The licensing of discourse particles in complex questions:

Evidence from graded judgments and event-related potentials

Anna Czypionka, Josef Bayer, Maribel Romero & Carsten Eulitz

Background

Question-sensitive discourse particles = **Q-DiPs** in German:
denn (lit. then), *nur* (lit. only), *schon* (lit. already), *wohl* (lit. well)...

Q-DiPs:
- enrich the pragmatic impact of questions, modifying illocutionary force
- need to be licensed by interrogative clause type / mood

Syntactic licensing constraints:
- licensed by a c-commanding licensor in the FORCE projection
- licenser must be locally accessible: either minimally c-commanding the DiP, or c-commanding the DiP via a wh-chain [1]

*Wer$_i$ hat t$_i$ (denn) gesagt, dass Peter (*denn) kommt?*
Who has (DiP) said that Peter (DiP) comes?

Semantic scope of Q-DiP depends on its surface position:

Was$_i$ denkt er (schon), t$_i$ dass Susi (schon) t$_i$ mitgekriegt hat?
What thinks he (DiP) that Susi (DiP) understood has?
„What does he think that Susi has understood?"

-> New type of long-distance dependency with an interplay of syntactic, semantic and pragmatic licensing constraints

Research Questions

What are the exact licensing conditions for Q-DiPs?

How are licensing violations for Q-DiPs reflected in the EEG?

What are the effects of failed licensing of the Q-DiP *denn* if

(1) the interrogative element (here a wh-phrase) is missing altogether?
(2) the interrogative element c-commands the DiP while the DiP is not locally accessible (``too far away´´)?

Discussion

Q-DiP licensing in questions is subject to syntactic licensing constraints,
graded reduction in acceptability for inaccessible compared to absent licensors
-> `less acceptable´ or `illusory licensing´? We assume the former.

ERP for Q-DiP vs. non-Q-DiP:
root clauses: ERP effects are surprisingly weak, no N400 for unlicensed Q-DiP.
embedded clauses: - no licensor: no N400, but P600
- inaccessible licensor: no N400, but P600.
- descriptive contrast for embedded clauses matches behavioral data.

Q-DiPs in declaratives receive bad acceptability ratings.
In EEG measurements, there are no N400 to reflect this (as could be expected with failed licensing).

-> The licensing failure is not caused by problems in lexical retrieval.
-> EEG patterns match the processing of syntactic and possibly semantic/pragmatic dependencies

Link to negative polarity items

Negative polarity items = **NPIs,** English: *ever, any;* German: *jemals*

- may enrich the pragmatic impact of negation (strengthening)
- licensed in the semantic scope of negation (c-commanded by licensor, occasionally excluding long-distance licensing)
- behavioral: *intrusive licensing* by present, but inaccessible licensor: higher acceptance rates for inaccessible licensors than absent licensors [2]

ERP effects (relative to present and accessible licensors for NPIs):

- German: no licensor: N400 [4]; N400 + P600 [5]
  inaccessible licensor: N400 + P600 [5]
  N400 amplitude decreased for inaccessible compared to absent licensor [2]
  (see [5] for discussion of illusory licensing)
- English: no licensor: P600, no N400 [6]
  inaccessible licensor: P600, no N400 [6]
  P600 amplitude decreased for inaccessible licensor [6]
  (see also for discussion of illusory licensing)

Questions: Mechanisms behind illusory licensing?
Reason for discrepancy between languages?

Relationship of our findings to NPI literature:

Our findings for embedded clauses are more similar to findings for English NPI than for German NPI:

- no N400 in conditions without licensor
- P600 for absent or inaccessible licensor (descriptively weaker for inaccessible licensors)

This suggests that contrast between findings for English and German NPIs do not reflect a general contrast between processing of long-distance dependencies in both languages.

Experiments

Stimuli

40 items in 8 different conditions (2x2x2 design), factors: CLAUSE TYPE (declarative or question), DiP (denn vs jetzt), DiP position (root or embedded).

