

The issue of lexical guidance in sentence production: Evidence from structural priming experiments

Sandra Pappert (Bielefeld), Michael Baumann (Bielefeld),
& Thomas Pechmann (Leipzig)

sandra.pappert@uni-bielefeld.de,
michael.baumann@uni-bielefeld.de

Outline

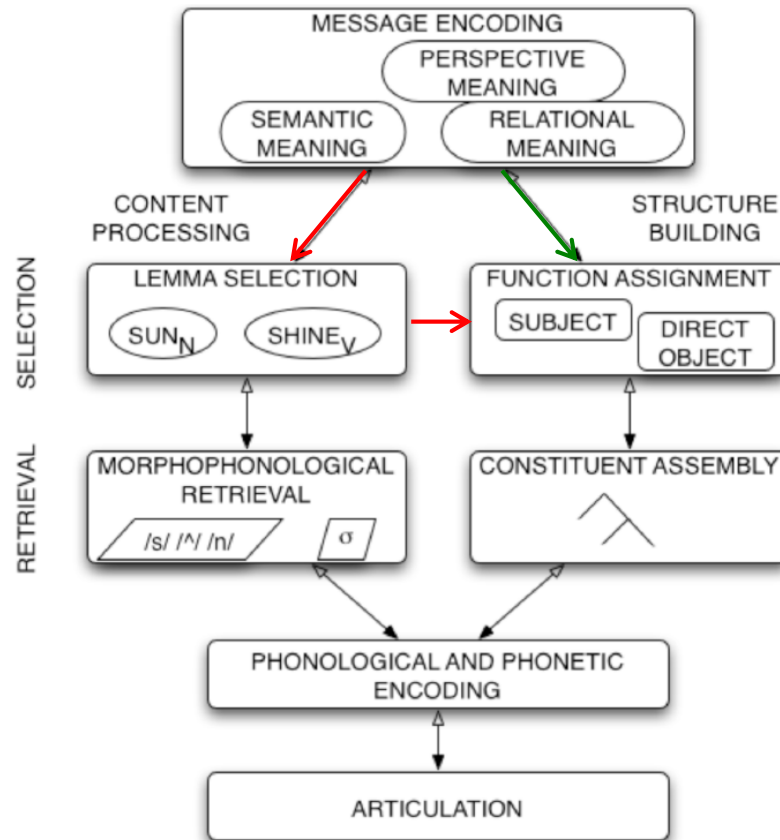
- Sentence production
 - Lexicalist vs. "conceptualist" accounts
 - Evidence from structural priming
- Experiment
 - Design, materials
 - Results
 - Discussion
- Outlook
- Summary

Sentence production

Conceptualisation

Formulation

Articulation



"conceptualist"

"lexicalist"

Figure 1. Schematic of consensus model of grammatical encoding. Filled arrowheads mark direction of primary information flow, open arrowheads mark possible feedback information flow.

(Ferreira & Slevc, 2007)

