

Testing the Word-based Model in the Ontological Analysis of Modern Greek Derivational Morphology

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Agenda

- Morphology ?
- Derivation ?
- Morphological analysis
- MMoOn model
- Ontological analysis
- Future plans

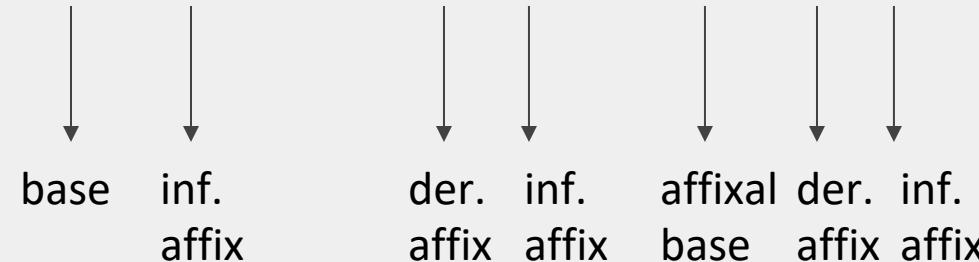
Morphology = Grammatical structure

- Investigates the minimal semantically atoms within lexical formations i.e. morphemes and their realizations, morphs
- Is regarded as a separate grammatical sector despite its admitted association with syntax (i.e. inflection)
- Has been explored lately within ontological contexts i.e. Onto-Morphology

Derivation

It is the morphological process that produces new words (lemmas) that enter the lexicon and reveals the particular grammatical patterns behind them

