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Extraposition without Subjacency

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Outline of the Talk

- Introduction: Relative Clause Extraposition
- Subclausal Locality Constraints on Extraposition
 - Review of the Constraints and Discussion of Counterexamples
 - Subjacency (Chomsky 1973)
 - Generalized Subjacency (Baltin 1981, 1983, 2006)
 - Barriers Approach (Chomsky 1986)
 - Brief Discussion of Corpus Evidence for German
 - Experimental Acceptability Studies
 - English
 - German
- Discussion

Introduction:
Relative Clause Extraposition
in English and German

Relative Clause Extraposition - English

- Integrated relative clause (“in situ”)

I met [_{DP} a girl [_{RC} who looked like you]] yesterday

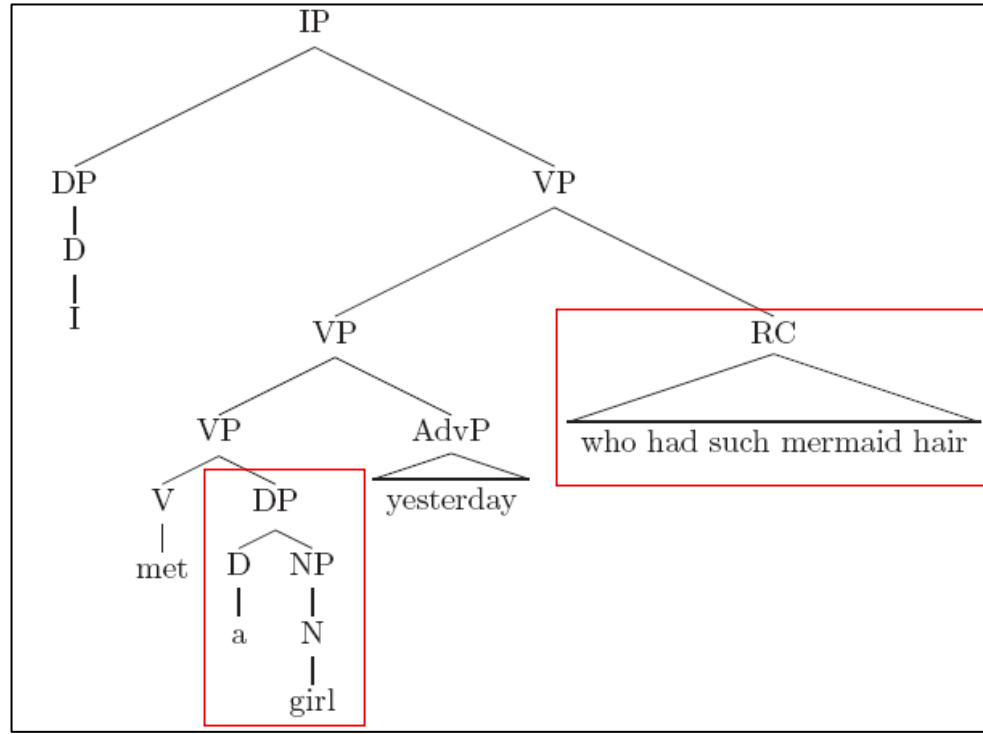
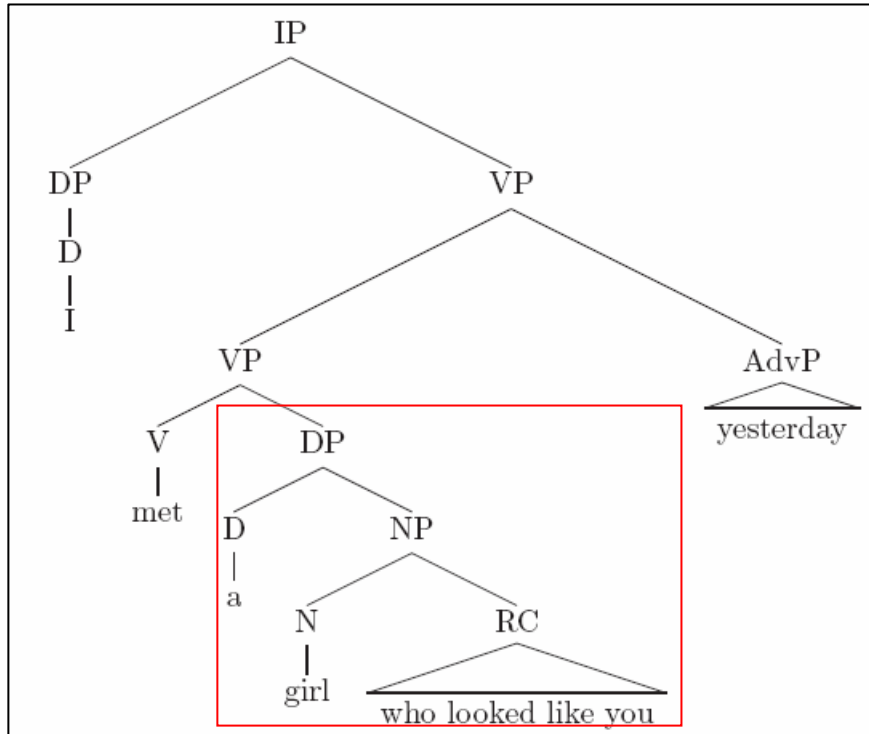
(profile.myspace.com/index.cfm?fuseaction=user.viewprofile&friendid=21174003, 03/11/2007)

- Extraposed relative clause

I met [_{DP} a girl t] yesterday [_{RC} who had such mermaid hair]

(profile.myspace.com/index.cfm?fuseaction=user.viewprofile&friendid=16025622, 03/11/2007)

Relative Clause Extraposition - English



Relative Clause Extraposition - German

- Integrated relative clause (“in situ”)

Ich habe [_{DP} *alle diesbezüglichen Threads*] [_{RC} *die ich finden konnte*]] *gelesen*

I have all relevant threads that I find could read

‘I have read all relevant threads that I could find.’

(www.rcforum.de/ftopic6950.html, 03/11/2007)

- Extraposed relative clause

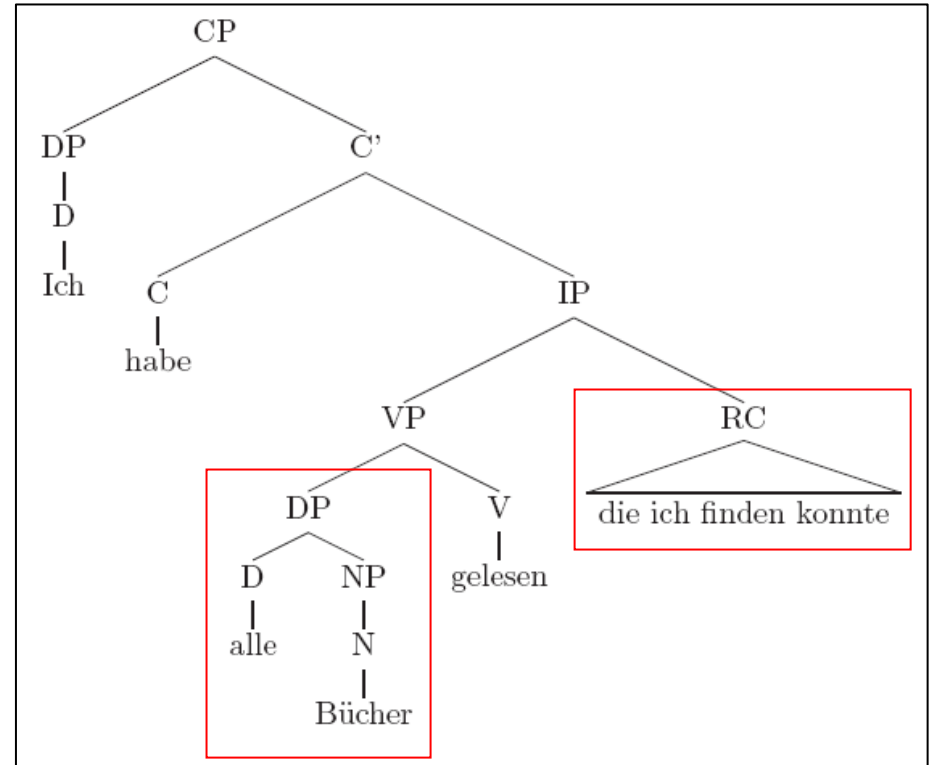
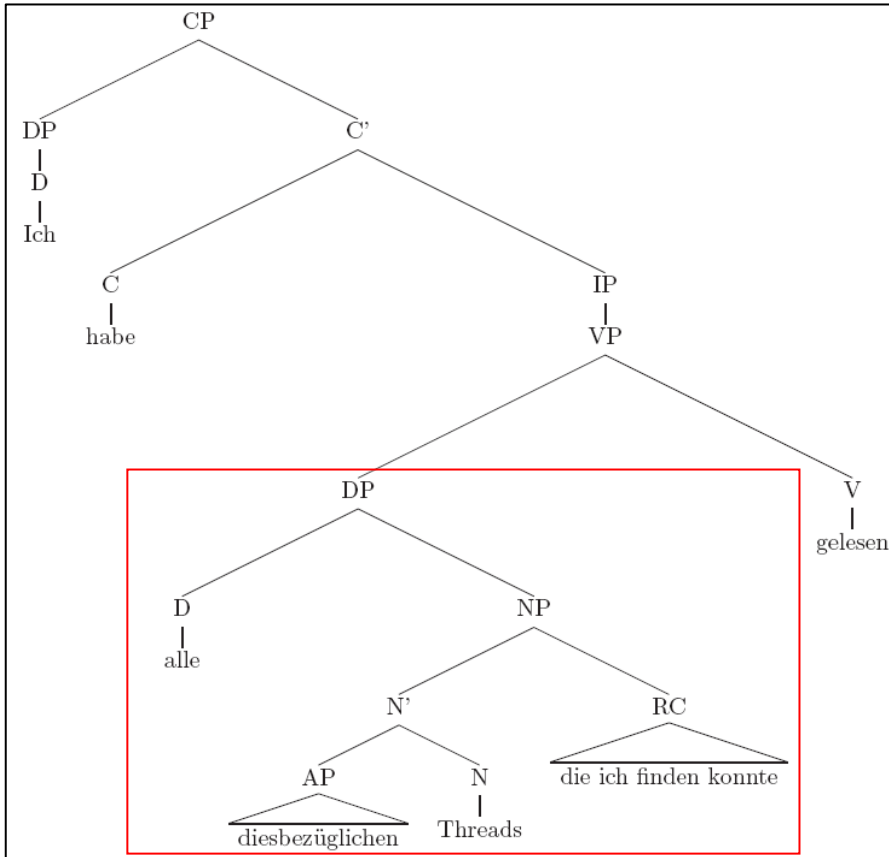
Ich habe [_{DP} *alle Bücher t*] *gelesen* [_{RC} *die ich finden konnte.*]

I have all books read that I find could

‘I have read all books that I could find.’