Lexicalist accounts

- Combinatorial nodes

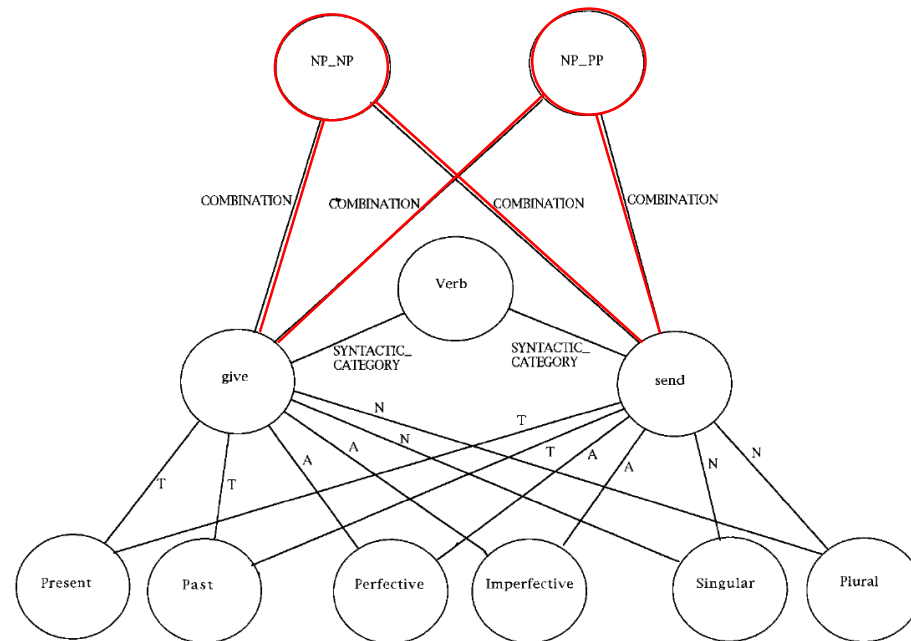


FIG. 1. A partial model of the representation of syntactic information associated with verbs in the production lexicon. The labels T, A, and N refer to tense, aspect, and number, respectively.

(Pickering & Branigan, 1998;
cf. Cai, Pickering, & Branigan, 2012)

- Representation of

- syntactic contexts?
(Pickering & Branigan, 1999)
- argument structures?
(Levelt, Roelofs, & Meyer, 1999)
- ...

Residual activation

- frequency
- recency (priming)

"Conceptualist" accounts

- Direct mapping from message to syntactic form
 - strict incrementality (cf. Melinger, Pechmann, & Pappert, 2009)
 - conceptual accessibility
 - inherent accessibility: animacy, concreteness, prototypicality
 - derived accessibility: givenness, priming
(cf. Bock, Irwin, & Davidson, 2004; Prat-Sala & Branigan, 2000)
 - controversial; plausible for verb-final structures?
(Hwang & Kaiser, 2014; Momma, Slevc, & Phillips, in press)