e.g. xor-ós > xor-ev-o > xoref-tí-s



Morphological analysis

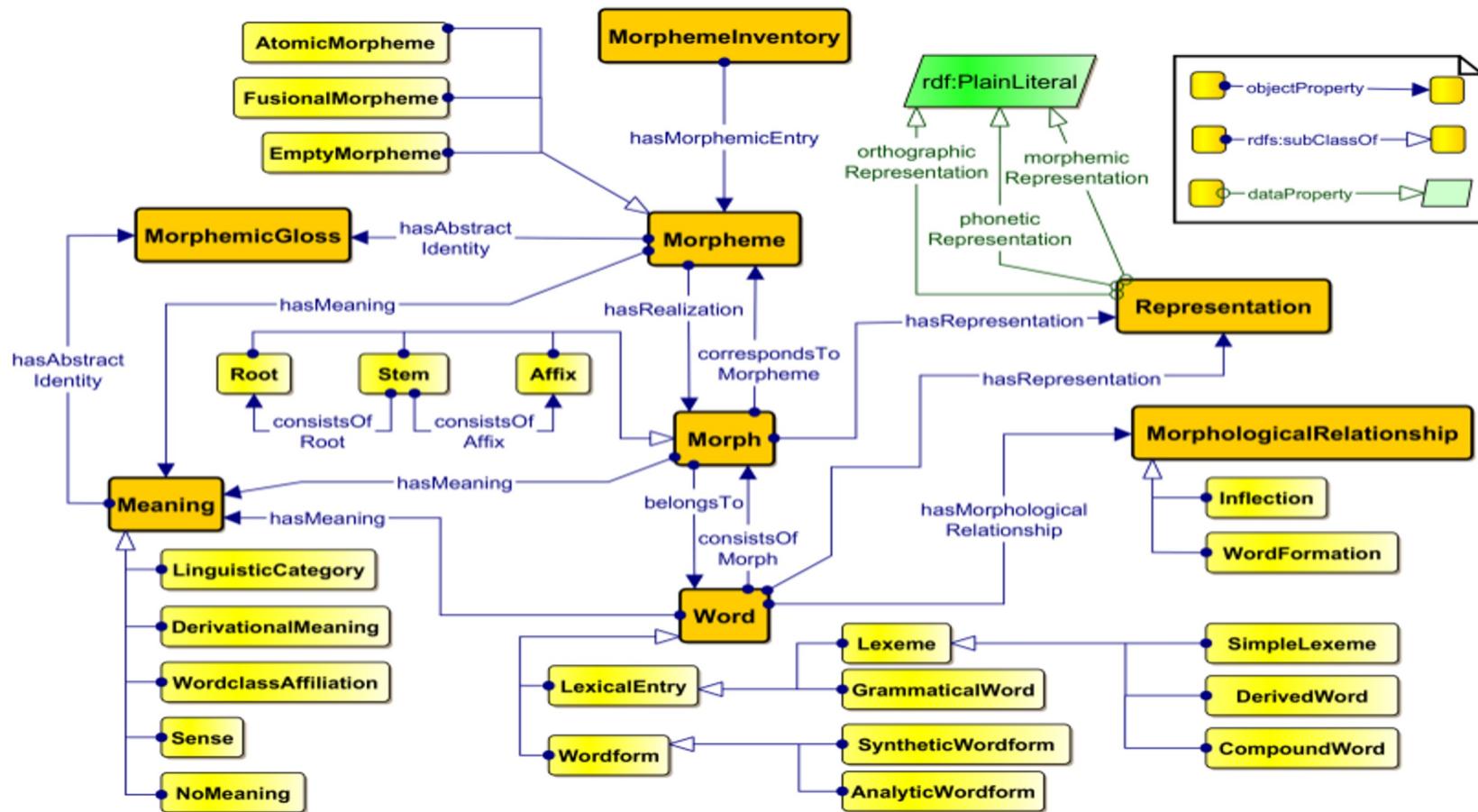
Two approaches to derivation

- Morpheme-based approach
 - concatenative process (affixation), e.g. strati-ótí-s > stratioti-ik-ós
 - **morpheme** is the key concept, i.e. -oti-, -s, -ik-, -os
 - morphemes enter the lexicon → strong Lexicalist approach
 - sublexical analysis
- Word-based approach
 - **word** is the key concept, e.g. stratia > stratiotis
 - morphemes do not enter the lexicon
 - words are derived on the basis of templatic rules, $X_A \rightarrow X_{A/B}$ or $X_A \leftrightarrow X_{A/B}$
 - $Xti-s_N \rightarrow Xik-os_{ADJ}$ (stratiótis > stratiotikós)