	Clause Type	
	declarative	question
	Manche von diesen Leuten... Some of these people ...	**Welche** von diesen Leuten... Which of these people

	DiP type	
DiP Position	DENN	JETZT
root clause	... haben **denn** gesagt, dass der Koch die Zwiebeln anbraten soll. ... have DiP said that the cook the onions fry should. ... have THEN said that the cook should fry the onions.	... haben **jetzt** gesagt, dass der Koch die Zwiebeln anbraten soll. ... have NOW said that the cook the onions fry should. ... have NOW said that the cook should fry the onions.
embedded clause	... haben gesagt, dass der Koch die Zwiebeln **denn** anbraten soll. ... have said that the cook the onions THEN fry should. ... have said that the cook should THEN fry the onions.	... haben gesagt, dass der Koch die Zwiebeln **jetzt** anbraten soll. ... have said that the cook the onions NOW fry should. ... have said that the cook should fry the onions now.

Experiment 1: Acceptability ratings

Magnitude Estimation task, 57 participants

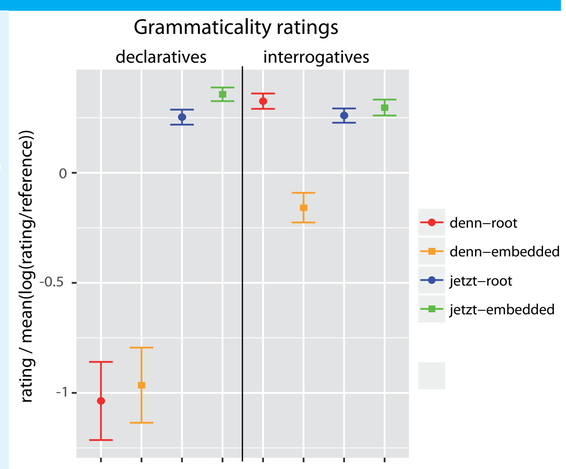
Analysis: LMM, fixed eff. CLAUSE TYPE*DIP*POSITION, random terms PARTICIPANT (rand. slope DIP*POSITION+CLAUSETYPE*DIP) and ITEM.
-> CLAUSE TYPE:DIP:POSITION t=9.12, p<.001

Separate analyses for *jetzt* and *denn*: fixed eff. CLAUSE TYPE*POSITION, random terms PARTICIPANT (rand. slope CLAUSETYPE*POSITION) and ITEM,

jetzt: POSITION:CLAUSETYPE t=.3.2, p<.01
root clauses: CLAUSETYPE not sign.
embedded clauses: CLAUSETYPE t=-3.9, p<.001

denn: POSITION:CLAUSETYPE t=-7.9, p<.001
root clauses: CLAUSETYPE t=7.6, p<.001
embedded clauses: CLAUSETYPE licensor t=5.0, p<.001;

-> Unlicensed *denn* is rated worse than *jetzt*.
-> *denn* with present, but inaccessible licensor is rated worse than other interrogatives, but better than unlicensed *denn*.
-> *jetzt* conditions make good baseline for *denn* conditions