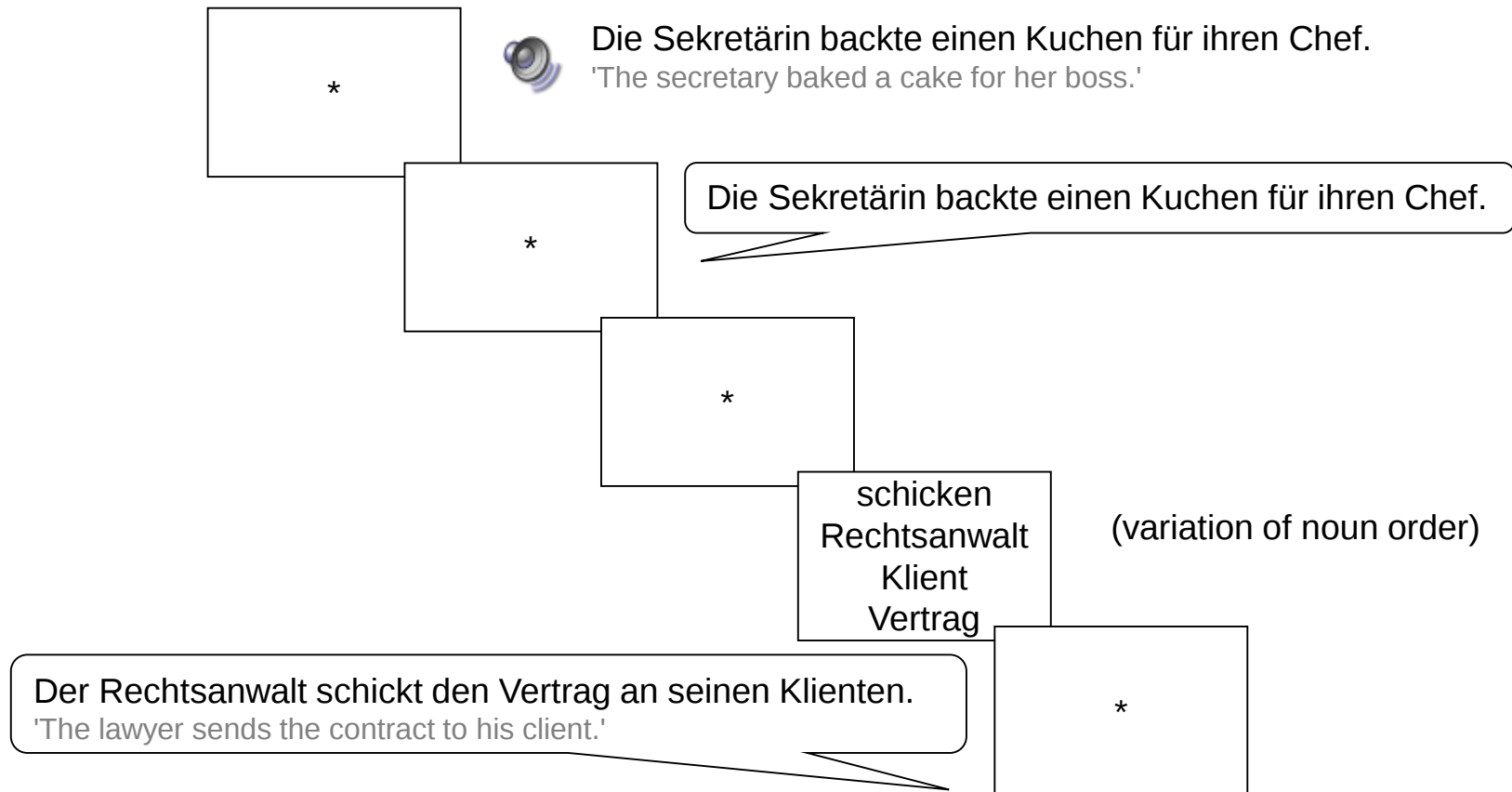
Evidence from structural priming

- *Is sentence production guided by argument structure?*
- Structural priming
 - Speakers tend to re-use previously uttered structures (Bock, 1986).
 - prime-target relation
 - structural similarity (vs. identity)
 - dissociation of crucial vs. less crucial similarities
(Bernolet, Hartsuiker, & Pickering, 2009; Bock & Loebell, 1990; Chang, Bock, & Goldberg, 2003; Pappert & Pechmann, 2014)

Evidence from structural priming

- *Is sentence production guided by argument structure?*
- Structural priming across argument structures?
(Pappert & Pechmann, 2013)
 - German
 - benefactive alternation structures with monotransitive verbs
 - dative alternation structures with ditransitive verbs
 - sentence generation task

Evidence from structural priming



(Pappert & Pechmann, 2013; Pappert & Pechmann, 2014; Chang, Baumann, Pappert, & Fitz, 2015)

Evidence from structural priming

- *Is sentence production guided by argument structure?*
 - structural priming
between benefactive alternation structures with monotransitive verbs
and dative alternation structures with ditransitive verbs
 - no evidence for necessary involvement of argument structure
 - compatible with "conceptualist" account
- (Pappert & Pechmann, 2013)

Experiment

- *Is the argument mapping procedure sensitive to the role properties?*
- Structural priming between different event semantics / thematic roles?
 - benefactive alternation structures with monotransitive verbs and 'true' beneficiaries (Kittilä, 2005)
 - dative alternation structures with ditransitive verbs and recipients
 - sentence generation task in German

Experiment - materials

- Recipients vs. 'true' beneficiaries

primes

- (DA.dataacc) *Der Schiffsjunge vermittelt dem Fischer den alten Kahn.*
'The cabin boy offers the fisher the old boat.'
- (DA.accPP) *Der Schiffsjunge vermittelt den alten Kahn an den Fischer.*
'The cabin boy offers the old boat to the fisher.'
- (BA.dataacc) *Der Schiffsjunge schrubbt dem Fischer den alten Kahn.*
'The cabin boy scrubs the fisher the old boat.'
- (BA.accPP) *Der Schiffsjunge schrubbt den alten Kahn für den Fischer.*
'The cabin boy scrubs the old boat for the fisher.'

