

Computerlinguistik  
 DFKI Language Technology Lab

# Generalized Dependency Theory

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Preliminaries

- \* A word of caution
  - o coming from outside the tradition of Systemic Functional Linguistics
  - o in a phenomena-driven setting
  - o introducing systematicity into the interpretation of linguistic data
- \* Motivation
  - o linguistic modelling as annotation of morphosyntactic phenomena
  - o increasingly popular perspective in grammar engineering
  - o changing the way grammar modularity is understood
- \* "Generalized dependency theory"
  - o an extension of classical dependency-grammar approaches
  - o closely related to phenomena-oriented practice of test-suite building and corpus-annotation
  - o based on multiple dimensions

A generalised notion of dependency

- > Arrays of systematic relations observable in morphosyntax.
- > No systematic relation is required to be explicitly directional.
- > A convention needed for identifying (or referring to) a systematic relation.

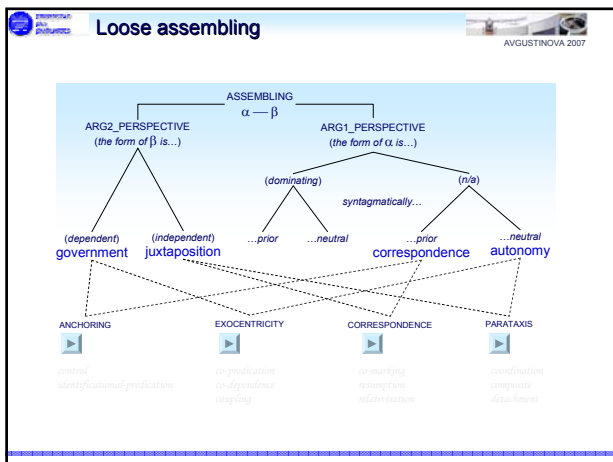
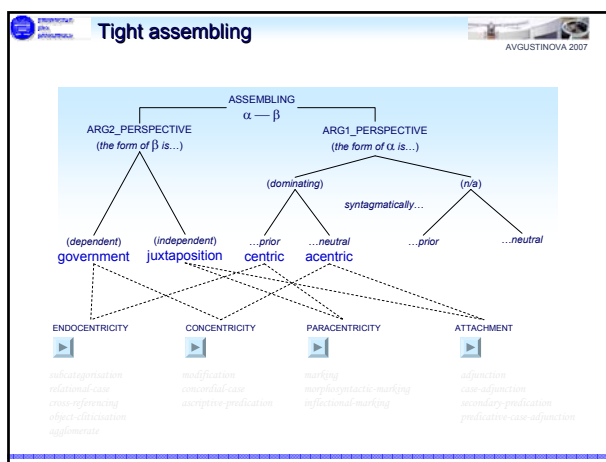
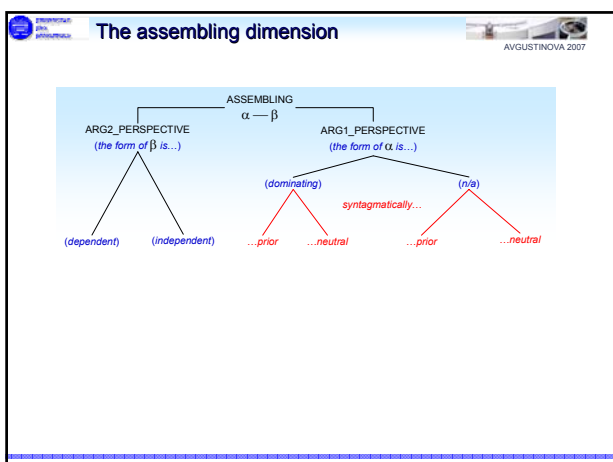
Key to formalisation

- \* Syntagmatic regularities in morphosyntax reveal basic relations between properties of linguistic objects.
- \* Grammatical representations
  - > identify **linguistic items** of different motivation and complexity
  - > encode **properties** of linguistic items
  - > specify explicit or implicit **relationships** between properties of linguistic items
- \* Cross-linguistically observable syntagmatics
  - o assembling } morphosyntactic phenomena
  - o co-variation } morphosyntactic phenomena
  - o alignment } word order phenomena

