Konseptuaalisen semantiikan käsitys mielestä ja kielestä:

Tiernet – a micro-modular approach to language

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THE IDEA BEHIND IT ALL

Representational modularity

Representation

- Each sentence is a combination of different kinds of information, phonological, syntactic, semantic, etc. These levels of different informaton are called representations.

Autonomous representation

- A representation is autonomous when it cannot be reduced to another level of representation.

Representational modularity (Jackendoff 1997)

- Each autonomous level of representation is based on formation principles of a separate module. Autonomous representational modules have their own primitives and principles of combination.

Tiers

- In phonology, since 1980's the phonological representation is seen as a combination of tiers (timing, melody, syllable, tone, stress, etc.). Each tier has its own primitives and principles of combination.

→ $\text{Tier}_{\text{def}} = \text{Representation}_{\text{def}}$

THE DEEPEST ESSENCE OF TIERNET AND CONCEPTUAL SEMANTICS

Layers of a linguistic theory (Nikanne, in progress)

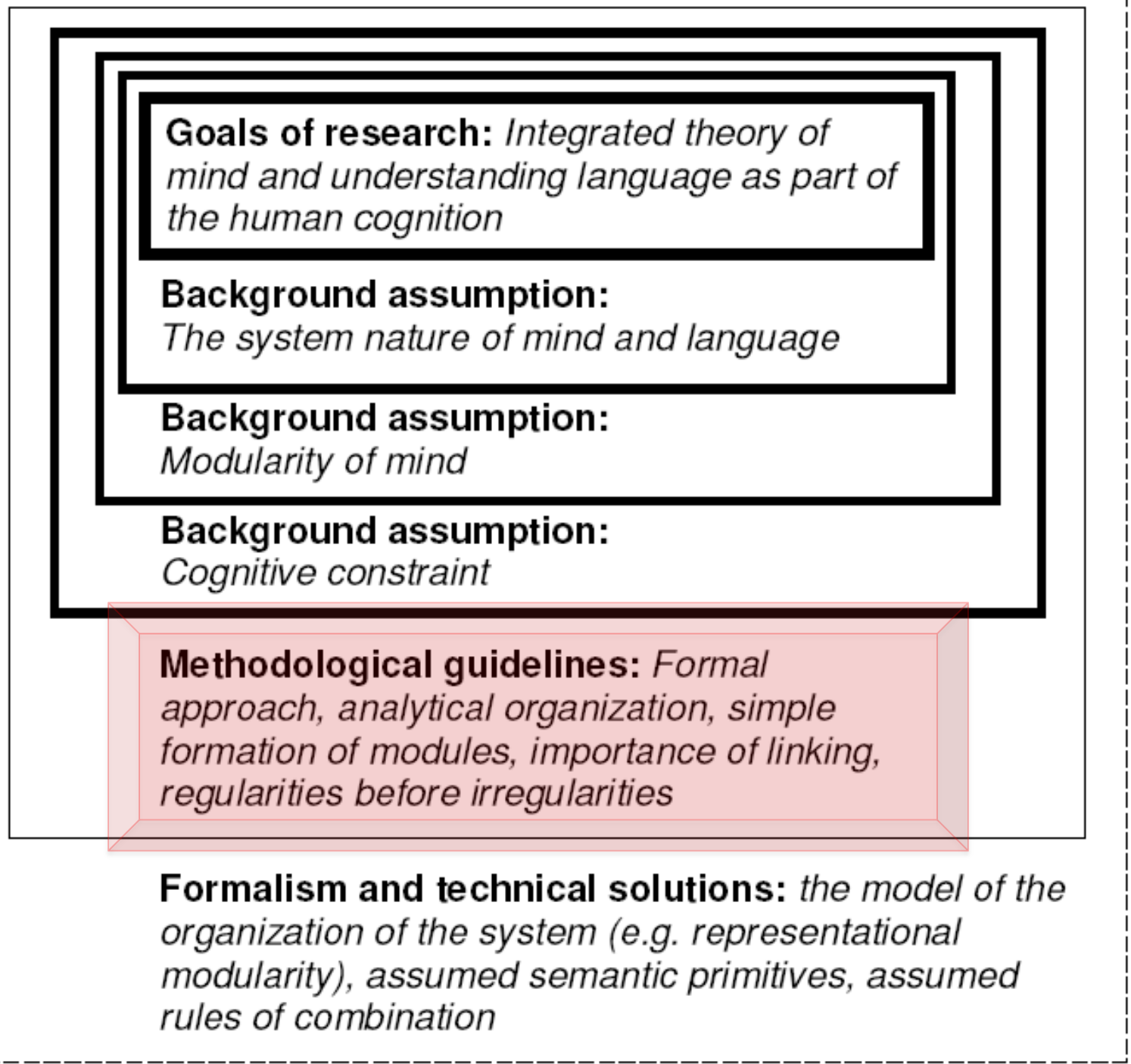
Goals of research:
The research topic and the research perspective.

Background assumptions:
Motivated hypotheses on the nature of the research topic. These hypotheses give the research a direction.

Methodological guidelines:
”Ways of thinking”. The guidelines are based on the goals of research and background assumptions of the research topic and the ideas of right way to do scientific work.

Formalism and technical solutions:
The formalism and technical solutions must be compatible with the goals of research, background assumptions, and methodological guidelines. They express the theoretical ideas of the nature of the research topic.

Conceptual Semantics (Nikanne 2008, in progress)



Methodological guidelines

(A) Formal approach

Formalize your statements.

WHAT: The conceptual semantics approach is formal, i.e. the statements of the research topic should be based on and presented by well defined terms.

WHY: this guideline is based on the background assumption that language and mind are organized as systems. If language is a system, it should be described as a system and its behavior is to a large extent a consequence of the properties of the system. There is no way around this. As Esa Itkonen points out, this is the requirement of explicitness.

Methodological guidelines (B) Analytical organization

- ***Keep the formation of formally independent sub-systems apart*.**
- **WHAT**: If it can be shown that there is a part of the system that has its own primitives and principles of combination, it constitutes a module of its own.
- **WHY**: It makes sense methodologically to keep the independent systems apart. The understanding achieved of the independent modules is always useful.

Methodological guidelines
(C) Simple Formation of Modules

- ***Keep the formation of the sub-systems simple.***
- **WHAT**: the formation of sub-systems should contain as few primitives and as simple principles of their combination as possible.
- **WHY**: This is an application of Occam's Razor: "One should not increase, beyond what is necessary, the number of entities required to explain anything." Also guideline B above suggests – even if it does not logically entail – that the representations be simple.

Methodological guidelines

(D) Importance of Linking:

- ***Study carefully the interaction between the modules*.**
- **WHAT**: The principles that govern the correspondences between the sub-systems are a crucial part of the system.
- **WHY**: As language and mind work as a whole the model should show how the whole works. representations does not always have to be one-to-one, because then the representations were analogical, and in practice both guideline B and C would be violated

THE INGREDIENTS OF THE THEORY

Micro-modularity: a tier based modular organization (cf. B Analytical organization)

Micro-modularity is a consequence of the methodological guidelines of conceptual semantics. Independent structures are formed in their own modules.