(www.wer-weiss-was.de/theme46/article2357606.html, 03/11/2007)

Relative Clause Extraposition - German



Subclausal Locality Constraints on Extraposition

Subjacency

- Chomsky (1973) claims that:
 - Extraposition is not only clause-bounded (Ross 1986)
 - But obeys a stricter, subclausal locality constraint

No rule can move an item from position Y to position X in the structure

$\dots [\beta \dots [\alpha \dots Y \dots] \dots] \dots X \dots$
where $Y \neq \alpha$ and α, β are cyclic categories, ...

(Chomsky, 1973, p. 271)

- Chomsky (1973) and also Akmajian (1975) assume that the set of cyclic nodes includes **S** (IP) and **NP** (DP)
- **Prediction:** Extraposition “out of” a noun phrase embedded in another noun phrase is impossible

Subjacency

- This is explicitly argued for with regard to the extraposition of prepositional phrases by Akmajian (1975, p. 118)

“[_{DP} A photograph t] was published last year [_{PP} of a book about French cooking.]”

“[_{DP} A photograph [_{PP} of [_{DP} a book t]]] was published last year [_{PP} about French cooking.]”*

Generalized Subjacency

- Baltin (1981, 1983, 2006) claims that extraposition obeys an even stricter subclausal locality constraint:

Generalized Subjacency

In the configuration $A \dots [\alpha \dots [\beta \dots B \dots]_{\beta} \dots]_{\alpha} \dots A'$,

- a. A and B cannot be related where α and $\beta = \text{NP, PP}$, and either one or both of S and S';
- b. A' and B cannot be related where α and β are maximal projections of any major category.

(quoted from Baltin 1983, p. 155; see also Baltin 1981, p. 262)

- **Prediction:** Only one maximal projection can intervene between an extraposed relative clause and its “in situ” position

Generalized Subjacency

- Generalization (Baltin 2006, p. 241):
“An extraposed phrase is adjoined to the first maximal projection that dominates the phrase in which it originates.”
- See also Akmajian (1975), Asakawa (1979), Jacobson (1987), and Rochemont and Culicover (1997) for English, Wiltschko (1997) for German, and Keller (1995) for both languages.

Counterexamples - English

- Constructed counterexample from Uszkoreit (1990, p. 2333)

“ $[_{DP}$ Only letters $[_{PP}$ from $[_{DP}$ those people t]]] remained unanswered $[_{RC}$ that had received our earlier reply.]”

- Naturally occurring examples

We drafted $[_{DP}$ a list $[_{PP}$ of $[_{DP}$ basic demands t]]] that night $[_{RC}$ that had to be unconditionally met or we would stop making and delivering pizza and go on strike.]

(portland.indymedia.org/en/2005/07/321809.shtml, 02/22/2007)

A wreath was placed $[_{PP}$ in $[_{DP}$ the doorway $[_{PP}$ of $[_{DP}$ the brick rowhouse t]]]] yesterday, $[_{RC}$ which is at the end of a block with other vacant dwellings.]

(<http://www.firerescue1.com/DutyDeaths/278039/>, 02/22/2007)

Counterexamples - German

- Constructed example by Müller (2004)

*Karl hat mir [DP eine Kopie [DP einer Fälschung [DP des Bildes
Karl has me a copy a.GEN forgery the.GEN painting
[DP einer Frau t]]]] **gegeben**, [RC die schon lange tot ist.]
a.GEN woman given who already long dead is*

‘Karl gave me a copy of a forgery of the painting of a woman who has been dead for a long time.’

- Other authors also claim that such examples are grammatical in German: Haider (1997), Kiss (2005), Müller & Meurers (2006) and others.

Counterexamples - German

Und dann sollte ich [_{DP} *Augenzeuge* [_{DP} *der* *Zerstörung*
and then should I eye witness the.GEN destruction
[_{DP} *einer Stadt t*]]] *werden*, [_{RC} *die mir am Herzen lag*]
a.GEN city become that me at.the heart lay

- *Sarajevo.*

- Sarajevo

‘And then I was about to become an eye witness of the
destruction of a city that was dear to my heart – Sarajevo.’

(Tübinger Baumbank des Deutschen / Schriftsprache (TüBa-D/Z),
sentence 16294)

Intermediate Summary

- Extraposition from an DP embedded inside another DP has been argued to be grammatical in German by some authors
- Natural German but also English examples can indeed be found in corpora
- Chomsky's (1973) version of Subjacency is therefore falsified as a categorical constraint on extraposition in both German and English (if NP is taken to be a cyclic node)
- Baltin's even more restrictive Generalized Subjacency is therefore also falsified:

An extraposed RC is not always adjoined to the first maximal projection containing its antecedent.

Chomsky's Barriers Approach

- Chomsky (1986, p. 14) makes a revised proposal which incorporates the distinction between arguments and adjuncts:

γ is a BC for β iff γ is not L-marked and γ dominates β .

γ is a barrier for β iff (a) or (b):

Barrier by inheritance

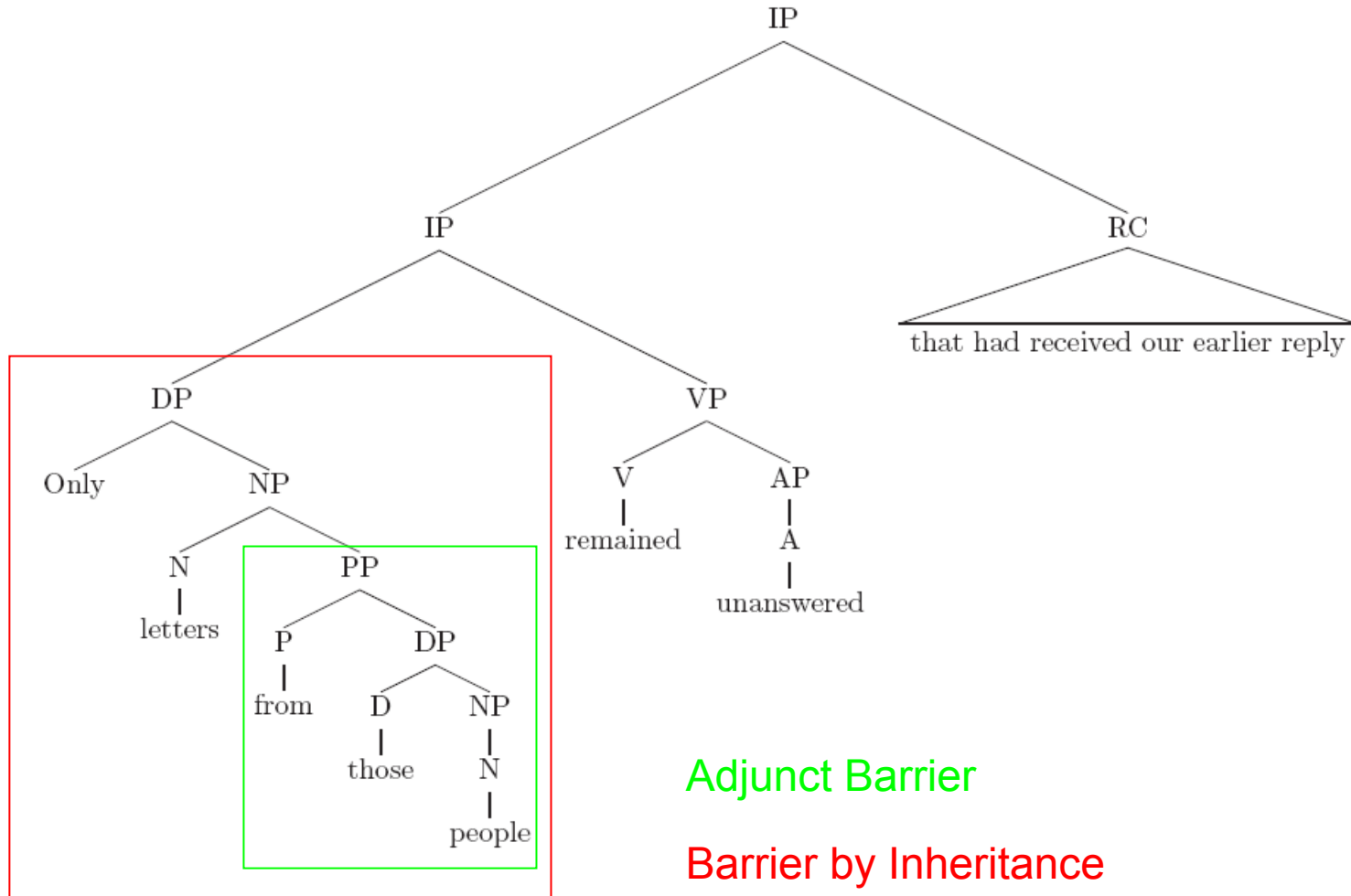
a. γ immediately dominates δ , δ a BC for β ;

b. γ is a BC for β , $\gamma \neq \text{IP}$.