Domain of interest

Observable syntagmatics

→ Towards a pre-theoretical ontology of systematic relations



### Classification of assembling relations

\* 8 distinguished classes of phenomena

		Tight Assembling		Loose Assembling	
		$\alpha \rightarrow$ [dominating;prior]	[dominating;neutral]	[prior]	[neutral]
Form Government	dependent	<b>ENDOCENTRICITY</b> "strict selection" *subcategorisation *relational_case *cross-referencing *object-cliticisation *agglomerate	<b>CONCENTRICITY</b> "mutual selection" *modification *concordial_case *ascriptive_predication -attributive -classificational	<b>ANCHORING</b> *control *identificational_predication -equative -specificational	<b>EXOCENTRICITY</b> *co-predication *co-dependence -existential -localisation -possessive
	independent	<b>PARACENTRICITY</b> "head - functor" *marking *morphosyntactic_marking *inflectional_marking	<b>ATTACHMENT</b> *adjunction *case_adjunction *secondary_predication *predicative_case_adjunction	<b>CORRESPONDENCE</b> *co-marking *resumption *relativisation	<b>PARATAXIS</b> *coordination *composite *detachment -isolating -parenthetical -expository

### Tight assembling: endocentricity

U	$\alpha$ functor=head syntagmatically prior formally dominating	$\beta$ formally dependent
*subcategorisation	predicate	complement
*relational-case	verb	referential subject/object
*cross-referencing	pronominal clitic	replicated referential material
*object-cliticisation	verb	object clitic
	noun	possessive clitic
*agglomerate	neg_exist_verb	WH-complement

### Tight assembling: concentricity

U	$\alpha$ syntagmatically neutral formally dominating	$\beta$ formally dependent
*modification	X	X's adjunct
*concordial-case	noun	adjective
*ascriptive-predication	referential subject	ascriptive predicative
-attributive-predication	referential subject	attributive adjective
-classificational-predication	referential subject	classificational adjective

**Tight assembling: paracentricity**

	$\alpha$ head syntagmatically prior formally dominating	$\beta$ functor formally independent
* <i>marking</i>	major category	minor category (prep/conj/particle)
* <i>morphosyntactic-marking</i>	verb	auxiliary
* <i>inflectional-marking</i>	predicative	copula

**Tight assembling: attachment**

	$\alpha$ syntagmatically neutral formally dominating	$\beta$ formally independent
* <i>adjunction</i>	X	adjunct
* <i>case-adjunction</i>	X	case-predetermined adjunct
* <i>secondary-predication</i>	X	predicative adjunct
* <i>predicative-case-adjunction</i>	X	case-predetermined predicative adjunct

**Loose assembling: anchoring**

	$\alpha$ triggering-expression syntagmatically prior	$\beta$ targeted-expression formally dependent
* <i>control</i>	controller	controlled predicate
* <i>identificational-predication</i>	nominal subject	nominal predicative
- <i>equative-predication</i>	X	Y being set equal to X
- <i>specificational-predication</i>	X	Y further specifying X

**Loose assembling: exocentricity**

	$\alpha$ syntagmatically neutral	$\beta$ formally dependent
* <i>co-predication</i>	primary predicate	secondary predicate
* <i>co-dependence</i>	referential complement of X	referential complement of X
* <i>coupling</i>	autonomous expression	autonomous expression
- <i>existential-coupling</i>	existing entity	location
- <i>localisation-coupling</i>	location	existing entity
- <i>possessive-coupling</i>	entity	possessor (as location)

**Loose assembling: correspondence**

	$\alpha$ syntagmatically prior	$\beta$ formally independent
* <i>co-marking</i>	marker of X	marker of X
* <i>resumption</i>	expression	resuming pronominal form
* <i>relativisation</i>	nominal expression	relative pronoun

**Loose assembling: parataxis**

	$\alpha$ syntagmatically neutral	$\beta$ formally independent
* <i>coordination</i>	coordinand	coordinand
* <i>composite</i>	part of a compositum	part of a compositum
* <i>detachment</i>	embedding expression	detached expression
- <i>isolating</i>	embedding expression	isolated expression
- <i>parenthetical</i>	embedding expression	parenthesized expression
- <i>expository</i>	embedding expression	expository expression