A sketch of the micro-modular organization of the Finnish grammar:

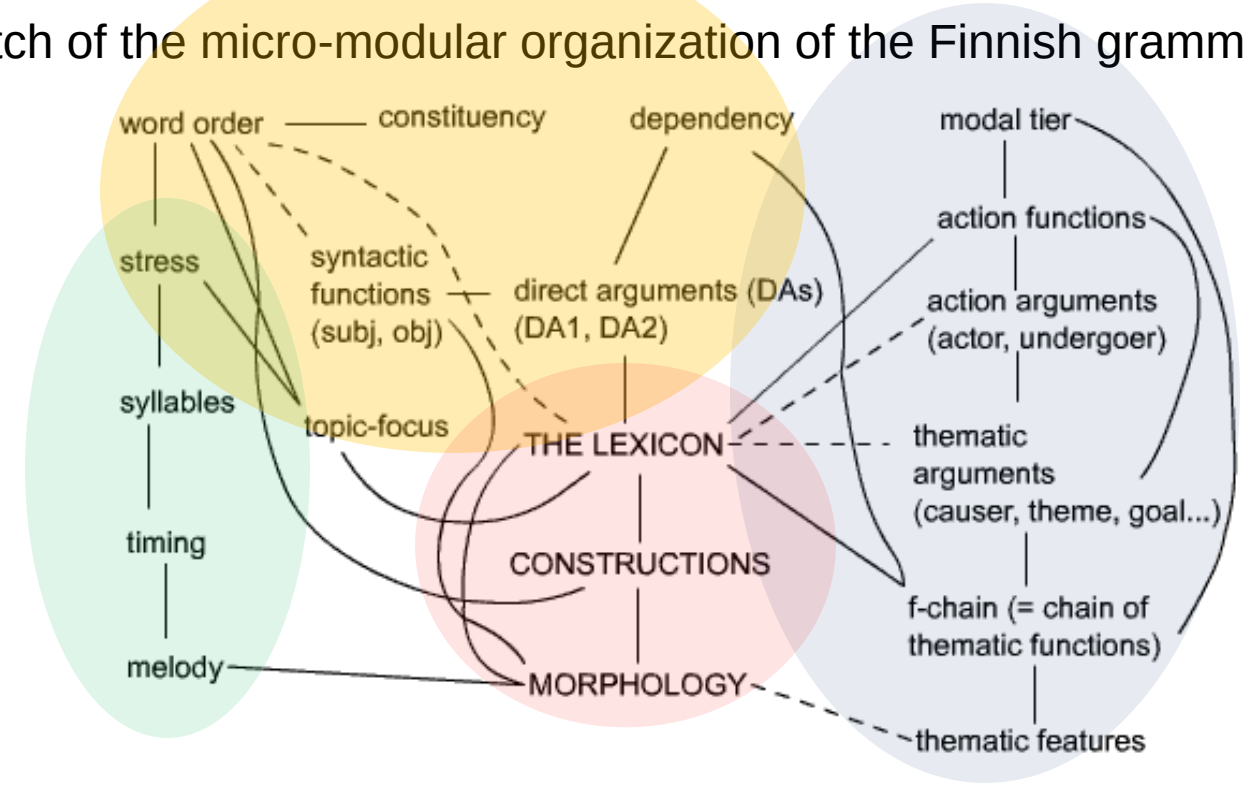


Figure 1. The relevant parts of the organization of the Finnish grammar.

Examples of sub-systems (micro-modules) (cf. C Simple formation of modules)

- **tone**: H, L (max 3, OCP)
- **f-chain** (thematic funktions: causation, change, location): f3* → f2 → f1*
- **act-chain** (activity, dominance): (AC) – (UN)
- **word order**: 0-1-2-3-4-5- ...
- **DA-system** (logical subject and logical object = subject and object arguments): DA1 > DA2
- **Grammatical functions**: SUBJ > OBJ
- **Argument level**Arg

Building the network

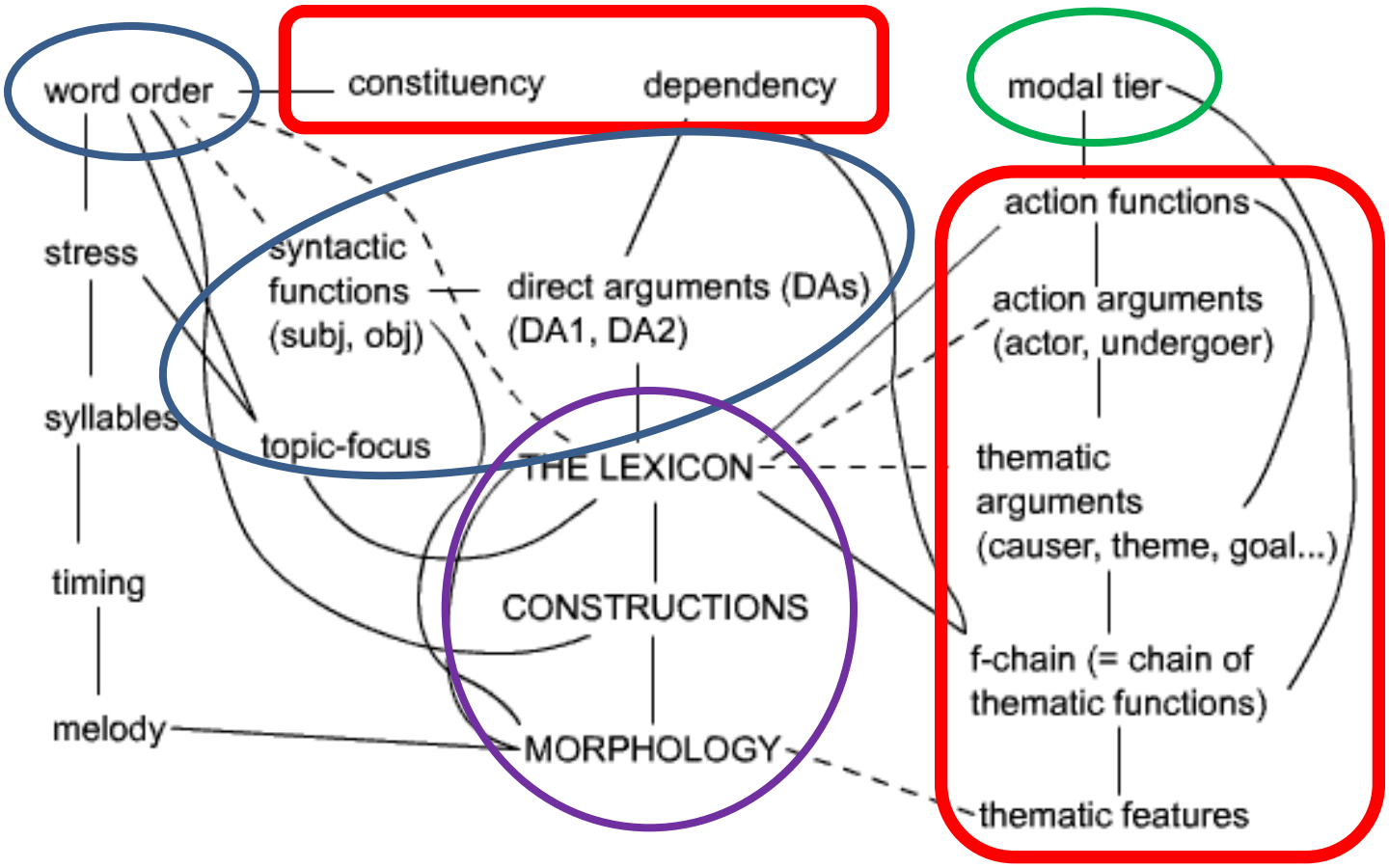


Figure 1. The relevant parts of the organization of the Finnish grammar.

