

Computational Psycholinguistics

Die **Dependency Locality Theory** (DLT, Gibson, 1998; 2001), Teil 2: **Probleme** und mögliche Lösungsvorschläge.

DLT (Gibson, 1998; 2001)

- ⇒ Verarbeitungsschwierigkeit ergibt sich aus der Summe von **Total Integration Cost** (intervenierende neue Diskursreferenten) und **Storage Cost** (vorherzusagende Köpfe)
- ⇒ **Paralleles Verarbeitungsmodell**: Bei Ambiguität ergibt sich die **Gewichtung** („ranking“) einer Alternative ebenfalls aus TIC + SC. Reanalyse (i.e. re-ranking) umso schwieriger, je größer die Diskrepanz zwischen initialer und endgültiger Gewichtung.

Wie sehen die Vorhersagen von DLT für folgende Ambiguitäten aus?

↓
The foster mother who accepted the little boy didn't really like *herself* at all and was reported to the social committee. (**high attachment**)

↓
The foster mother who accepted the little boy didn't really like *himself* at all was reported to the social committee. (**low attachment**)

High Attachment

	The	foster mother	who	accepted	the	little	boy	didn't really like	herself	at all
DPC	0	1	0	1	0	0	1	1	0	0
SIC	0	0	0	0	0	0	0	2	0	0
Total IC	0	1	0	1	0	0	1	3	0	0
SC	2	1	3	1	2	2	1	1	0	0

	and	was reported	to	the	social committee
DPC	0	1	0	0	1
SIC	0	3	0	0	0
Total IC	0	4	0	0	1
SC	1	0	1	1	0

Low Attachment

	The	foster mother	who	accepted	the	little	boy	didn't really like	himself	at all
DPC	0	1	0	1	0	0	1	1	0	0
SIC	0	0	0	0	0	0	0	0	0	0
Total IC	0	1	0	1	0	0	1	1	0	0
SC	2	1	3	1	2	2	1	1	1	1

	was reported	to	the	social committee
DPC	1	0	0	1
SIC	3	0	0	0
Total IC	4	0	0	1
SC	0	1	1	0

⇒ Low Attachment sollte präferiert werden!

Sturt, Pickering, Scheepers, & Crocker (2001, e3)

- Self-paced reading Experiment
- Zweifaktorielles Design (**Attachment**: high vs. low; **Length**: short vs. long)
- 📖 The foster mother / who accepted / the little boy / didn't really like / *herself* / at all / and was reported / to the social committee. (**high, short**)
- 📖 The foster mother / who accepted / the little boy / didn't really like / *himself* / at all / was reported / to the social committee. (**low, short**)
- 📖 The foster mother / who accepted / the little boy / of the children's home / didn't really like / *herself* / at all / and was reported / to the social committee. (**high, long**)
- 📖 The foster mother / who accepted / the little boy / of the children's home / didn't really like / *himself* / at all / was reported / to the social committee. (**low, long**)

High Attachment („long“ version)

	The	foster mother	who	accepted	the	little	boy	of	the	children's home	didn't really like
DPC	0	1	0	1	0	0	1	0	0	1	1
SIC	0	0	0	0	0	0	0	0	0	0	3
Total IC	0	1	0	1	0	0	1	0	0	1	4
SC	2	1	3	1	2	2	1	2	2	1	1

	herself	at all	and	was reported	to	the	social committee
DPC	0	0	0	1	0	0	1
SIC	0	0	0	4	0	0	0
Total IC	0	0	0	5	0	0	1
SC	0	0	1	0	1	1	0

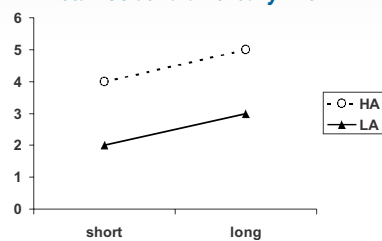
Low Attachment („long“ version)

	The	foster mother	who	accepted	the	little	boy	of	the	children's home	didn't really like
DPC	0	1	0	1	0	0	1	0	0	1	1
SIC	0	0	0	0	0	0	0	0	0	0	1
Total IC	0	1	0	1	0	0	1	0	0	1	2
SC	2	1	3	1	2	2	1	2	2	1	1

