Negative Polarity Items
Corpus Linguistics, Semantics, and Psycholinguistics

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Our four questions

- licenser
- licensee marking
- licensing relation
- status

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- licensee marking $\Leftarrow$ corpus data help
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- licenser – depends on theory
- licensee marking $\Leftarrow$ corpus data help
- licensing relation – depends on theory
- status – depends on theory

The data problem

Introspection:

- not systematic
- can't uncover subtle distinctions
- not always objective
- can't answer certain types of questions

Corpus evidence:

- occurrence gaps
- status not always clear
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Processing evidence

Psycholinguistic experiments:

- multiple examples of a construction type
- large number of naive participants
- $\Rightarrow$ more robust evidence
- $\Rightarrow$ finer distinctions

Assumptions:

- interpretation is immediate and incremental
- integration difficulty is measurable

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Licensers: Drenhaus et al. (2005a)

Drenhaus, Frisch, & Saddy (2005a)

separating the semantic and syntactic aspects of NPI licensing

- syntactic licensing: c-command
- semantic licensing: negative context

a. Kein Mann, der einen Bart hatte, war jemals glücklich.

b. *Ein Mann, der einen Bart hatte, war jemals glücklich.

c. *Ein Mann, der keinen Bart hatte, war jemals glücklich.

Licensers: Drenhaus et al. (2005a)

Experiment 1

- acceptability judgments
- rapid serial visual presentation (RSVP)
- typical features of experiments:
  - ► counterbalancing
  - ► distractors

Results:

- responses to (a) and (b) equally fast (and different from (c))
- responses to (a) and (b) equally accurate (and different from (c))

Licensers: Drenhaus et al. (2005a)

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Experiment 2: event-related potentials (ERP)

- small voltage changes measured at the surface of the scalp reflecting cognitive processes
- compared to a baseline
- some components:
  - ▸ N400: semantic "fit"
  - ▸ P600: syntactic violations (agreement, case marking, phrase structure), complexity

Results:

- responses to (a) and (b) equally accurate (and different from (c))
- N400 and P600 in (b) compared to (a)
- ⇒ both syntax and semantics play a role

similar ERP results: Saddy, Drenhaus, & Frisch (2004) (see Drenhaus et al. (2005b))

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Licenser strength: Drenhaus et al. (2006)

a. Kein Jäger hat den Angler jemals gestört.
b. Welcher Jäger hat den Angler jemals gestört?
c. *Der Jäger hat den Angler jemals gestört.
d. *Ein Jäger hat den Angler jemals gestört.
   No/Which/The/A hunter has the fisherman-ACC ever disturbed

Results:

- N400 and P600 in (c) and (d) (N400 somewhat stronger in (c))
  ⇒ replicates the effect in Drenhaus et al. (2005a)
- N400 in (b): NPI less expected after a wh-phrase than following negation

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ERP study

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Licenser strength: Warren et al. (2006)

Warren, Vasishth, Hirotani, & Drenhaus (2006): licenser strength in English and German

- "strong": licensing NPIs both in restrictor and in scope
- "moderate": licensing NPIs only in restrictor

a. No man who ever ate apples liked playing football.

b. Every man who ever ate apples liked playing football.

c. *The man who ever ate apples liked playing football.

Self-paced reading

— —. — —— —. — — —.

Self-paced reading

The lazy dog —— —- — — —.

Self-paced reading

— —- — jumped —- — — —.

Self-paced reading

— —- — —— over — — —.

Self-paced reading

— —- — —— —- the sly fox.

Licenser strength: Warren et al. (2006)

English self-paced reading study

   a. No man who ever ate apples liked playing football.

   b. Every man who ever ate apples liked playing football.

   c. *The man who ever ate apples liked playing football.

Results:

- no differences at NPI
- on next word: unlicensed NPI slower than licensed
- no difference between *every* and *no*

Licenser strength: Warren et al. (2006)

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   a. No man who ever ate apples liked playing football.

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German self-paced reading study

   a. Kein Zahnarzt, der jemals nach Asien gereist ist, besass einen Hund.

   b. Jeder Zahnarzt, der jemals nach Asien gereist ist, besass einen Hund.

   c. *Der Zahnarzt, der jemals nach Asien gereist ist, besass einen Hund.

Results:

- at NPI, condition (a) read faster than the other two

Licenser strength: Warren et al. (2006)

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Summary of results:

- unlicensed NPIs cause processing difficulty in both English and German
- licenser strength only has an influence in German
- $\Rightarrow$ small effect

Interim summary

- unlicensed NPIs cause processing difficulty
- NPI licensing seems to involve both syntax and semantics
- licenser strength makes a difference

but...

- is it ungrammaticality or complexity?
- how real is the semantic component?