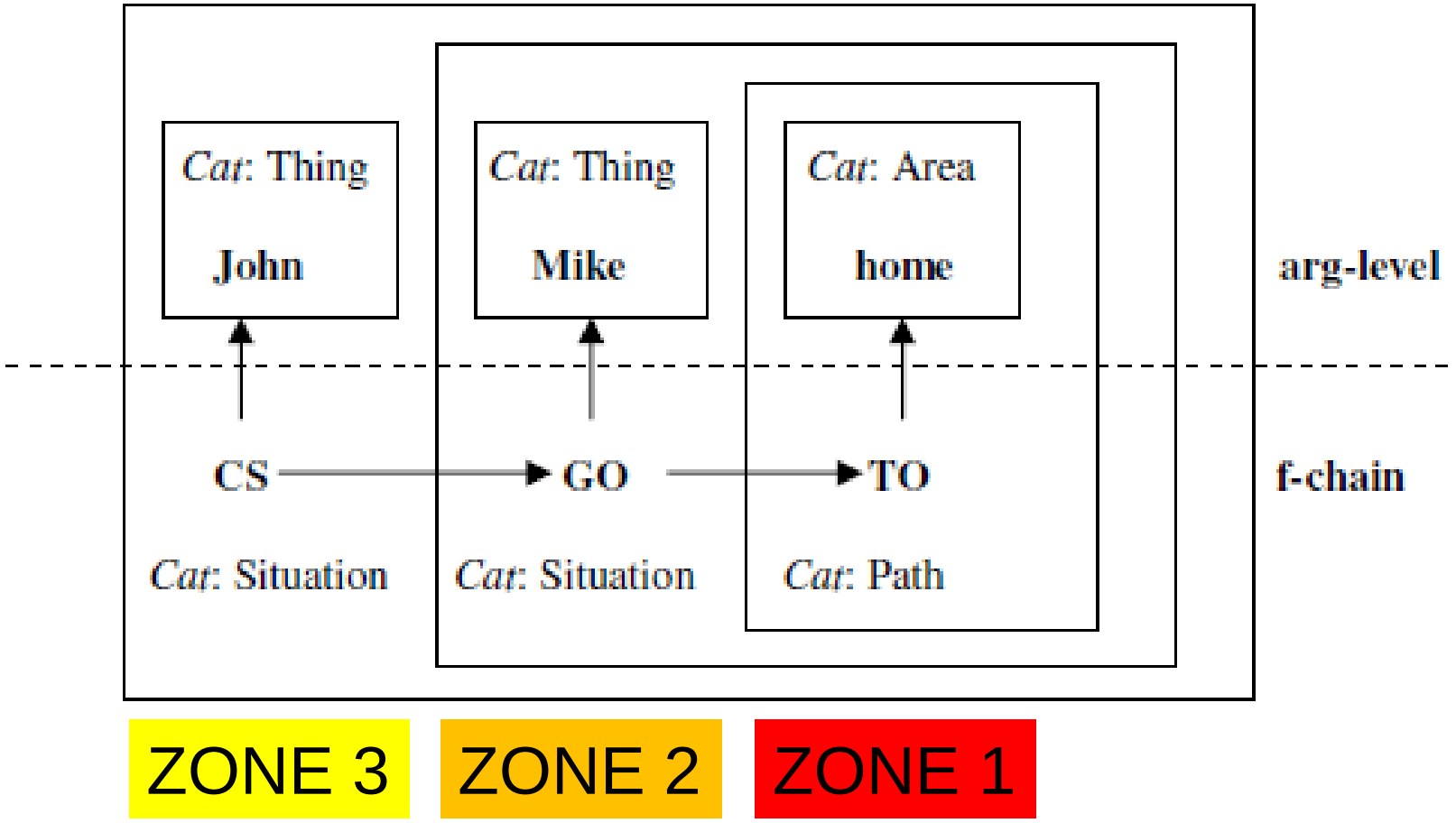
Linking types and strengths

- –D– (default),
- ═══ (fixed),
- ⟶ (selection),
- ------ (belong to the same unit),
- –Princ– (linking based on general principles)

THEMATIC STRUCTURE

Network and linking (Cf. D Importance of linking)

The dependency structure and conceptual categories of the thematic structure of the sentence *John made Mike go home*. (Nikanne in progress)



f-chain schema

$f3^* \rightarrow f2 \rightarrow f1^*$

(* indicates that there are none, one or more functions of the kind in the dependency chain)

Zone 1
the location zone

- Functions: Place- and Path-functions (TO, TOWARD, AWAY-FROM, VIA; AT, IN, ON, UNDER, *etc*.) and their arguments.
- Thematic roles: goal, source, route, location.

Zone 2
the non-causative situation zone

- Functions: non-causative situation functions (BE, GO, MOVE, *etc*.).
- Thematic role: theme

Zone 3
the causative (incl. inchoative) zone

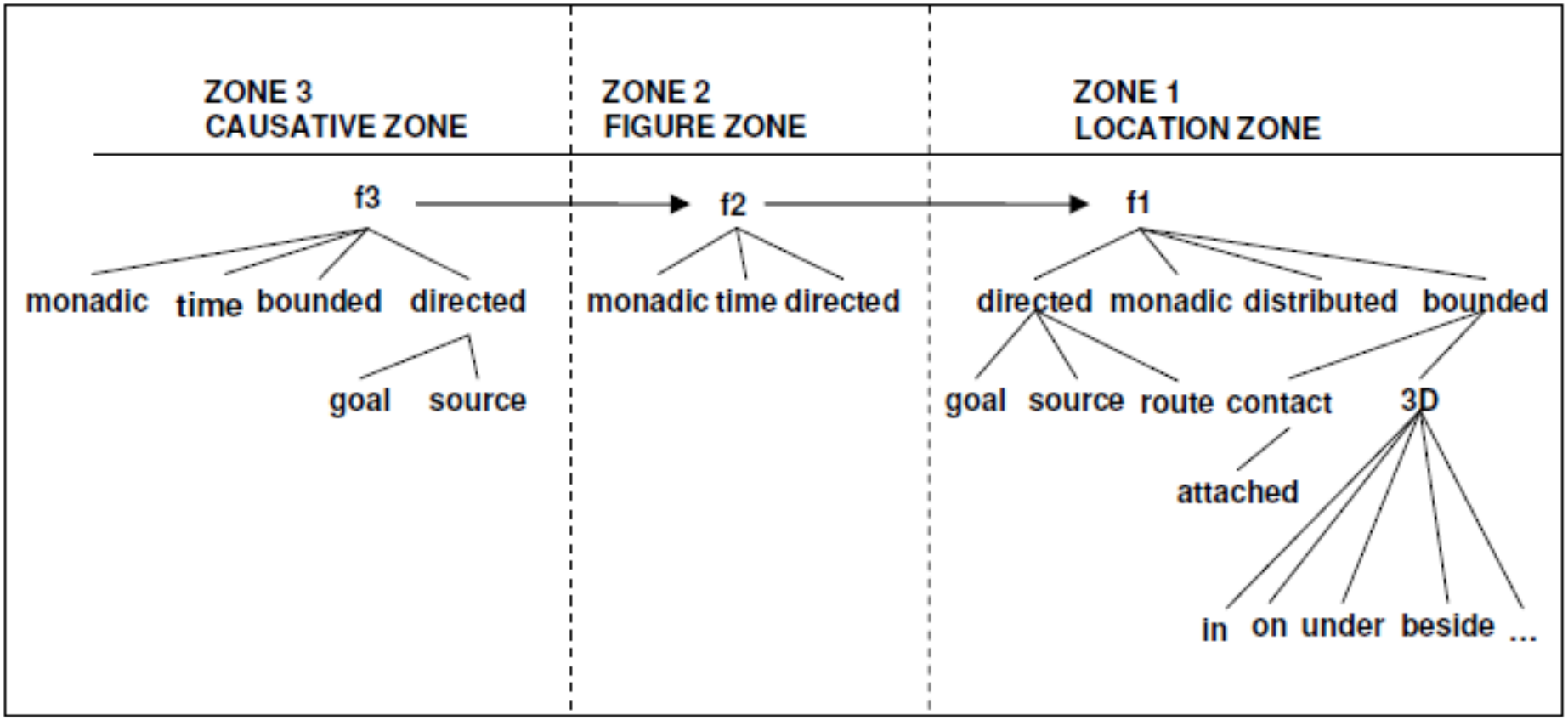
- Functions:

