



A usage-based approach to constructional ambiguity

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Purpose

- Show that constructions in a hierarchical network interact with each other (→ constructional ambiguity)
- Show how this interaction can be operationalized and quantified

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- Illustrate these issues on the basis of a case of word order variation in Dutch

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 - Systematic analysis of both actual and elicited language use
 - Taking into account sociolinguistic diversity
 - Objective operationalization of linguistic hypotheses and theoretical notions
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Constructional interaction



Constructional interaction

[ADJ Vfin]_{emb}

[PART Vfin]_{emb}

Constructional interaction

[ADJ Vfin]_{emb}

[PART Vfin]_{emb}

[...] dat de deur [open is]

[...] that the door [open is]

[...] dass die Tür [offen ist]

Constructional interaction

[ADJ Vfin]_{emb}

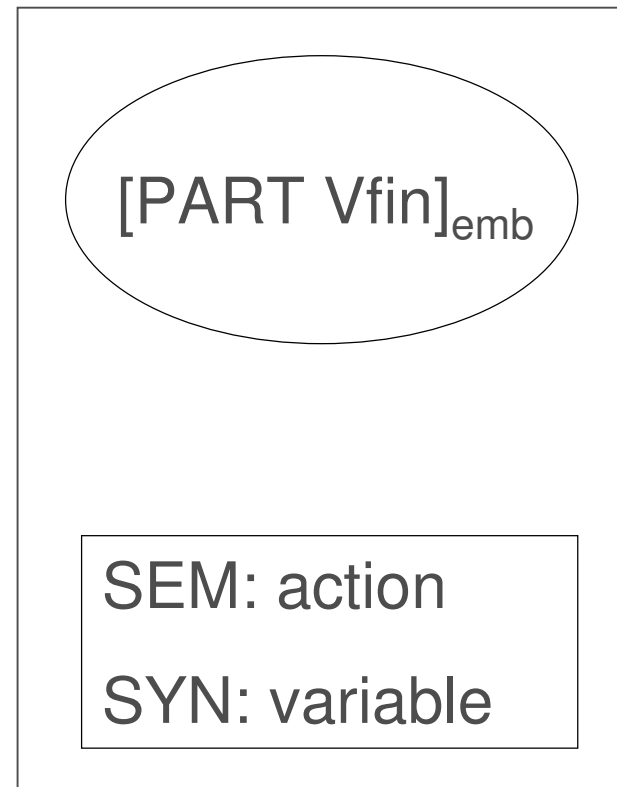
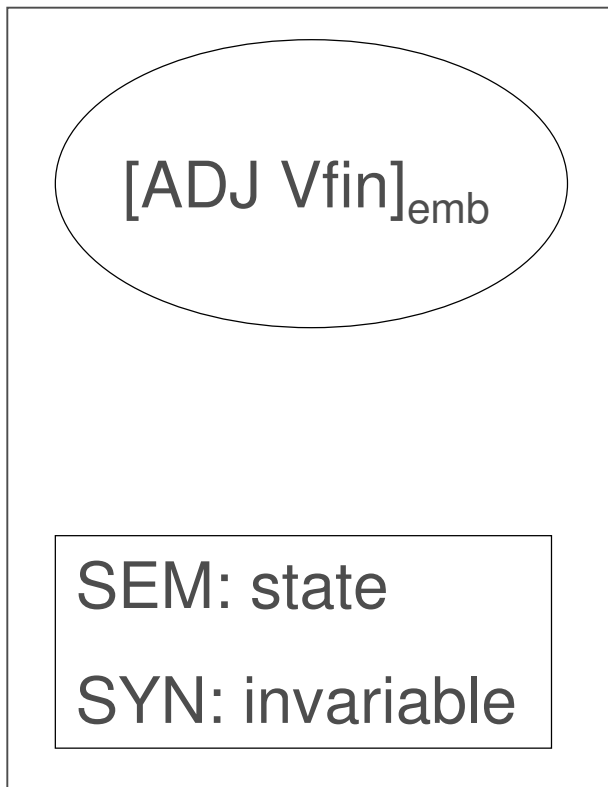
[PART Vfin]_{emb}

[...] dat de deur [gesloten is / is gesloten]

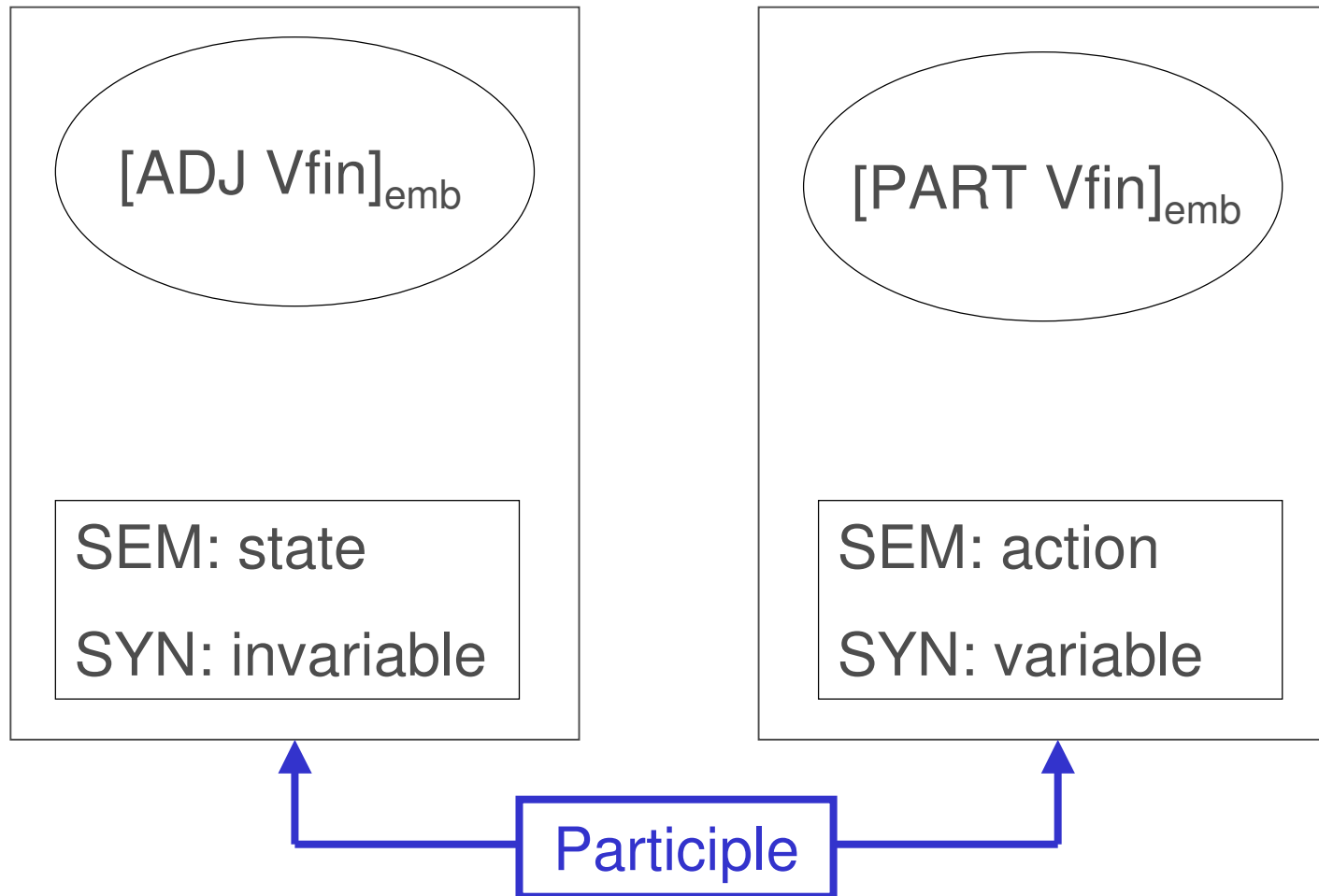
[...] that the door [closed is / is closed]

