

Introduction — Constraint Types as a Macro-Classification of Locality

Project description

We use mathematical tools to investigate under which conditions **complex constraints** can be **replaced by simpler ones** and relate our findings to the study of locality.

Starting point

Müller (2005) orders the constraint classes of Müller and Sternefeld (2000) with respect to their application domain, thereby **connecting locality and constraint classes**.

Specific questions

- What can we learn from constraints about locality?
- What can we learn from locality about constraints?
- How does the use of specific constraints translate into claims about locality?

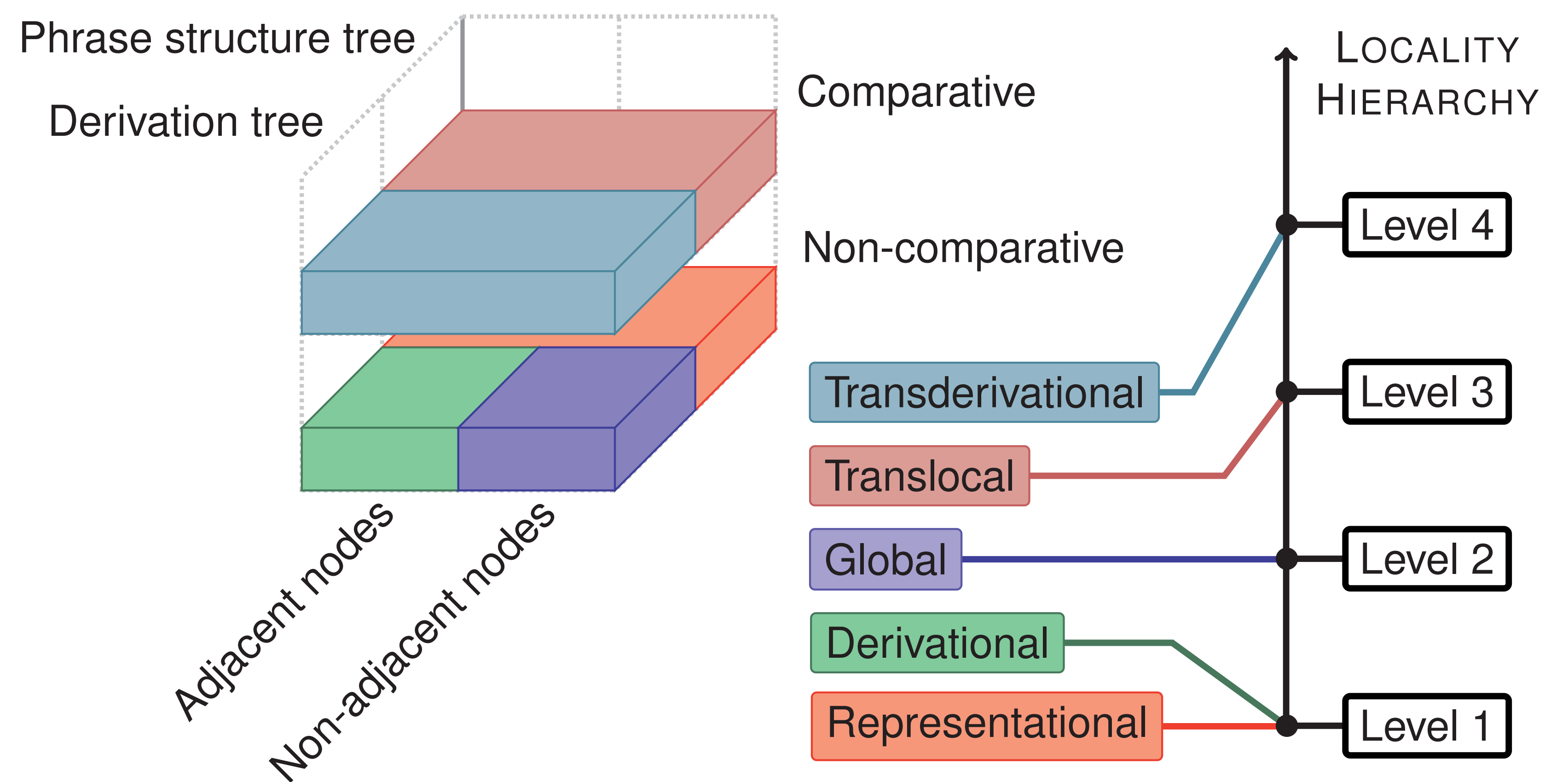


Figure: Parametric classification of constraints and their ordering with respect to locality