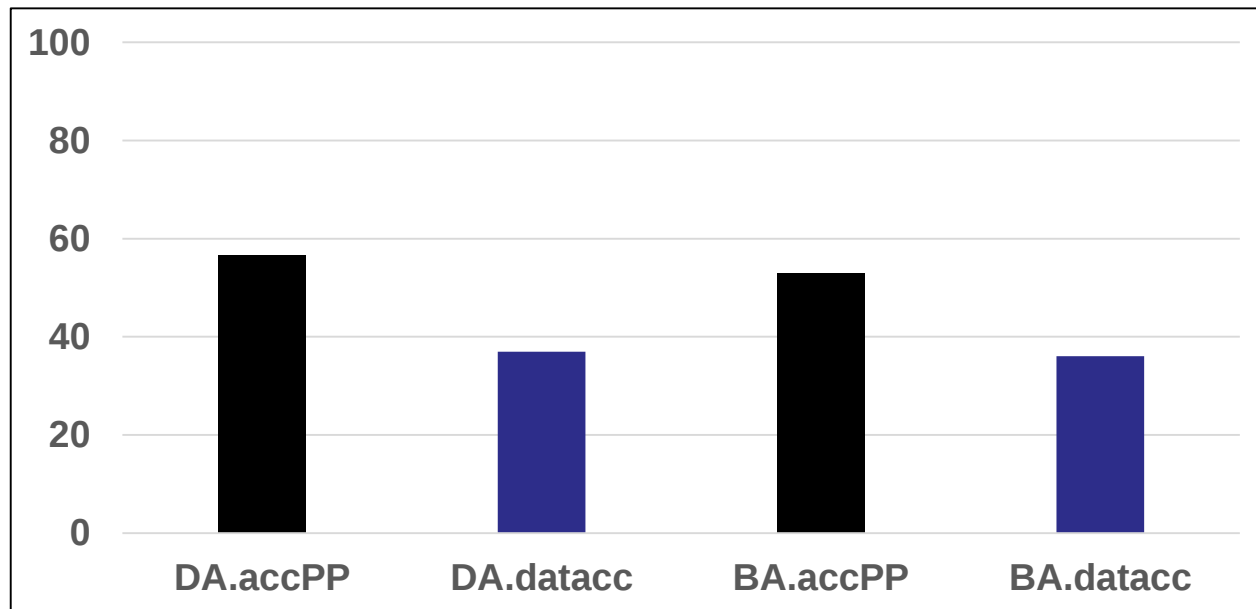
target

(DA) *Fan Rose Sänger überreichen*
fan rose singer hand

Experiment - results

- percentage of DA.accPP (vs. DA.dataacc) responses per prime condition

	prime DA.accPP	DA.dataacc	BA.accPP	BA.dataacc
% DA.accPP	56.65	36.94	52.98	36.02



Experiment - results

- percentage of DA.accPP (vs. DA.dataacc) responses per prime condition

	prime DA.accPP	DA.dataacc	BA.accPP	BA.dataacc
% DA.accPP	56.65	36.94	52.98	36.02

- GLMM (N = 659)

	Estim.	Std. Err.	t value	p
(Intercept)	1.5393	0.0665	23.151	< .001 ***
phrase structure	-0.1575	0.0299	-5.261	< .001 ***
thematic role	-0.0196	0.0297	-0.658	0.511
ps : tr	-0.0044	0.0593	-0.074	0.941

- main effect of phrase structure
- no interaction of phrase structure : thematic role

Experiment - discussion

- main effect of phrase structure
- no interaction of phrase structure : thematic role
- + not different from primes with recipient-beneficiary in Pappert & Pechmann (2013)

Is the argument mapping procedure sensitive to the role properties?

- Differences between event semantics and thematic roles, as defined here, do not seem to be crucial for the mapping mechanism.
- Points towards abstract phrase structural representations / syntactic procedures. Independent from lexical argument structure.