  causative (and inchoative) functions (CS and INC).

- Thematic role:

  causer.

The f-chain and th-features (Nikanne 1990, forthc.)

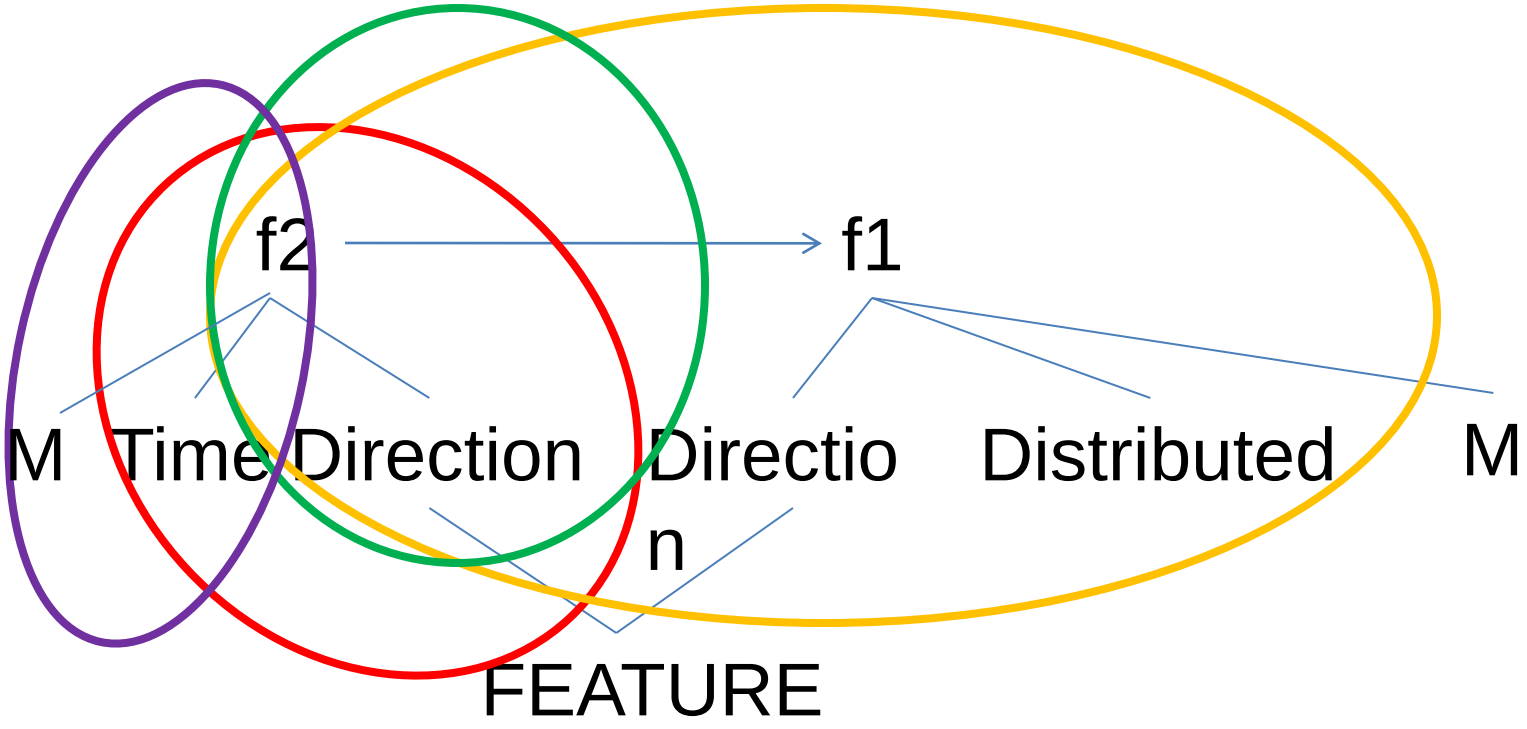


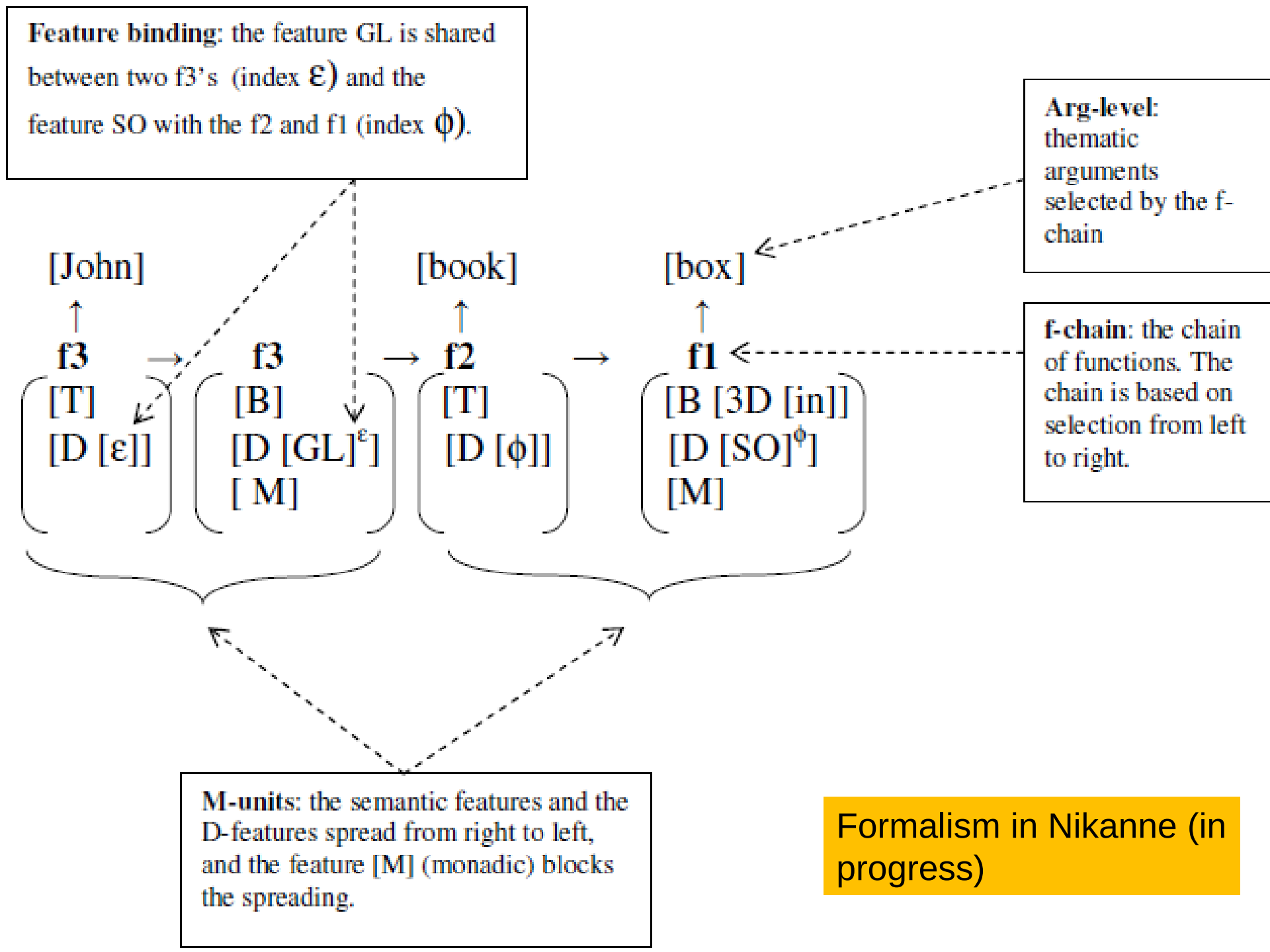
The feature hierarchy (another notation)