Morphological analysis

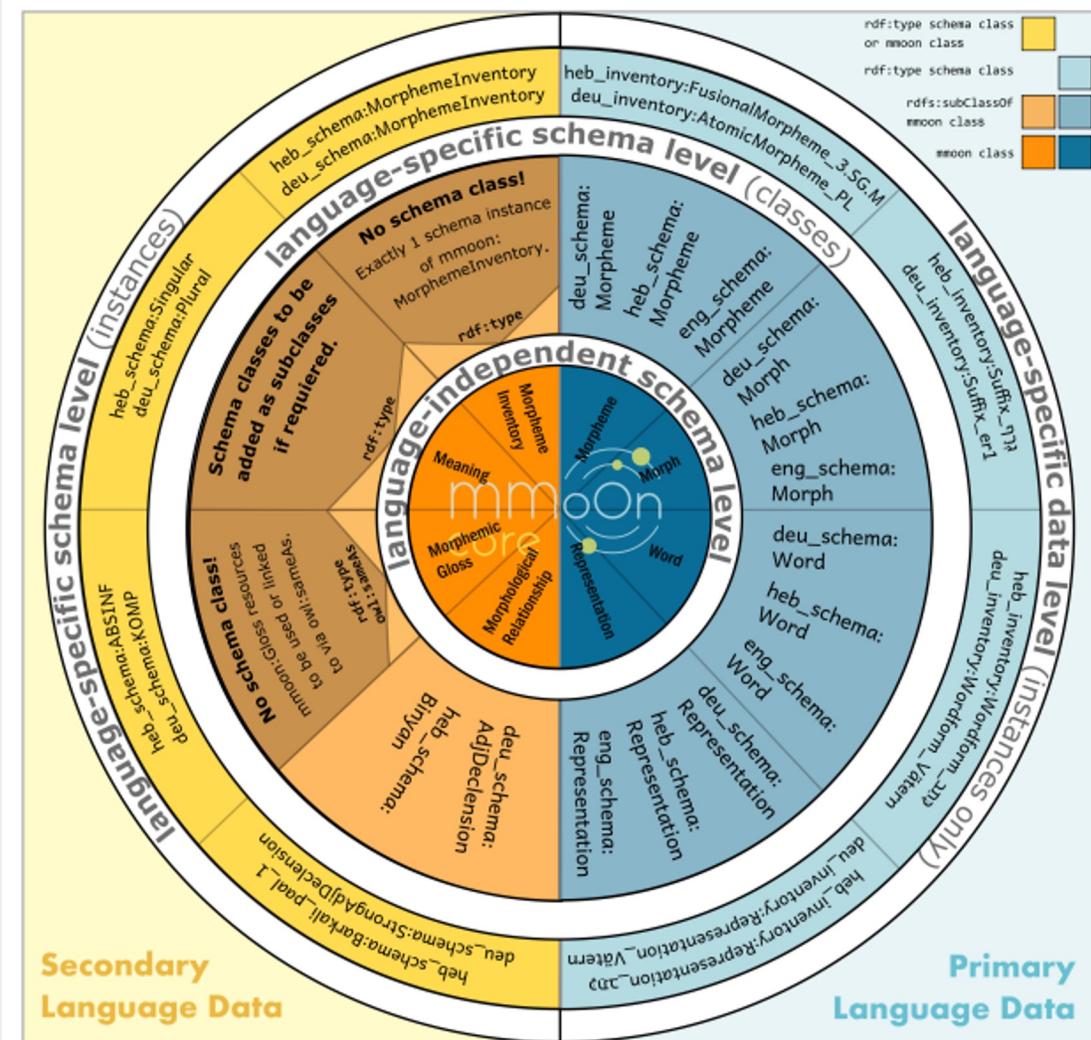
IP template	Lexical instance	Specific rule type	Broader rule category
$X_V \rightarrow xeX_V$	léo 'say' > xeléo 'to unsay'	Prefixation	Affixation
$Xti-s_N \rightarrow Xik-os_{ADJ}$	stratiótis 'soldier' > stratiotikós 'military'	Suffixation	
$X_{ADJ} \rightarrow X_N$	nomikós 'juristic' > nomikós 'laywer'		Conversion
$Xos_N \leftrightarrow Xo_V$	οδιγός 'driver' <⇒> οδιγό 'to drive'		
$Xó_V \rightarrow Xáo_V$	αγαρό > αγαράο 'to love'		Reanalysis
$Xeno_V \rightarrow Xa_N$	ανασένο 'to breathe' > ανάσα 'breath'		Back-formation
$Xía_N \rightarrow Xiá_N$ $Xéas_N \rightarrow Xiás_N$	poniría > poniriá 'cunning' vasiléas > vasiliás 'king'		Synizesis
$eX_V \rightarrow X_V$	erotó > rotó 'to ask'		Subtraction
$proX_N \rightarrow proproX_N$	propápos 'great-grandfather' > pro-propápos 'great-great-grandfather'		Reduplication
$X_{ADV} \rightarrow XX_{ADV}$	liyo 'a little' > liyo-liyo 'little by little'		
$Xma_N \leftrightarrow Xsi_N$	θέ-ma 'topic' <⇒> θέ -si 'position'		Cross-formation
$xeX_V \leftrightarrow paraX_V$	xeléo 'to unsay' <⇒> paraléo 'to exaggerate'		