Adjunct Barrier

- Again, two barriers are needed to render extraposition illicit
- Prediction:** Extraposition from a DP that is contained in some kind of adjunct (e.g., of another DP) is ungrammatical

Chomsky's Barriers Approach



Chomsky's Barriers Approach

- Chomsky (1986, p. 40) argues that the RC in the following example can only modify the higher NP (i.e., it can only originate from position t' and not from t)

[_{DP} many books [_{PP} with [_{DP} stories t]] t'] were sold
[_{RC} that I wanted to read]

- Müller (2004, p. 10) argues that structurally equivalent examples in German are in fact grammatical with unambiguous attachment of the RC to the embedded DP

weil [_{DP} viele Schallplatten [_{PP} mit [_{DP} Geschichten t]]]

because many records with stories

verkauft wurden [_{RC} die ich noch lesen wollte]

sold were that I still read wanted

'because many records with stories were sold that I still wanted to read'

Counterexamples - English

*I'm reading [_{DP} a book [_{PP} about [_{DP} Elliott Smith t]]
right now, [_{RC} who killed himself]]*

(www.songmeanings.net/lyric.php?lid=3530822107858518290, 02/28/2007)

*For example, we understand that Ariva buses have won
[_{DP} a number [_{PP} of [_{DP} contracts [_{PP} for [_{DP} routes
[_{PP} in [_{DP} London]] t]]]]] **recently**, [_{RC} which will not be run
by low floor accessible buses.]*

(<http://www.publications.parliament.uk/pa/cm199899/cmselect/cmenvtra/32ii/32115.htm>,
02/24/2007)

Counterexamples - German

... hielt sie vor allem [DP das Andenken [PP an [DP “die gute alte Zeit”
held she above all the memory of the good old time
[PP unter [DP ihrem verstorbenen Mann t]]]]] hoch, [RC der im
under her deceased husband high who in the
Mittelpunkt ihres Wahlkampfes stand.]
center of her campaign stood

‘... she mostly kept the memory of the good old times under her deceased husband alive who was at the center of her election campaign.’

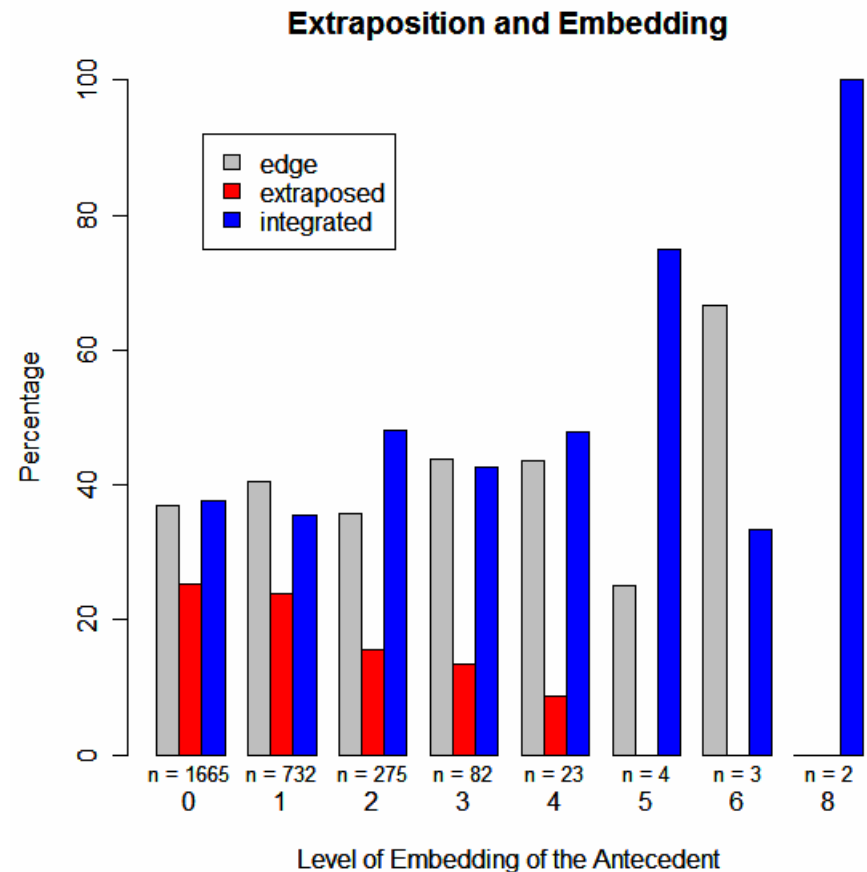
(Tübinger Baumbank des Deutschen / Schriftsprache (TüBa-D/Z), sentence 12507)

Intermediate Summary

- Counterexamples against Chomsky's Barriers approach can be found both in German and English
- Extraposition is possible "out of" multiply embedded DPs
- No subclausal locality constraint proposed so far is compatible with the counterexamples we have presented
- The null hypothesis should be that there is no syntactic subclausal locality constraint on extraposition
- More systematic empirical research is needed

Corpus Evidence for German

- German newspaper corpus TüBa-D/Z
- 2,789 relative clauses
- Likelihood of RC extraposition decreases with deeper embedding
- But the decrease is very gradual:
 - Embedding 0 – 25.4 %
 - Embedding 1 – 23.9 %
 - Embedding 2 – 15.5 %
 - Embedding 3 – 13.4 %
 - Embedding 4 – 8.7 %
 - Embedding 5-8 – 0 %



Experimental Studies

Motivation

- Are there consistent gradual effects of subclausal locality constraints?
- Questions
 - Do systematic experiments reveal subclausal locality effects?
 - What is the strength of these effects?
 - Are there differences between offline and online measures (acceptability and reading time data)?
 - Are there any differences between English and German?

Experiments – Acceptability

- Systematic elicitation of acceptability judgments
 - Participants read a sentence on screen
 - And judged it on a scale from 1 (natural / acceptable) to 8 (unnatural / unacceptable)

Ich habe einen gefeierten Heiler aus einem einheimischen Dorf zu einer schweren Epidemie befragt, die Misstrauen gegen die westliche Medizin gesät hat.

natürlich 1 2 3 4 5 6 7 8 unnatürlich

- Dependent variable:
Mean (z-normalized) acceptability rating

Experimental Design - English

- 3 x 2 factorial design crossing the two factors
 - depth of **embedding** of the antecedent of the RC
 - height of **attachment** of the RC
- Experimental items consisted of a matrix sentence which contained 3 DPs and an extraposed relative clause (inspired by Gibson & Breen 2003)

<i>I consulted</i>	Subj. + Verb
<i>[_{DP1} the diplomatic representative</i>	DP 1
<i>[_{PP} of [_{DP2} a small country</i>	DP 2
<i>[_{PP} with [_{DP3} border disputes t]]]]]</i>	DP 3
<i>early today</i>	Interv. Adv.
<i>[_{RC} which threaten to cause a hugely disastrous war.]</i>	Extrap. RC

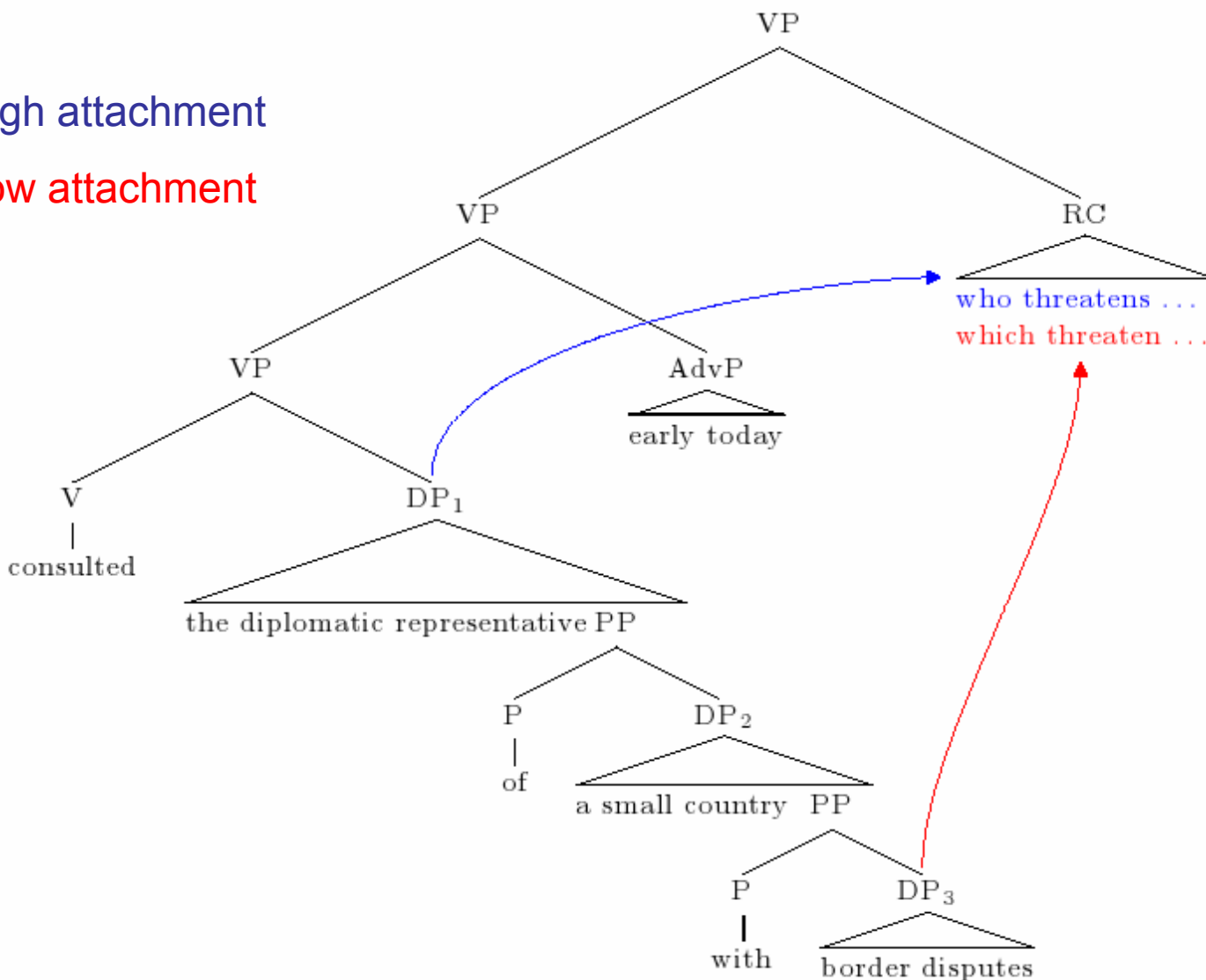
Experimental Design - English

- Three levels of embedding (of DP_3): deep, mid, shallow
 - Varying structure of the matrix clause: transitive – ditransitive by exchanging prepositions
 - Comparison of different depths of embedding of the antecedent (varying severity of Subjacency violations)
- Crossed with the factor height of attachment (high attachment to DP_1 vs. low attachment to DP_3)
 - Attachment forced through animacy of the relative pronoun and number of the verb
 - Direct comparison between the two attachment conditions (especially for deep embedding of DP_3)
 - Low Attachment: Severe violation of Subjacency
 - High Attachment: No violation of Subjacency