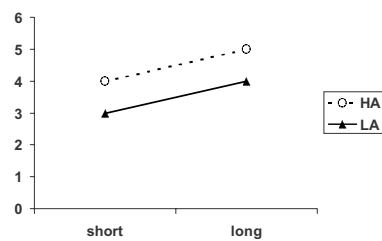
	himself	at all	was reported	to	the	social committee
DPC	0	0	1	0	0	1
SIC	0	0	4	0	0	0
Total IC	0	0	5	0	0	1
SC	1	1	0	1	1	0

Vorhersagen (DLT)

Total ICs at “didn't really like”

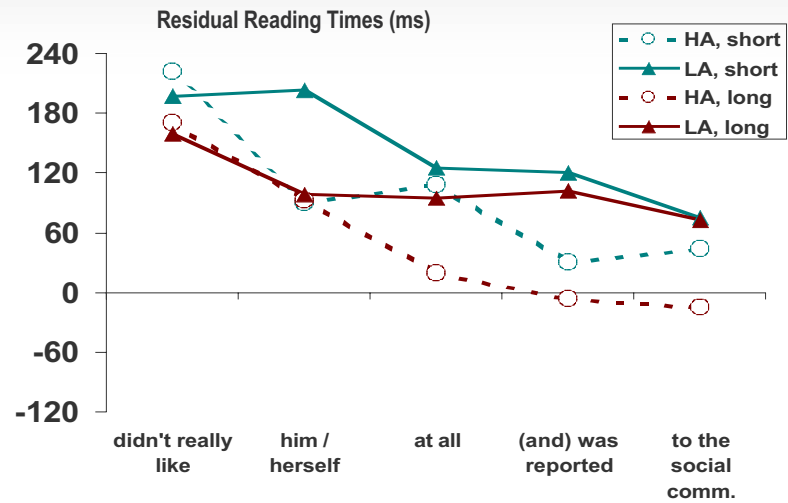


Without considering Storage
Cost at him/herself



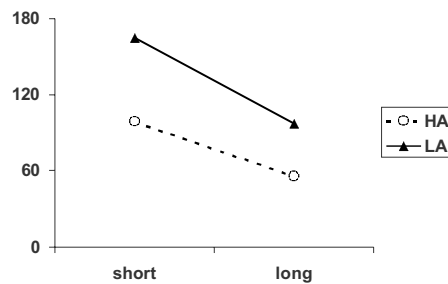
Also considering Storage
Cost at him/herself

Results



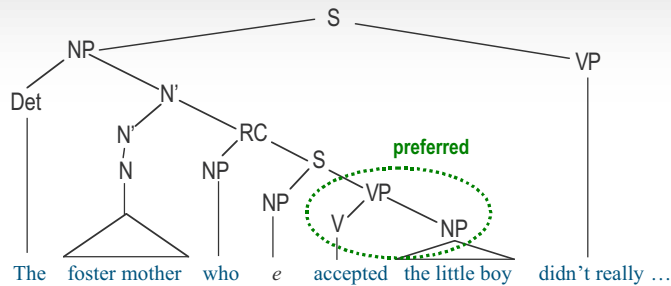
Results (2)

Residual RTs (ms) averaged across "him/herself at all"



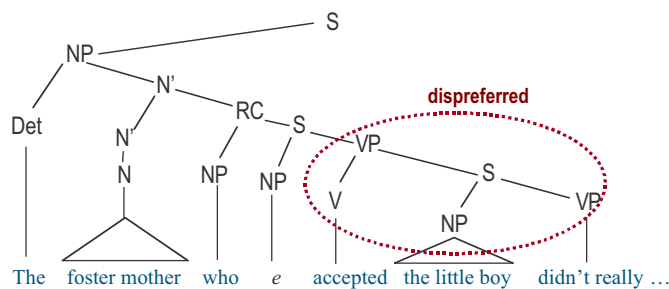
- ⇒ Das genaue **Gegenteil** der DLT-Vorhersagen trifft zu:
 - ⇒ **short** schwieriger als **long**
 - ⇒ **low attachment** schwieriger als **high attachment**

The ambiguity revisited



Keine Reanalyse!

