Focus projection: extending the empirical data base

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Outlook

"Focus projection": the prosodic cue for focus is realized on a small unit, but a larger part can be interpreted as focused.

My neighbor is building a DESK.

possible foci

Goal: extend the empirical data base in two directions

1. Exp. 1: focus projection and syntactic movement
2. Exp. 2: focus projection vs. contrastive topic projection

Background on focus projection

Basic observations

Observation: when the **object** carries sentence stress in an English sentence, the **VP or IP** can be interpreted as focused:

(1) Is your neighbor building a chair?
No, my neighbor is building [a DESK]$_{\text{focus}}$.

(2) Is your neighbor sleeping?
No, my neighbor is [building a DESK]$_{\text{focus}}$.

(3) Why couldn't you sleep? Was it because of the weather?
No, [my neighbor is building a DESK]$_{\text{focus}}$.

(cf. Chomsky 1971, Jackendoff 1972)

Basic observations

Focus projection is also possible from non-final position, e.g. **within the subject**:

(4) Did the man with the red tie talk to you?
No, the man with the red [SHIRT]$_{\text{focus}}$ talked to me.

(5) Did the man next to Peter talk to you?
No, the man [with the red SHIRT]$_{\text{focus}}$ talked to me.

(6) Did the tall woman talk to you?
No, [the man with the red SHIRT]$_{\text{focus}}$ talked to me.

(cf. Chomsky 1971, Jackendoff 1972)

Basic observations

Focus projection is not arbitrary, but seems to follow certain **rules**. For example, usually focus cannot project from the subject to the whole sentence:

(7) Why could you not sleep? Was it because of the weather?
#No, [my NEIGHBOR is building a desk]$_{\text{focus}}$.

...or from the verb to the VP:

(8) Is your neighbor sleeping?
#No, my neighbor is [BUILDING a desk]$_{\text{focus}}$.

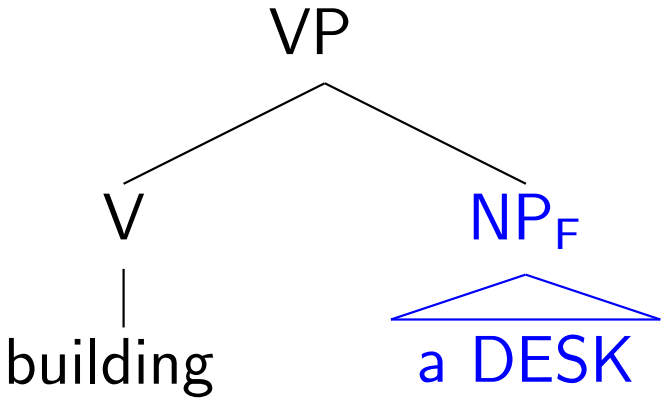
(cf. Chomsky 1971, Jackendoff 1972)

Selkirk's (1984) focus projection rules

Selkirk (1984) suggested to model this in terms of 'focus projection rules':

- A constituent with a pitch accent is focused.
- A constituent may be focused if its head is focused, or it contains an argument of the head that is focused.

Selkirk's (1984) focus projection rules



Only O accented:

- object focus possible

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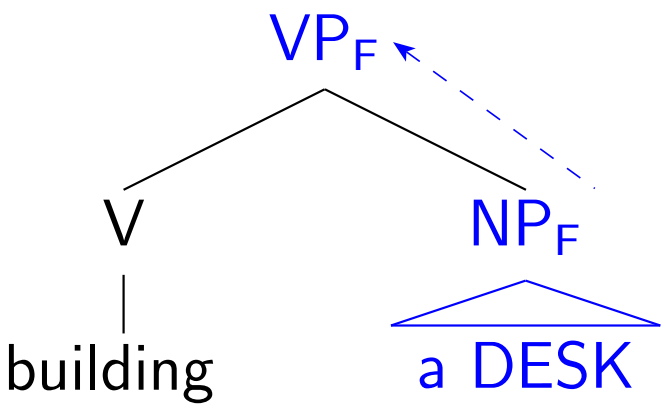
Selkirk's (1984) focus projection rules



Only O accented:

- object focus possible
- VP (and IP) focus possible

- A constituent with a pitch accent is focused.
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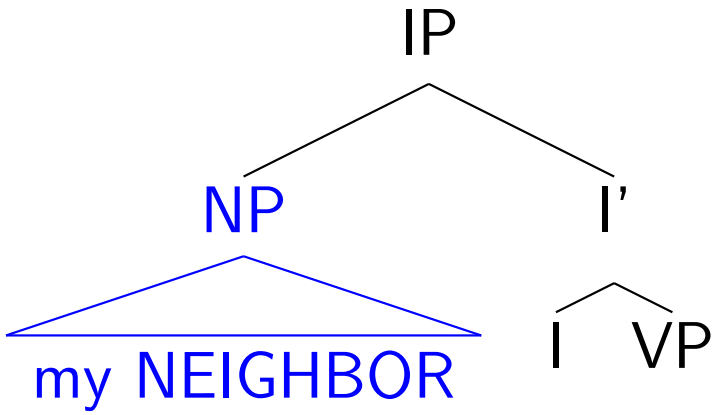
Selkirk's (1984) focus projection rules



Only S accented:

- subject focus possible
- VP/IP focus impossible

- A constituent with a pitch accent is focused.
- A constituent may be focused if its head is focused, or it contains an argument of the head that is focused.

Selkirk's (1984) focus projection rules

Aspects of Selkirk's (1984) focus projection rules:

- Only **presence/absence** of pitch accents matters.
- There is **no neutral** prosody (independent of focus).
- Focus projection is a **syntactic** process.

