

Focus in German: Towards a Corpus-Based Study

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Focus in German:
Towards a
Corpus-Based Study

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Detmar Meurers

Motivation

Background

Expressing inf. struc.
Characterizing intonation
Autoregulation-mental cogn.
Disc. for. of pitch accents
Relating infor. & interpretation
Focus projection
Constraining projection
An open issue

A pilot study

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- ▶ The nature of the integration of a sentence into discourse can provide an explanation for constraints stipulated in syntax (De Kuthy 2002; De Kuthy & Meurers 2003).
 - ▶ To explore this line of research, we need an explicit representation of information structure and its interaction.
- ▶ German and English are intonation languages:
 - ▶ Prosody plays an important role in constraining the possible integration of a sentence into the discourse.
- ▶ Research relating syntax, information structure, and intonation predominantly theoretically driven
 - ▶ partly contradictory empirical assumptions
- ▶ Investigate this empirically by looking at the intonation of naturally occurring sentences in a larger discourse.
 - ⇒ A pilot study based on intonationally annotated corpora

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Expressing information structure

- ▶ Languages differ with respect to how the information structure of an utterance is represented.
- ▶ Linguistic means of marking information structure include:
 - ▶ word order
 - ▶ morphology
 - ▶ prosody
- ▶ English and German are so-called intonation languages
 - ▶ Information structuring is signaled by the intonation (contour) of an utterance, including pitch accents.
 - ▶ The absence or presence of an accent is an indicator of the discourse function of a constituent in a sentence.

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Characterizing intonation

- ▶ Intonation patterns consist of intonation features or subsystems of several kinds:
 - ▶ intonational contour (tune)
 - ▶ prominence (stress)
 - ▶ intonational phrasing
 - ▶ pitch range
- ▶ The contour indicates the movement of pitch.
 - ▶ For example, the intonation pattern of an assertion has a distinct contour from that of a question.
- ▶ Intonational phrasing divides the sequence of words into intonational units, the intonational (prosodic) phrases.
 - ▶ Phrase boundaries are marked by pauses, boundary tones and duration patterns.
- ▶ Pitch range controls limits in which contours are realized.

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Autosegmental-metrical approach to intonation

- Pierrehumbert (1980) proposes a description of intonation:
 - ▶ the grammar of phrasal tones, consisting of L and H tones:
 - ▶ pitch accents
 - ▶ phrase accents
 - ▶ boundary tones
 - ▶ the metrical representation of the text
 - ▶ rules for lining up the tune with the text
- Phonological tones
 - ▶ Each phrase requires at least one pitch accent
 - ▶ English: H*,L*, or bitonal: H*+L, H+L*, L*+H, L+H*, H*+H
 - ▶ Each phrase receives a phrase accent at the end of the word associated with the last pitch accent:
 - ▶ H*, L*
 - ▶ Each phrase ends with a boundary tone:
 - ▶ H%, L%
- The approach has been modified and further developed
 - ▶ e.g., in Beckman & Pierrehumbert (1986)

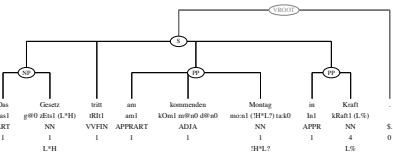
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Tones and Break Indices (ToBI)

- ToBI is a system for transcribing the intonation patterns and other aspects of the prosody of English utterances.
 - ▶ Based on autosegmental-metrical approach to intonation.
- The perceived intonation contour is described in terms of high (H) and low (L) targets in the local pitch range.
- ToBI transcription marks:
 - ▶ accented syllables, for English:
 - ▶ H*,L*, or bitonal: H*+L, H+L*, L*+H, L+H*, H*+H
 - ▶ The * marks the tone on the accented syllable.
 - ▶ intonational boundaries (with break values from 0–4):
 - ▶ intermediate boundary (0–3): H*, L*
 - ▶ full boundary (4): L% or H%

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Discourse function of pitch accents

- Pitch accents can have different shapes allowing them to signal different functions in the discourse.
- The H* pitch accents are often assumed to signal focus, i.e., new material.
 - ▶ A more precise mapping of each possible pitch accent to its information structure role is subject of debate.
- Autosegmental-metrical approach to German intonation (Uhmann 1991; Féry 1993) assumes:
 - ▶ H* or H*+L represent focus accents
 - ▶ L* highlights background constituents
 - ▶ L*+H is a topic marker

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Relating intonation and interpretation

Focus projection

- The word marked by a pitch accent and the extension of the focus are related by rules of focus projection.