[...] dass die Tür [geschlossen ist / ist geschlossen]

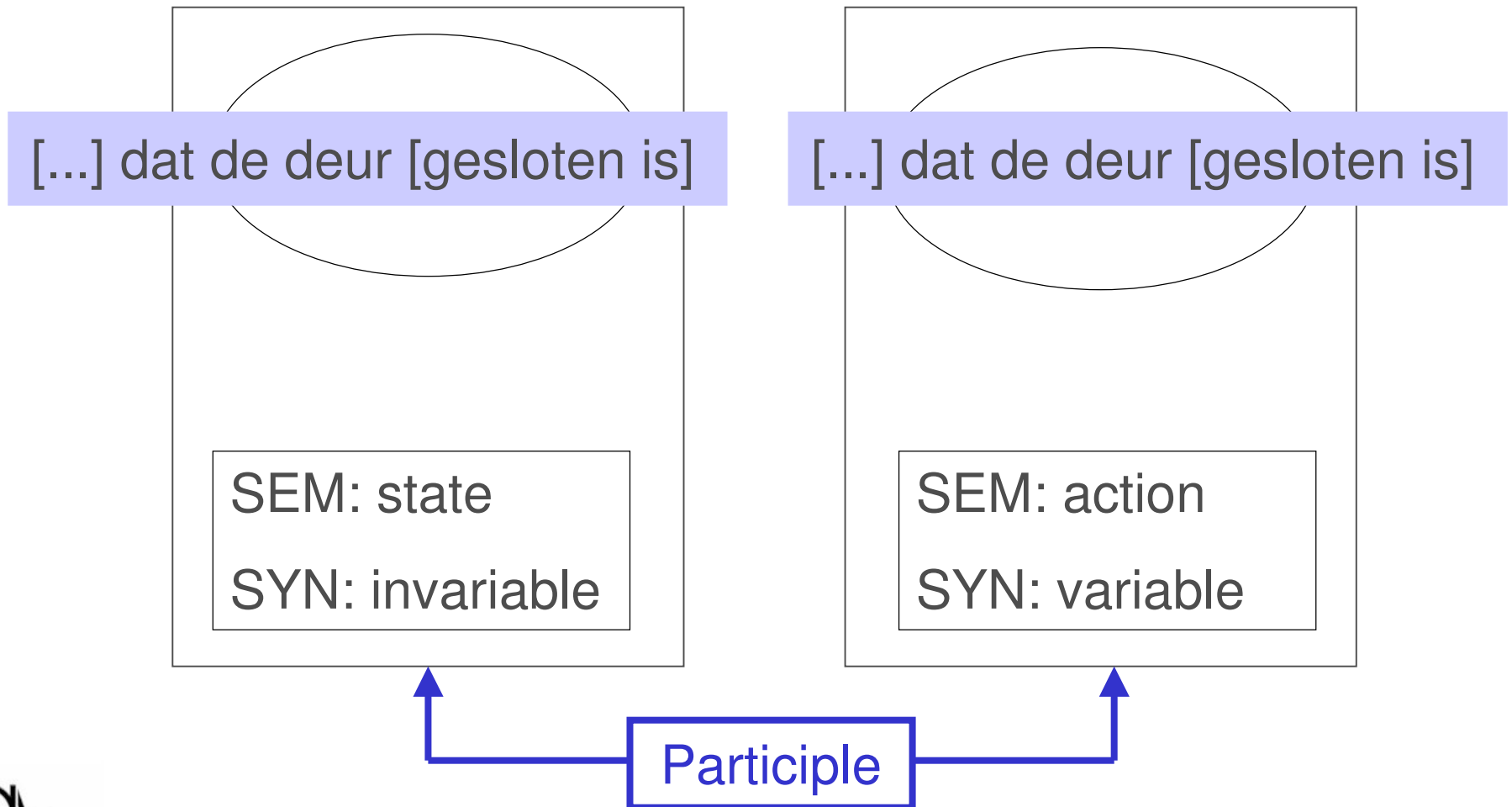
Constructional interaction



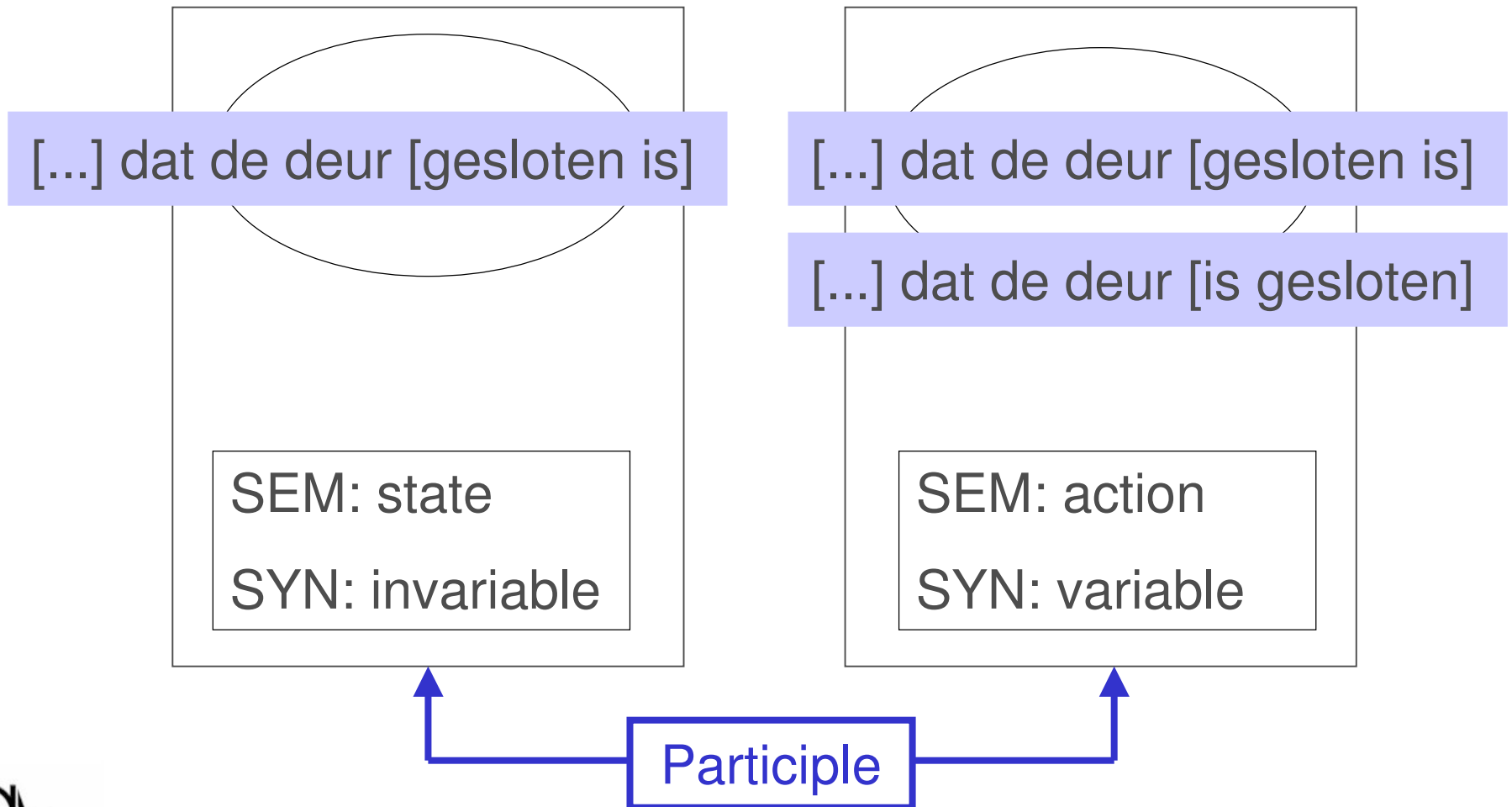
Constructional interaction



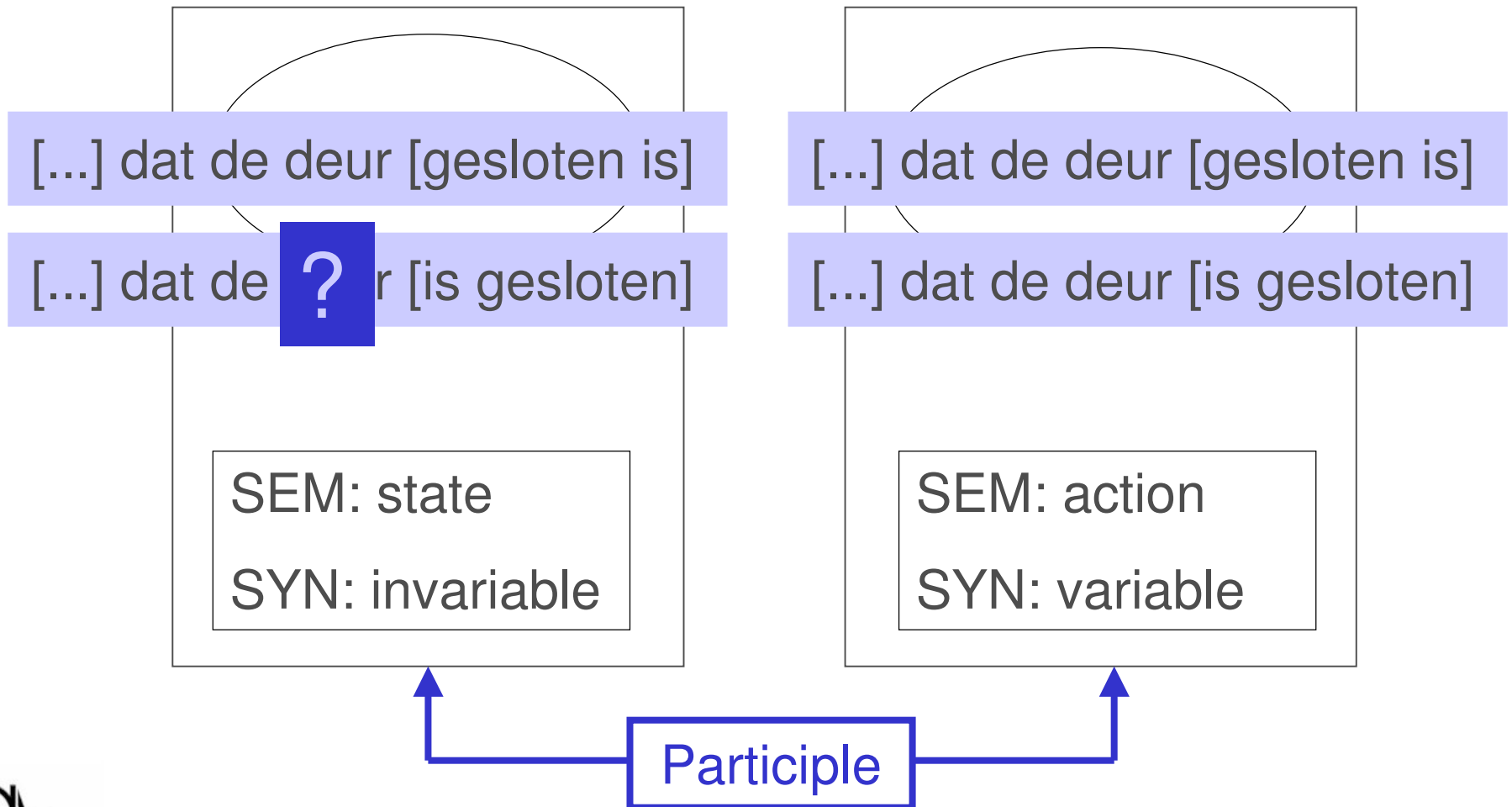
Constructional interaction



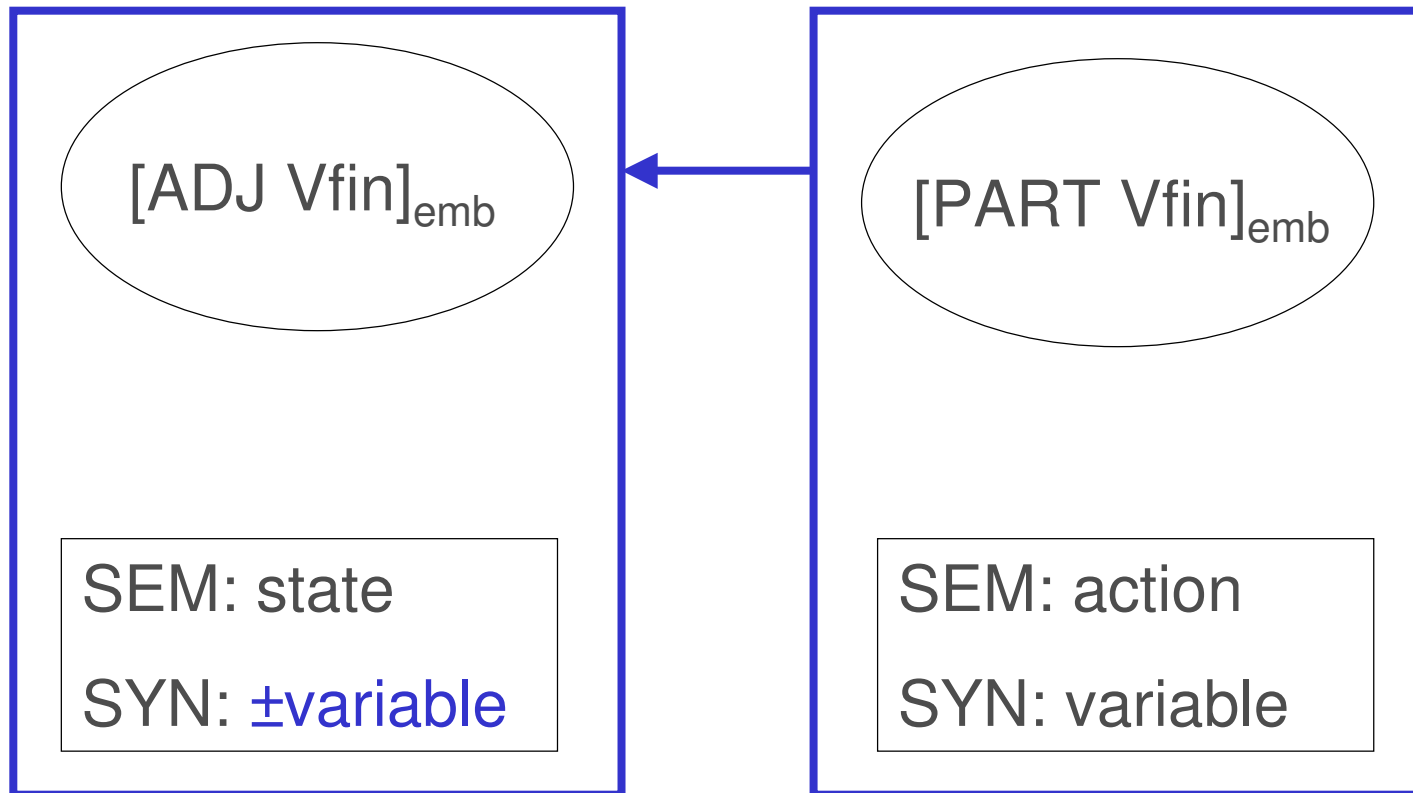
Constructional interaction



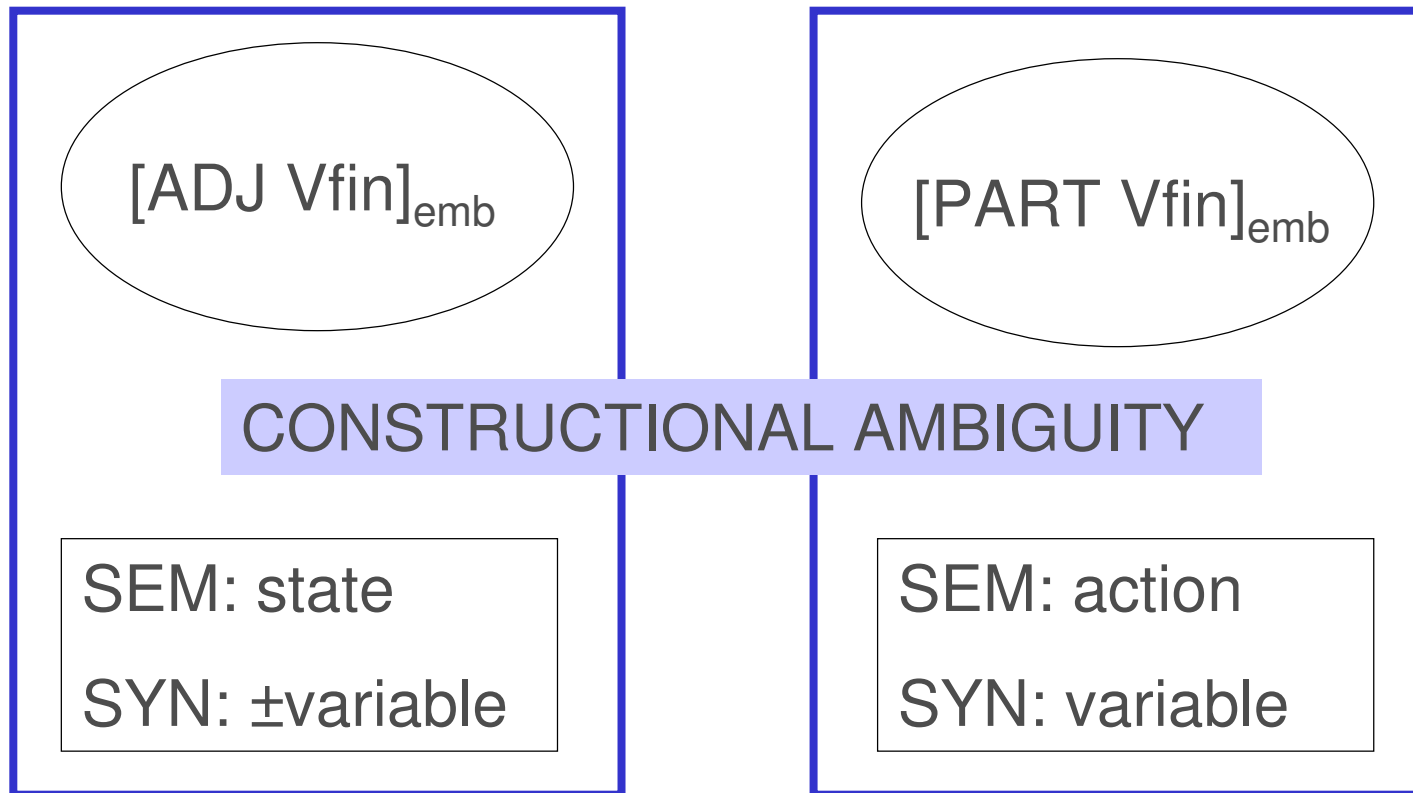
Constructional interaction



Constructional interaction



Constructional interaction



Research question

Design of the study



Stating and restating the problem

- Is there an interaction between the [ADJ Vfin] and the [PART Vfin] construction?
- Does [ADJ Vfin] exhibit word order variation to some extent?
- Problem 1: How do you discriminate between both constructions in attested language use?
 - [...] dat de deur gesloten is ⇒ [PART Vfin] or [ADJ Vfin]?
 - [...] dat de deur is gesloten ⇒ [PART Vfin] or [ADJ Vfin]?
- Problem 1': How do you figure out whether the participle is used in an adjectival or in a verbal sense?



Methodological aim

- Operationalize the status of the participle;
- That enables a non-subjective and systematic analysis of participles in attested language use;
- So that (i) one can figure out which construction is activated and (ii) the effect of the [PART Vfin] construction on the structural properties of the [ADJ Vfin] construction can be quantified and statistically tested.



Design of the study

- [...] dat de deur **gesloten is / is gesloten**.
- Selection criteria:
 1. aux = *zijn* 'to be'
 2. Part \in {VERB}
 3. [dat ... [part/aux](...)]_{comp. clause}
- Register: formal, written Belgian Dutch (Condiv)
- Retrieval and annotation: Abundantia Verborum
- Dataset contains 842 observations