Experiment - discussion

Conceptualisation

Formulation

Articulation

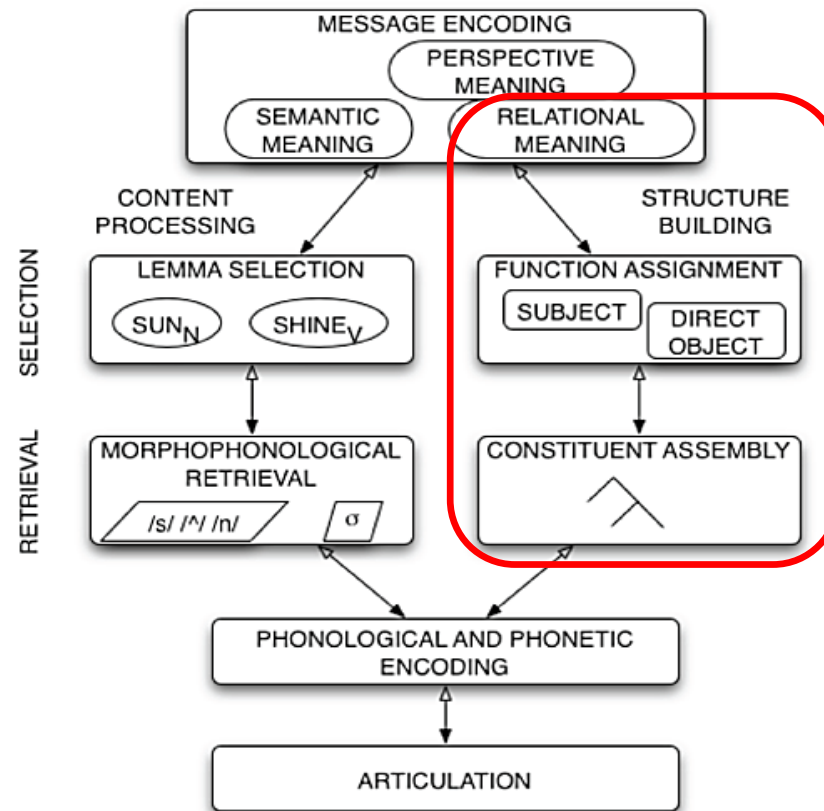


Figure 1. Schematic of consensus model of grammatical encoding. Filled arrowheads mark direction of primary information flow, open arrowheads mark possible feedback information flow.

Outlook

- Open question: Proto-Roles?
 - recipient = recipient-beneficiary = beneficiary = Proto-Recipient ?
(Primus, 1999)
- Future experiment:
 - benefactive alternation vs. temporal PP-adjunct

Outlook

- beneficiaries vs. temporal adjuncts

primes

- (Tp.accPP) *Der Manager reserviert das Tonstudio für eine Stunde.*
'The manager reserves the recording studio for one hour.'
- (BA.accPP) *Der Manager reserviert das Tonstudio für den Künstler.*
'The manager reserves the recording studio for the artist.'
- (BA.dataacc) *Der Manager reserviert dem Künstler das Tonstudio.*
'The manager reserves the artist the recording studio.'
- (Mt.acc) *Der Manager reserviert das Tonstudio.*
'The manager reserves the recording studio.'

target

(BA) *Assistent Brief Chef öffnen*
assistant letter boss open

Experiments - Summary

Sentence production

- No evidence for necessary involvement of lexical argument structure
- No evidence for the sensitivity of the mapping procedure for fine grained differences between thematic roles
- Compatibility with "conceptualist" account
 - procedures for mapping Proto-Roles to phrase structure
- Future experiment(s): Test further role and argumenthood contrasts