### The co-variation dimension

- \* The essential notion is relational:
  - systematic co-variation
    - of grammatical / linguistic forms
    - of feature specifications between two separate elements
- \* Research on agreement
  - long-standing tradition, especially in Slavic linguistics
  - complexity of agreement systems provides good reasons for concentrating on the co-variation sources
  - the relational aspect is only implicit and generally underrepresented
- \* Needed: linguistically motivated level of abstraction
  - in the attempts to define agreement
  - in accommodating non-trivial instances of co-variation
  - in formalising the typology of agreement phenomena

### Some non-trivial cases

- \* Analytical verb forms
 

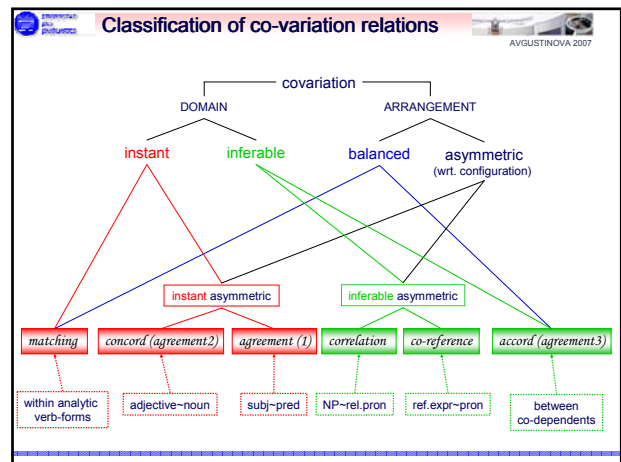
Ti you.2SG si AUX.2SG štjala AUX.SG.F da PRT dojdeš. come.2SG  
Bulgarian: You would come (reportedly).
- \* Co-dependents
 

Ona she.NOM.3SG.F rastët grow.3SG sčastlivym happy.INST.SG.M rebënkom. child.INST.SG.M  
Russian: She grows (up) as a happy child.
- \* Clitic doubling
 

Maria Mary.SG.F ja ACC.3SG.F vidjaxa saw.3PL maskirana. disguised.SG.F  
Bulgarian: They saw Mary disguised.

### How are the 'agreeing' items related?

- \* Directionality
  - Asymmetric co-variation
    - trigger-target configuration
    - compatibility: *monotonic* vs. *non-monotonic* (resolved or partial)
  - Balanced (distributed) co-variation
    - cannot be formulated in directional terms
    - 'agreeing' items are interpretable as co-targets of an external trigger
- \* Domain
  - Instant co-variation (in immediate domains)
  - Inferable co-variation (in non-immediate domains)