- Marius hat ein Buch mit BAGGERN bekommen.*
- Was für ein Buch hat Marius bekommen?
Marius hat ein Buch [mit BAGGERN]_F bekommen.*
- Was hat Marius bekommen?
Marius hat [ein Buch mit BAGGERN]_F bekommen.*
- Wie war Weihnachten für Marius?
Marius [hat ein Buch mit BAGGERN bekommen]_F.*
- Was war los?
[[Marius hat ein Buch mit BAGGERN bekommen]_F.*

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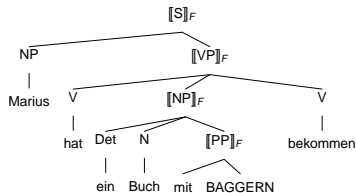
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From pitch accent to projected focus: Example



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Constraining focus projection

- Focus projection rules determine the focus projection potential of a pitch accent depending on syntactic structure
- Strongest accent is generally constrained to fall on the last element (e.g., Nuclear Stress Rule of Chomsky & Halle 1968 for English; Jacobs 1988, p. 124 for German)
- Narrow focus examples exemplifying this:
 - Wer hat ein Buch mit Baggern bekommen?
[[MARIUS]_F hat ein Buch mit Baggern bekommen.*
 - Was mit Baggern hat Marius bekommen?
Marius hat ein [[BUCH]_F mit Baggern bekommen.*

These are not felicitous answers to questions such as:

- Was hat Marius bekommen?*
- Wie war Weihnachten für Marius?*
- Was war los?*

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- Popular syntax-driven approach to focus projection: Selkirk (1995) and many variants
- Recently, some authors have questioned whether there is an interesting constraining relation between syntax, intonation, and information structure:
 - Büring (2006) any accent within a phrase can project focus to the phrase, i.e., focus can always project
 - Kadmon (2006) and Roberts (2006): focus never projects (new elements must be accented; unaccented focused elements are given/retrievable/expectable)

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An open issue (cont.)

- ▶ There is very little published empirical research on focus projection (Gussenhoven 1983; Birch & Clifton 1995; Welby 2003; Féry 1993).
 - ▶ substantial evidence for the existence of some focus projection, i.e., for certain pairs of verbs with object-NP arguments in English
 - ▶ but more evidence is needed, specifically:
 - ▶ In which constructions can what kind of elements be accented (with which type of accents) and project focus how far?
- ▶ Can we obtain more robust empirical evidence for focus projection from authentic language data?

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The IMS Radionews Corpus (Rapp 1998)

- ▶ Recordings of radio broadcasts on Deutschlandfunk:
 - ▶ 4 consecutive news broadcasts (28.07.1995)
 - ▶ 17 news stories, 3 weather forecasts (617.272 s), female
 - ▶ 11 news stories, 1 weather forecast (476.553 s), male
 - ▶ 14 consecutive news broadcasts (21.11.1995)
 - ▶ 13 news stories, 3 weather forecasts (541.659 s), female
 - ▶ 94 news stories, 12 weather forecasts (3551.8 s), male
- Total length: 1 h 26 min, 514 sentences (≈ 10 sec/sent)
- ▶ Corpus preparation involved:
 - ▶ manual segmentation into news stories
 - ▶ orthographic transliteration
 - ▶ automatically word alignment
 - ▶ manual prosodic labeling with ToBI

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Syntactic annotation of the corpus

- ▶ IMS Radionews corpus is not syntactically annotated.
 - ▶ Parsed corpus with the Berkeley parser (Petrov & Klein 2007) to obtain syntactic analysis (thanks to Adriane Boyd).
 - ▶ Converted corpus including
 - ▶ orthographic transcription
 - ▶ phonetic transcription
 - ▶ ToBI annotation
 - ▶ syntactic analysis
- into TiGer-XML so that it can be browsed and searched using TiGerSearch tool (Lezius 2002).