Participle disambiguation

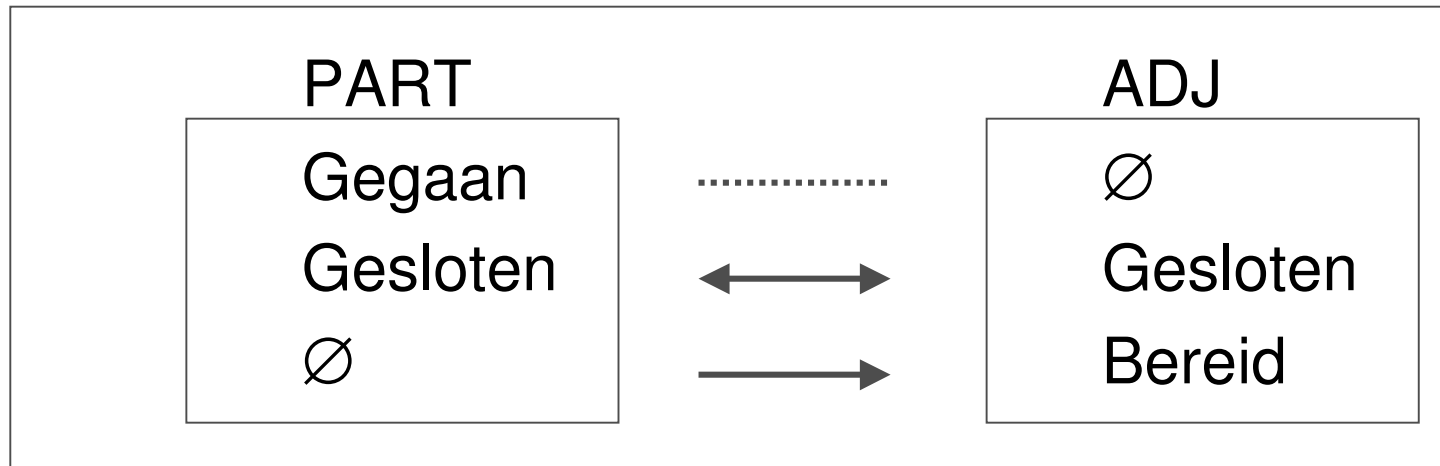


Criteria for disambiguating PART

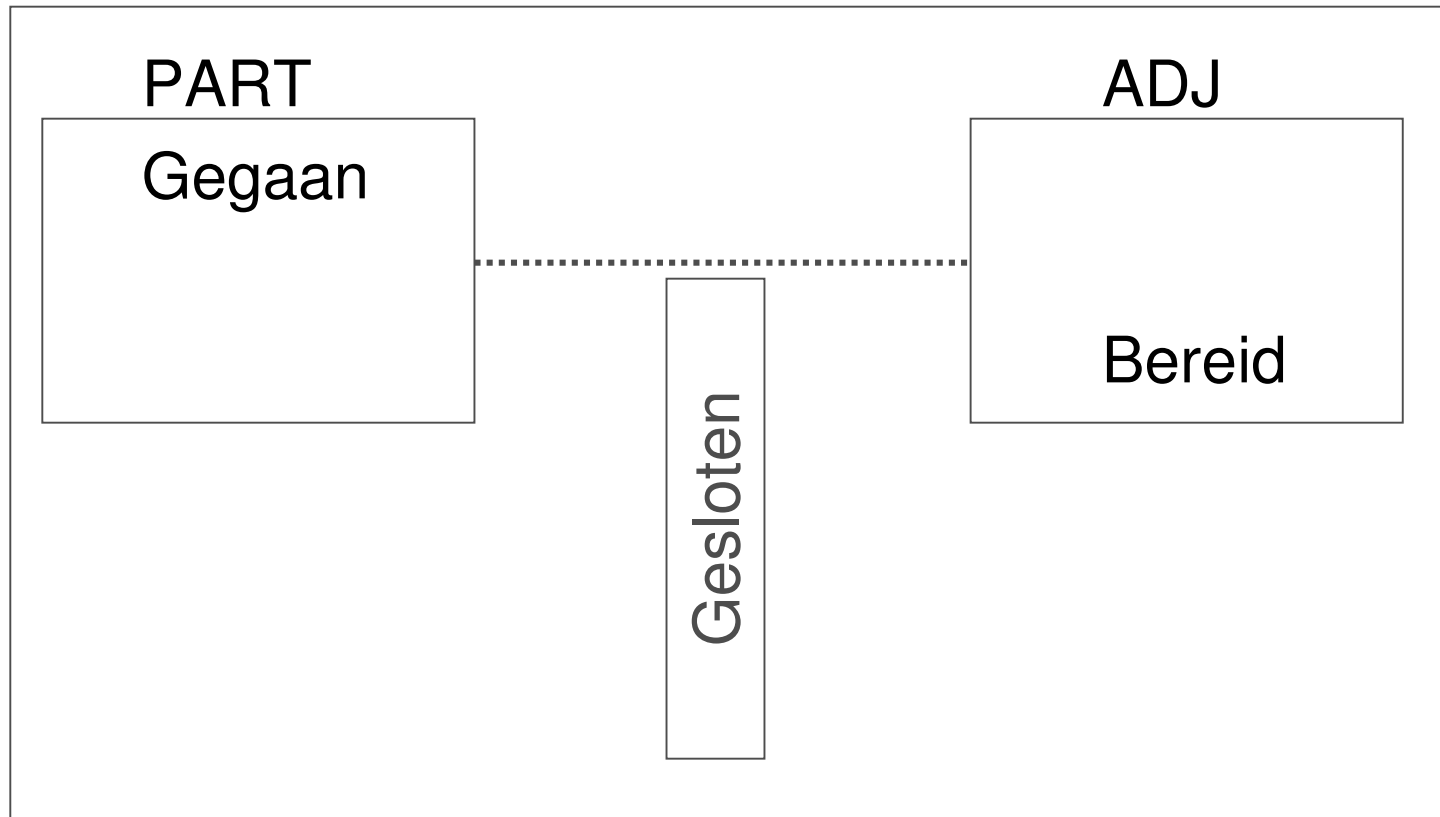
- Wealth of criteria:
 - Semantic criteria: e.g., *state or action, divergent meaning*
 - Morphological criteria: e.g., *inflection, prefixation with un-*
 - Syntactic criteria: e.g., *attributivization, gradation*
- But:
 - Unclear definitions
 - Relying on intuition of the analyzer
 - Tests for adjective potentiality, not reality
 - Assumption: a binary classification is possible



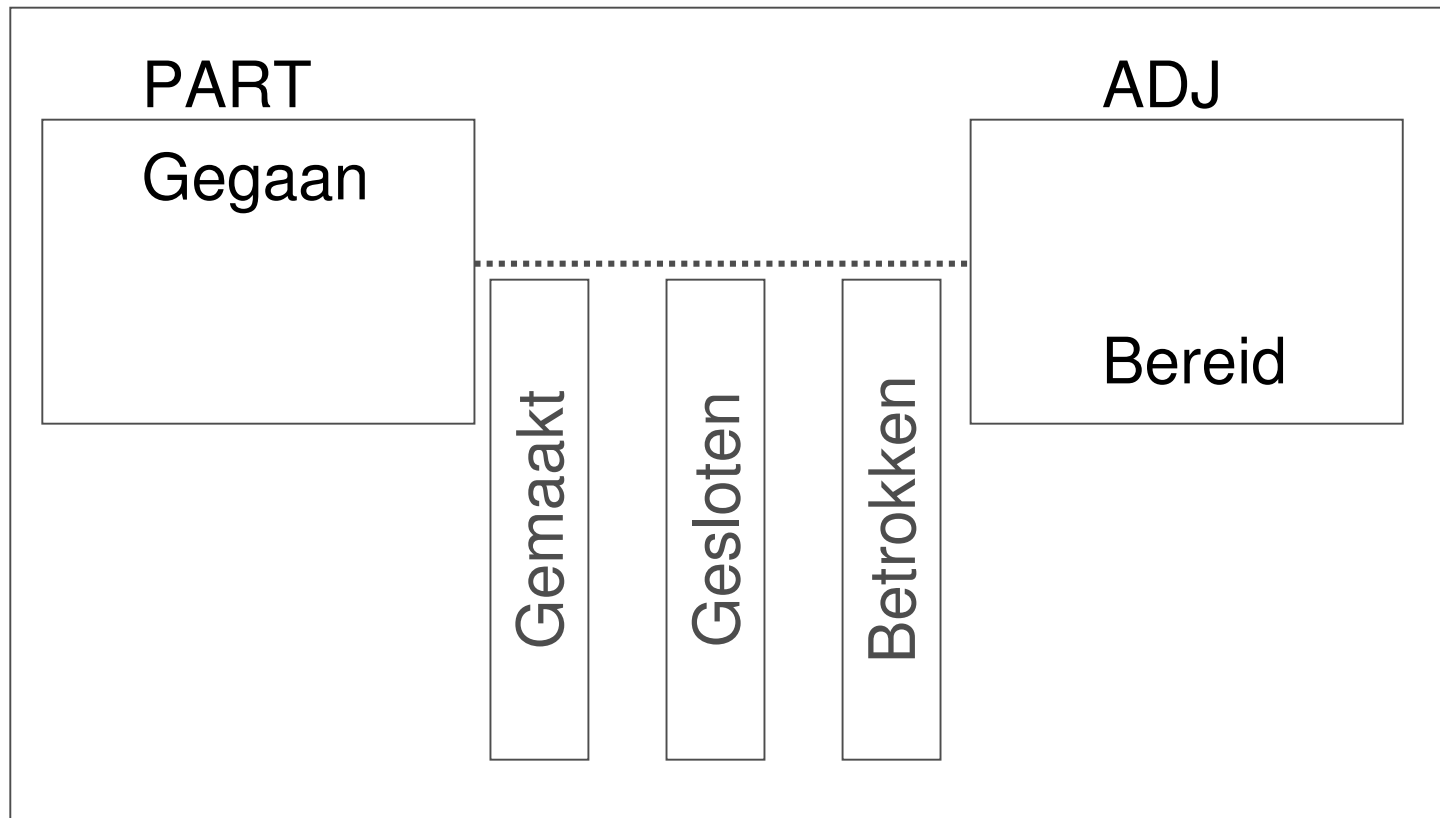
Criteria for disambiguating PART



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Criteria for disambiguating PART



PDA

- Participle Disambiguating Algorithm which determines the degree of adjectivity of each participle
- An alternative which is:
 - Context-sensitive
 - More fine-grained
 - Less categorical
 - Less subjective

General architecture of PDA

- Module 1: Adjective reality: which contextually available criteria are disambiguating?
- Module 2: Adjective potentiality: what is the chance of a given participle to be used as an adjective?
- Module 3: Adjective tolerance: is it possible at all to interpret a given participle adjectivally?