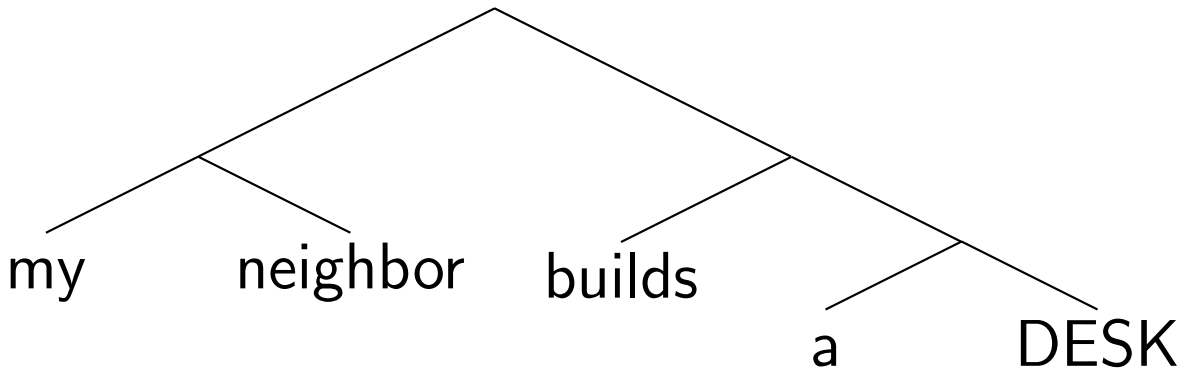
Default vs. marked prosody: trees

Later approaches often differ in these aspects:

- Different **levels** of prominence matter.
- There is **neutral** prosody (based on syntax); focus can cause deviations.
- The link between focus and syntax is **less direct**.

Default vs. marked prominence: trees

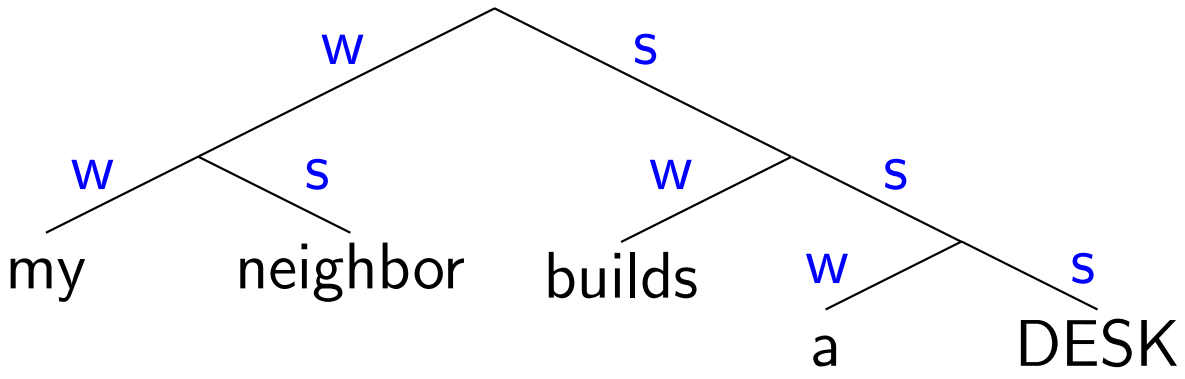
One way to represent default and marked prominence relations: **metrical trees**.



cf. Williams (1997), Szendrői (2003), Wagner (2012), Büring (2015)

Default vs. marked prominence: trees

The **default** pattern can be represented by strong and weak branches (based on syntax).

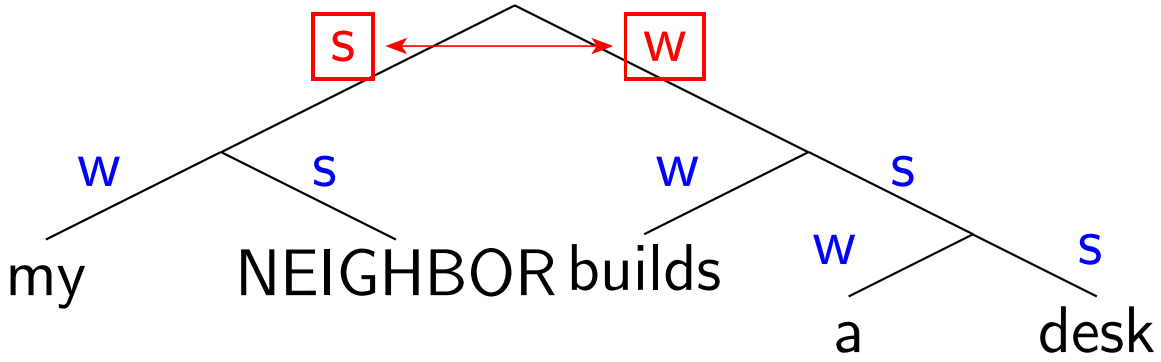


cf. Williams (1997), Szendrői (2003), Wagner (2012), Büring (2015)

Default vs. marked prominence: trees

Focus can **change** the default pattern at a certain level.

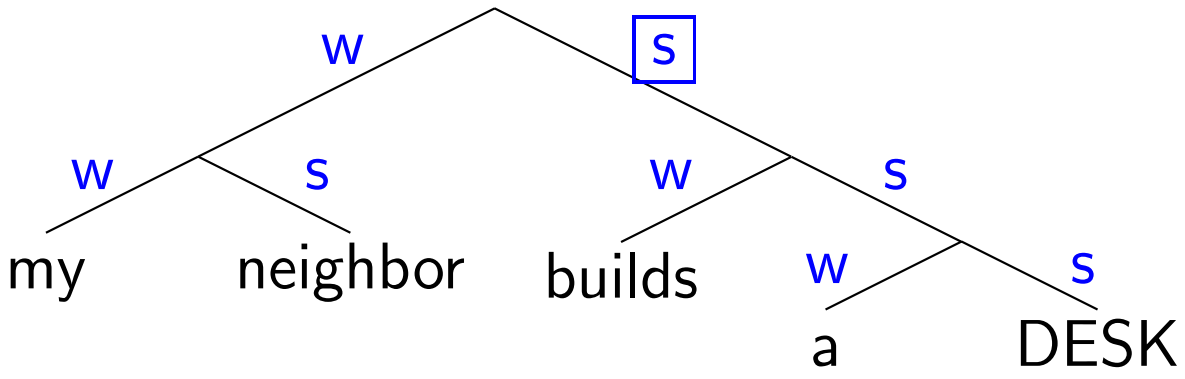
E.g., **subject focus** requires a change, because the subject is a weak branch by default.