end of presentation

time for questions and remarks

References

- Bernolet, S., Hartsuiker, R. J. & Pickering, M. J. (2009). Persistence of emphasis in language production: A cross-linguistic approach. *Cognition*, 112, 300-317.
- Bock, J. K. (1986). Syntactic persistence in language production. *Cognitive Psychology*, 18, 355-387.
- Bock, J. K., Irwin, D. E., & Davidson, D. J. (2004). Putting first things first. In J. M. Henderson, & F. Ferreira (Eds.), *The interface of language, vision, and action: Eye movements and the visual world* (pp. 249-278). New York: Psychology Press.
- Bock, J. K., & Loebell, H. (1990). Framing sentences. *Cognition*, 35, 1-39.
- Cai, Z. G., Pickering, M. J., & Branigan, H. P. (2012). Mapping concepts to syntax: Evidence from structural priming in Mandarin Chinese. *Journal of Memory and Language*, 66, 833-849.
- Chang, F., Baumann, M., Pappert, S., & Fitz, H. (2015). Do lemmas speak German?: A verb position effect in German structural priming. *Cognitive Science*, 39, 1113-1130.
- Chang, F., Bock, J. K., & Goldberg, A. E. (2003). Do thematic roles leave traces of their places? *Cognition*, 90, 29-49.
- Ferreira, V. S., & Slevc, L. R. (2007). Grammatical encoding. In G. Gaskell (Ed.), *Oxford Handbook of Psycholinguistics* (pp. 453-469). Oxford, UK: OUP.
- Hole, D. (2015). Arguments and adjuncts. In A. Alexiadou & T. Kiss (Eds.), *Handbooks of linguistics and communications sciences: Vol. 42. Syntax - theory and analysis: Vol. 2* (S. 1284-1320). Berlin: Mouton de Gruyter.
- Hwang, H. & Kaiser, E. (2014). The role of the verb in grammatical function assignment in English and Korean. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 40, 1363-1376.
- Kittilä, S. (2005). Recipient-prominence vs. beneficiary-prominence. *Linguistic Typology*, 9, 269-297.
- Levelt, W. J. M., Roelofs, A., & Meyer, A. S. (1999). A theory of lexical access in speech production. *Behavioral and Brain Sciences*, 22, 1-38.
- Melinger, A., Pechmann, T., & Pappert, S. (2009). Case in production. In A. Malchukov & A. Spencer (Eds.), *The Oxford handbook of case* (pp. 384-401). Oxford: Oxford University Press.
- Momma, S., Slevc, R., & Phillips, C. (in press). The timing of verb selection in Japanese sentence production. *Journal of Experimental Psychology: Learning, Memory, and Cognition*.
- Pappert, S., & Pechmann, T. (2013). Bidirectional structural priming across alternations: Evidence from the generation of dative and benefactive alternation structures in German. *Language and Cognitive Processes*, 28, 1303-1322.
- Pappert, S., & Pechmann, T. (2014). Priming word order at the conceptual level: No evidence for additional priming at the positional level. *Quarterly Journal of Experimental Psychology*, 67, 2260-2278.
- Pickering, M. J., & Branigan, H. P. (1998). The representation of verbs: Evidence from syntactic priming in language production. *Journal of Memory and Language*, 39, 633-651.
- Pickering, M. J. & Branigan, H. P. (1999). Syntactic priming in language production. *Trends in Cognitive Sciences*, 3, 136-141.
- Prat-Sala, M., & Branigan, H. (2000). Discourse constraints on syntactic processing in language production: A cross-linguistic study in English and Spanish. *Journal of Memory and Language*, 42, 168-182.
- Primus, B. (1999). *Cases and thematic roles: Ergative, Accusative and Active*. Tübingen: Niemeyer.
- Shibatani, M. (1996). Applicatives and benefactives: A cognitive account. In M. Shibatani & S. A. Thompson (Eds.), *Grammatical constructions* (pp. 157-196). Oxford: Clarendon Press.



Syntactic configuration

- High vs. low applicatives (Pylkkänen, L. (2008). *Introducing arguments*. MIT Press.)
- A functional head Appl introduces non-core arguments into the syntactic representation of the argument structure of a verb

non-core arguments
- Recipients = low Appl
- Beneficiaries = high Appl -> conceptual-semantic distinction
- Low Appl head merges in a syntactic tree representation below the VP
 - transfer-of-possession relation between to individuals
- High Appl head merges above the VP
 - relates an individual and the event described by the verb

Lexical argument structure revisited

- Verb-specific argument linking vs. abstract representations of argument structure
 - lexical boost (e.g. Pickering & Branigan, 1998; Chang et al., 2015)

primes

- (Tp.accPP) *Der Makler reserviert das Haus für den Interessenten.*

'The estate agent reserves the house for the potential buyer.'