General Definitions of Non-Comparative Constraints

Framework

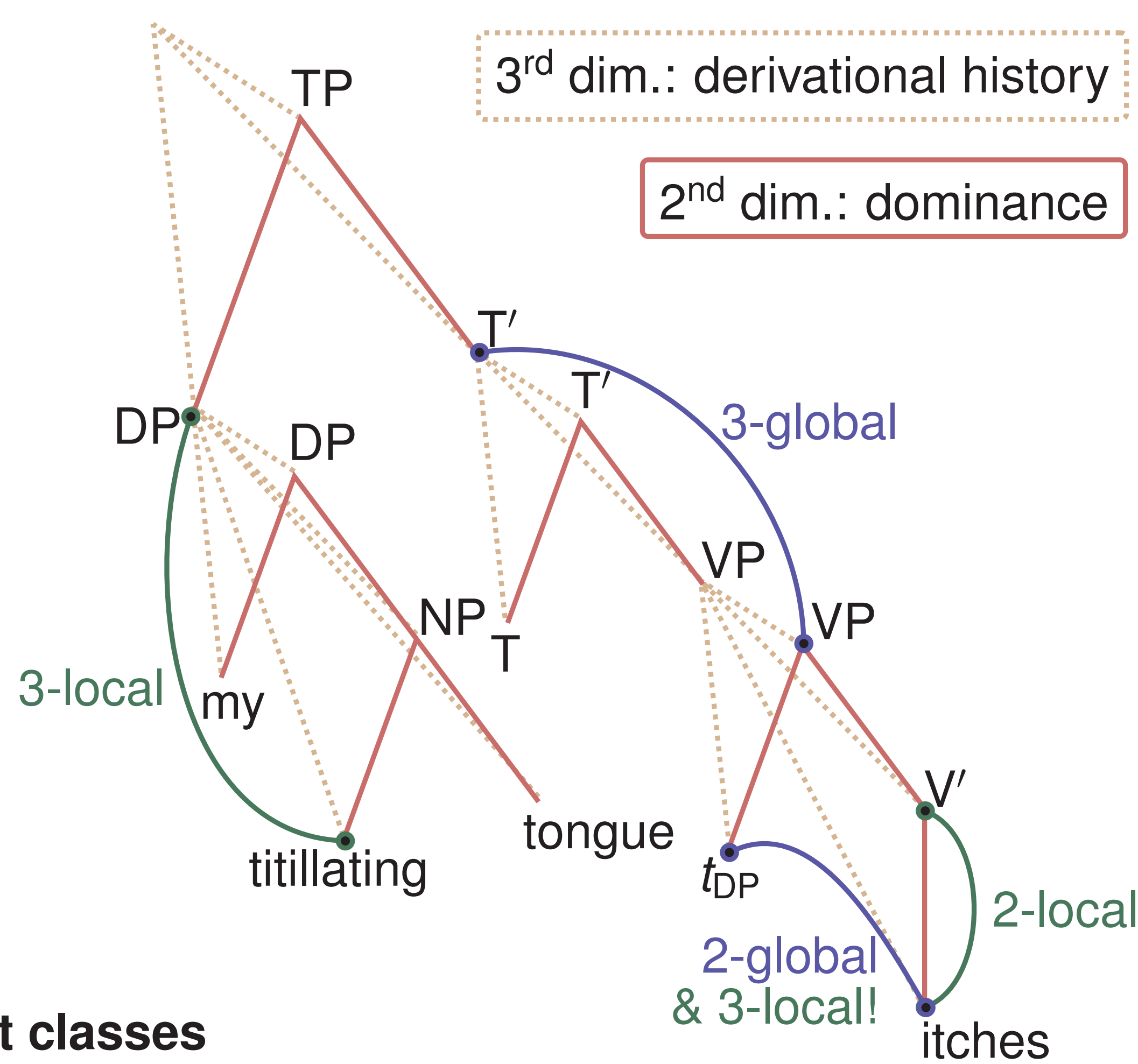
Multi-dimensional trees (Rogers 2003) function as a general encoding system. Hence our results hold across a wide range of syntactic theories:

- GB
- Classic Minimalism
- Phasal Minimalism
- Mirror Theory
- GPSG
- TAG
- ...