	SITUATION ZONES		LOCATION ZONE
	Zone 3, Causative zone	**Zone 2, Figure zone**	**Zone 1, Location zone**
f-chain element	f3	f2	f1
Features and their hierarchy	[M] [B] [T] [D [GL][SO]]	[T] [M] [D [GL][SO][RO]]	[D {[GL][SO][RO]}] [B [C [A] [3D {[in][on][…]}] [Di]
Thematic role	Causer	Theme	Landmark (i.e. goal, source, route, location)
Complex category governed by f	Situation	Situation	Place or Path

Jackendovian functions GO, ORIENT, and EXT as feature combinations

GO, ORIENT, EXT, MOVE




Feature binding: the feature GL is shared between two f3's (index ε) and the feature SO with the f2 and f1 (index ϕ).
Arg-level: thematic arguments selected by the f-chain
f-chain: the chain of functions. The chain is based on selection from left to right.
[John]
[book]
[box]
f3
[T]
[D [ε]]
f3
[B]
[D [GL]ε]
[M]
f2
[T]
[D [ϕ]]
f1
[B [3D [in]]]
[D [SO]ϕ]
[M]
M-units: the semantic features and the D-features spread from right to left, and the feature [M] (monadic) blocks the spreading.
Formalism in Nikanne (in progress)

Argument level formation

General rules:

A. f must select Arg.

Specific rule A.1 f [M] does not need to select Arg.

Specific rule A.1.1 f2 must select Arg.

B. f may select max 1 Arg.

The formation of the CS representation of *John goes into the house*

F-chain schema
→ f2 is obligatory

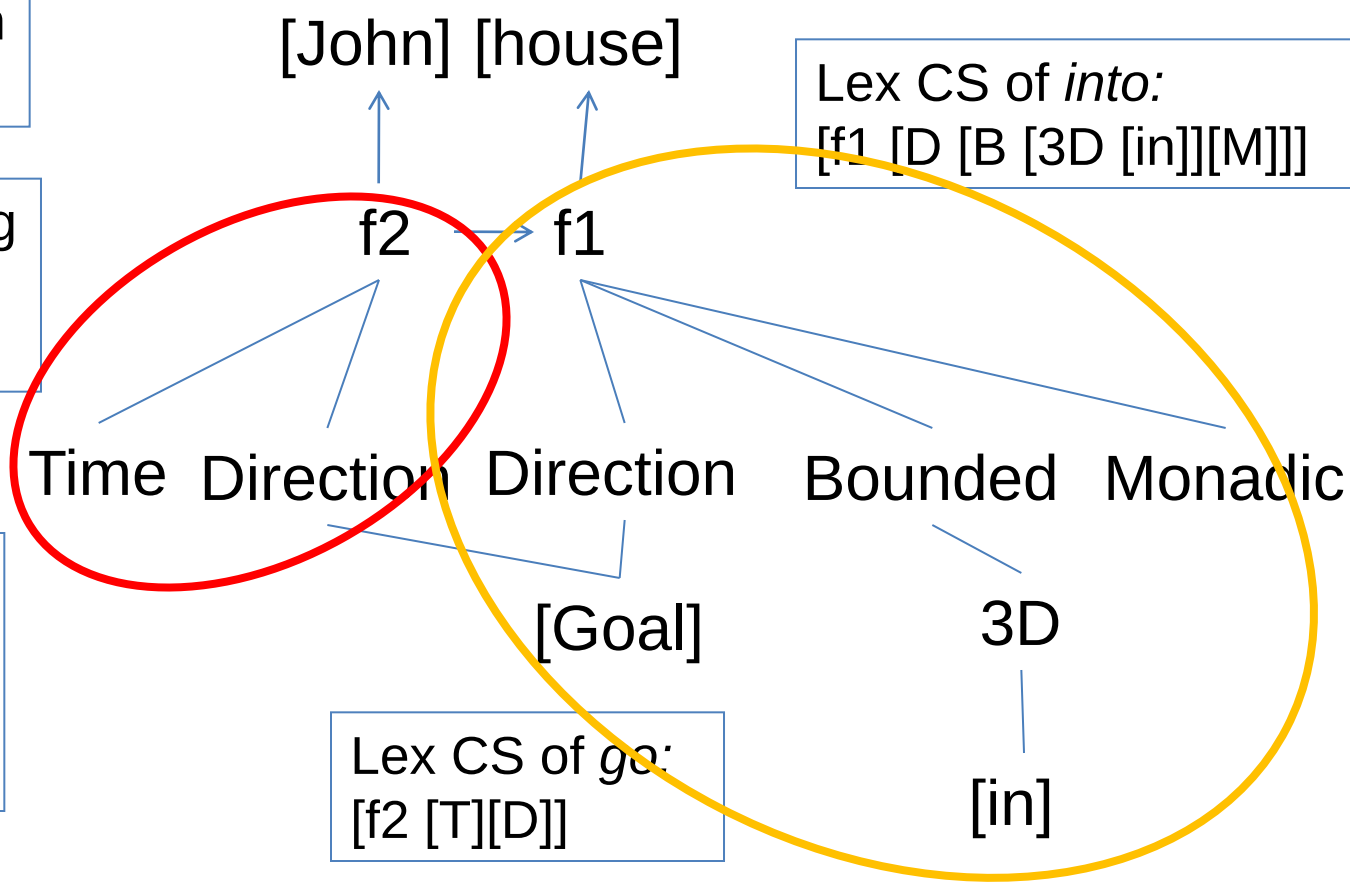
Arg-level formation
→ Arg obligatory

f-chain schema
→The selected f is f1.