- **Präferierte** Struktur wird beibehalten
- **Monotone** (strukturerhaltende) Erweiterung der syntaktischen Repräs.



Reanalyse!

- **Präferierte** Struktur wird **nicht** beibehalten
- **Nicht-monotone** (destruktive) Revision der bisherig. Analyse

Fallen monotone Revisionen generell leichter?

Sturt, Pickering, & Crocker (1999)

- ⇒ Zweifaktorieller Versuchsplan
(**Construction**: NP/S vs. NP/∅; **Ambiguity**: + vs. -)

NP/S, ambiguous

The Australian woman saw the famous doctor had been drinking quite a lot.

NP/S, unambiguous

The Australian woman saw that the famous doctor had been drinking quite a lot.

NP/∅, ambiguous

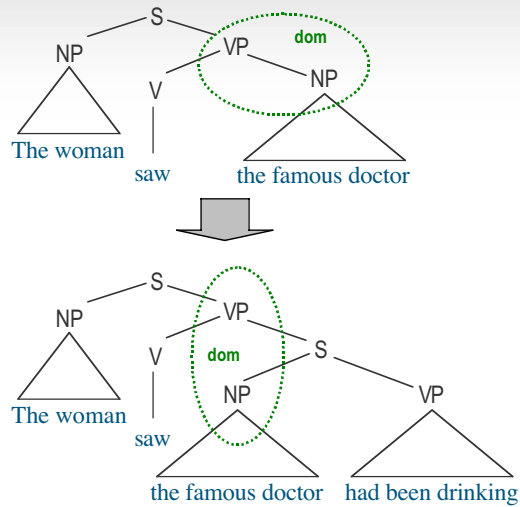
Before the woman visited the famous doctor had been drinking quite a lot.

NP/∅, unambiguous

Before the woman visited , the famous doctor had been drinking quite a lot.

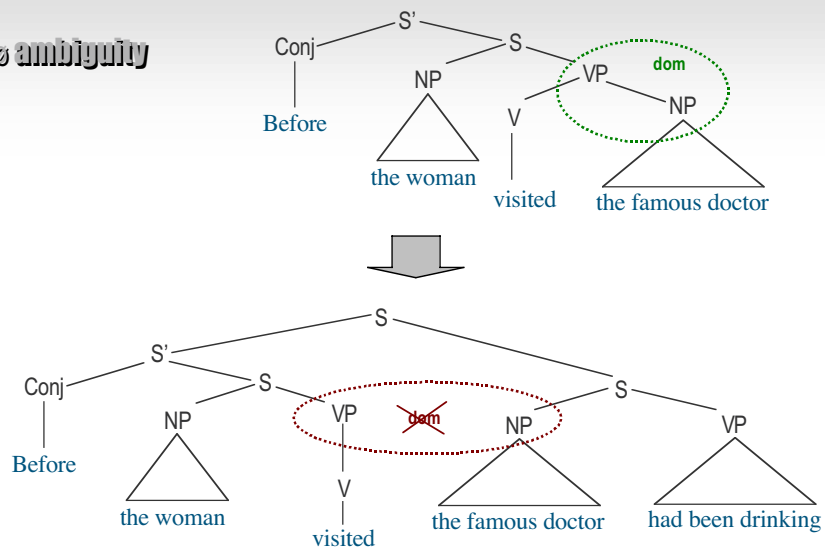
Kontrollierte Faktoren: Verb-bias, Plausibilität

NP/S ambiguity



Monotone reanalyse (leicht!)

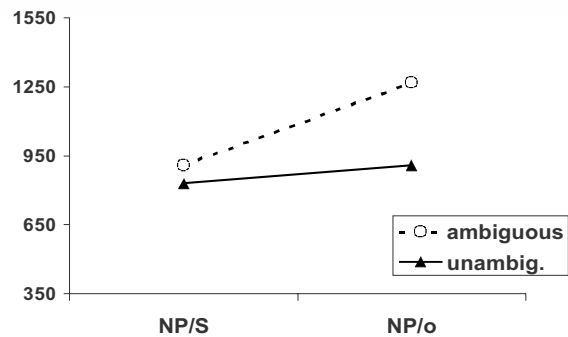
NP/ø ambiguity



Nicht-monotone reanalyse (schwierig!)