Definition of constraint classes

A constraint is

- d -global** iff it restricts **nodes at dimension $k \leq d$** .
- d -local** iff it restricts **nodes at dim. $k < d$ or adjacent nodes at dim. d** .



Reducibility of Comparative Constraints

- Comparative constraints are modeled by optimality systems (Jäger 2002), a restricted variant of OT.
- The output language of an optimality system is at most as complex as its input language if **global optimality** is satisfied for every optimal output:

If output o is optimal for input i , then there is no input i' for which o is an output candidate but not optimal.

- Therefore, **some but not all comparative constraints** can be **reduced to global ones**.

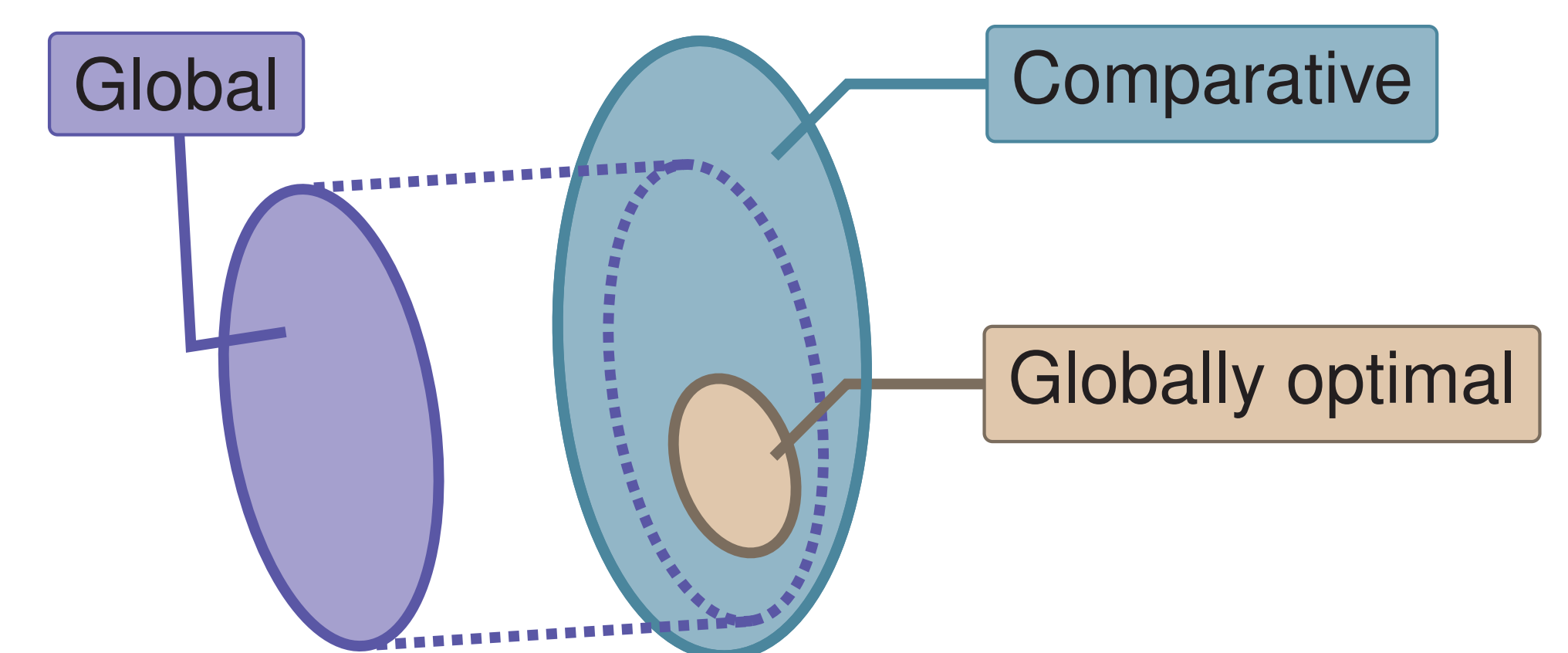


Figure: A proper subset of all comparative constraints (probably including most syntactic ones) can be reduced to global constraints.