The MMoOn model

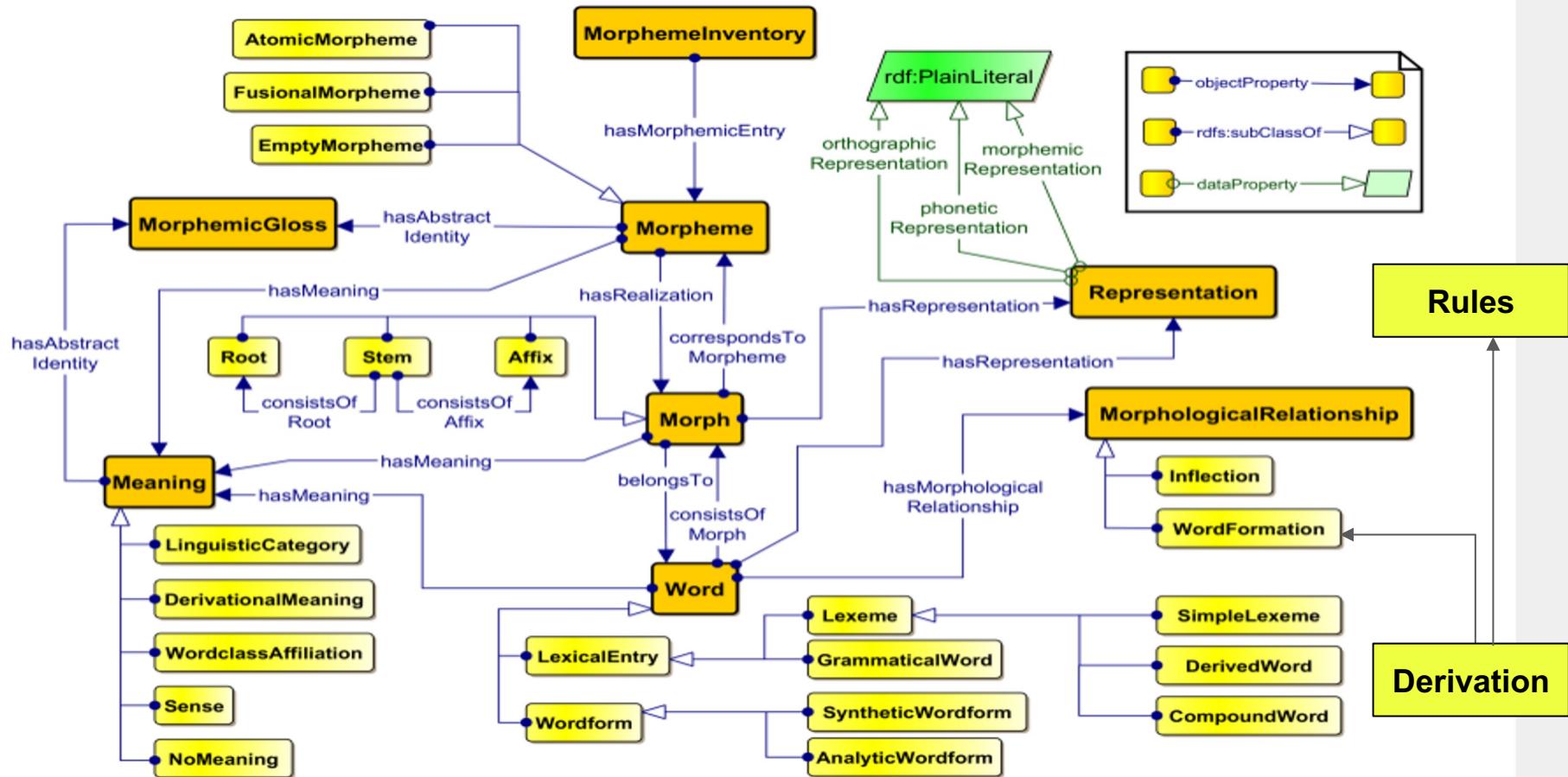


Why MMoOn ?