Arg-level formation
→ Arg obligatory

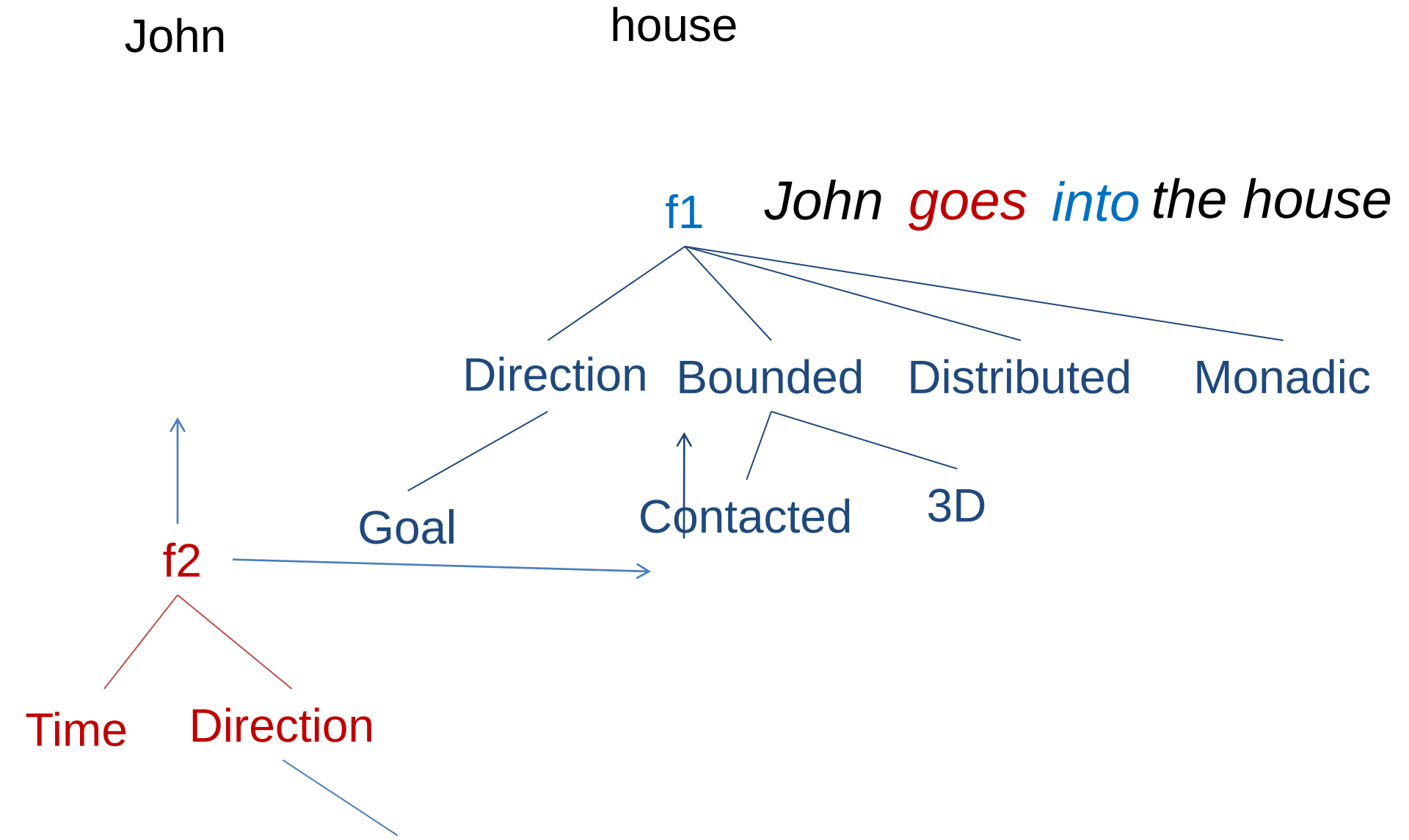
Arg level: max 1 arg
+ no feature [M]
→ Select another f.

Dircection
Feature pciple
→D-feature shared with f2 and f1



Lex CS of *into:*
[f1 [D [B [3D [in]][M]]]

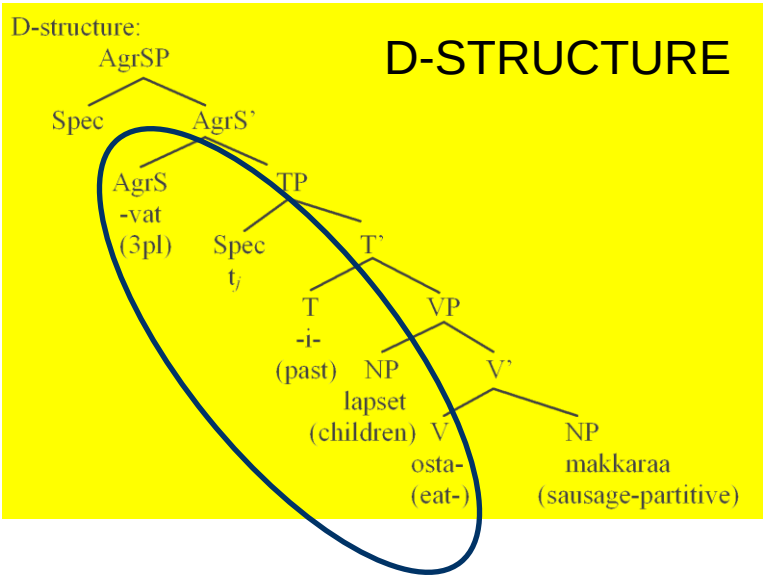
Lex CS of *go:*
[f2 [T][D]]