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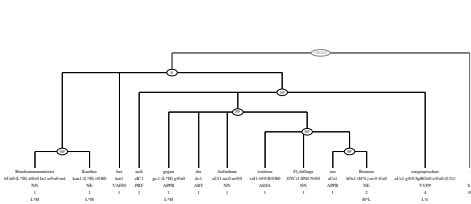
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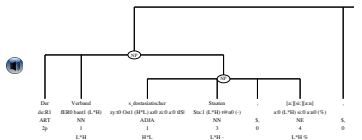
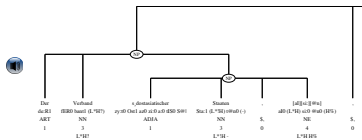
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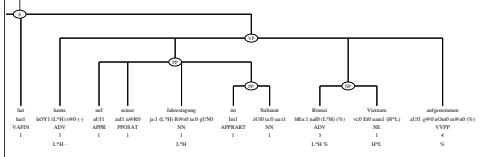
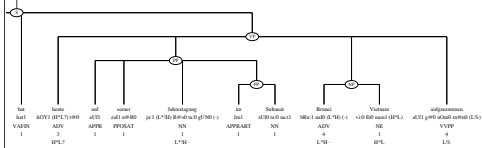
PP with one accent



Examples occurring twice with different accents (1,2)



Examples occurring twice with different accents (1,2)



Conclusion

- In light of conflicting theory-driven proposals on the interaction of syntax, intonation, and information structure, it is crucial to strengthen the empirical basis.
- Spoken corpora are attractive source of authentic data
 - Targeted exploration requires annotated corpora.
 - Where treebanks are not available, parsing is a viable option for supporting syntactic corpus queries.
- Reported first observations on IMS Radionews Corpus
 - One finds more accents than assumed by traditional theories of focus projection.
 - A number of accents occur in positions unexpected for standard theories of focus projection.
 - There is significant variation, even when the same information in the same context is reported.
- Larger intonationally annotated corpora of spoken language in context are needed to test theories of the interaction of information structure, syntax, and intonation.

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Phrasal Tones

Phrasal tones will be assigned at every intermediate or intonation phrase:

- ▶ L- or H- phrase accent, which occurs at an intermediate phrase boundary (level 3 and above);
- ▶ L% or H% (final) boundary tone, which occurs at every full intonation phrase boundary (level 4)

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Pitch accents

- ▶ Pitch accent tones are marked at every accented syllable.
- ▶ Lack of pitch accent assignment for a syllable is interpreted as meaning that the syllable is **not** accented.
 - ▶ H* 'peak accent'
 - ▶ an apparent tone target on the accented syllable which is in the upper part of the speaker's pitch range for the phrase.
 - ▶ L* 'low accent'
 - ▶ an apparent tone target on the accented syllable which is in the lowest part of the speaker's pitch range.
 - ▶ L*+H 'scooped accent'
 - ▶ a low tone target on the accented syllable which is immediately followed by relatively sharp rise to a peak in the upper part of the speaker's pitch range.
 - ▶ L+H* 'rising peak accent'
 - ▶ a high peak target on the accented syllable which is immediately preceded by relatively sharp rise from a valley in the lowest part of the speaker's pitch range.
 - ▶ H+IH*
 - ▶ clear step down onto the accented syllable from a high pitch which itself cannot be accounted for by a H phrasal tone ending the preceding phrase or by a preceding H

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Break Index Values

- ▶ Values for the break index are:

- 0 for cases of clear phonetic marks of clitic groups; e.g. the medial affricate in contractions of 'did you' or a flap as in 'got it'.
- 1 most phrase-medial word boundaries.
- 2 a strong disjuncture marked by a pause or virtual pause, but with no tonal marks; i.e. a well-formed tune continues across the juncture. OR a disjuncture that is weaker than expected at what is tonally a clear intermediate or full intonation phrase boundary.
- 3 intermediate intonation phrase boundary; i.e. marked by a single phrase tone affecting the region from the last pitch accent to the boundary.
- 4 full intonation phrase boundary; i.e. marked by a final boundary tone after the last phrase tone.

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Recent proposals

Questioning focus projection rules

- ▶ Büring (2006): Focus Projection and Default Prominence [recent article]
- ▶ Roberts (2006): Resolving Focus [Sinn & Bedeutung abstract]
- ▶ Kadmon (2006): Some Theories of the Interpretation of Accent Placement [OSU talk handout]

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Büring: Focus projection and default prominence

- ▶ Starting point: Selkirk (1995)
 - F-marking:
 - ▶ An accented word is F-marked.
 - ▶ Vertical Focus Projection:
F-marking of head of phrase licenses F-marking of phrase.
 - ▶ Horizontal Focus Projection:
F-marking of internal argument licenses F-marking of head.
 - ▶ Focus of the sentence (FOC):
 - F-marked node not dominated by another F-marked node.
 - F Interpretation:
 - ▶ constituent F-marked (but not FOC): New
 - ▶ constituent not F-marked: Given
 - ▶ Büring (2006): eliminates focus projection rules
 - No restrictions on **vertical focus projection**, i.e., any accent within a phrase can project focus to the phrase.
 - **Horizontal focus projection** is the consequence of default prominence assignment, not focus projection.
- ⇒ No syntactic constraints on focus projection are needed.