Reducibility of Non-Comparative Constraints

With feature coding

If we allow for new features, **all d -global** constraints can be reduced to **d -local** constraints.

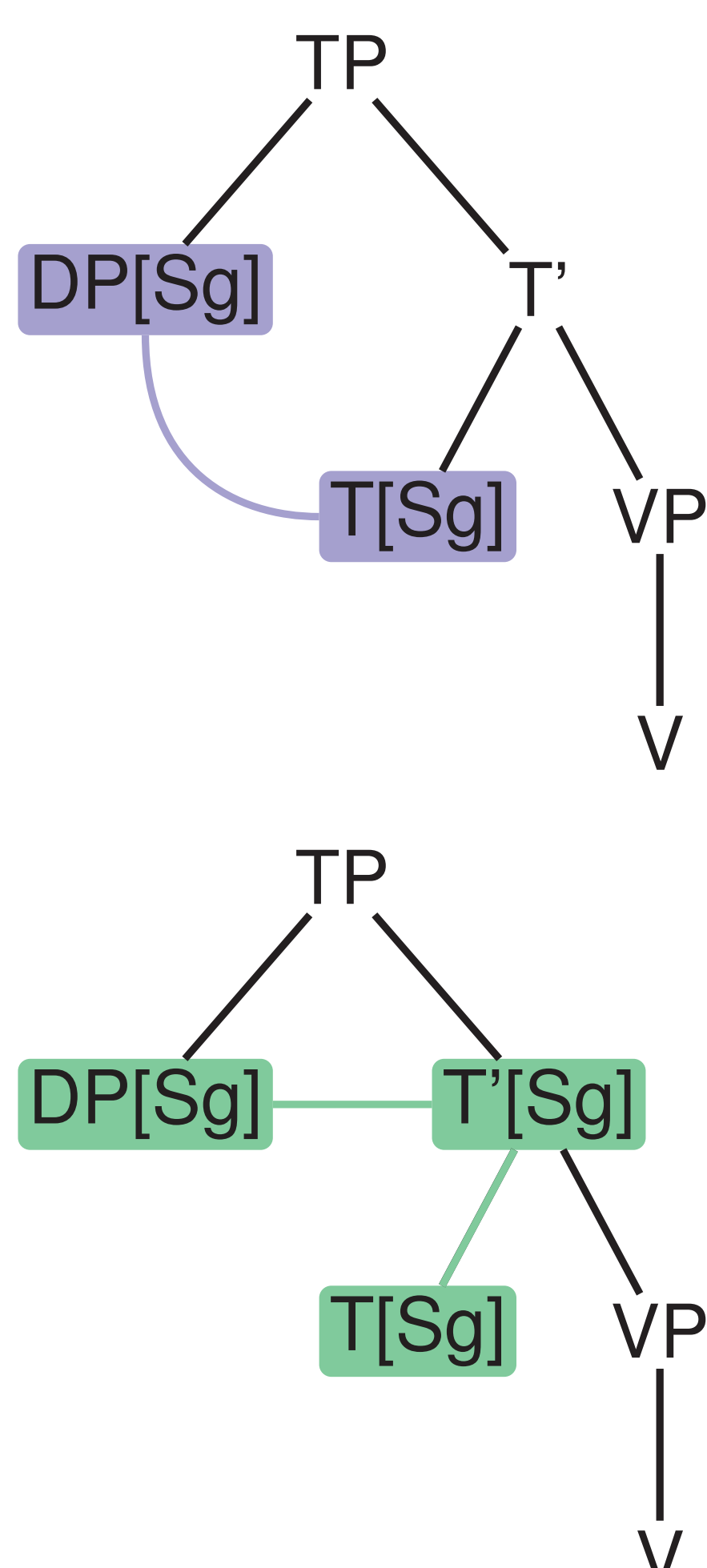


Figure: All global constraints are decomposable into local ones by means of feature coding.

Without feature coding

If we ban new features and feature percolation, only a **proper subset of all d -global** constraints can be reduced to **$d+1$ -local** ones.