cf. Williams (1997), Szendrői (2003), Wagner (2012), Büring (2015)

Default vs. marked prominence: trees

VP focus, on the other hand, does **not require** to change the default pattern – the VP is a strong branch by default.



cf. Williams (1997), Szendrői (2003), Wagner (2012), Büring (2015)

Default vs. marked prominence: grids

Default and marked prominence relations can alternatively be represented in a **metrical grid**.

$$
\begin{array}{llll}
(& & &)_{\iota} \\
(\quad) & (& (\quad) &)_{\phi} \quad \textit{prosody} \\
[\ \mathrm{S}\ ]_{\mathrm{NP}} & [\ \mathrm{V} & [\ \mathrm{O}\ ]_{\mathrm{NP}} &]_{\mathrm{VP}} \quad \textit{syntax}
\end{array}
$$

cf. Truckenbrodt (1995), Féry & Samek-Lodovici (2005)

Default vs. marked prominence: grids

The **neutral** pattern can be represented by grid marks at different prosodic levels.

(		x	$)_{\iota}$	
(x)	(	(x)	$)_{\phi}$	*prosody*
[S]$_{NP}$	[V	[O]$_{NP}$	]$_{VP}$	*syntax*

cf. Truckenbrodt (1995), Féry & Samek-Lodovici (2005)

Default vs. marked prominence: grids

Focus can **change** the prosodic structure and/or the prominence relations at certain levels.

E.g., **subject focus** requires a change, because the subject is not prominent at the level of the intonation phrase by default.

(x ←			$)_{\iota}$	
(x)	(	(x)	$)_{\phi}$	*prosody*
[S]$_{NP}$	[V	[O]$_{NP}$	]$_{VP}$	*syntax*

cf. Truckenbrodt (1995), Féry & Samek-Lodovici (2005)

Default vs. marked prominence: grids

VP focus does **not require** a change, because the VP is prominent at the level of the intonation phrase by default.

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cf. Truckenbrodt (1995), Féry & Samek-Lodovici (2005)

Focus projection: summary

Summary: In current theories, **'focus projection'** to the VP/IP corresponds to cases in which the **default** prosodic pattern (determined by syntax) satisfies the focus requirement for these larger constituents.

Focus projection: outlook

I will present two new experiments:

- both: auditory stimuli, forced-choice, web-based
- **Exp. 1: focus projection and syntactic movement**
  testing projection from the verb/object to the VP level
- **Exp. 2: focus projection vs. contrastive topic projection**
  testing projection from the subject/object to the sentence

Experiment 1: focus projection and syntactic movement

Bresnan (1971)

Bresnan's (1971) observation: structures with syntactic movement show prosodic parallels to simpler (underlying) structures.
→ **"prosodic reconstruction"**

(9) Functional O → V stressed; lexical O → V unstressed.

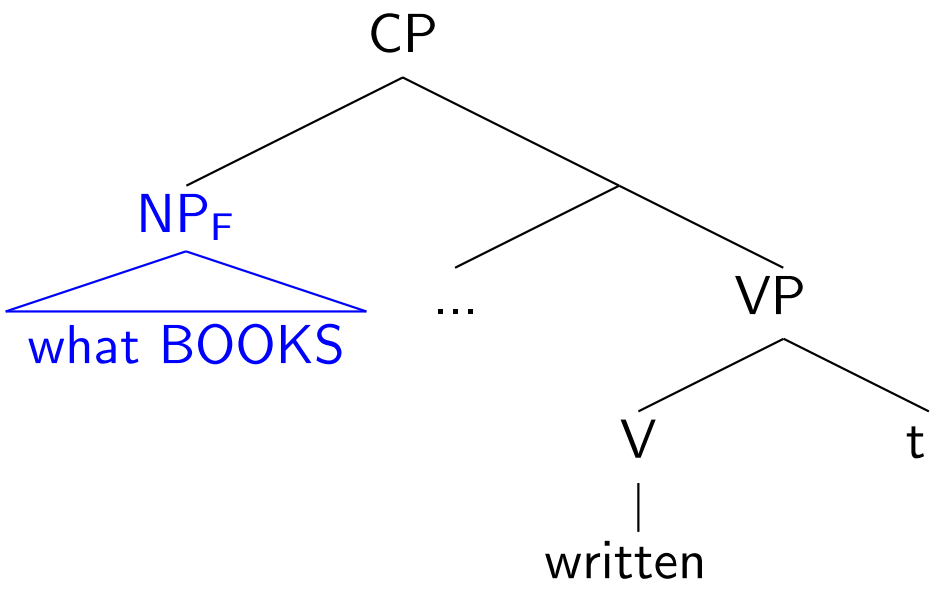
a. Helen has WRITTEN something. SVO
b. Helen has written some BOOKS. SVO

(10) Functional O → V stressed; lexical O → V unstressed.

a. What has Helen WRITTEN? OSV
b. What BOOKS has Helen written? OSV

Selkirk (1995)

Selkirk (1995) acknowledged Bresnan's observations and implemented them by an additional focus projection rule.



- F-marking of the antecedent of a trace [...] licenses the F-marking of the trace.

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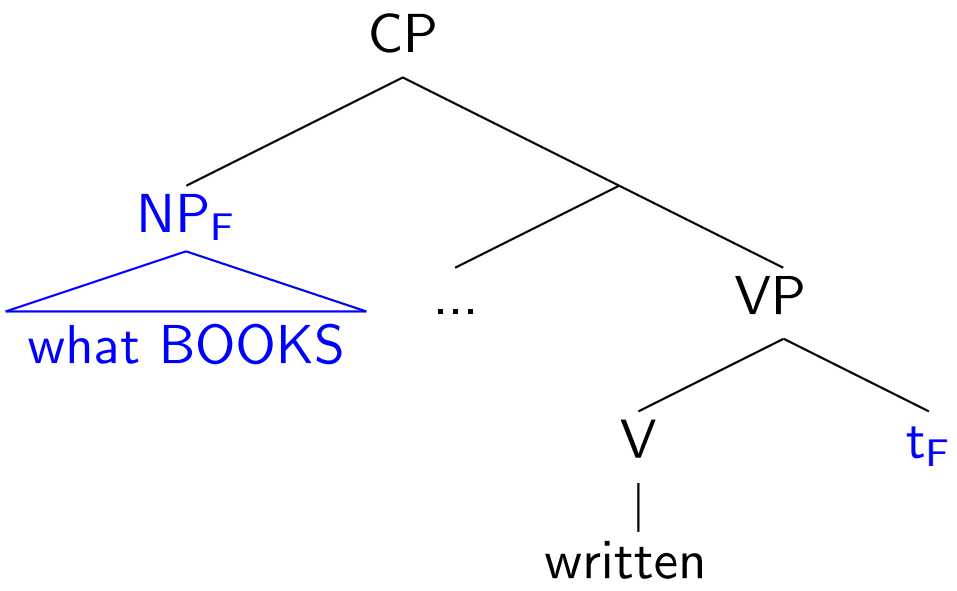