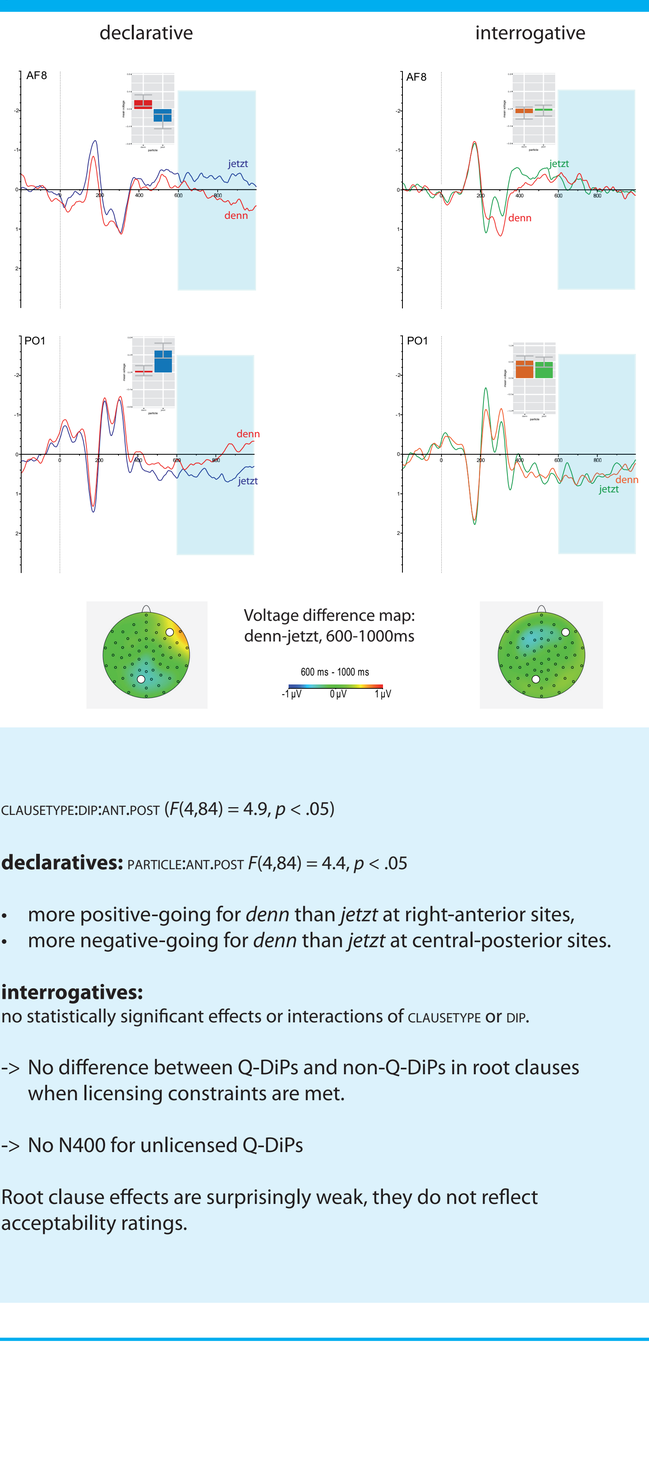


Experiment 2: EEG

visual stimulus presentation, chunked or word-by-word, 800 ms for single words, 200 ms blank screen ISI
22 participants, 64 electrodes, filtered bandpass 0.5-70Hz before segmentation
Analysis: 25 electrode subset, 5 anterior-posterior positions, 5 medial-lateral positions; separate ANOVA for positions (root clause and embedded clause), mean amplitude in time window for CLAUSETYPE*DIP*MEDIALLATERAL*ANTERIORPOSTERIOR

selected time window for analysis: 600-1000 ms, presented separately for root clauses and embedded clauses

(1) Root clauses



CLAUSETYPE:DIP:ANT.POST (F(4,84) = 4.9, p < .05)

declaratives: PARTICLE:ANT.POST F(4,84) = 4.4, p < .05

- more positive-going for *denn* than *jetzt* at right-anterior sites,
- more negative-going for *denn* than *jetzt* at central-posterior sites.

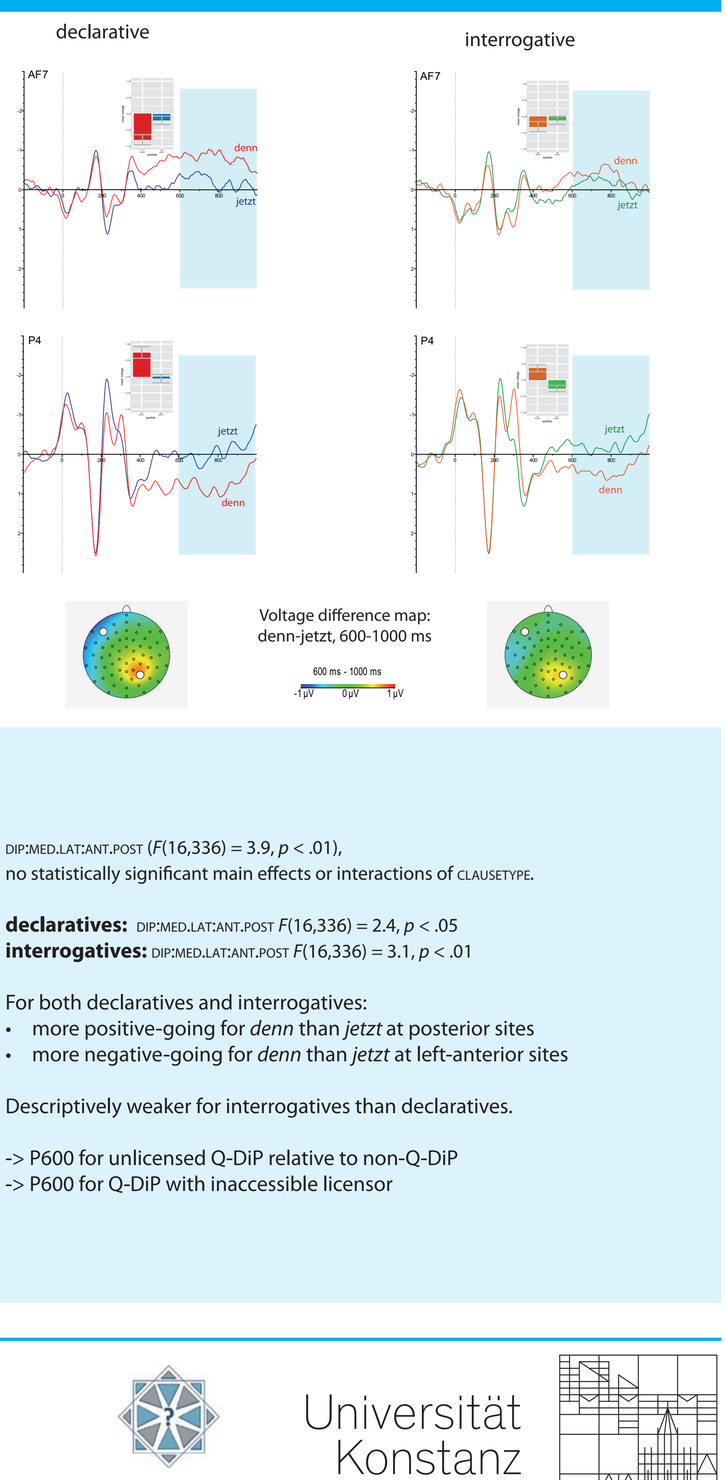
interrogatives:
no statistically significant effects or interactions of CLAUSETYPE or DIP.