Module 1: Adjective reality

- Questionnaire (65 attested sentences, 5 informants)
- Degree of consensus: 80%; 100% in 24 of 65 sentences
- Analysis of consensus cases:
 - Locative adjunct
 - Temporal adjunct
 - Oblique object (*door* «by» + agent)

Module 2: adjective potentiality

- Indirect adjective potentiality measurement:

$$\frac{\text{Frequency of part}}{\text{Frequency of all verb forms}}$$

- Direct adjective potentiality measurement:

$$\frac{\text{Frequency of part, tagged as adj}}{\text{Frequency of all part occurrences}}$$

- Output: ranging from 0 (verbal) to 1 (adjectival)
- Frequency information: Celex, CGN (release 5)



Module 2: adjective potentiality

Index (indirect measurement) ADJ > 0.66	Index (indirect measurement) ADJ = 1
afgelopen, afgesproken, afgestemd, begraven, bestemd, betrokken, bevroren, doodgeschoten, gebaseerd, gekant, genegen, geneigd, genoodzaakt, geschonden, ontslagen, opgewassen, overdreven, uitgeput, verboden, verplicht, vrijgelaten	aanbeland, besloten, besmet, bestreden, bewezen, gecremeerd, gekopieerd, genegen, getint, gewaarschuwd, gewezen, gezonken, gezwollen, ontdekt, ontslagen, opgewassen, uitgeroeid, verkozen, verslaafd, vertrouwd, verzadigd, voorbijgestreefd, vooringenomen

Module 2: adjective potentiality

Index (direct measurement) ADJ > 0.66	Index (direct measurement) ADJ = 1
bekend	opgewassen, verkeerd, genegen, bekend, geoorloofd, geweest, gewijzigd, gezegd, gezegend, gezet, gezien, gezocht, gezonken, gezwollen, vooringenomen

Module 3: adjective tolerance

- Context insensitive application of 5 morpho-syntactic addition tests:
 - Prefixation with *on-*: *bekend*
 - Grading with *zeer, heel, hoogst, te*: *bekend, beperkt*
 - Prenominal use: *bepaald, gegeven, afgelopen, verkeerd, bekend, beperkt, gesloten, betrokken, geschikt, verantwoord, verplicht, betaald, vertrouwd, gericht, besmet, voortgezet, gebroken, toegevoegd, verloren, mislukt*
 - Comparative and/or superlative use: -
 - Nominalization: *betrokken, gegeven, vermoeden*



Output of PDA

- **Module 1: Adjective reality**
 - Categorical: V or next module
 - Continuous: 0 or next module
- **Module 2 & 3: Adjective potentiality and tolerance**
 - Categorical: A or V
 - Continuous: average of all index information

Data analysis



Categorical data analysis

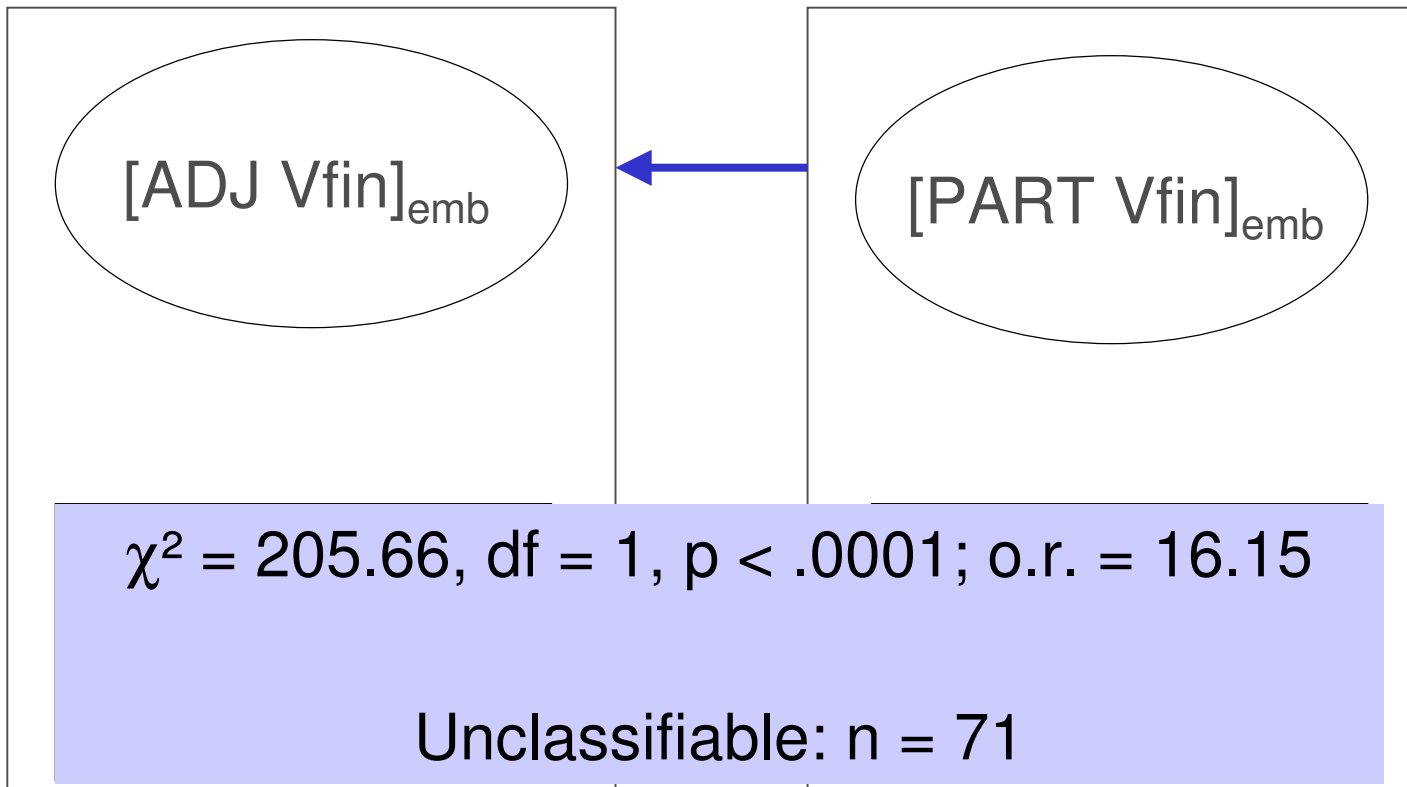
[ADJ Vfin]_{emb}

Vfin final: 87.44%
(188/215)
Vfin first: 12.56%
(27/215)