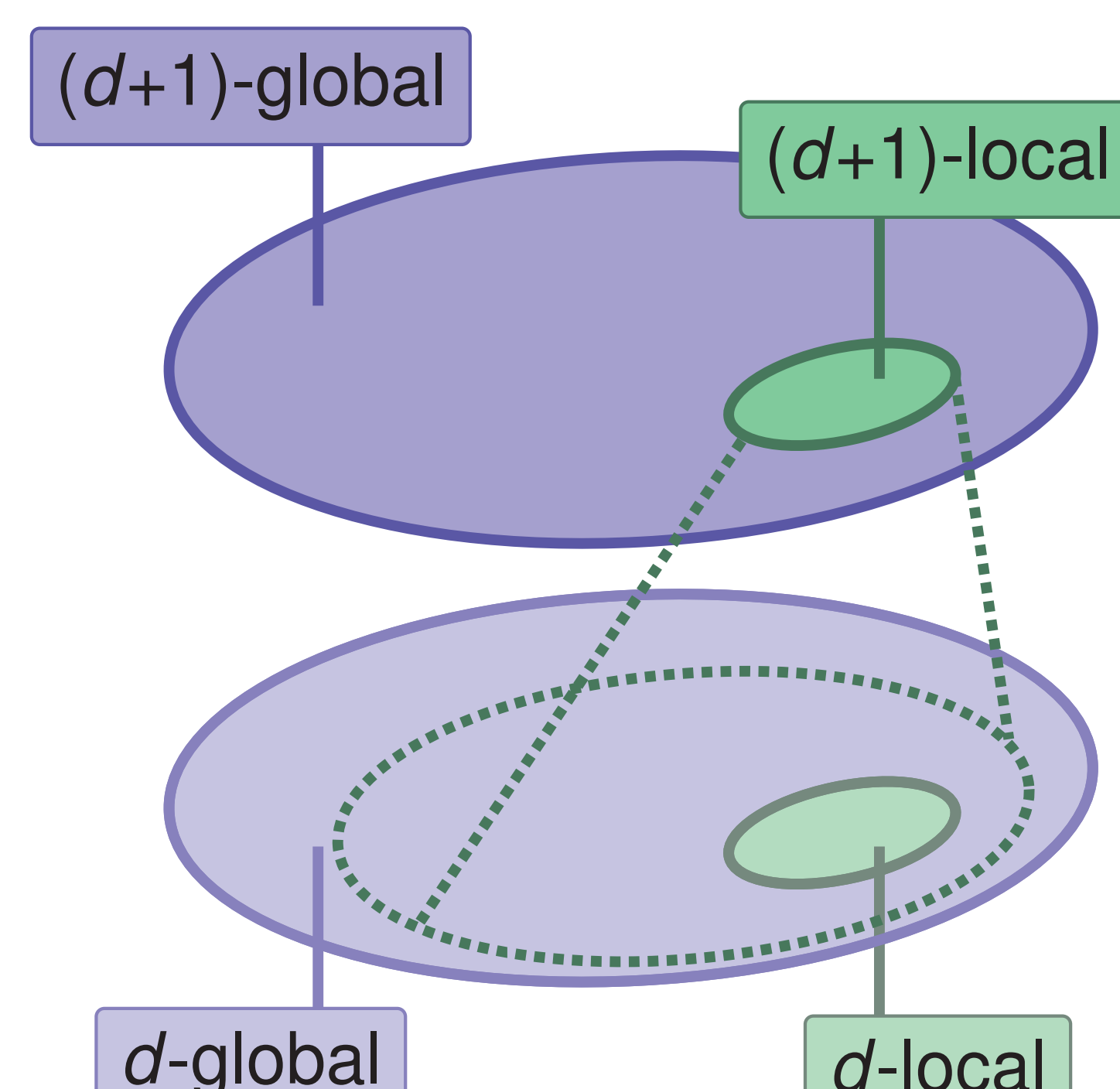


Figure: Without feature coding, a proper subset of all global constraints can be replaced by local ones at the next dimension.

Significance of Results

Our study confirms the big picture of Müller's hierarchy and adds the following observations:

Locality in flux

Locality isn't a fixed notion, it may vary between different theories, so be cautious with comparisons!

Qualitative dimension of locality studies

Attempts to reduce the size of locality domains can be thought to investigate **whether there are any irreducibly global constraints in syntax**.

Looks can be deceiving

Constraints may embody **stronger locality assumptions** than their definitions suggest.

Opacity of feature coding

Feature coding obscures the role of locality conditions in natural language and should be avoided.

References

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