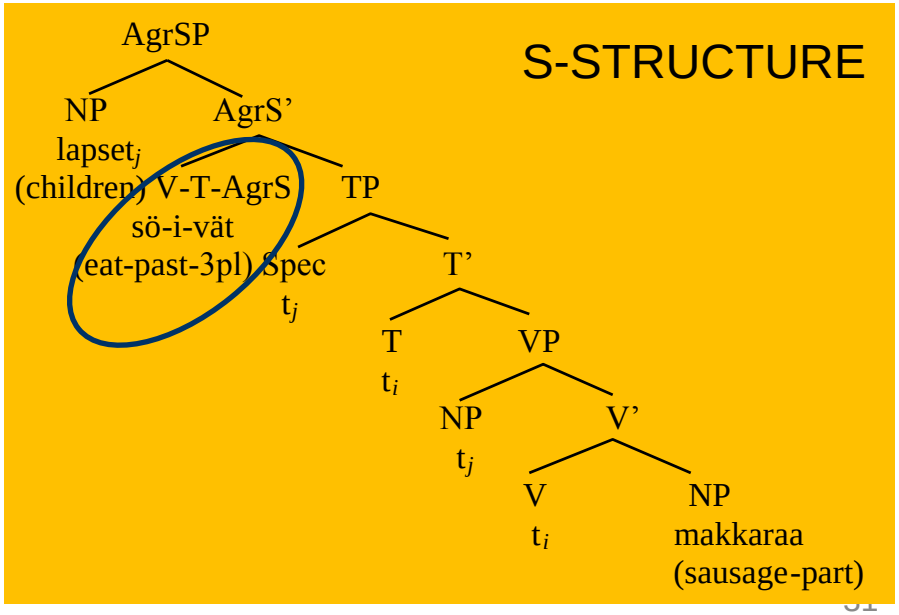


Interpretation of the sentence *John goes into the house*

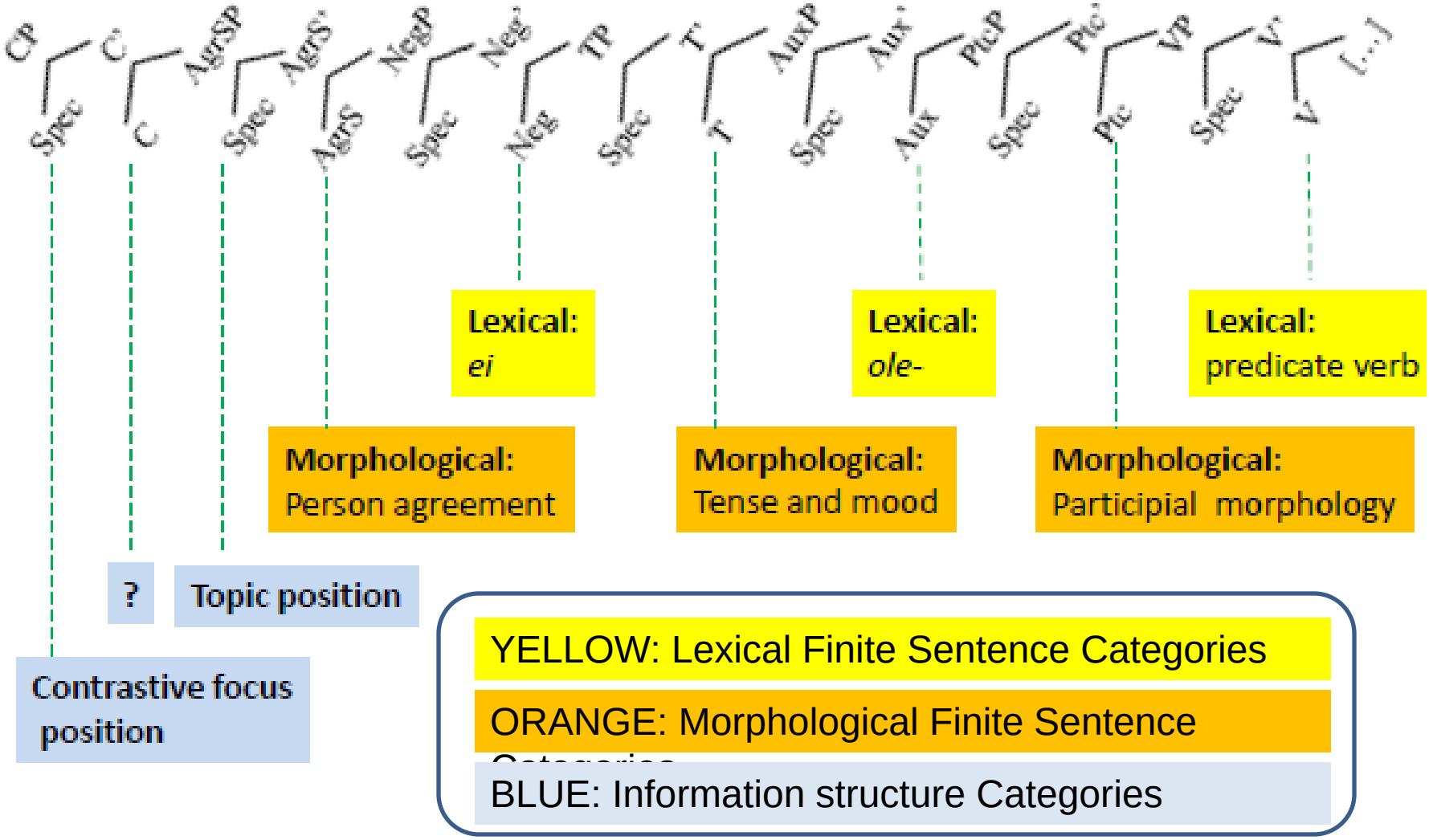
SYNTAX AND INFORMATION STRUCTURE

Derivation from D- to S-structure leads to mirror image in the finite verb morphology in the H&al-model





The maximal structure of the Finnish finite sentence: A new perspective



The word order tier

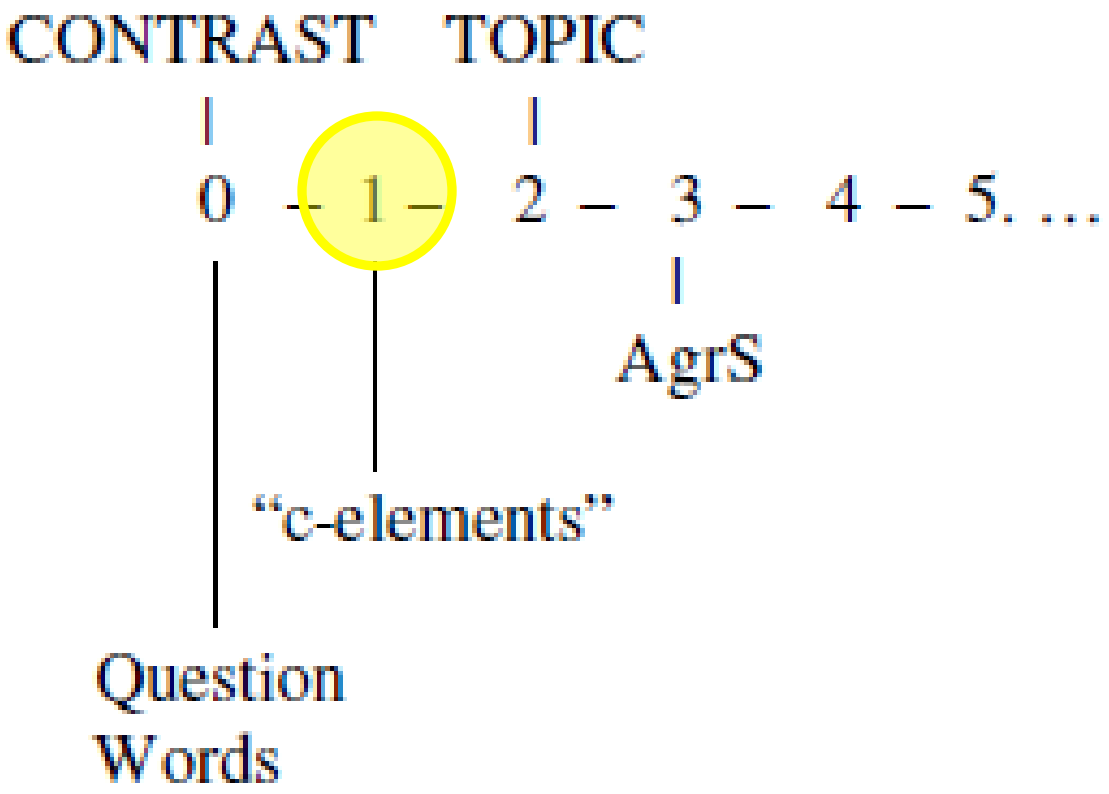
CP – C' –AgrSP – AgrS' – NegP – Neg – TP – T' …
| | | | | | | |
Spec C Spec AgrS Spec Neg Spec T

