**Generalized Dependency Theory**

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**A word of caution**
- coming from outside the tradition of Systemic Functional Linguistics
- in a phenomena-driven setting
- introducing systematically into the interpretation of linguistic data

**Motivation**
- linguistic modelling as annotation of morphosyntactic phenomena
- increasingly popular perspective in grammar engineering
- changing the way grammar modularity is understood

"Generalized dependency theory"
- an extension of classical dependency-grammar approaches
- closely related to phenomena-oriented practice of test-suite building and corpus-annotation
- based on multiple dimensions

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**Preliminaries**

**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.

**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**
- assembling
- co-variation
- alignment

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**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
  - assembling
  - co-variation
  - alignment

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**Domain of interest**

- How linearization motivated units $\alpha$ and $\beta$ are aligned
- How morphological forms of $\alpha$ and $\beta$ co-vary with regard to person, number and gender

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**Observable syntagmatics**

- Towards a pre-theoretical ontology of systematic relations

  1. **Assembling**
     - How syntactically motivated entities $\alpha$ and $\beta$ are combined

  2. **Alignment**
     - How linearization motivated units $\alpha$ and $\beta$ are aligned

  3. **Observation**
     - How morphological forms of $\alpha$ and $\beta$ co-vary with regard to person, number and gender
The assembling dimension

Tight assembling

Loose assembling

Classification of assembling relations

Tight assembling: endocentricity

Tight assembling: concentricity
### Tight assembling: paracentricity

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>verb</td>
<td>auxiliary</td>
</tr>
<tr>
<td>copula</td>
<td></td>
</tr>
</tbody>
</table>

### Tight assembling: attachment

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>adjunct</td>
<td>X adjunct</td>
</tr>
<tr>
<td>case-adjunct</td>
<td>X case-predetermined adjunct</td>
</tr>
<tr>
<td>predicative adjunct</td>
<td>X predicative adjunct</td>
</tr>
<tr>
<td>case-predetermined predicative adjunct</td>
<td>X case-predetermined predicative adjunct</td>
</tr>
</tbody>
</table>

### Loose assembling: anchoring

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>controller</td>
<td>controlled predicate</td>
</tr>
<tr>
<td>nominal subject</td>
<td>nominal predicate</td>
</tr>
<tr>
<td>X</td>
<td>X being set equal to X</td>
</tr>
<tr>
<td>X</td>
<td>X further specifying X</td>
</tr>
</tbody>
</table>

### Loose assembling: exocentricity

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>primary predicate</td>
<td>secondary predicate</td>
</tr>
<tr>
<td>X dependent of X</td>
<td>X being equal to X</td>
</tr>
<tr>
<td>autonomous expression</td>
<td>autonomous expression</td>
</tr>
<tr>
<td>existing entity</td>
<td>location</td>
</tr>
<tr>
<td>location</td>
<td>existing entity</td>
</tr>
<tr>
<td>entity</td>
<td>possessor (as location)</td>
</tr>
</tbody>
</table>

### Loose assembling: correspondence

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>marker of X</td>
<td>marker of X</td>
</tr>
<tr>
<td>resuming pronoun</td>
<td>nominative expression</td>
</tr>
<tr>
<td>relative pronoun</td>
<td>nominal expression</td>
</tr>
</tbody>
</table>

### Loose assembling: parataxis

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>coordinand</td>
<td>coordinand</td>
</tr>
<tr>
<td>part of a compositum</td>
<td>part of a compositum</td>
</tr>
<tr>
<td>detached expression</td>
<td>detached expression</td>
</tr>
<tr>
<td>isolated expression</td>
<td>isolated expression</td>
</tr>
<tr>
<td>parenthesized expression</td>
<td>parenthesized expression</td>
</tr>
<tr>
<td>expository expression</td>
<td>expository expression</td>
</tr>
</tbody>
</table>
**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.SG
  - сi
    - AUX.SG
  - дi
    - PRT
  - сdojdeš.
    - come.2SG
  - Bulgarian: You would come (reportedly).

- Co-dependents
  - Ona
    - she.NOM.SG.F
  - rastel
    - grow.SG
  - счастьливым
    - happy.INST.SG.M
  - ребёнком.
    - child.INST.SG.M
  - Russian: She grows (up) as a happy child.

- Clitic doubling
  - Maria
    - Mary.SG.F
  - ja
    - ACC.SG.F
  - видяха
    - saw.3PL
  - маскирана.
    - disguised.SG.F
  - Bulgarian: They saw Mary disguised.

**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)

**Classification of co-variation relations**

- **DOMIAN**
  - covariation
  - AGREMENT

- **Directionality**
  - instant asymmetric
  - inferable asymmetric

- **Domain**
  - within analytic verb forms
  - cross-referencing
  - co-referencing [SG.F]

- **Current examples**
  - agr1 [SG.F]
  - agr2 (concord) [SG.M]
  - agr3 (accord) [SG]

**Some non-trivial cases (continued)**

- (Russian)
  - Ona
    - she.NOM.SG.F
  - rastel
    - grow.3SG
  - счастьливым
    - happy.INST.SG.M
  - ребёнком.
    - child.INST.SG.M

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

- (Bulgarian)
  - Maria
    - Mary.SG.F
  - ja
    - ACC.SG.F
  - видяха
    - saw.3PL
  - маскирана.
    - disguised.SG.F

  - "They saw Mary disguised."
"You would come (reportedly)."

"The student whom we talked about comes in."

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Syntagmatics: alignment dimension

- Minimal distinctions needed
  - Continuity
    - Continuous
    - Discontinuous
  - Precedence
    - ALPHA precedes BETA
    - BETA precedes ALPHA
  - Periphery
    - Left
    - Right

- Relevant for modeling linearization aspects of agreement phenomena...

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Non-monotonic asymmetric covariation

- Strategy A (resolution)
  - In establishing covariation, conjoined noun phrases are treated as a semantically justified syntactic unit with a resolved index.
- Strategy B (partial)
  - One of the conjuncts is favored as decisive in establishing covariation, mainly on alignment grounds.
- The two strategies exemplified: Czech

"This day and this state are surrounded in our unconsciousness by many myths about Czech uniqueness." (Lidové noviny, č. 250/251, 1998)

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"Partial agreement" with coordination

- Co-variation
  - Asymmetric (wrt. compatibility)
  - Monotonic
    - Resolved
    - Partial
  - Non-monotonic
    - Resolved & Partial
    - Non-first & not nearest conjunct

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3D Syntagmatics (summary)
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.

Prospects and outlook