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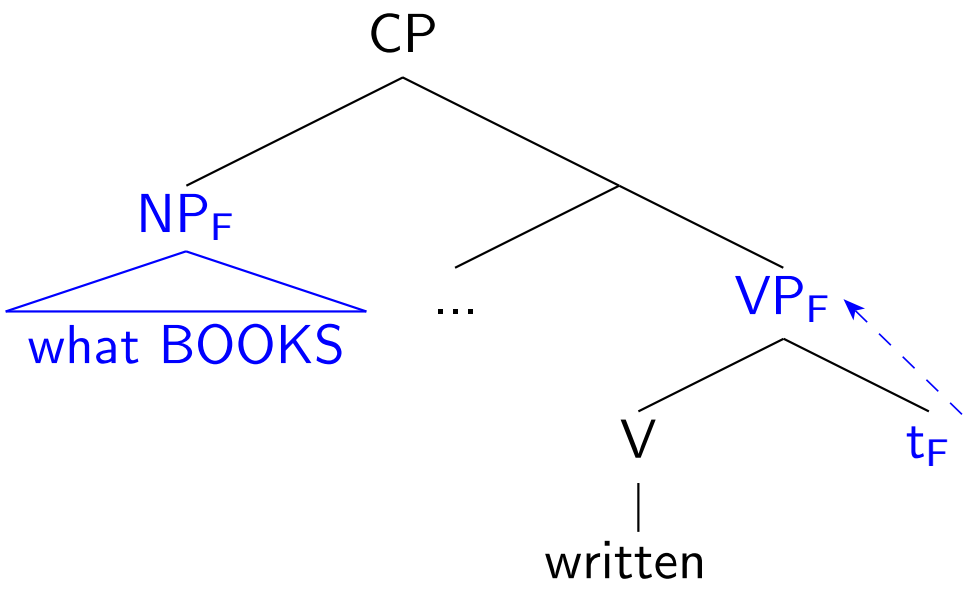


- F-marking of the antecedent of a trace [...] licenses the F-marking of the trace.

Later approaches

Recall that in later approaches, focus projection is typically modeled in terms of default (syntax-based) prosody.

These default syntax-prosody mapping rules usually depend on **local configurations** in the prosodic structure.

syntax	→	prosody
head-complement		weak-strong
VP write books		w s ɹaɪt bʊks

Later approaches

Recall that in later approaches, focus projection is typically modeled in terms of default (syntax-based) prosody.

These default syntax-prosody mapping rules usually depend on **local configurations** in the prosodic structure.

syntax	$\rightarrow$	prosody
lexical XP		phonological phrase
[write [books]$_{NP}$]$_{VP}$		(ɹaɪt (bʊks)$_{\phi}$)$_{\phi}$

Revisiting prosodic reconstruction theoretically

Thus, **revisiting** prosodic reconstruction from a **theoretical** point of view is necessary:

→ To trigger prosodic weakening of the verb, the moved object must be a part of the prosodic structure in its base position at an intermediate point of the derivation.

→ Proposal: **syntax-prosody mapping** ≺ **copy deletion**

(ɹaɪt (bʊks)$_\phi$)$_\phi$	O triggers deaccentuation of V
(ɹaɪt ( )$_\phi$)$_\phi$	O is deleted

(See Wierzba 2017 for more detailed discussion.)

Revisiting prosodic reconstruction empirically

Potential problem in Bresnan's (1971) examples:
(see Lakoff 1972, Berman & Szamosi 1972, Bolinger 1972)

- Default prosody does not only depend on syntax.
- **Further factors**: predictability, semantic richness, topicality, etc.

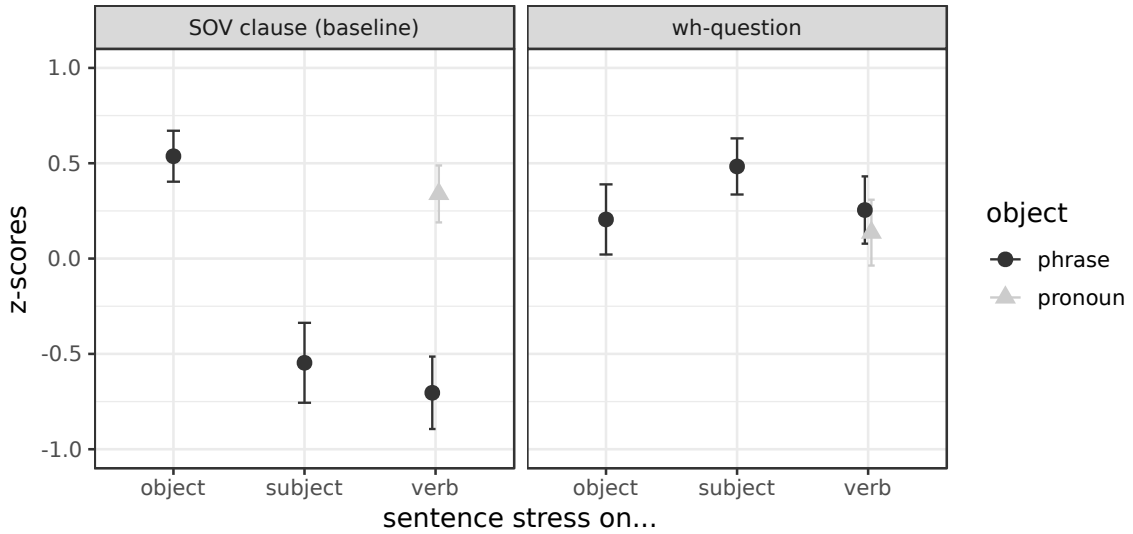
Bresnan's (1972) answer:

- Yes – but the crucial point is that the pattern should be **parallel** with/without movement.