- (BA.accPP) *Der Makler reserviert dem Interessenten das Haus.*

'The estate agent reserves the potential buyer the house.'

- (BA.datacc) *Der Makler **öffnet** das Haus für den Interessenten.*

'The estate agent **opens** the house for the potential buyer.'

- (Mt.acc) *Der Makler **öffnet** dem Interessenten das Haus.*

'The estate agent **opens** the potential buyer the house.'

target

(BA) *Assistent Brief Chef **öffnen***

*assistant letter boss **open***

Evidence against effects during the linearisation of phrase structure

- DA.dataacc Der Rentner schickt dem Minister den Beschwerdebrief.
'The retiree sends the minister the complaint-letter.'
- **DA.accdat** Der Rentner schickt den Beschwerdebrief einem Minister.
'The retiree sends the complaint-letter a minister.'
- **DA.accPP** Der Rentner schickt einen Beschwerdebrief an den Minister.
'The retiree sends a complaint-letter to the minister.'
- DA.PPacc Der Rentner schickt an den Minister einen Beschwerdebrief.
'The retiree sends to the minister a complaint-letter.'

primed accdat

Der Vorgesetzte erklärt die Arbeit dem Angestellten.

'The boss explains the task the employee.'

Lexicalist accounts

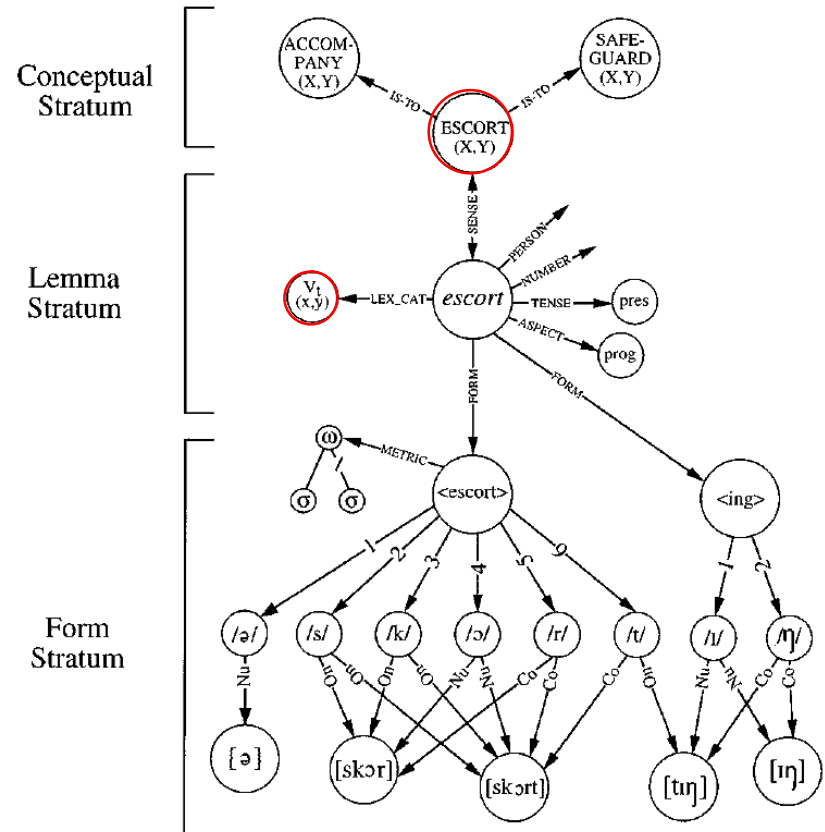
Lexical entry

1. Lemma

- syntactic information
- triggers syntactic encoding

2. Word form

- morpho-phonological information



(Kempen & Hoenkamp, 1987; Levelt, 1989; Roelofs, 1997; Levelt, Roelofs, & Meyer, 1999)