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Büring: Vertical focus projection

- ▶ Büring (2006, based on Schwarzschild 1999) uses de-accenting examples to argue: focus can always project.
 - (9) *I know that John drove Mary's red CONVERTIBLE.
But what did Bill drive?*
 - (10) a. *He drove [his MOTORCYCLE]F.*
b. *He drove [her BLUE convertible]F.*
⇒ *focus can project from adjectives/adjuncts*
- ▶ Similar de-accenting examples support focus projection from transitive subjects, indirect objects, adverbs, minor categories and headless structures—all of which had been claimed to not support focus projection.
- ▶ Vertical focus projection (Büring 2006):
 - F-marking of any daughter licenses F-marking of mother.

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Büring: Horizontal focus projection

- ▶ Horizontal Focus Projection (Büring 2006)
 - In configuration [A B], one of A, B can be unaccented, even though it is interpreted as F-marked.
- ▶ Büring (2006) wants to derive this effect based on a theory of **default prominence**.
- ▶ idea of default prominence: default accent placement, independent of whether focus or background
- ▶ The idea is only sketched, not worked out. A default pattern suggested for English states that predicates don't receive a pitch accent if an argument does.

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Roberts (2006): Resolving Focus

- ▶ Roberts (2006) eliminates focus projection entirely and instead proposes to relate accent placement to interpretation using the notion of **retrievability**.
- ▶ Core components:
 - ▶ Accentuation: Freely align pitch accents (in an independently generated prosodic structure) with words (in an independently generated syntactic structure).
 - ▶ Retrievability presupposition: If a contentful constituent bears no accent, then its denotation is conventionally implicated to be **RETRIEVABLE**.
 - ▶ Novelty Implicature of Focus: If a constituent bears an accent, then its denotation is **IRRETRIEVABLE**.
- ▶ Elements without nuclear pitch accent which traditionally were analyzed as part of a projected focus must be
 - ▶ retrievable, or
 - ▶ accented after all

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Kadmon (2006): Some theories of the interpretation of accent placement

- ▶ Parallel to Roberts (2006), Kadmon eliminates focus projection entirely and instead relies on the notion of **EXPECTABLE** to relate accent placement and interpretation.
- ▶ Core components:
 - ▶ Interpretation of pitch accent placement: A word is interpreted as **EXPECTABLE** iff it is unaccented.
 - ▶ An expression **B** is **EXPECTABLE** in an utterance **U** iff the following holds:
 - ▶ Presented with the result of replacing **B** in **U** with a variable, it would be possible for the hearer to infer on the basis of prior context that in the actual utterance, the position of that variable should be occupied by **B**.
- ▶ Elements without nuclear pitch accent which traditionally were analyzed as part of a projected focus must be
 - ▶ expectable, or
 - ▶ accented after all

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Roberts (2006)/Kadmon (2006): An Example

- (11) *What did you do?* (traditionally: wide, VP focus)
- (12) a. *I INVITED BILL.* (R/K claim: good without further context)
- b. *I invited BILL.* (R/K claim: bad without further context, good if party context)

(How is it ensured that the focus must contain some accent, even if Bill is also retrievable?)

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Empirical Evidence: Gussenhoven (1983) [I]

- ▶ Context-retrievability experiment: judge whether a question and an answer are from the same or a different dialogue.
- ▶ Experiment includes two types of questions:
 - (13) *What do you do?* (wide, VP focus)
 - (14) *What do you teach?* (narrow, NP focus)
- ▶ Two types of answers:
 - (15) *I TEACH LINGUISTICS.* (accents on verb and NP)
 - (16) *I teach LINGUISTICS.* (accent on NP only)
- ▶ Results
 - ▶ Listeners performed no better than chance in judging whether questions and answers were matched.
 - ▶ This finding supports focus projection: To focus the VP, it is sufficient to accent the object NP.