- **Word order tier**: 0 – 1 – 2 – 3 – 4 …
- **Finite sentence morphological categories**: AgrS>T>Ptc >PASS
- **Finite sentence lexical categories**: NEG>AUX>V

Information structure

- The **information structure** tier is based on categories such as focus and topic.
- The information structure elements are linked to the word order tier as follows:
- **Focus1** *(Vilkuna's* **contrast***) has a fixed link to position 0 and* **topic** *to position 2.*

A model on the word order, information structure and morpho-syntax in Finnish finite sentence (Nikanne, in progress)



Correlation between conceptual structure and syntactic categories in English and Finnish

[f1…] —— Default —— P

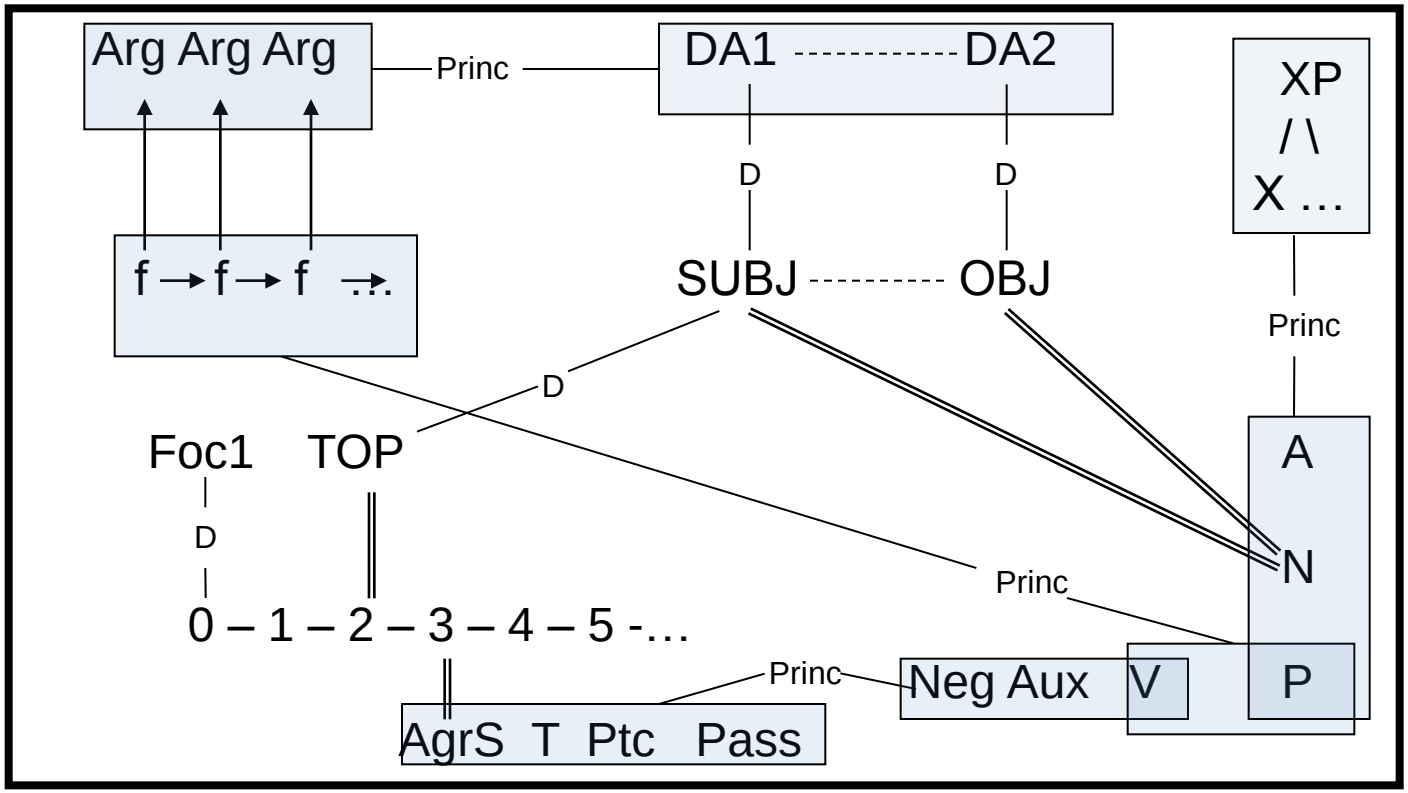
[f>1…] —— Default —— V

- If the zone of the governing function in the lexical conceptual structure of word W is 1, then the syntactic category of W is by default P.

- If the zone of the governing function in the lexical conceptual structure of word W is bigger than 1, then the syntactic category of W is by default V.

A fragment of linking network of Finnish (sketch)

Linking types:
–D– (Default), ═ (fixed), ⟶ (selection), ------ (same unit),
–Princ– (linking based on general principles)



MODAL TIER, A SKETCH

Primitives of the modal tier (Nikanne forthc.)

- **Negation:** **NOT**
- **Necessity:** **NEC**
- **Probabilty:** **PRB**
- **Possibility:** **PSB**
- These primitives are operators with a scope.
- The modal tier has semantic fields of its own (*Epistemic* and *Deontic*).
- Negation is not associated to the semantic fields.

Modal tier
(Nikanne forthc.)

MODAL OPERATOR	ENGLISH MODAL EXPRESSION	FINNISH MODAL EXPRESSION
NEC | Epistemic	*must, should, ought to*	*varmasti, pitää, täytyy, on* ('be') *V-PTC1*
PRB | Deontic	*certainly, must*	*varmasti, pitää, täytyy*
PRB | Deontic	*be recommended*	*on syytä, on suositeltavaa, olisi* ('be-COND') *V-PTC1*
PRB | Epistemic	*probably*	*luultavasti,* potential mood
PSB | Deontic	*be allowed, may*	*sopii, on mahdollista*
PSB | Epistemic	*be possible, may*	*voi, saattaa, on mahdollista*

Epistemic modals and negation

(Nikanne forthc.)

Equal implications

	COMBINATION	MEANING	EXAMPLES OF ENGLISH ADVERBIALS
a.	Neg → PSB | Epist	'It is not possible that X'	*certainly not*
b.	PSB → Neg | Epist	'It is possible that not X'	*possibly not*
c.	Neg → PRB | Epist	'It is not probable that'	*probably not, hardly, unlikely*
d.	PRB → Neg | Epist	'It is probable that not'	*probably not, hardly, unlikely*
e.	Neg → NEC | Epist	'It is not necessary that X'	*not necessarily*
f.	NEC → Neg | Epist	'It is certain that not X'	*certainly not, never*

CONCLUSIONS

Conclusions

- Tiernet is an open network of very simple, formally motivated sub-systems that interact with each other (cf. non-linear phonology).
- The set of modules and links may differ in different languages, and the links may be stronger or weaker.
- The technical solutions and the formalism are compatible with the principles above.

Conclusions

- There is no need to operate with such representations and modules as phonology, syntax, semantics, etc.
- A sub-system whose formation is independent from other sub-systems, is treated as a micro-module (tier) of its own.
- The theory must define the autonomous formation principles of each micro-module as well as links to other micro-modules.

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