→ using **minimal pairs** is crucial.

Revisiting prosodic reconstruction empirically

Previous experiment (Wierzba 2017):



Main problems: Overall high ratings for all wh-questions, small differences, unexpectedly high ratings for subject prominence.

(See also Truckenbrodt & Darcy 2010 for a production study on extraposition of complement clauses in German, which did not show reconstruction effects.)

Revisiting prosodic reconstruction empirically

Potential sources of the problem:

- Not fully **minimal pairs**: embedded declarative clauses vs. matrix wh-questions.
- **Information structure** difficult to control in matrix wh-questions.
- Recordings were **rated in isolation** – some prosodic differences might have been hard to notice/judge.

New experiment

Main features of the new experiment:

- Clear instructions + training phase.
- **Forced-choice** method – direct comparison of different prosodic realizations.
- Embedded whether-questions vs. embedded wh-questions.
- Only one non-pronominal argument.
- Clear context: **focus on embedded question**.

Design

What did the manager ask you about the waiter?
– There was an incident today, and she wanted to know...

(11) a. ...ob ihn ein Koch beleidigt hat.
whether him a cook insulted has
'...whether a cook insulted him.' SV

b. ...ob er einen Koch beleidigt hat.
whether he a cook insulted has
'...whether he insulted a cook.' OV

🔊 ...KOCH beleidigt...

🔊 ...Koch BELEIDIGT...

Design

What did the manager ask you about the waiter?
– There was an incident today, and she wanted to know...

(11) a. ...welcher Koch ihn beleidigt hat.
which cook him insulted has
'...which cook insulted him.' S...V

b. ...welchen Koch er beleidigt hat.
which cook he insulted has
'...which cook he insulted.' O...V

🔊 ...KOCH...beleidigt...

🔊 ...Koch...BELEIDIGT...

Hypotheses

Non-wh sentences:

(12) a. ...ob ihn ein Koch [beleidigt]$_{VP}$ hat. SV
b. ...ob er [einen Koch beleidigt]$_{VP}$ hat. OV

- **S/O asymmetry** expected: only the object should trigger deaccentuation of the verb.
- **Caveats**: pragmatic factors play a role; syntactic S/O asymmetry more controversial in German than in English (subject might be able to trigger deaccentuation, too).

Hypotheses

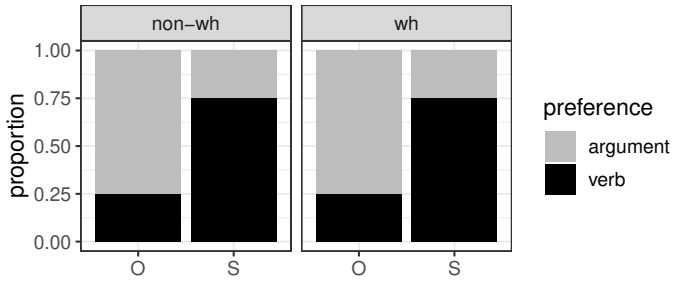
Wh-sentences:

(13) a. ...welcher Koch ihn __ [beleidigt]$_{VP}$ hat. S...V
b. ...welchen Koch er [__ beleidigt]$_{VP}$ hat. O...V

- Surface prosody: **no S/O asymmetry** expected.
- Prosodic reconstruction: **S/O asymmetry** expected.

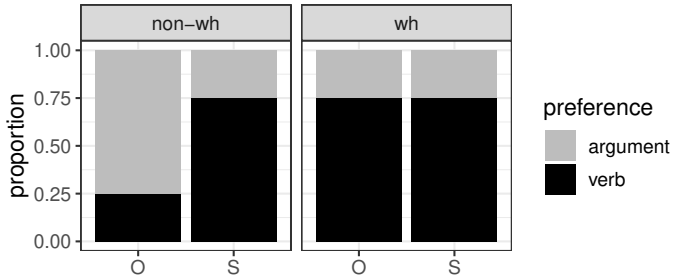
Hypotheses

Under the assumption that there is an S/O asymmetry at all: if there is prosodic reconstruction, the asymmetry should be present with and without wh-movement.



S/O asymmetry + reconstruction

→ main effect of argument type

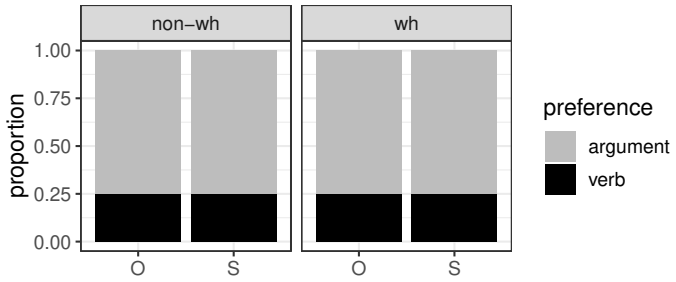


S/O asymmetry + surface mapping

→ interaction argument type × sentence type

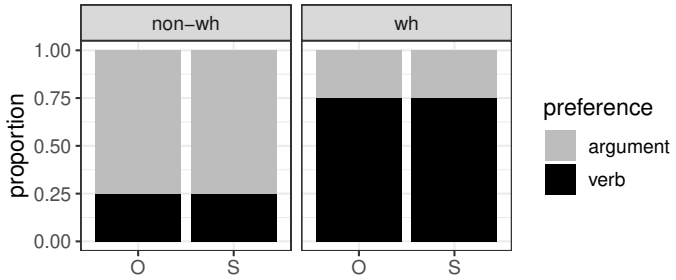
Hypotheses

If there is no S/O asymmetry in the first place:
both S and O should be able to trigger verb deaccenting in situ, but not necessarily when they undergo movement.