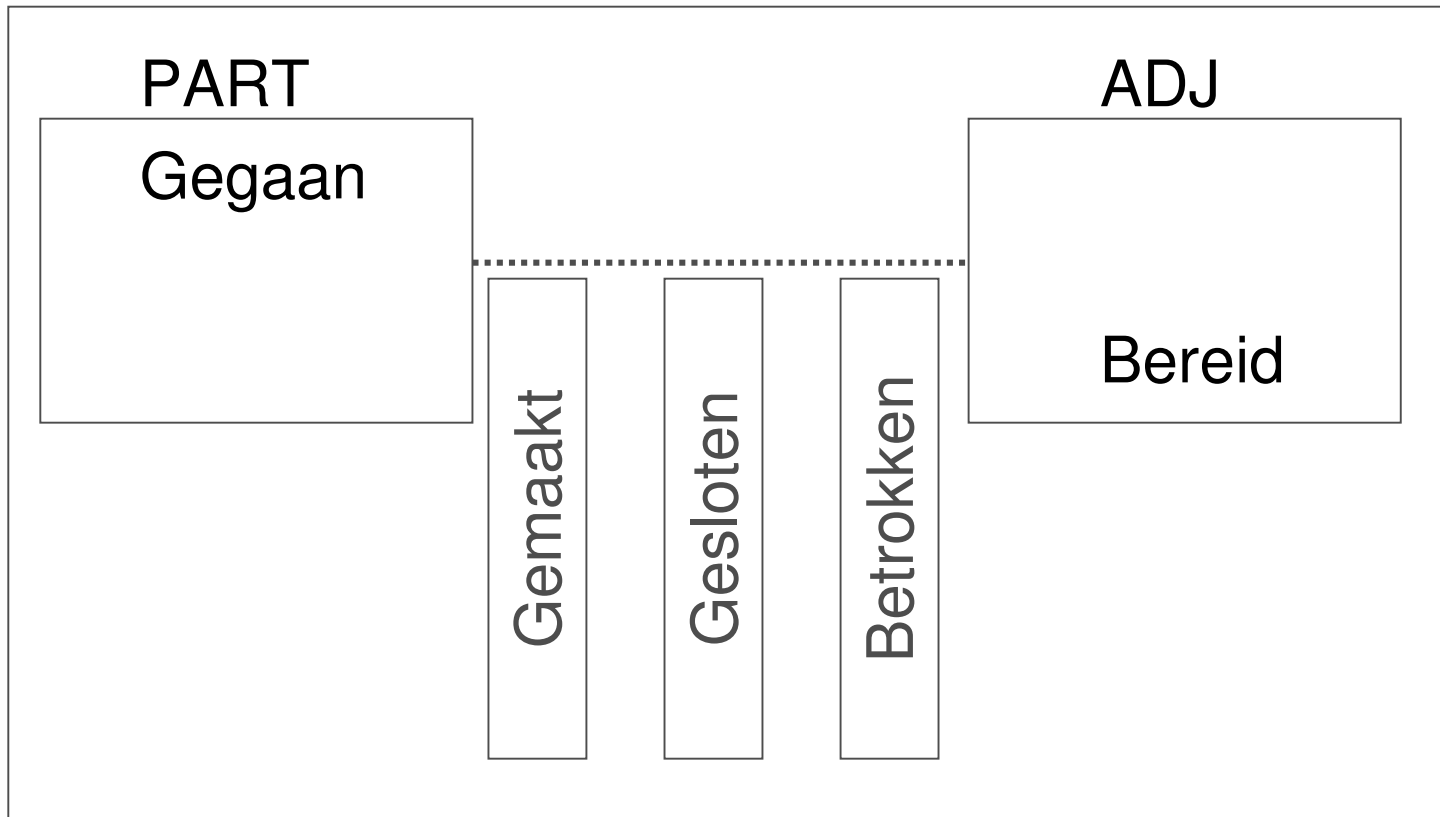
[PART Vfin]_{emb}

Vfin final: 29.04%
(167/556)
Vfin first: 69.96%
(389/556)