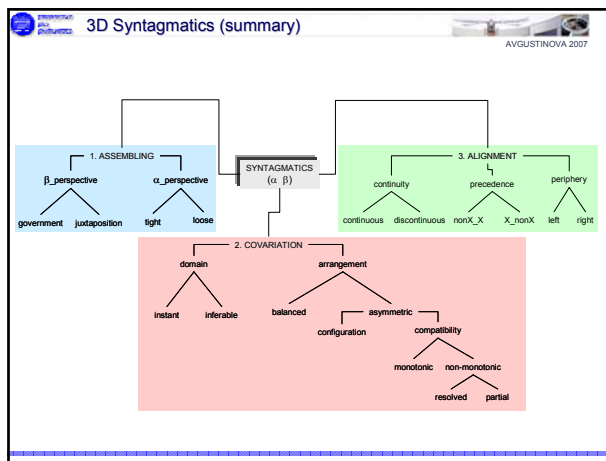
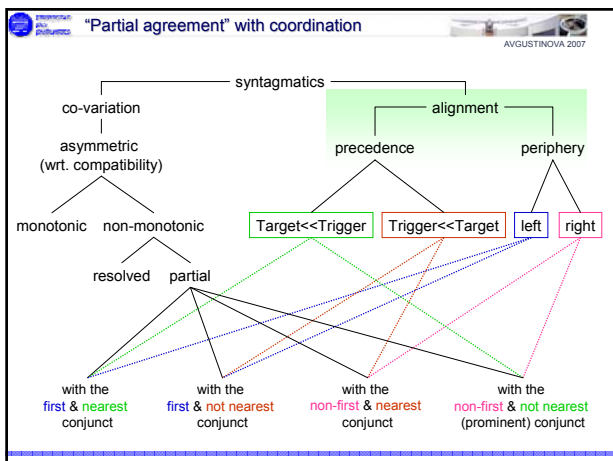
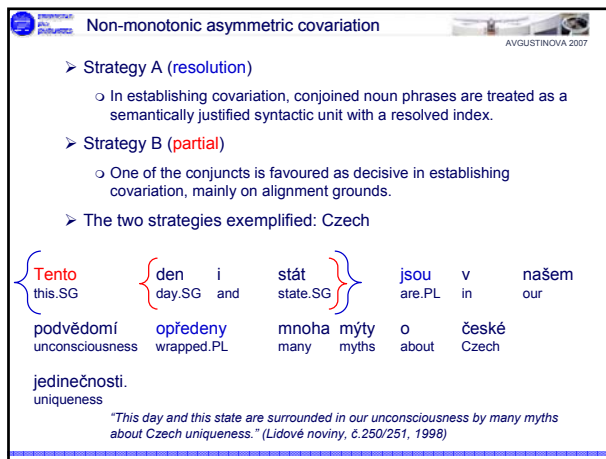
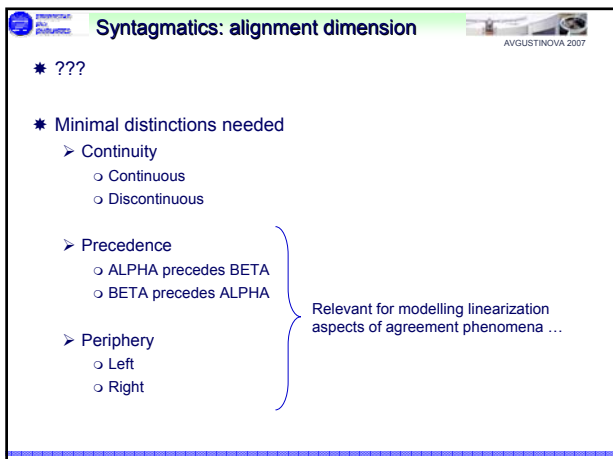
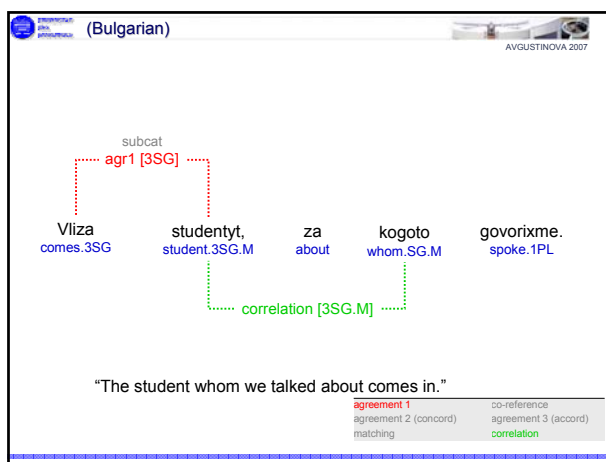
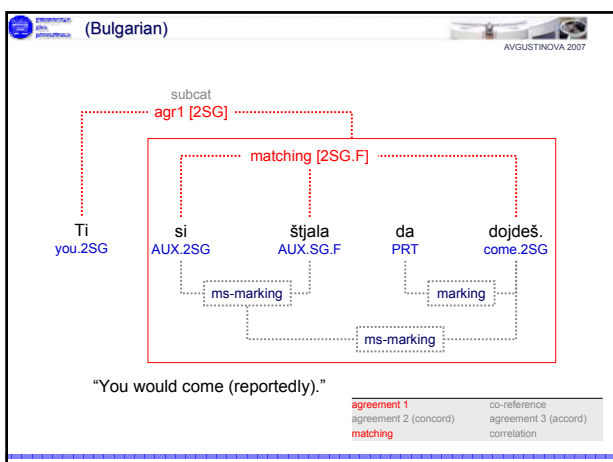


### (Russian)

"She grows (up) as a happy child."

### (Bulgarian)

"They saw Mary disguised."



Prospects and outlook

- \* The outlined approach focuses on the relational aspect
  - It allows us to specify more precisely the nature of the observable grammatical phenomena as well as to properly sub-classify them.
  - The space of possible relationships is derived from a small number of distinctions, employing the power of multidimensional inheritance networks for a systematic and concise description.
  - The resulting ontology of systematic relations is open enough to accommodate typologically diverse phenomena.
- \* A “meta-annotation” of morphosyntactic phenomena → compatible (by design) with theory-specific annotation schemes
- \* Subtasks in grammatical research defined more cleanly.