no S/O asymmetry + reconstruction

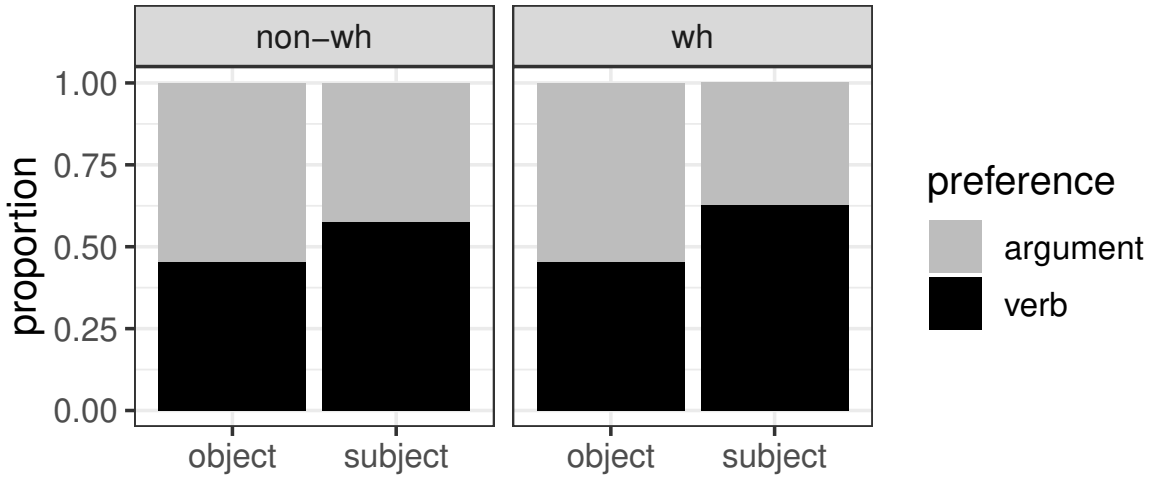
→ no differences



no S/O asymmetry + surface mapping

→ main effect of sentence type

Results



- Significant main effect of argument (subject vs. object).
- No main effect of sentence type (non-wh vs. wh)
- No interaction.

→ Compatible with prosodic reconstruction hypothesis.

(20 items, 24 subjects; 2 excluded based on $>$ 20% unexpected responses in controls.)

Discussion

First piece of experimental evidence for prosodic reconstruction

Caveats:

- based on the *absence* of an interaction
  (but: no trend in direction expected under surface mapping)
- within non-wh conditions, only marginally significant difference between object and subject.

Experiment 2: focus projection vs. contrastive topic projection

Contrastive topics: semantics

Focus marking indicates what question is currently addressed:

(14) Mein Nachbar baut einen TISCH.
my neighbor builds a desk
'My neighbor is building a DESK.

→ Current question: 'What is your neighbor building?'

Contrastive topic (CT) marking (rising accent in German) indicates what further questions are relevant:

(15) Mein /NACHBAR baut einen TISCH...

→ Current question: 'What is your neighbor building?'

→ Also relevant: 'What are other people building?'

Contrastive topics: phonology (German)

CT:

- rising pitch accent: L*H (or fall-rise, 'root contour')
- following material: compressed register (high)

Focus:

- falling nuclear pitch accent: H*L
- following material: compressed register (low)

CT + focus form a **'hat contour'** in German:

(16) Mein NACHBAR baut einen TISCH

cf. Féry (1993), Jacobs (1997)

Contrastive topics vs. foci

Different theoretical proposals:

- CTs are essentially (higher-order) foci.
  (Wagner 2012, Constant 2014)
- CT and focus are distinct categories.
  (Büring 2003)

If they are the same category, we would expect **similar projection behavior**.

Contrastive topic projection

That CT projection from the object to the VP is possible has been sporadically noted in the literature:

(17) Den /ROMAN habe ich GESTERN gelesen...
the novel have I yesterday read
'I read the novel yesterday...'

→ Current question: 'When did you read the novel?'

→ Also relevant: 'When did you read other things?' $CT = O$

or: 'When did you do other things?' $CT = VP$

cf. Jacobs 1997:96, Büring 1997:72–74, Constant 2014:42/105–106.

Contrastive topic projection

It has been proposed that focus and CT are similar wrt. prosodic prominence: (Féry 2007)

- Fronted CTs form their own intonation phrase.
- Parallel prosodic requirements:
  - STRESS-TOPIC: A topic phrase has the highest prosodic prominence in its topic domain.
  - STRESS-FOCUS: A focused phrase has the highest prosodic prominence in its focus domain.

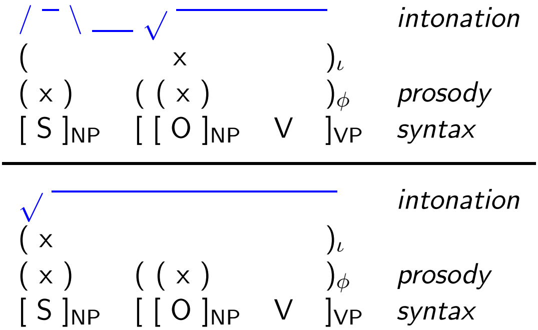
Contrastive topic projection

If focus and CT are similar categories with **similar prosodic constraints**, we would only expect a difference in the **intonational** realization of the **nuclear accent**:

/ ¯ \ ___	/ ¯ \ _____			*intonation*	compatible with:
(	x		$)_{\iota}$		focus = object
(x)	((x)		$)_{\phi}$	*prosody*	focus = VP
[S]$_{NP}$	[[O]$_{NP}$	V	]$_{VP}$	*syntax*	focus = sentence

/ ¯ \ ___	√ _____			*intonation*	compatible with:
(	x		$)_{\iota}$		CT = object
(x)	((x)		$)_{\phi}$	*prosody*	CT = VP
[S]$_{NP}$	[[O]$_{NP}$	V	]$_{VP}$	*syntax*	CT = sentence

Alternative: the relevant cue for projection might not be the fall-rise contour on the nuclear accent, but rather the **alignment of the hat contour** → left-aligned with CT? (Wierzba 2013, 2017)



/ ¯ \ __ √ ——— *intonation*
(x)$_\iota$
(x) ((x))$_\phi$ *prosody*
[S]$_{NP}$ [[O]$_{NP}$ V]$_{VP}$ *syntax*

compatible with:
CT = object
CT = VP

√ ——— *intonation*
(x)$_\iota$
(x) ((x))$_\phi$ *prosody*
[S]$_{NP}$ [[O]$_{NP}$ V]$_{VP}$ *syntax*

compatible with:
CT = sentence

Empirical challenges

Challenges in experimental investigations of CTs:

- Complex, partly implicit **discourse structure** involved.