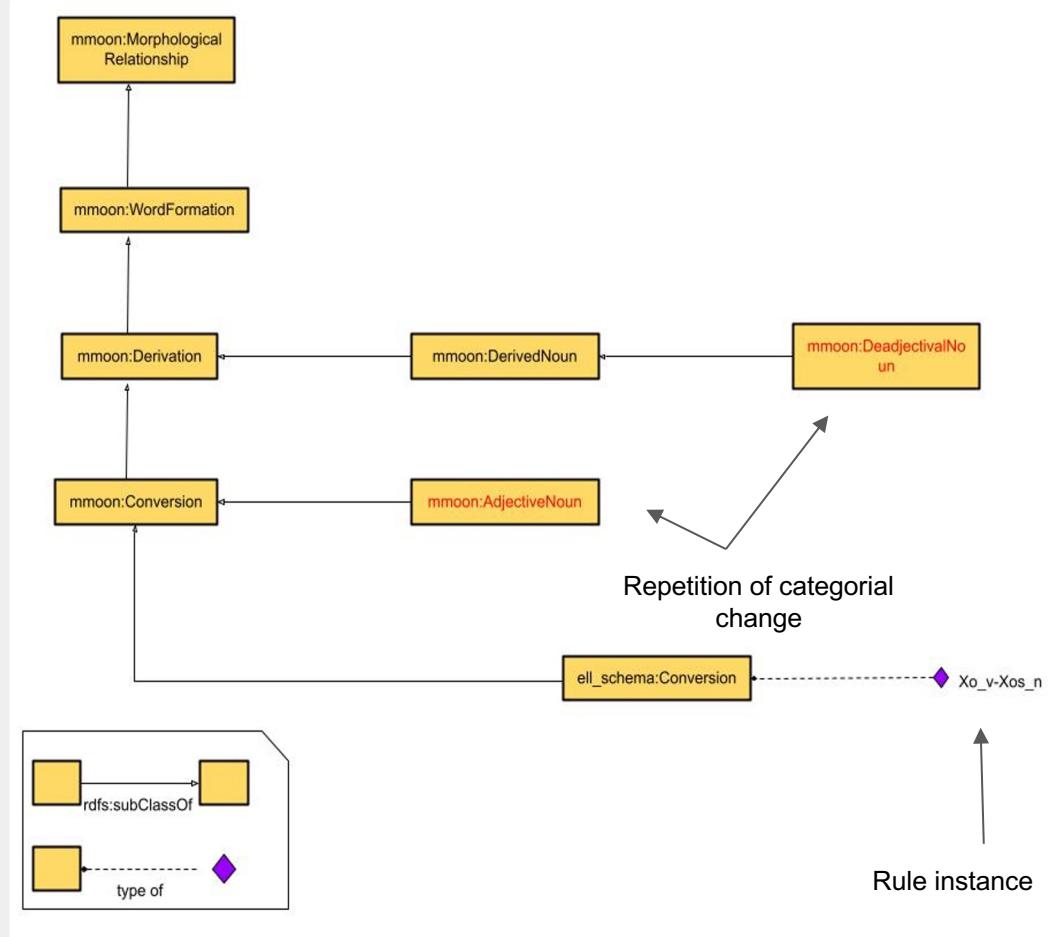
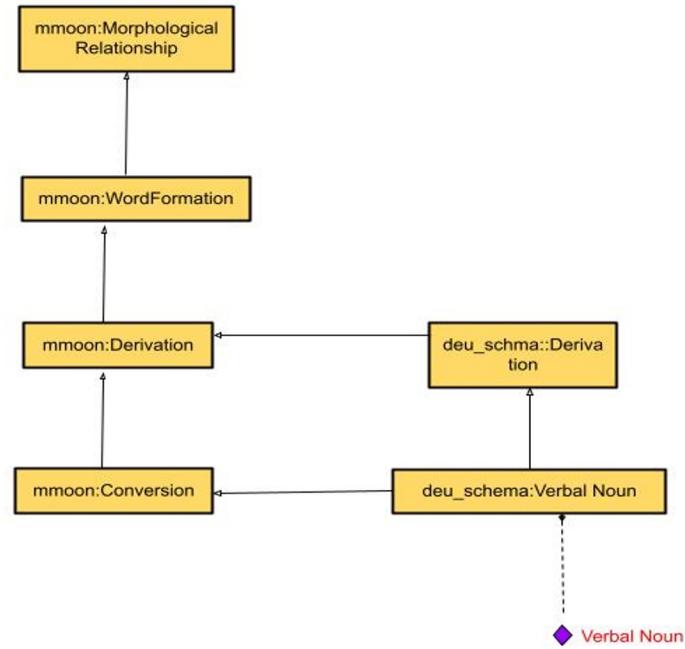
- it is currently the only existing comprehensive domain ontology for the linguistic area of morphological language data
 - it is designed to host a language specific schema and its instances
 - it is used as a modeling template for the development of the Ontolex Morphology Module