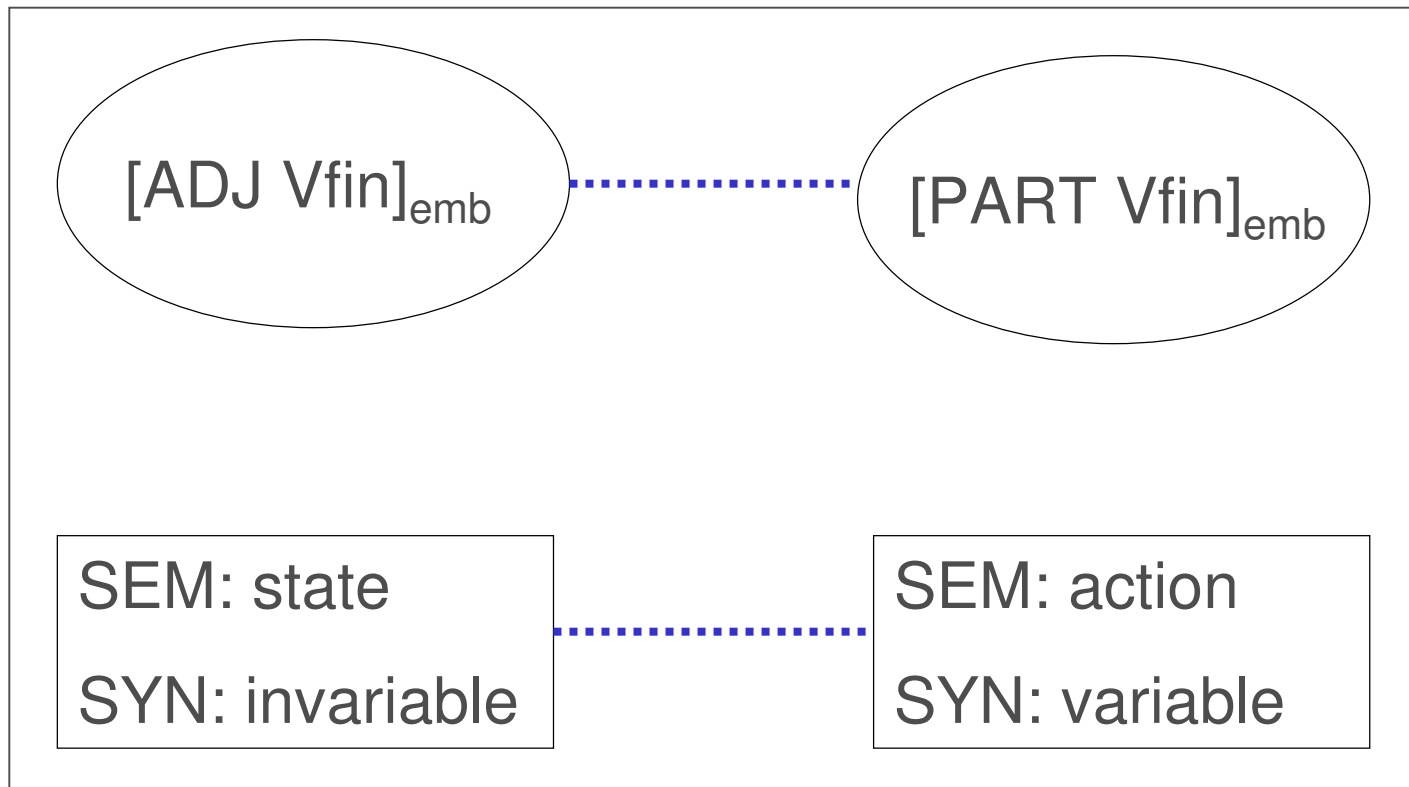
Categorical data analysis



Continuous data analysis

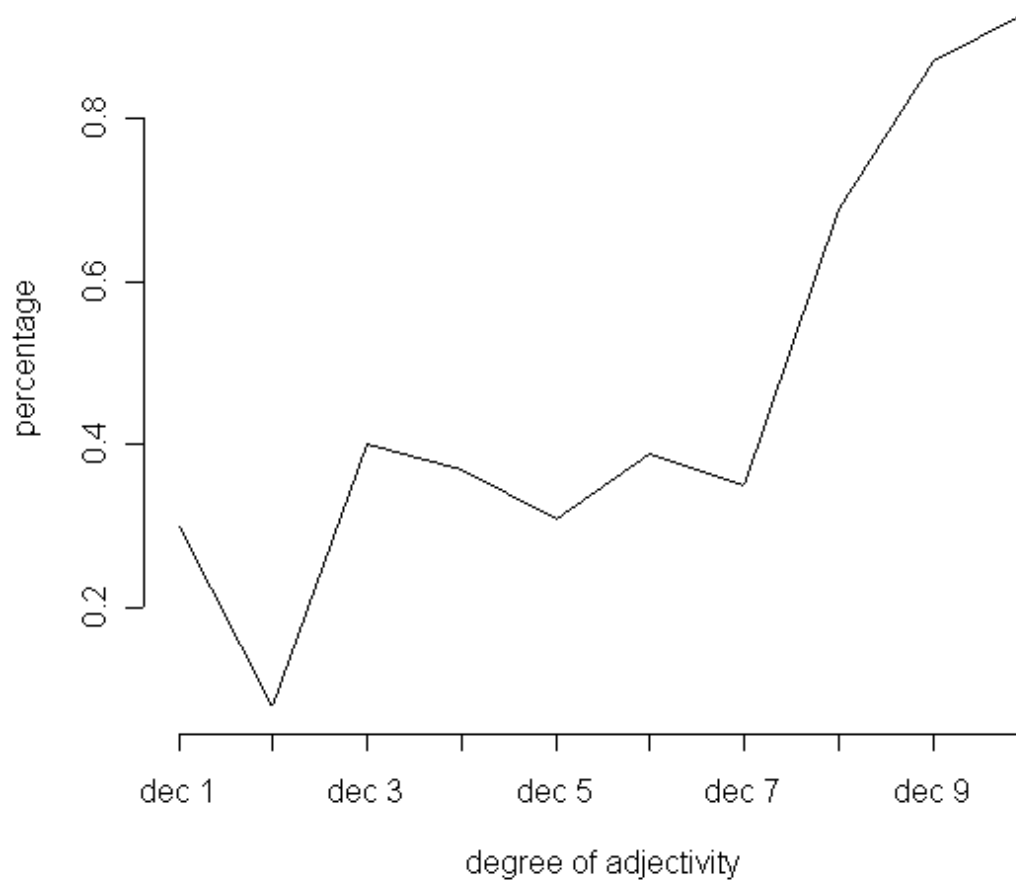


Continuous data analysis



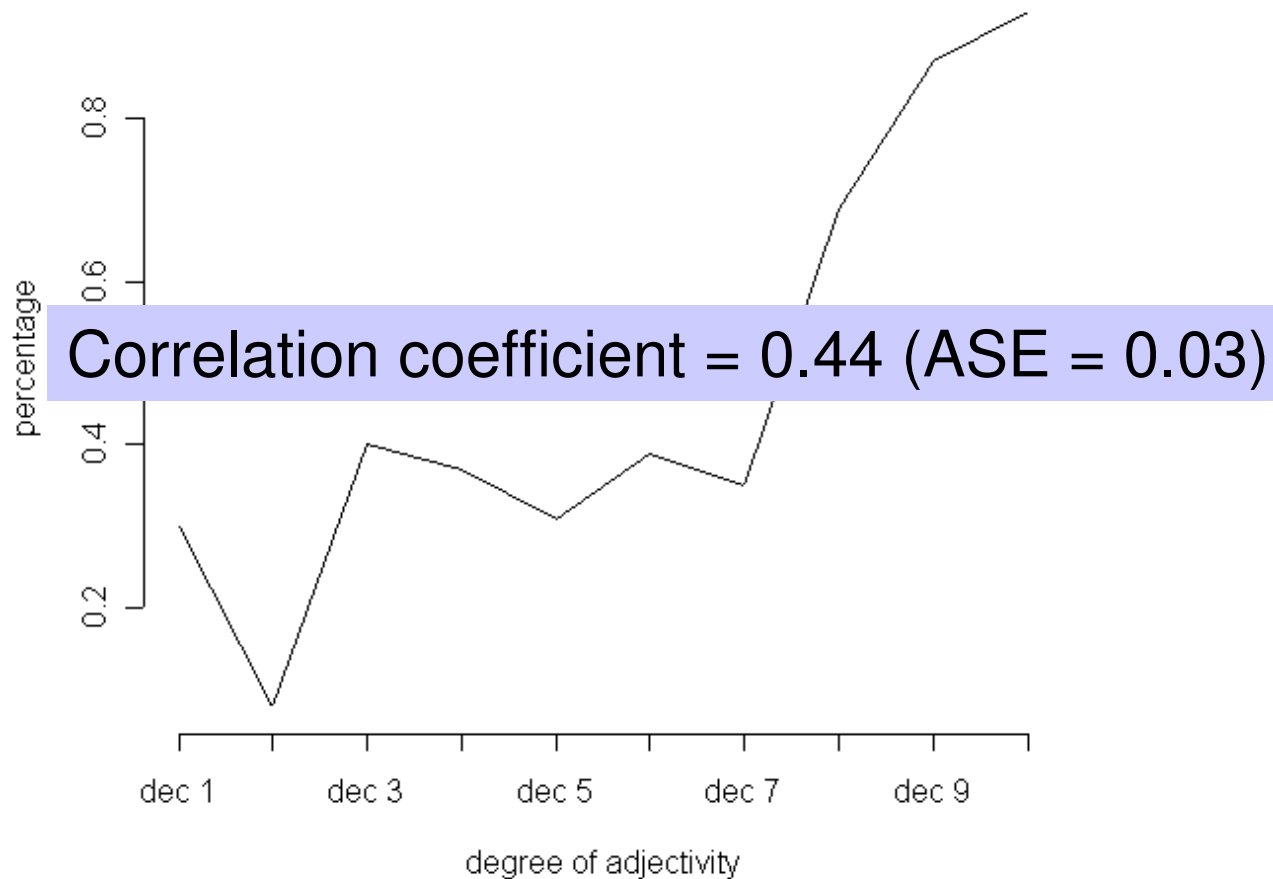
Continuous data analysis

Preference for Vfin final word order



Continuous data analysis

Preference for Vfin final word order



Conclusions & perspectives



Conclusions & perspectives

- Show that constructions in a hierarchical network interact with each other
- Show how this interaction can be operationalized and quantified
- Illustrate these issues on the basis of a case of constructional ambiguity in Dutch: [ADJ V_{fin}] vs. [PART V_{fin}]

Conclusions & perspectives

- Show that constructions in a hierarchical network interact with each other
- Show that construction membership is a gradual quantity (continuum)
- Illustrate the interaction between constructions [Vfin]

Consequence 1: construction membership is not an all-or-nothing matter, but is gradual in nature (continuum)

Consequence 2: the interaction may affect the constructions' properties

Conclusions & perspectives

- Show that constructions in a hierarchical network interact with each other
- Show how this interaction can be operationalized and quantified
- Illustrate the operationalization and quantification of the degree of adjectivity of participles so that it can be statistically tested
[Vfin]

Operationalization and quantification of the degree of adjectivity of participles so that it can be statistically tested

Drawbacks of the PDA:

| Polysemy

| Depends partly on decisions made by others

Conclusions & perspectives

- Show that constructions in a hierarchical network interact with each other
- Show how this interaction can be operationalized and quantified

- Illustrate [constructions, Vfin]

Background: quantitative variational research in RU
Quantitative Lexicology and Variational Linguistics (D. Geeraerts, D. Speelman, K.U.Leuven)

| constructional variants / allostructions (cf. Heylen)
| sociolectometric variation

Conclusions & perspectives

- Show that constructions in a hierarchical network interact
- Show how analogical extension of structural properties of one construction to a formally related construction (i.e. quantification) leads to constructional ambiguity
- Illustrate these issues on the basis of a case of constructional ambiguity in Dutch: [ADJ Vfin] vs. [PART Vfin]



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