→ difficult to set up a plausible unambiguous contexts and to exclude accommodation

- Cue involves **intonation**, not (only) prominence.

→ tends to be overlooked/ignored in experimental materials

- Previous experiments usually involved **fronting**, because CTs have to precede the focus to form the hat contour.

→ confound: syntactic movement.

New experiment

Main features of the experiment:

- A **theater scenario** with explicit scene descriptions.

→ allows to contrast any pair of propositions without plausibility issues

- **Forced-choice** method, explicit instructions and training.

→ guide attention to intonational cue

- CT is contained in **preposed embedded clause** with basic word order, focus in following main clause.

→ hat contour can be formed without syntactic movement

New experiment

Main features of the experiment (continued):

- Testing projection from **subject/object** to sentence level.

→ clear perceptual distinction; different hypotheses

- Direct comparison between **focus and CT** projection.

→ allows conclusions concerning their (dis)similarities

Method: example stimulus (CT)

You saw a theater play with a friend, including the following scenes:
Scene 1: *(in a port)* A fisherman warns a sailor.
Scene 2: It storms.

Later, you talk about the play:
You say: "I remember that a fisherman warned a sailor and that it stormed. In which scenes did that happen?"
Your friend answers: "**Dass der Angler den Segler gewarnt hat**, haben wir in der ersten Szene gesehen.
(*lit.* **That the fisherman warned the sailor**, we saw in the first scene).
It stormed later."

...//ANGLER...Segler...	...Angler.../SEGLER...	neither

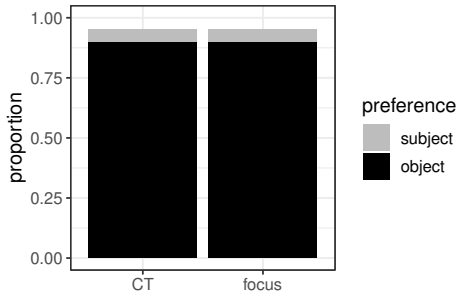
Method: example stimulus (focus)

You saw a theater play with a friend, including the following scenes:
Scene 1: *(in a port)* A fisherman warns a sailor.
Scene 2: It storms.

Later, you talk about the play:
You say: "I think that in the first scene we saw that it stormed."
Your friend answers: "Nein, da haben wir gesehen, **dass der Angler den Segler gewarnt hat**.
(*lit.* **No, there we saw that the fisherman warned the sailor**). It stormed later."

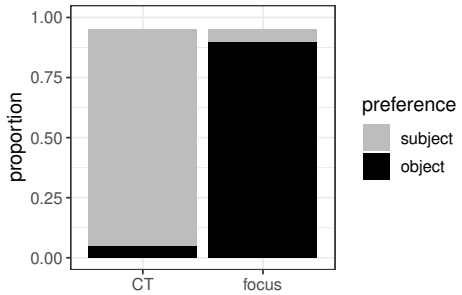
...ANGLER...Segler...	...Angler...SEGLER...	neither

Hypotheses



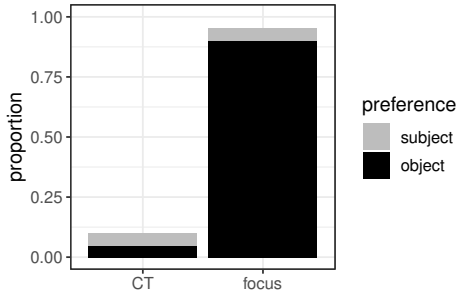
CT projection = focus projection

→ no differences



CT left-aligned with hat contour

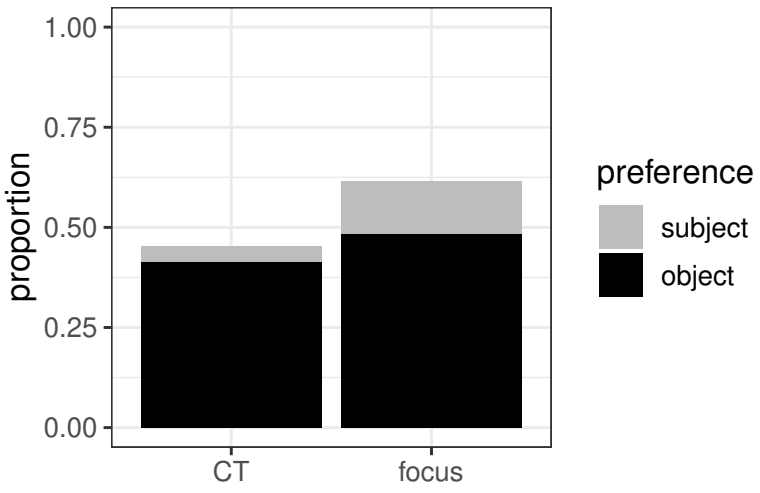
→ main effect of IS category on S/O preference



no CT projection, or different

→ main effect of IS category on 'neither' responses

Results: summary



- Significantly more "neither" answers for CTs.
- Significantly less projection from subject for CTs.