Design – Deep Embedding

■ High attachment

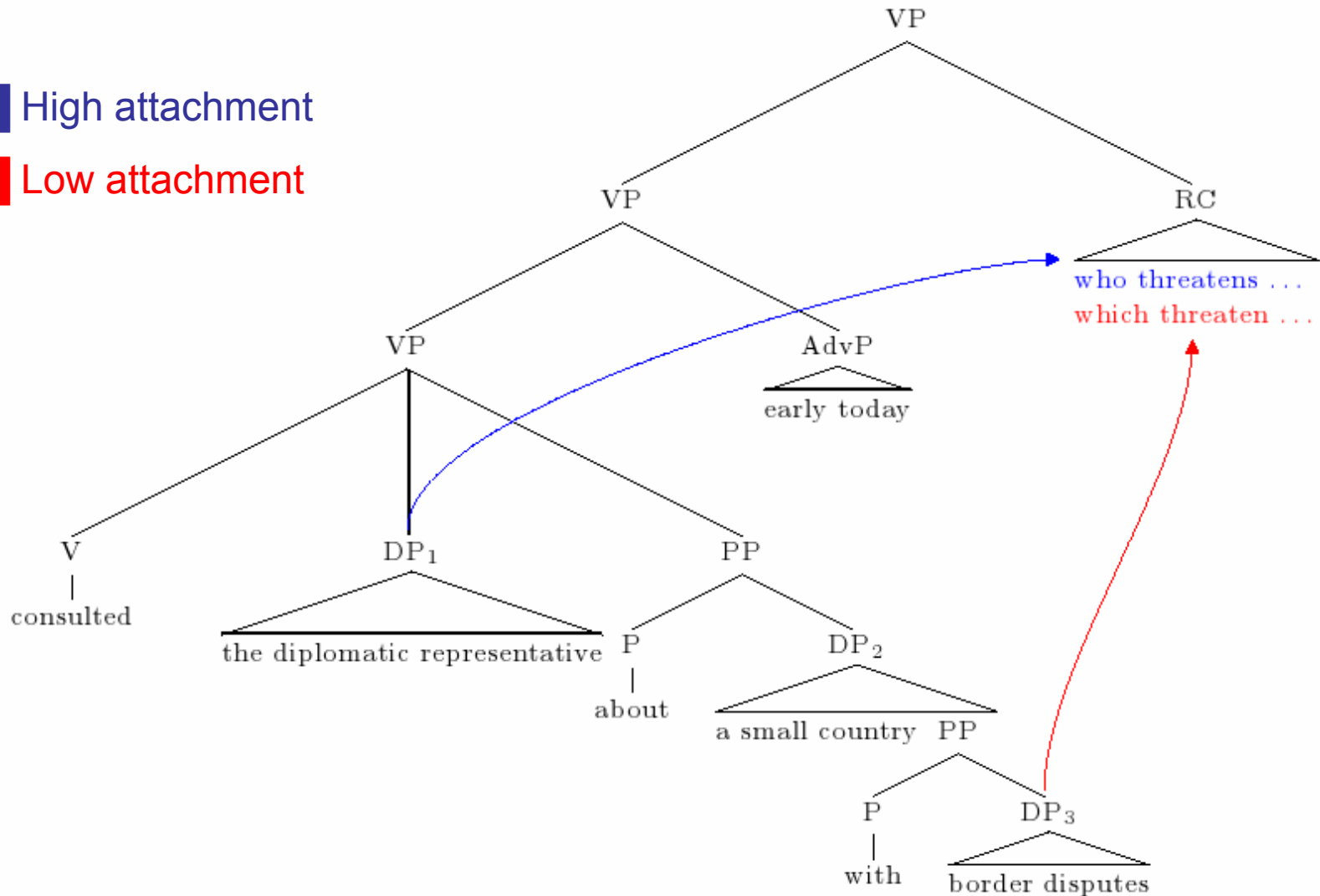
■ Low attachment



Design – Mid Embedding

■ High attachment

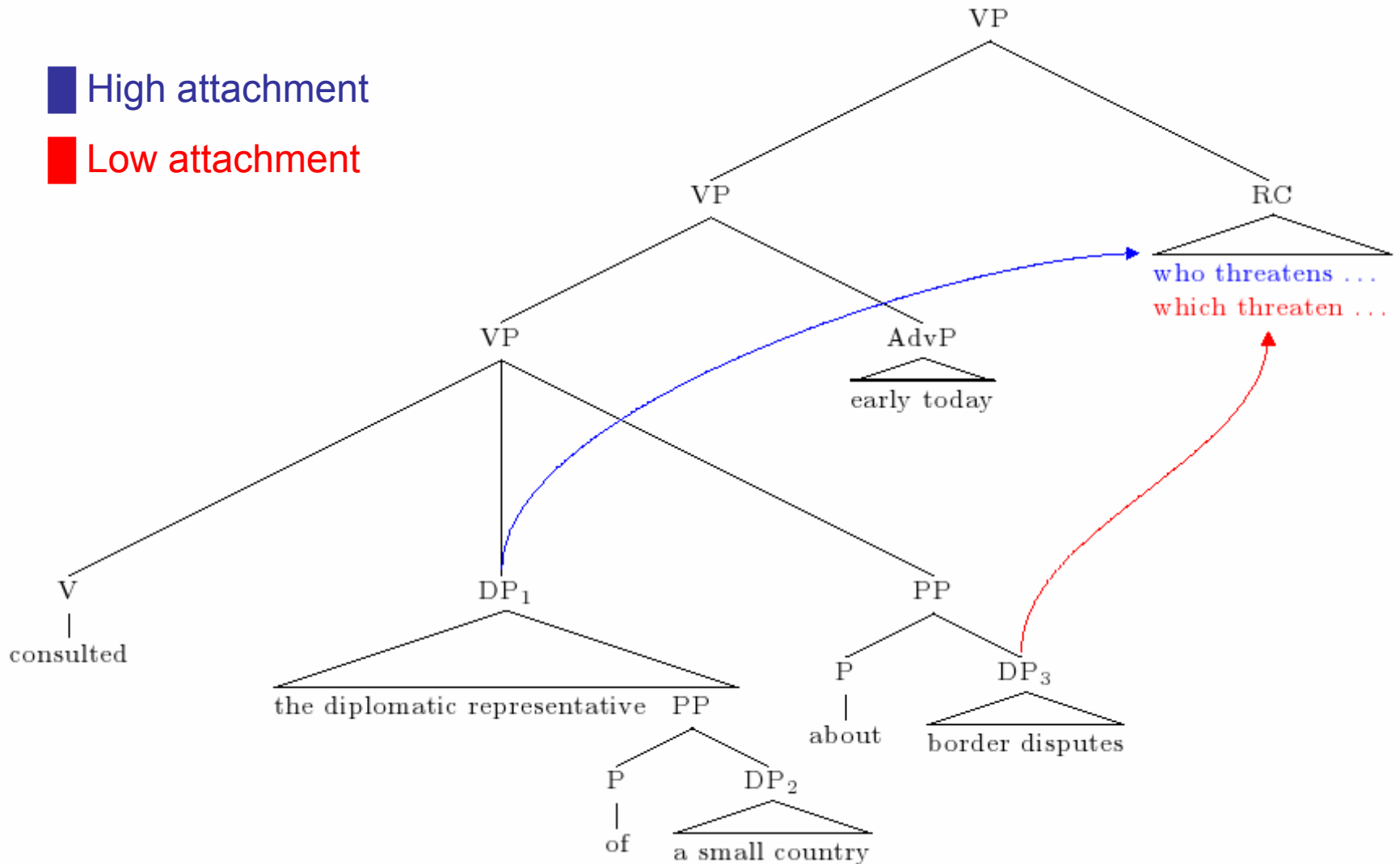
■ Low attachment



Design – Shallow Embedding

■ High attachment

■ Low attachment



Experimental Design - German

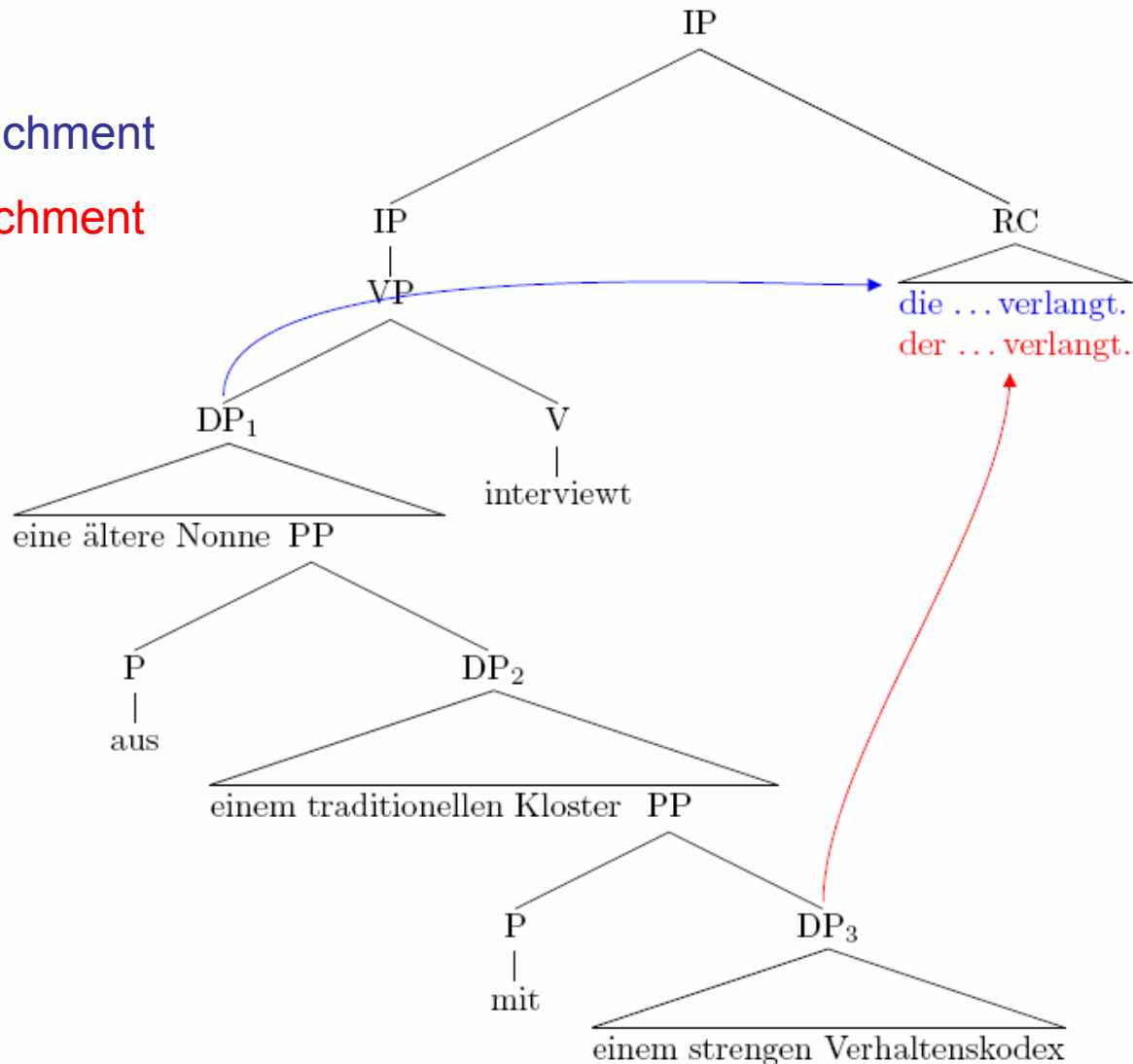
- 3 x 2 factorial design crossing the two factors
 - depth of **embedding** of the antecedent of the RC
 - height of **attachment** of the RC
- Same basic structure as in the English version
- Intervening material: Participle instead of adverb
- Attachment is forced by gender of the relative pronoun

<i>Ich habe</i>	Subj. + Verb1
<i>[_{DP1} eine ältere Nonne</i>	DP 1
<i>[_{PP} aus [_{DP2} einem traditionellen Kloster</i>	DP 2
<i>[_{PP} mit [_{DP3} einem strengen Verhaltenskodex t]]]]]</i>	DP 3
<i>interviewt</i>	Verb2
<i>[_{RC} der große Hingabe an die täglichen Rituale verlangt.]</i>	Extrap. RC