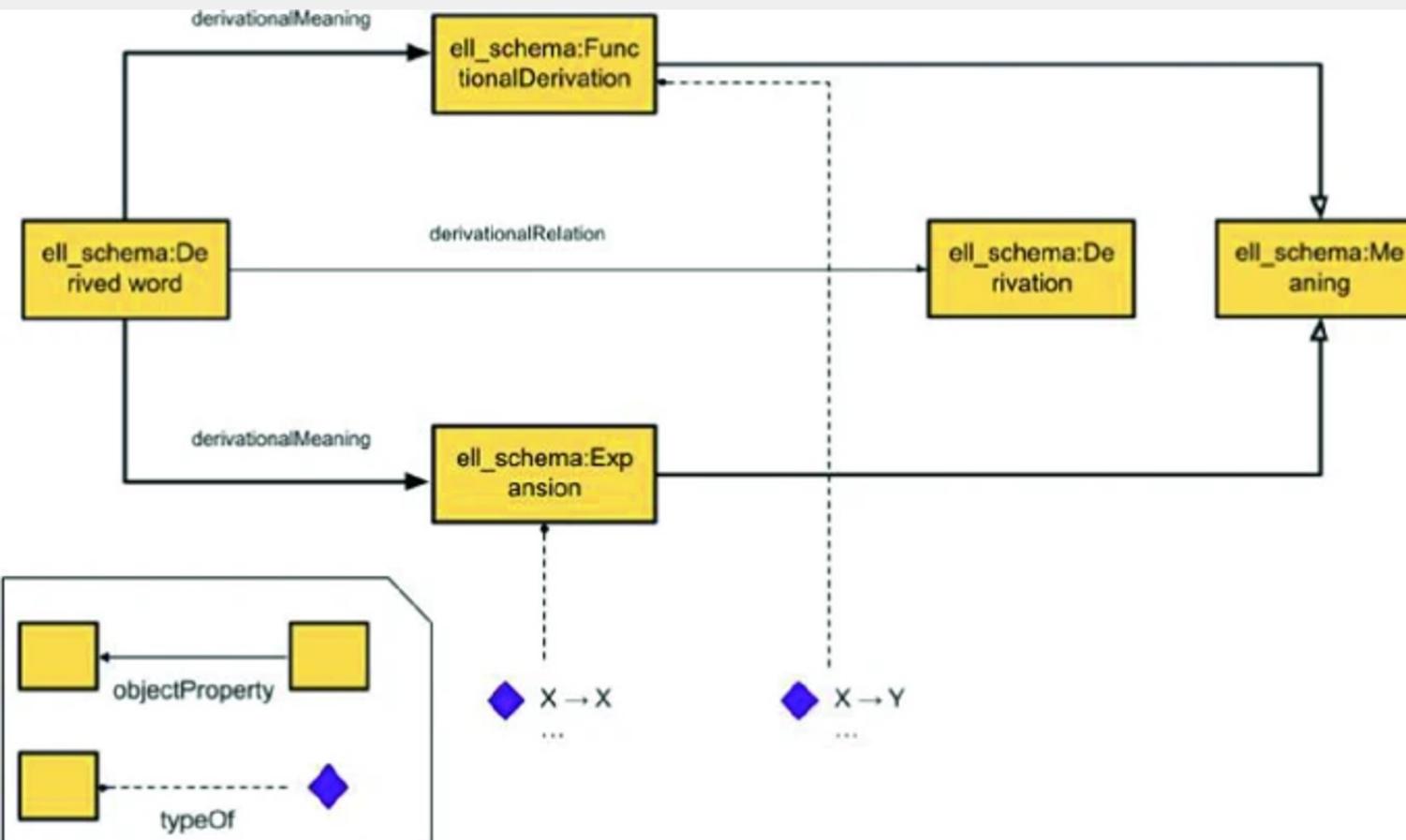
Ontological analysis



Ontological analysis



Ontological analysis



Ontological analysis

OP	Symmetric	Inverse Of	Subproperty Of	Domain	Range
is derived from		ell_schema:generates		Derived Word	Grammatical Word OR Lexical Entry
ell_schema_generates		is derived from		Grammatical Word OR Lexical Entry	Derived Word
ell_schema:bidirectionalDerivation	yes		is derived from	ell_schema:Derived Word	ell_schema:Derived Word

Ontological analysis

ell_schema:"οδηγώ" a ell_schema:DerivedWord.

ell_schema:"οδηγός" a ell_schema:DerivedWord;

ell_schema:bidirectionalDerivation ell_schema:"οδηγώ".

ell_schema:"οδηγός":isDerivedFrom ell_schema:"οδηγώ". **(inferred)**

ell_schema:"οδηγώ" ell_schema:generates ell_schema:"οδηγός". **(inferred)**

ell_schema:"οδηγώ" ell_schema:bidirectionalDerivation ell_schema:"οδηγός". **(inferred)**