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Empirical Evidence: Gussenhoven (1983) [II]

- ▶ Second experiment tested dialogues with questions:

(17) *Please tell me what happened that night?*
(wide, VP focus)

(18) *What do you remember from the last lesson?*
(narrow, NP focus)

- ▶ The answers contain "non-merging predicates":

(19) *I REMEMBER NOTHING.* (accent on V and NP)

(20) *I remember NOTHING.* (accent on NP only)

- ▶ Results: Listeners matched

- ▶ narrow focus questions (18) with answers accenting only the NP (20)
- ▶ wide focus questions (17) with answers accenting both the verb and the NP (19)

⇒ Non-merging predicates do not allow focus projection.

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Empirical Evidence: Birch & Clifton (1995) [I]

- ▶ Two sets of experiments, each consisting of:

- ▶ make-sense judgment task (appropriateness of dialogue): response times to make yes/no-judgments measured.
- ▶ linguistic judgment task: rate prosodic appropriateness on Likert scale (1–5)

- ▶ Experiment 1: Questions and answers used in dialogues:

(21) a. *Isn't Kerry pretty smart?* (wide, VP focus)
b. *Isn't Kerry good at math?* (V focus)

(22) a. *Yes, she TEACHES MATH.*
b. *Yes, she teaches MATH.*
c. *Yes, she TEACHES math.*

- ▶ Results for wide, VP focus question (21a):

- ▶ make-sense judgment: same reaction times for answers with accent on both V and NP (22a) or only on NP (22b)
- ▶ linguistic judgment: subjects preferred answers with accent on both V and NP (22a) over only on NP (22b)

⇒ Birch & Clifton (1995) interpret this a saying that accenting the verb of a focused VP is optional.

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Empirical Evidence: Birch & Clifton (1995) [III]

- ▶ Experiment 2 used questions supporting VP focus and answers with "non-lexical" argument NPs (quantifiers):

(23) *What can you tell me about the math program at Cornell this year?*

(24) a. *They ACCEPTED NO ONE.*
b. *They accepted NO ONE.*

- ▶ Results:

- ▶ make-sense judgment: faster response times for answers with accent on both V and NP (24a) than for NP only (24b).
- ▶ linguistic judgment: no preference for answers with accents on V and NP (24a) over only on NP (24b)

⇒ Conclusion: Accented lexically filled argument NPs project focus, while non-lexically filled ones do not.

- ▶ Parallel to Gussenhoven's "non-merging predicates" results
- ▶ Reverse linguistic judgment results remain as a puzzle.

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Empirical Evidence: Welby (2003)

- ▶ Welby (2003) investigates the influence of prosodic phrasing in the Birch & Clifton (1995) setup.

- ▶ Questions: VP focus (25a) or object-NP focus (25b):

(25) a. *What's that terrible smell coming from the neighbors' yard?*
b. *There's a terrible smell coming from the neighbors' yard. What are they burning?*

- ▶ There were four possible answer types:

(26) a. *They're BURNING their garbage.* (verb) L-L%

b. *They're burning their GARBAGE.* (obj-NP) L-L%

c. *They're BURNING their GARBAGE.* ("hat") L-L%

d. *They're BURNING their GARBAGE.* (two peak) L-L%

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Empirical Evidence: Welby (2003) Results

- ▶ The experiment used the linguistic judgment task of Birch & Clifton (1995), rating using Likert scale.
- ▶ Results for questions supporting VP-focus and for those supporting object-NP-focus were identical.
 - ▶ "hat" pattern and the object-NP-only accent pattern were rated as equally appropriate.
 - ▶ Appropriateness of hat pattern → prenuclear pitch accent does not affect focus structure interpretation.
 - ▶ Two-peak pattern was less acceptable
 - Two-peak pattern is disfavored for single focus interpretation (favors double focus interpretation).

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Empirical Evidence: Féry (1993)

- ▶ Context-retrievability experiment: judge whether a question and an answer are from the same or a different dialogue.
- ▶ Experiment includes two types of questions:
 - (27) *Wer ist verhaftet worden?*
who has arrested been
(narrow, NP focus)
 - (28) *Hast Du heute die Nachrichten gehört?*
have you today the news heard
(wide focus)
- ▶ Answer recorded twice, once for each question:
- (29) *GORBATSCHOV ist verhaftet worden.*
Gorbachev has arrested been
- ▶ Result: Listeners decided at random

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