Design – Deep Embedding

■ High attachment

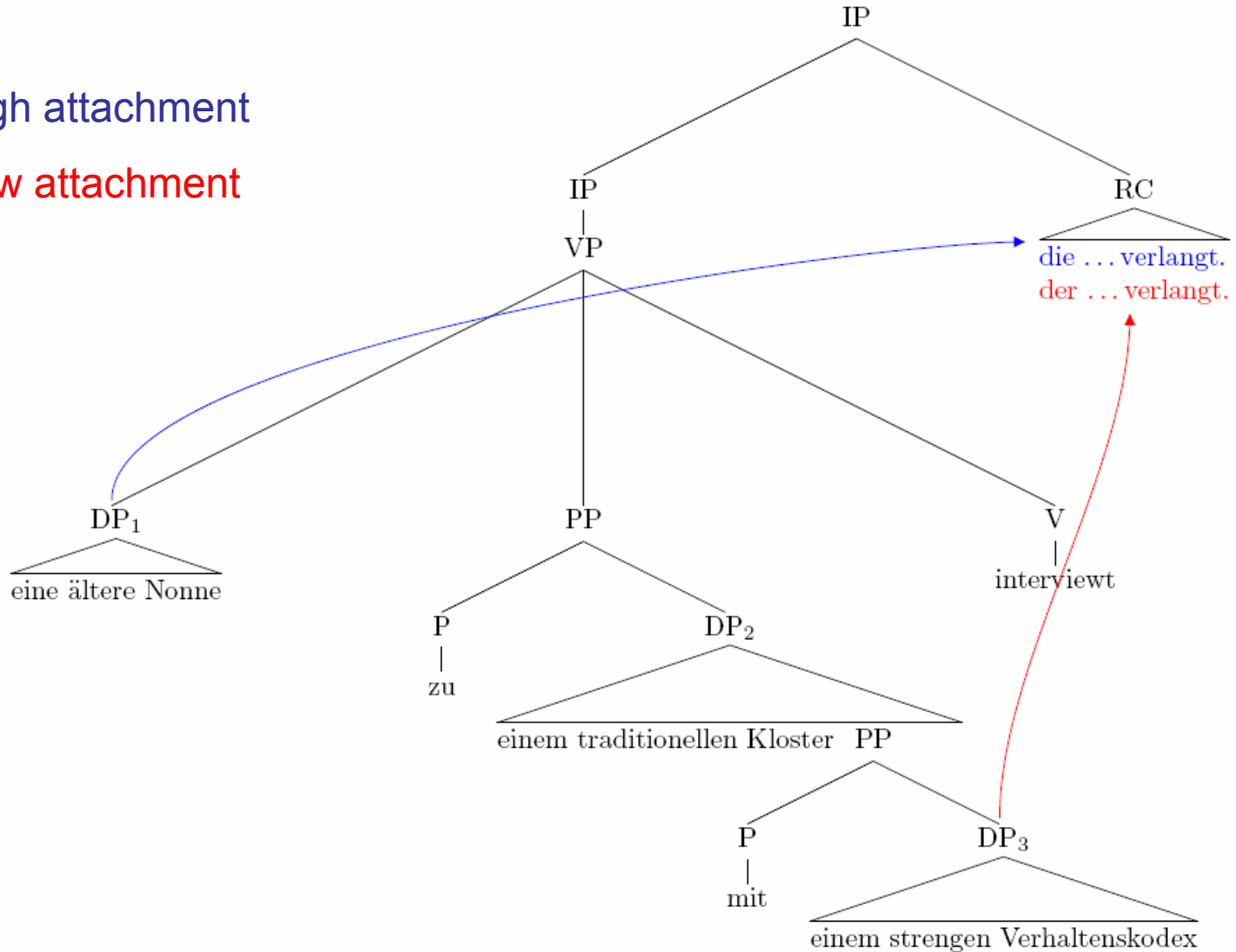
■ Low attachment



Design – Mid Embedding

■ High attachment

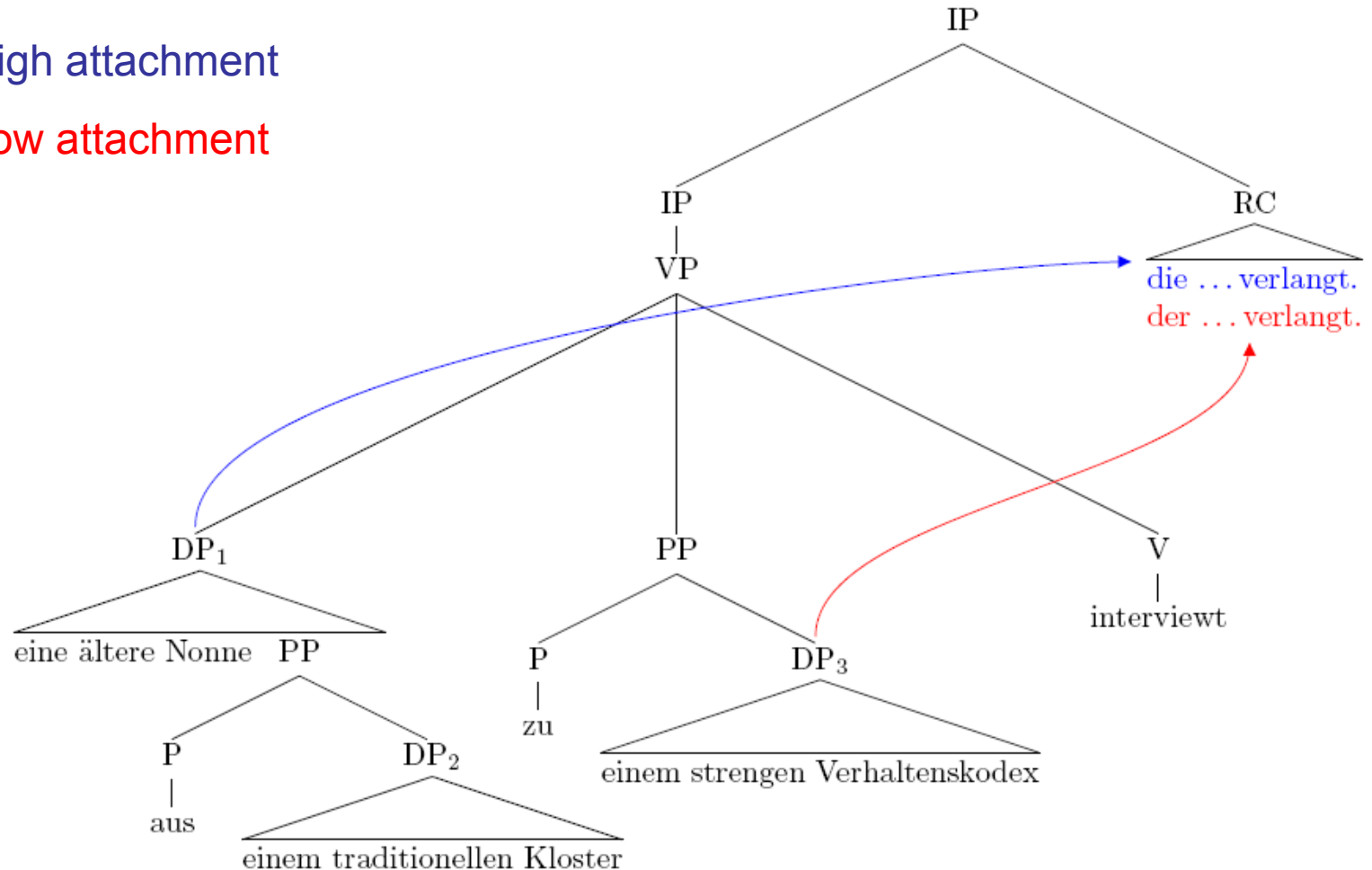
■ Low attachment



Design – Shallow Embedding

■ High attachment

■ Low attachment



Crucial Comparisons and Predictions

- Subclausal Locality
 - Deep-High (no subjacency violation)
 - vs.
 - Deep-Low (severe subjacency violation)
- Predictions
 - Subjacency predicts that Deep-High should be more acceptable than Deep-Low
 - We expect no difference because we believe that Subjacency is not an important constraint on extraposition

Crucial Comparisons and Predictions

- Subclausal Locality
 - Deep-Low (severe subjacency violation)
vs.
Mid-Low (medium subjacency violation)
vs.
Shallow-Low (no subjacency violation)
- Predictions
 - Subjacency predicts a clear increase in acceptability from Deep-Low to Mid-Low to Shallow-Low
 - We predict no or only a very gradual effect of depth of embedding

Processing Factors

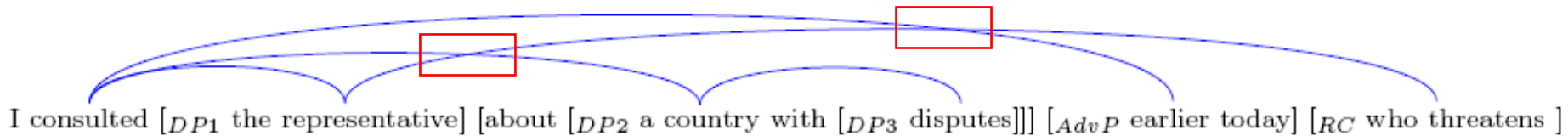
- Processing factors affecting high attachment in the mid and shallow embedding conditions
 - Longer distance between antecedent and relative clause (Gibson 2000)