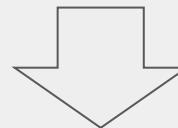
ell_schema:"οδηγώ":isDerivedFrom ell_schema:"οδηγός". **(inferred)**

ell_schema:"οδηγός" ell_schema:generates ell_schema:"οδηγώ". **(inferred)**

Ontological analysis

$X_v \rightarrow xe-X_v$, e.g. leo > xeleo

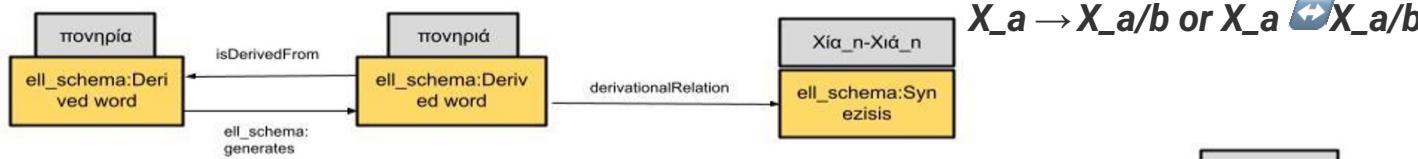
- no defined relationship in the model between a DerivedWord and a Word class
- the OPs isComposedOf / consistsOfWord are targeted at Compounds decomposition



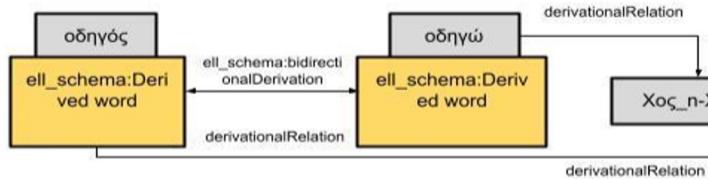
OP	Symmetric	Inverse Of	Subproperty Of	Domain	Range
ell_schema:consistsOfWord		ell_schema:belongsToWord		ell_schema:Word	ell_schema:Word
ell_schema:belongsToWord		ell_schema:consistsOfWord		ell_schema:Word	ell_schema:Word

Ontological analysis

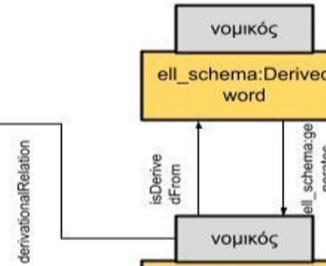
(a)



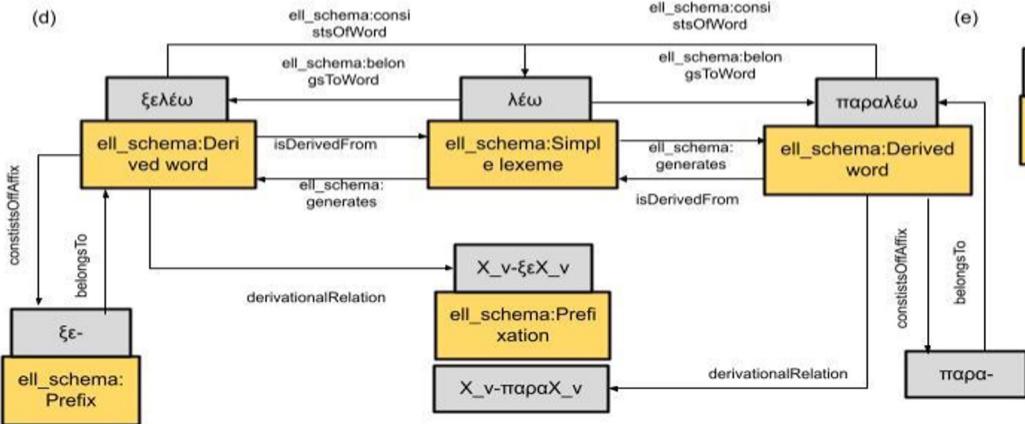
(b)



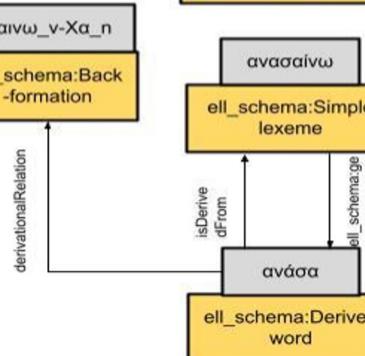
(c)