Sturt, Pickering, & Crocker (1999), self paced reading

RTs (ms) at "had been drinking"



- ⇒ Der Garden-Path Effekt (Reanalyseschwierigkeit) ist deutlich größer bei nicht-monotoner Reanalyse (NP/ø).

Fazit

- ⇒ **Locality** (cf. Late Closure, Recency) gilt nicht in jedem Fall, insbesondere dann nicht, wenn die lokale Anbindung (im Gegensatz zur nicht-lokalen) eine strukturelle Revision erfordert (*Revision as Last Resort*, cf. Fodor & Frazier, 1980).
- ⇒ Generelle Tendenz, einmal aufgebaute Strukturen so weit wie möglich beizubehalten (**monotone** Revisionen fallen leichter als **nicht-monotone**).

Sturt, Scheepers, & Pickering (in press)

Was passiert wenn reanalysiert werden **muß**, aber kein Unterschied
Hinsichtlich Reanalysekomplexität besteht? Ambiguität in der Reanalyse:



Low attachment, ambiguous

The social worker saw the foster mother who accepted the little boy didn't really trust **himself** at all about anything.



Low attachment, unambiguous

The social worker saw the foster mother who accepted **that** the little boy didn't really trust **himself** at all about anything.



High attachment, ambiguous

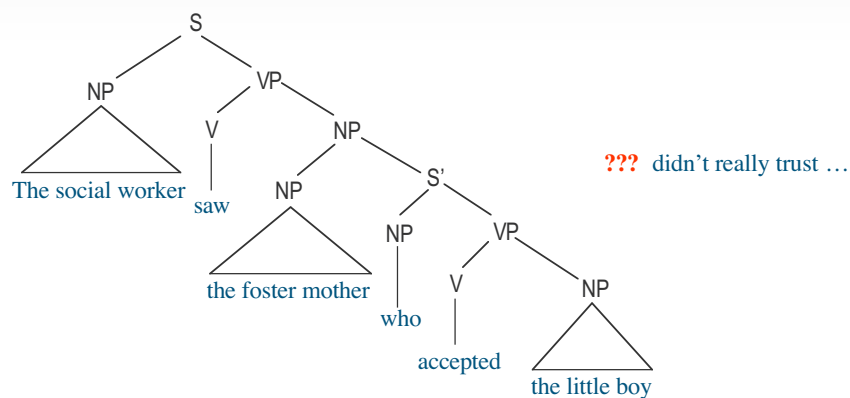
The social worker saw the foster mother who accepted the little boy didn't really trust **herself** at all about anything.



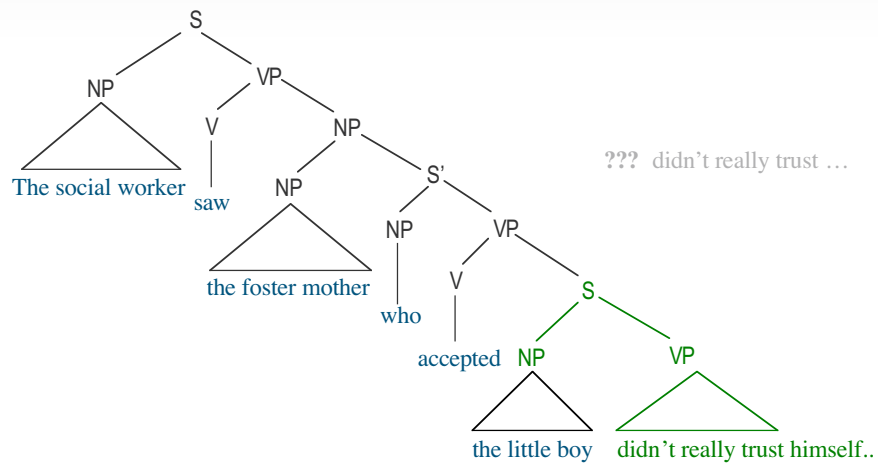
High attachment, unambiguous

The social worker saw **that** the foster mother who accepted the little boy didn't really trust **herself** at all about anything.