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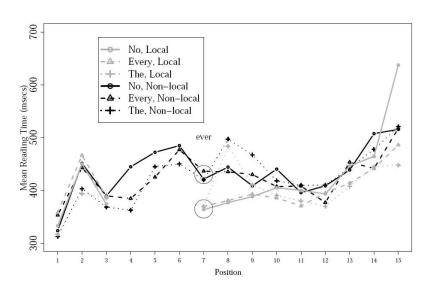- licenser strength makes a difference

but...

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Locality: Warren et al. (2006)

NPI licensing: a dependency relation (like filler-gap, argument-head)
– Does locality impact NPI licensing?
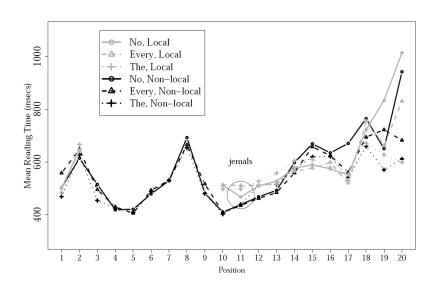
English self-paced reading study

   a. No man who ever ate apples liked playing football.

   b. Every man who ever ate apples liked playing football.

   c. *The man who ever ate apples liked playing football.

   d. No man who the woman said ever ate apples liked playing football.

   e. Every man who the woman said ever ate apples liked playing football.

   f. *The man who the woman said ever ate apples liked playing football.

Locality: Warren et al. (2006)

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German self-paced reading study

a. Kein Zahnarzt, der jemals nach Asien gereist ist, besass einen Hund.

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c. *Der Zahnarzt, der jemals nach Asien gereist ist, besass einen Hund.

d. Kein Zahnarzt, von dem die Patienten gesagt haben, dass er jemals nach Asien gereist ist, besass einen Hund.

e. Jeder Zahnarzt, von dem die Patienten gesagt haben, dass er jemals nach Asien gereist ist, besass einen Hund.

f. *Der Zahnarzt, von dem die Patienten gesagt haben, dass er jemals nach Asien gereist ist, besass einen Hund.

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Summary of results:

English

- non-local dependency processed more slowly than local ones
- unlicensed NPI read more slowly than licensed ones
- no effect of licenser strength

German

- anti-locality effect: local NPIs processed *more slowly* than non-local ones
- in local condition: *kein* read faster than the others

Intrusion: Drenhaus et al. (2005a)

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b. *Ein Mann, der einen Bart hatte, war jemals glücklich.

c. *Ein Mann, der keinen Bart hatte, war jemals glücklich.

Results:

- Experiment 1 (acceptability judgments with RSVP)
  - faster and more accurate responses in (a), (b) than in (c)
- Experiment 2 (event-related potentials)
  - more accurate answers in (a), (b) than in (c)
  - faster RTs in (a), (c) than in (b)
  - N400 in both (b) and (c) (somewhat stronger in (b))
  - P600 in both (b) and (c)
- ⇒ inaccessible licenser makes unlicensed NPI more acceptable

similar findings in Vasishth, Brüssow, Lewis, Drenhaus & Saddy (2006)

What does intrusion tell us?

similarity-based interference:

- NPI licensing
- antecedents for reflexives
- agreement

Vasishth et al. (2005): partial-cue-match retrieval

Xiang, Dillon, & Phillips (submitted)

- reflexives: local c-commanding antecedent
- NPIs:
  direct licensing by c-commanding negator, or
  by entire proposition containing licensor (Chierchia 2006)

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Explaining intrusion: Xiang et al. (submitted)

ERP study: NPI licensing vs. reflexive binding

a,b. No/Very few restaurants that the local newspapers have recommended [. . .] have ever gone out of business.

c,d. *The restaurants that no/very few local newspapers have recommended [. . .] have ever gone out of business.

e. *Most restaurants that the local newspapers have recommended [. . .] have ever gone out of business.

Results:

- significantly less accurate responses in (c),(d) than in (a),(b),(e)

- P600 in ungrammatical condition (e)

- reduced P600 in (c), (d)

- no difference in latency

Explaining intrusion: Xiang et al. (submitted)

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Explaining intrusion: Xiang et al. (submitted)

Reflexives

a. The tough soldier that Fred treated [. . .] introduced himself [. . .].

b. *The tough soldier that Katie treated [. . .] introduced herself [. . .].

c. The tough soldier that Fred treated [. . .] introduced herself [. . .].

Results

reflexives:

- gender stereotype violation in condition (c) triggers P600
- no attenuation in intrusion condition (b)
- → interference delayed or absent

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Discussion:

- different intrusion effects in NPIs vs. reflexives
- NPIs licensed globally by context
- P600 indicates reanalysis or general grammatical anomaly
- N400 in previous studies – task-related?

Summary

- unlicensed NPIs are anomalous
- licenser strength matters
- locality effect $\Rightarrow$ syntactic relation ?
- intrusion effect $\Rightarrow$ semantic relation (only?)
- interpretation of results not always clear