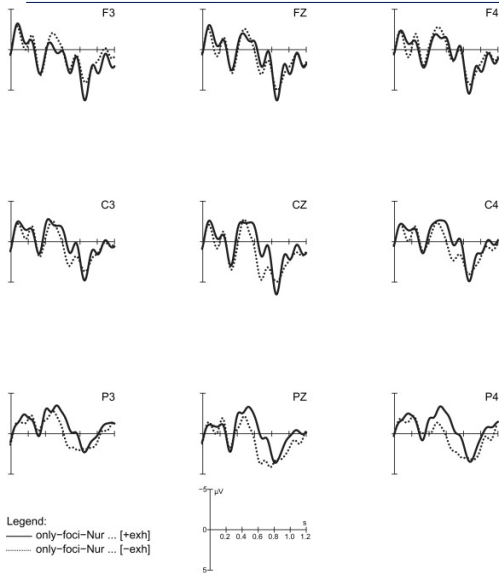# Event-related potential (ERP) study
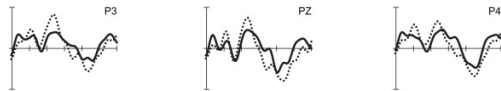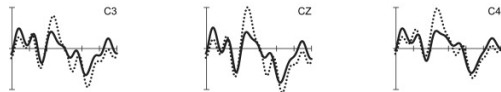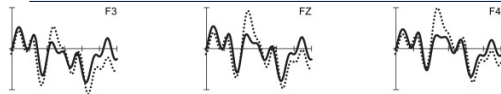
- The ERP study observes an N400 effect on *it*-clefts with the [-exh] condition and **not** in exclusives.
- A P600 effect is observed on exclusives with the [-exh] condition, and **not** in *it*-cleft sentences.

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Legend:
— only-foci-Nur ... [+exh]
······ only-foci-Nur ... [-exh]

Event-related potential (ERP) study–Summary

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- The exhaustiveness violations in *it*-clefts versus *only*-foci involve qualitatively different processing mechanisms and can hence be seen as involving different generators.

Event-related potential (ERP) study–Summary

- The N400 effect found on *it*-cleft sentences when exhaustivity is violated can be interpreted as a pragmatic integration process.
  Such violation **cannot** be interpreted as a truth-conditional (=semantic level) violation. A plausible explanation to the N400 effect is that it reflects efforts to integrate unexpected pragmatic elements.

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- The positivity found on *only* focus sentences can be interpreted as a general reanalysis or linguistic information mismatch. (van Herten et al,. 2005, Stolterfoht et al. 2007).

From this, the authors concluded that the exhaustivity inference in *it*-clefts must be pragmatic (as opposed to the semantic effect in exclusives).

Conclusion (again) and Summary

The main findings for the experiment we have discussed so far that in some sense *it*-clefts are **less** exhaustive than *only*-exclusives but more exhaustive than plain narrow focus.

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On the contrary, most of the theoretical literature tend to derive exhaustivity in *it*-clefts semantically.
Maybe there are some puzzles that we have overlooked here?

References I

De Veaugh-Geiss, J., M. Zimmermann, E. Onea, and A.-C. Boell (2015). Contradicting (not-) at-issueness in exclusives and clefts: An empirical study. In *Proceedings of Semantics and Linguistic Theory (SALT)*, Volume 25, pp. 373–393.

Drenhaus, H., M. Zimmermann, and S. Vasishth (2011). Exhaustiveness effects in clefts are not truth-functional. *Journal of Neurolinguistics 24*(3), 320–337.

Fischler, I., P. Bloom, D. Childers, S. Roucos, and N. Perry Jr (1983). Brain potentials related to stages of sentence verification. *Psychophysiology 20*(4), 400–409.

Kutas, M. and S. Hillyard (1980). Reading senseless sentences: Brain potentials reflect semantic incongruity. *Science 207*(4427), 203–205.

Kutas, M. and S. A. Hillyard (1983). Event-related brain potentials to grammatical errors and semantic anomalies. *Memory & Cognition 11*(5), 539–550.

References II

Kutas, M., C. Petten, and Gernsbacher (1994). Psycholinguistics electrified: Event-related brain potential investigations. In M. Gernsbacher (Ed.), *Handbook of psycholinguistics*, pp. 83–133. San Diego, CA: Academic Press.

Nieuwland, M. and G. Kuperberg (2008). When the truth is not too hard to handle: An event-related potential study on the pragmatics of negation. *Psychological Science 19*(12), 1213–1218.

Onea, E. and D. Beaver (2011). Hungarian focus is not exhausted. In E. Cormany, S. Ito, and D. Lutz (Eds.), *Proceedings of Semantics and Linguistic Theory (SALT)*, pp. 342–359.

References III

Proverbio, A. M. (2023). Eeg and erps in the study of language and social knowledge. In P. S. Boggio, T. S. H. Wingenbach, M. L. da Silveira Coêlho, W. E. Comfort, L. Murrins Marques, and M. V. C. Alves (Eds.), *Social and Affective Neuroscience of Everyday Human Interaction: From Theory to Methodology*. Cham: Springer International Publishing.