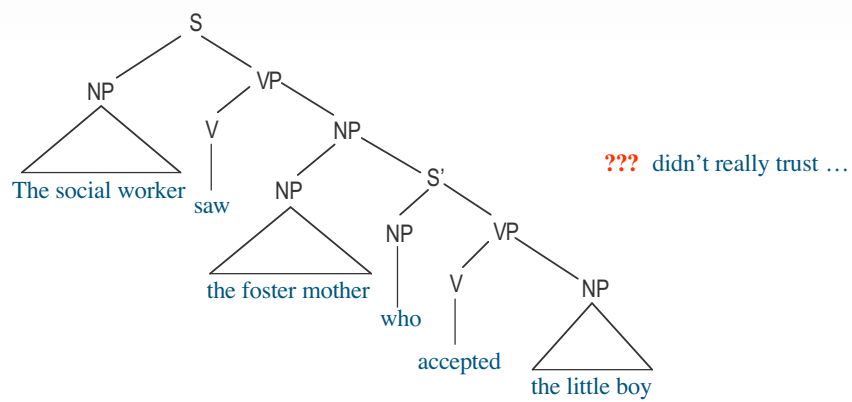
Initial Situation



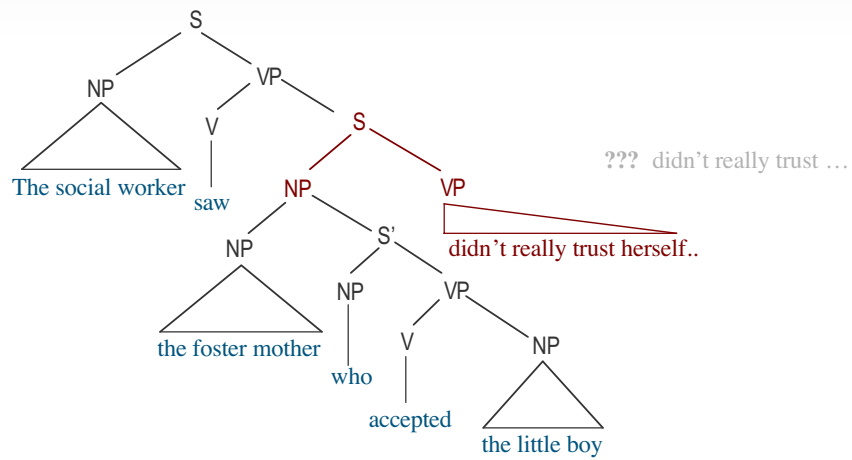
Low Attachment



Initial Situation

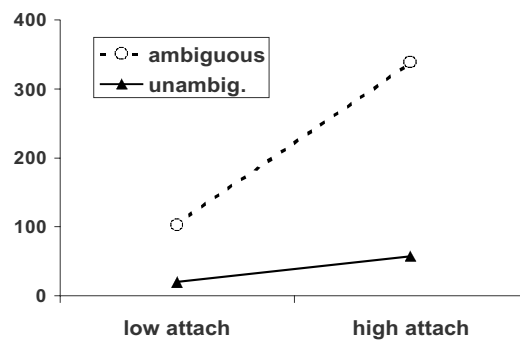


High Attachment



Eye-tracking Results

Regression Path Times (ms) at "him/herself at all"



⇒ *high attachment* schwieriger als *low attachment*!!

Fazit (2)

- **Locality** (bzw. Recency) ist ein Prinzip, das sowohl bei der initialen Analyse (1) als auch bei der Reanalyse (2) wirksam ist:

(1) Tom said Bill has left yesterday.

(2) The social worker saw the foster mother who accepted the little boy didn't really ...

- **Jedoch:** Andere Faktoren (z.B. Vermeiden einer Reanalyse) können Locality überschreiben (3):

(3) The foster mother who accepted the little boy didn't really ...

- **Monotone** (strukturhaltende) Reanalysen (4) fallen leichter als *nicht-monotone* (5):

(4) The Australian woman saw the famous doctor had been drinking quite a lot. (easy)

(5) Before the woman visited the famous doctor had been drinking quite a lot. (hard)

'Memory' Resources vs. 'Computational' Resources (cf. Sturt & Crocker '96)