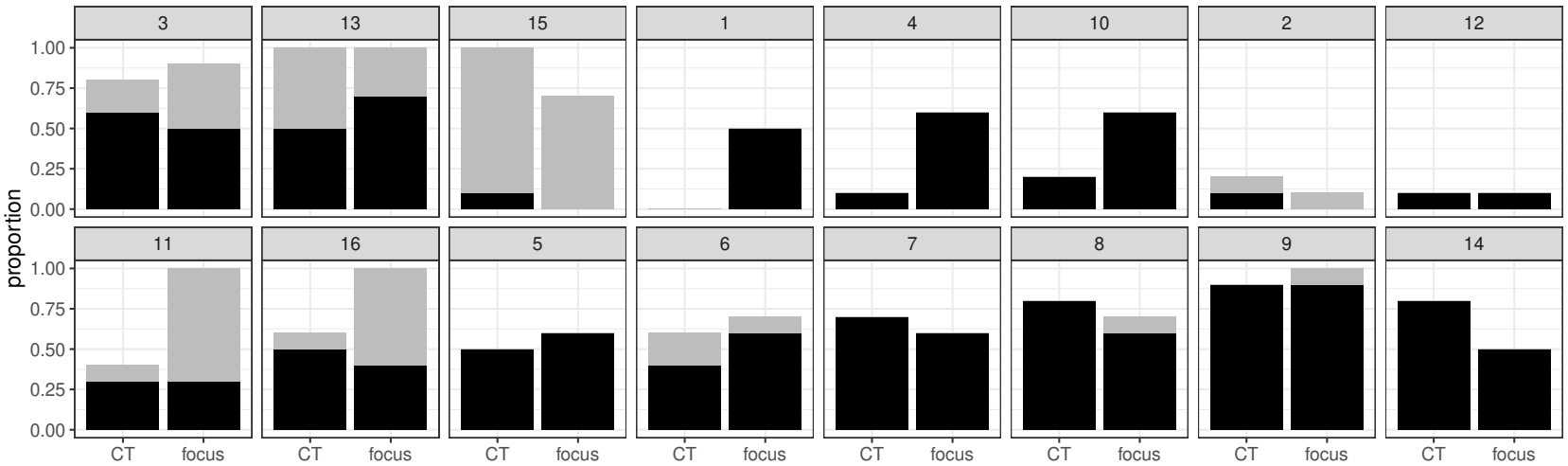
(20 items, 16 subjects; 3 subjects excluded based on $>$ 20% unexpected responses in control items.)

Results: by subject (grouped)

group 1: unexpected responses in controls

group 2: no CT projection

group 3: no projection

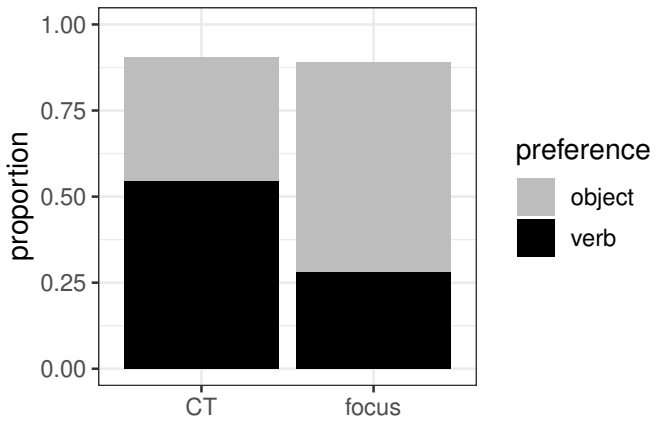


group 4: focus proj. from S/O

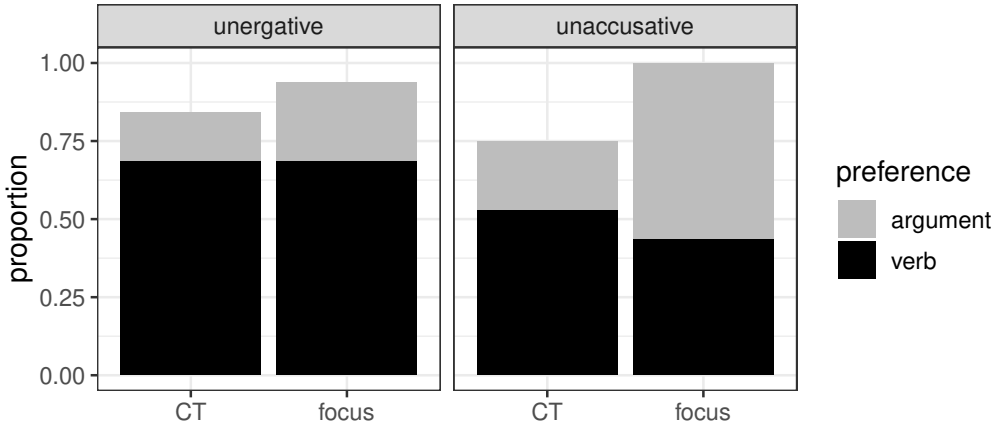
group 5: focus + CT projection work similarly: mostly projection from O

Results: fillers + comments

Fillers: accented verb preferred more frequently for CTs.



CT/focus = VP



CT/focus = intransitive sentence

Comments by a subject from the "no CT projection" group:

Betonung je auf einem Teil, nicht auf dem gesamten Abschnitt; Betonung nicht akkurat auf dem gesamten Teil
'prominence on each part, not (accurately) on the whole section'

Discussion

- **Mean results:** CT and focus projection possible from O, sometimes focus projection possible from S.

→ Do CT and focus projection work similarly, modulo noise?

- **By-subject analysis:** little noise, systematic patterns – some participants did not accept CT projection at all.

→ Would they prefer a different pattern, or is CT projection impossible for them? Do they have a different grammar?

- **Fillers + comments**: Perhaps the verb cannot be easily deaccented in broad CTs in general. Participants might vary in how willing they are to accept a non-ideal option.

Conclusions

- Highly consistent + interpretable results

  → new paradigm works

- Most but not all speakers accept CT projection from the object to the sentence level.

  → CT projection is possible
  → CT projection to sentence level similar to focus
  → left-alignment hypothesis falsified
  → but: exceptions (perhaps optimal pattern was not included)

- Unexpected finding in fillers: for CTs, generally higher preference for prominent verb.

  → Worth investigating in more detail: prominence of the verb

Summary and outlook

Summary:

- **Exp. 1:** compatible with prosodic reconstruction.
- **Exp. 2:** CT projection exists and is similar to focus projection to a certain extent.

Outlook:

- More consistent individual patterns in exp. 2 – replicating exp. 1 with this method could lead to clearer results.
- Once it is known how CT projection works in situ, reconstruction for CT projection can be studied.

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