-> No difference between Q-DiPs and non-Q-DiPs in root clauses when licensing constraints are met.

-> No N400 for unlicensed Q-DiPs

Root clause effects are surprisingly weak, they do not reflect acceptability ratings.

(2) Embedded clauses



DIP:MED.LAT:ANT.POST (F(16,336) = 3.9, p < .01),
no statistically significant main effects or interactions of CLAUSETYPE.

declaratives: DIP:MED.LAT:ANT.POST F(16,336) = 2.4, p < .05
interrogatives: DIP:MED.LAT:ANT.POST F(16,336) = 3.1, p < .01

For both declaratives and interrogatives:
- more positive-going for *denn* than *jetzt* at posterior sites
- more negative-going for *denn* than *jetzt* at left-anterior sites

Descriptively weaker for interrogatives than declaratives.

-> P600 for unlicensed Q-DiP relative to non-Q-DiP
-> P600 for Q-DiP with inaccessible licensor

Affiliations: University of Konstanz, Department of Linguistics (everyone)
Please see the handout for full references.

QUESTIONS AT THE INTERFACES
FOR2111

Universität Konstanz

The licensing of discourse particles in complex questions: Evidence from graded judgments and event-related potentials

Anna Czypionka, Josef Bayer,
Maribel Romero & Carsten Eulitz

Constance University

30th Annual CUNY Conference
on Human Sentence Processing
2017, Cambrideg, MA

anna.czypionka@uni-konstanz.de
josef.bayer@uni-konstanz.de
maribel.romero@uni-konstanz.de
carsten.eulitz@uni-konstanz.de

Universität
Konstanz

References

[1] Bayer, J., Häussler, J. & Bader, M. (2016). A New Diagnostic for Cyclic Wh-Movement: Discourse Particles in German Questions. *Linguistic Inquiry*, 47 (4), 591-629.

[2] Drenhaus, H., Saddy, D. & Frisch, S. (2005). Processing negative polarity items: When negation comes through the backdoor. *Linguistic evidence: Empirical, theoretical, and computational perspectives*. 145-165.

[3] Ladusaw, W. (1996). Negation and polarity items. In S. Lappin, ed., T*he Handbook of Contemporary Semantic Theory,* pp. 321-341. Blackwell.

[4] Saddy, D., Drenhaus, H. & Frisch, S. (2004). Processing polarity items: Contrastive licensing costs. *Brain and Language* 90, 495-502.

[5] Vasishth, S., Brüssow, S., Lewis, R.L., Drenhaus, H. (2008). Processing Polarity: How the Ungrammatical Intrudes on the Grammatical. *Cognitive Science* 32, 685-712.

[6] Xiang, M., Dillon, B., & Phillips, C. (2009). Illusory licensing effects across dependency types: ERP evidence. *Brain and Language*, 108(1), 40-55.