 - Intervening argument of the verb
 - Higher number of crossing dependencies (for English) (Gibson & Breen 2003)

I consulted [_{DP1} *the diplomatic representative* t] [_{PP} *about* [_{DP2} *a small country* [_{PP} *with* [_{DP3} *border disputes*]]]] *early today* [_{RC} *who threatens to cause a hugely disastrous war.*] **(Mid)**

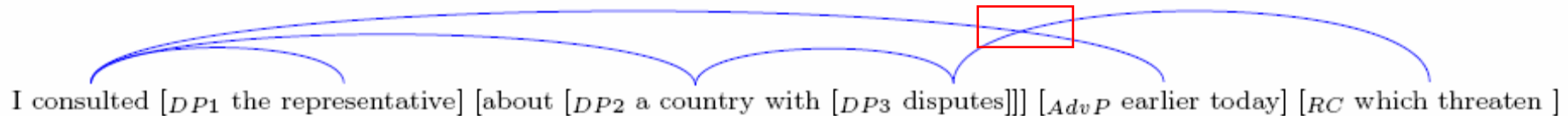
I consulted [_{DP1} *the diplomatic representative* [_{PP} *of* [_{DP2} *a small country*]]] t] [_{PP} *about* [_{DP3} *border disputes*]] *early today* [_{RC} *who threatens to cause a hugely disastrous war.*] **(Shallow)**

Processing Factors

- Number of crossing dependencies in English
 - Mid-High (two crossing dependencies)



- Mid-Low (one crossing dependency)



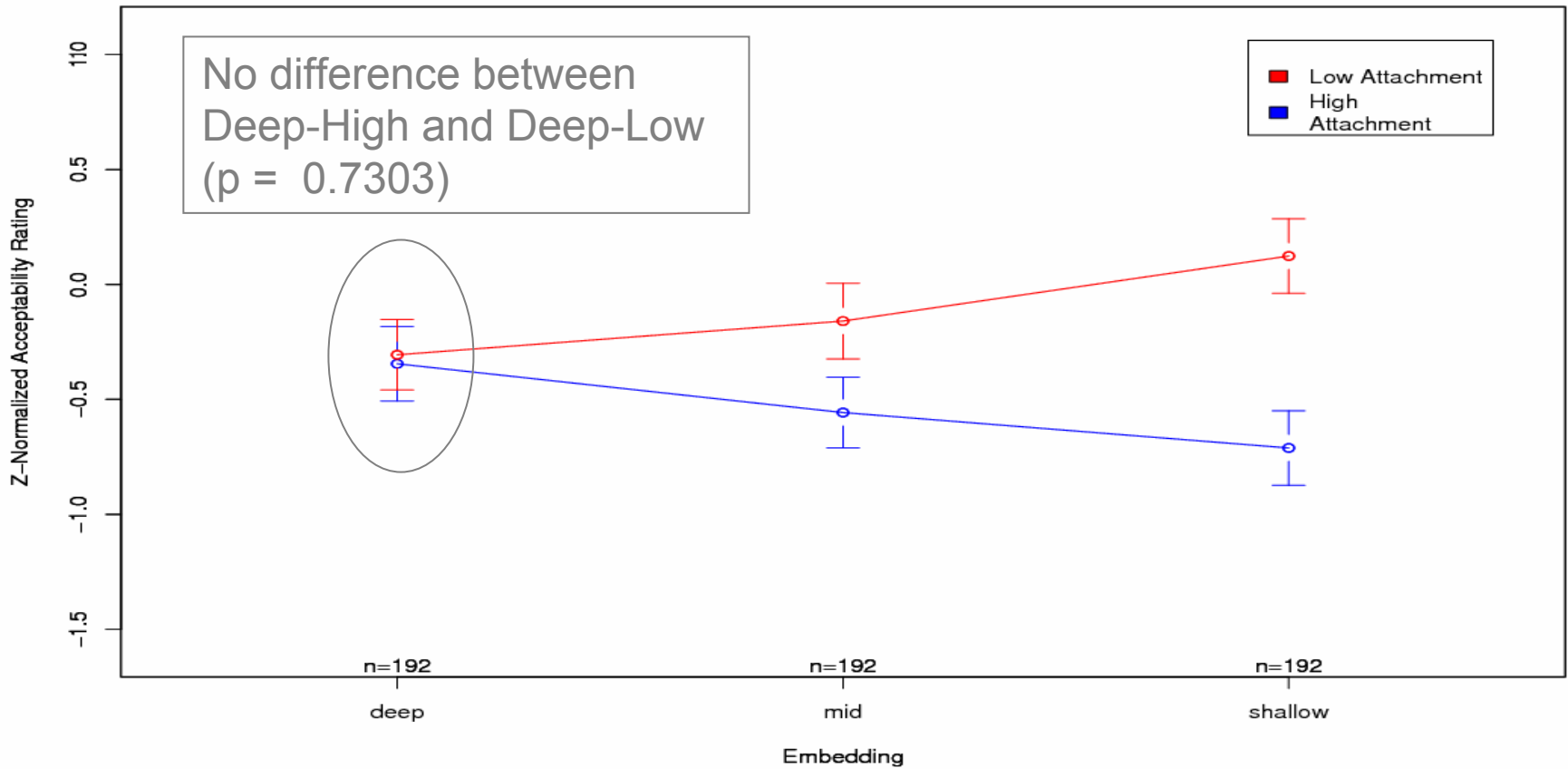
Crucial Comparisons and Predictions

- Gauge the magnitude of the effect of Subjacency within the low attachment condition
 - Deep-Low vs. Mid-Low vs. Shallow-Low
- By comparing it to the magnitude of the effect of the processing factors affecting the high attachment condition
 - Deep-High vs. Mid-High and Shallow-High
- Hypothesis: Subjacency is less important than these processing factors

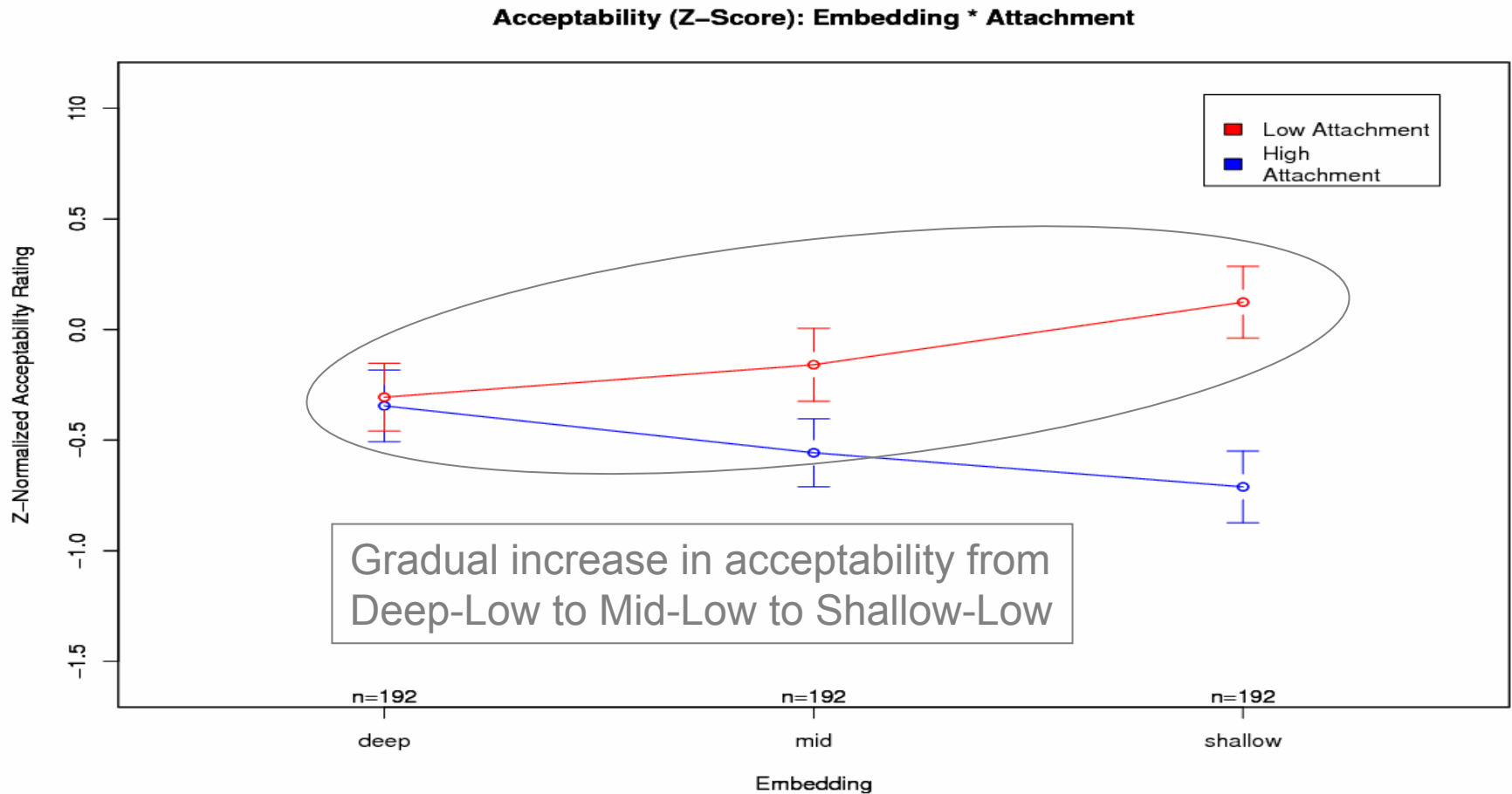
Results of the Experiments

Acceptability – English

Acceptability (Z-Score): Embedding * Attachment

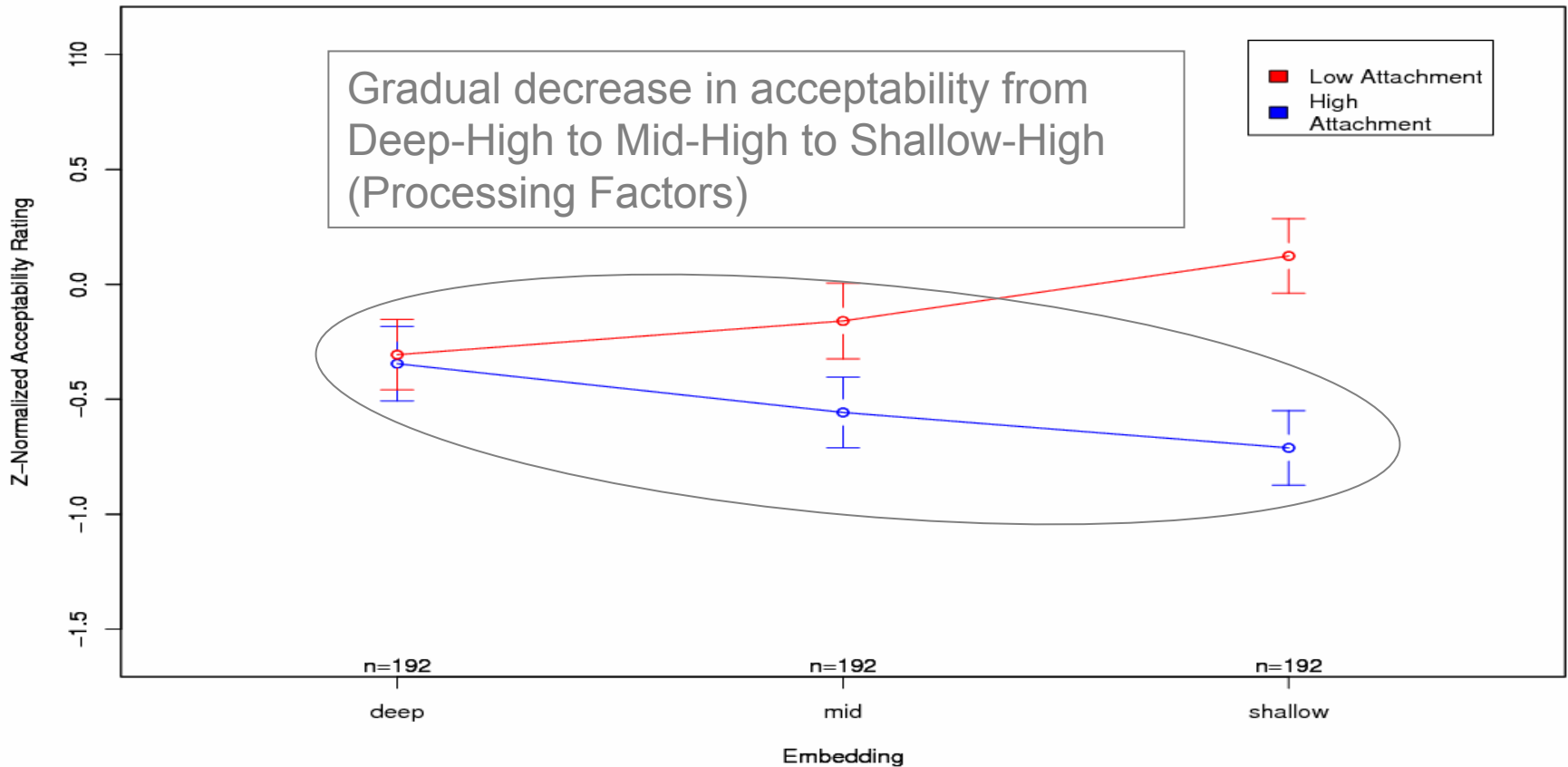


Acceptability – English

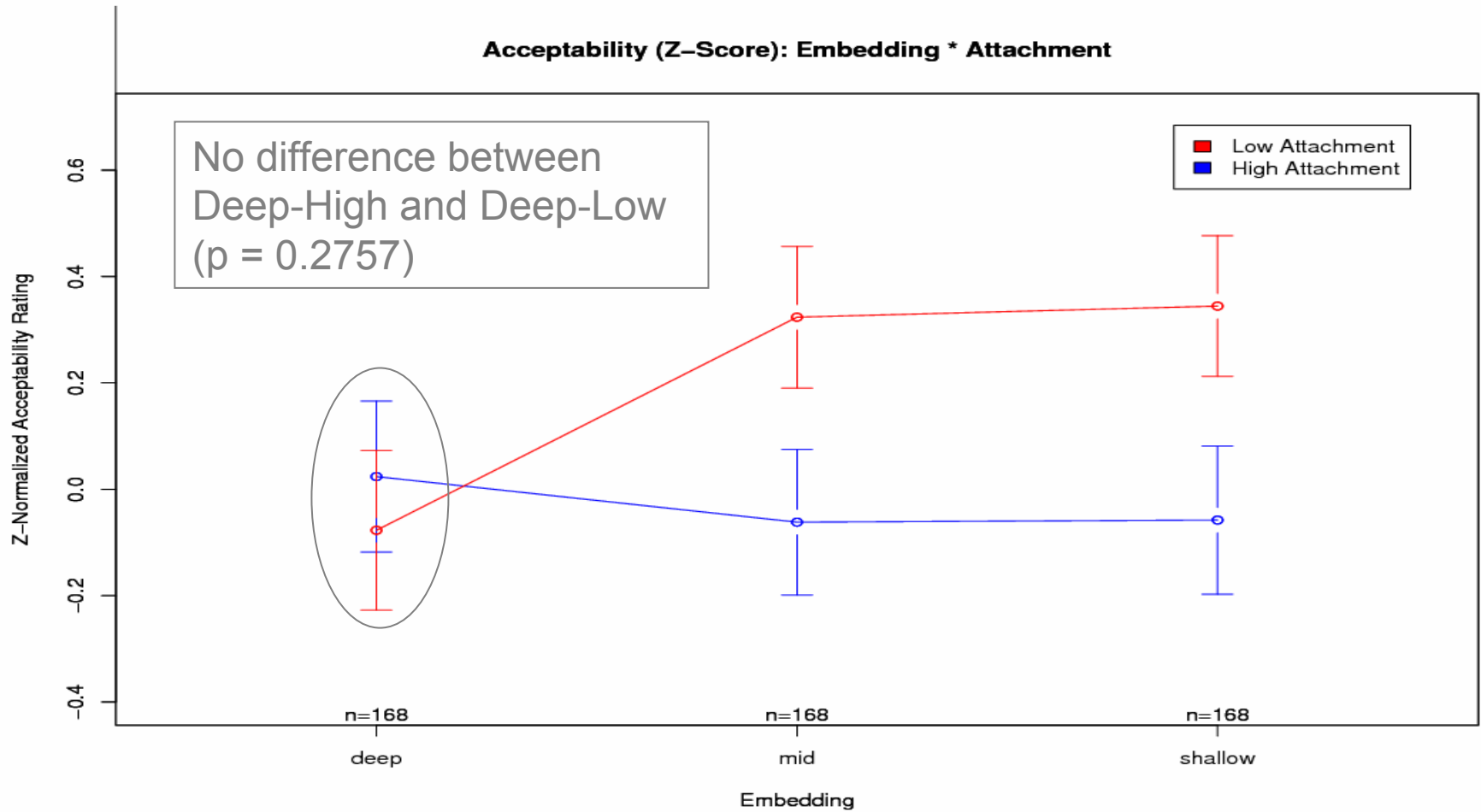


Acceptability – English

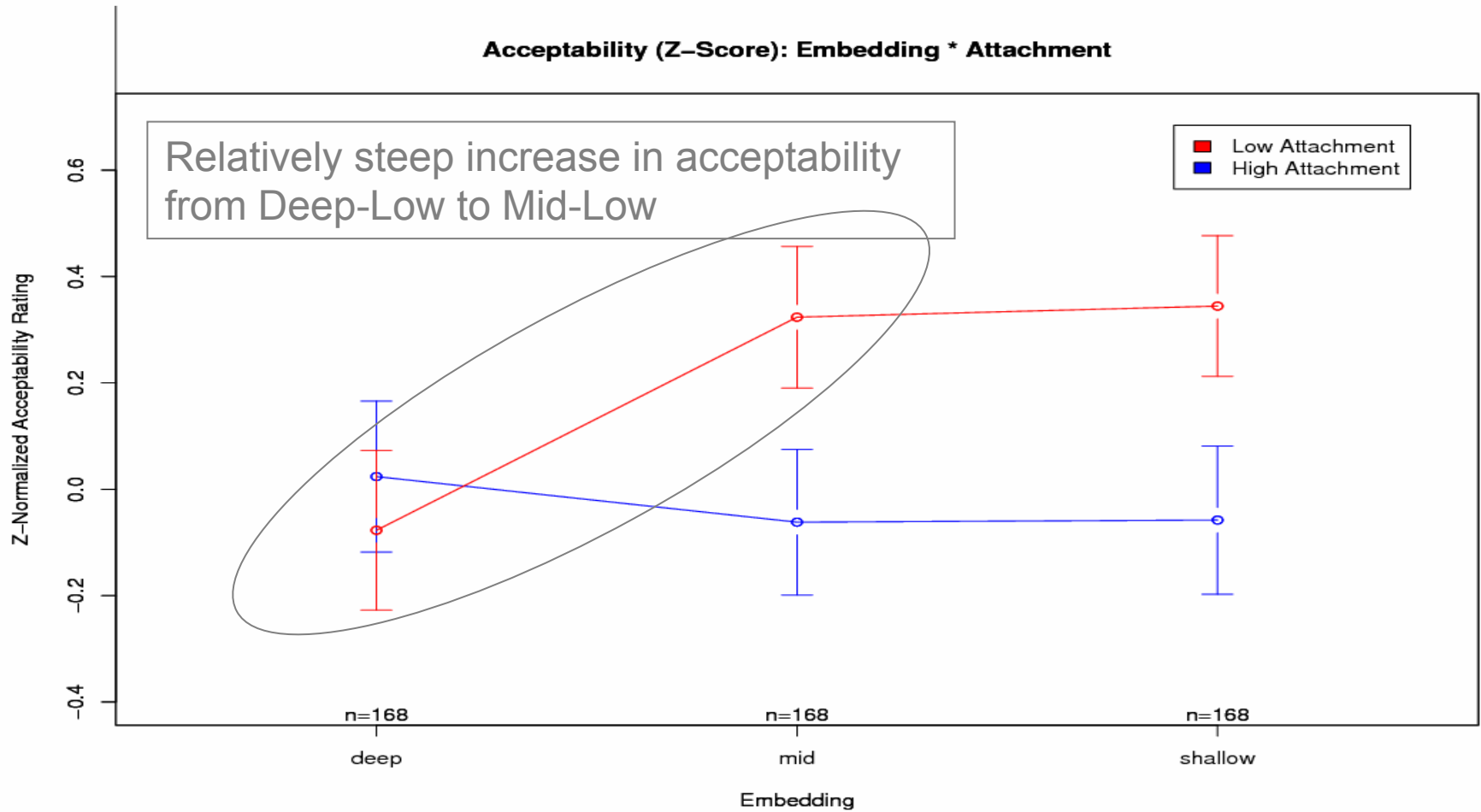
Acceptability (Z-Score): Embedding * Attachment



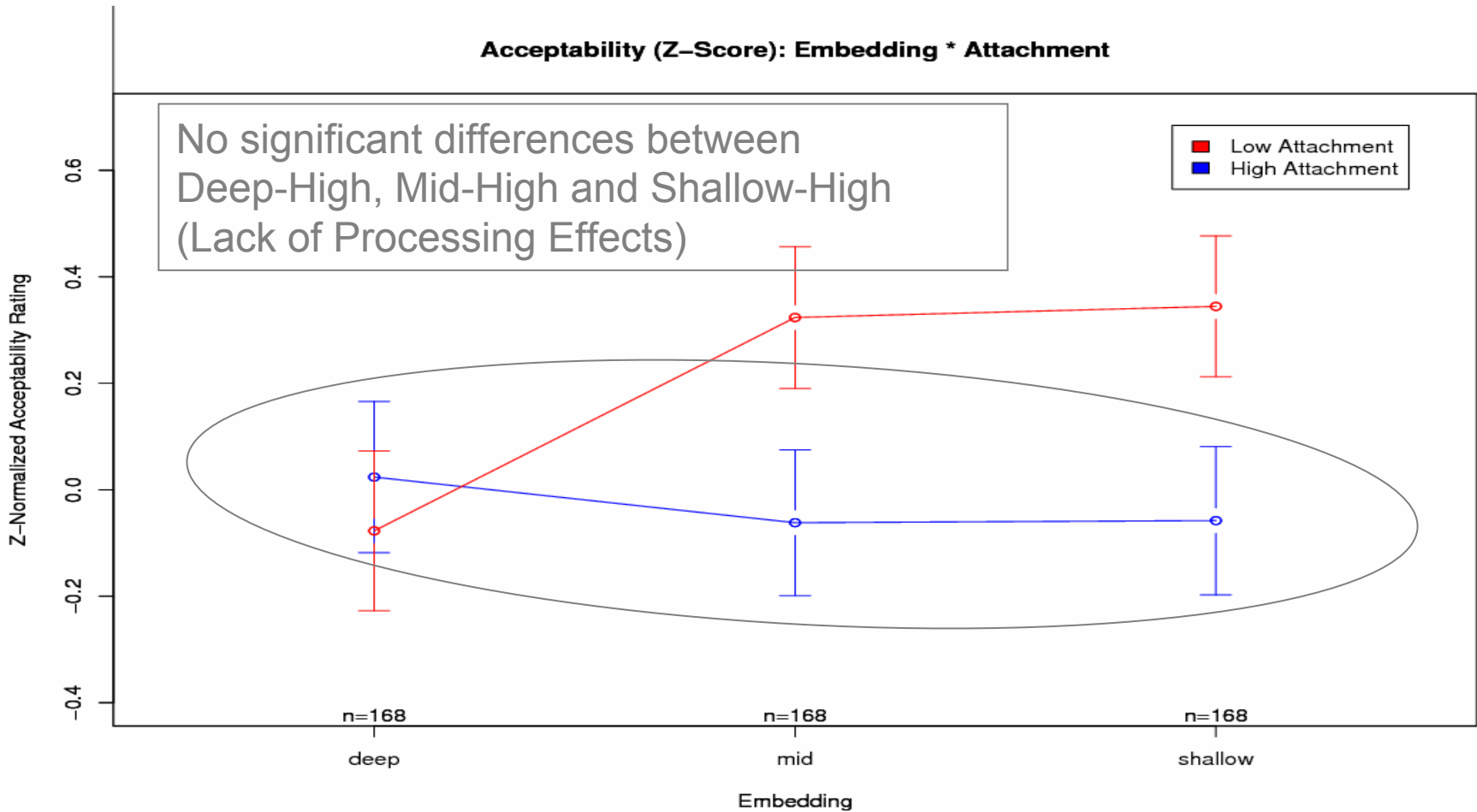
Acceptability – German



Acceptability – German



Acceptability – German



Discussion

Acceptability – Mixed Results

- The results with regard to Subjacency are somewhat mixed...
 - The difference in acceptability between Deep-High and Deep-Low predicted by Subjacency did not occur, neither for English nor for German
 - Examples with severe Subjacency violations thus do not seem to be necessarily worse than parallel examples without such violations
 - This result further strengthens our claim that the influence of subclausal locality constraints on extraposition has been overrated

Acceptability – Mixed Results

- But there also was an increase in acceptability from Deep-Low to Mid-Low to Shallow-Low in both experiments
- Compared to the influence of processing factors affecting high attachment, these locality effects were either larger (German) or approximately the same (English)
- This suggests that there is probably some kind of gradient, noncategorical locality constraint after all
- However, since the three embedding conditions also varied the argument structure of the verb, etc., further experimental and corpus evidence is needed...

Further Observations

- The decrease in acceptability from Deep-High to Mid-High and Shallow-High in English (as opposed to German) suggests that the number of crossing dependencies might be an important factor (cf. Gibson and Breen 2003)
- Inaba (2005) has suggested that RC extraposition in German and English are two totally different types of phenomena
 - Extraposition in English is syntactic movement
 - Extraposition in German is a phonological operation
- Our study rather suggests that there is no such fundamental difference between the two languages
 - Existence of counterexamples to subclausal locality constraints in both German and English
 - Rather similar results in the acceptability studies

Thank you!

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