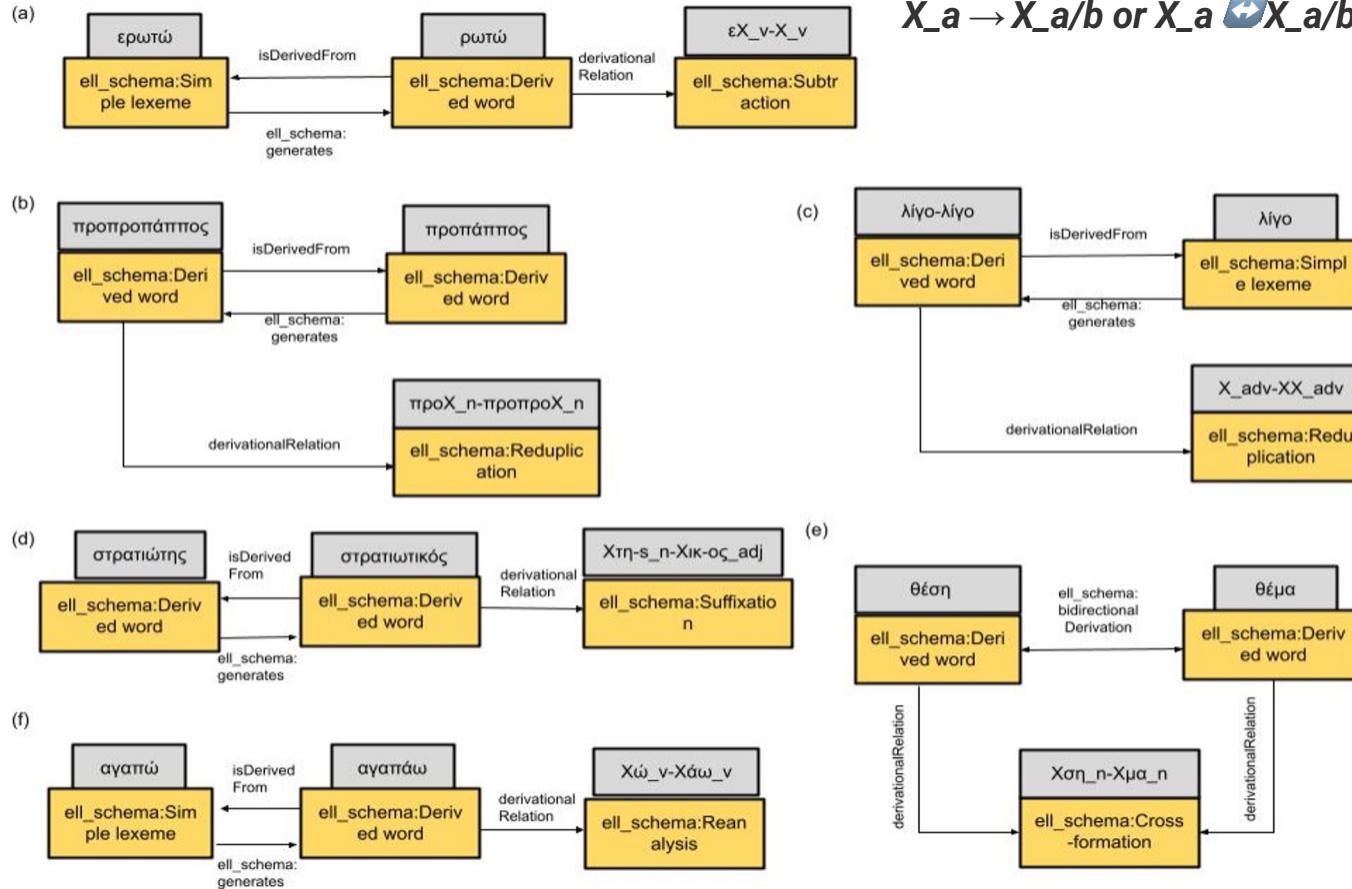
(d)



(e)



Ontological analysis



Useful Links

- MMoOn: <https://github.com/MMoOn-Project/MMoOn>
- ell schema:
https://github.com/nvasilogamvrakis/mmoon_project/blob/main/ell_schema/ell_schema_02.owl
- ell inventory:
https://github.com/nvasilogamvrakis/mmoon_project/blob/main/inventory/ell_inventory_02.owl
- Open German inventory: <https://github.com/MMoOn-Project/OpenGerman/blob/master/deu/inventory/og.ttl>.

Future plans

- Contrastive analysis of morpheme-based to word-based approach
- Sequential lexical relations
- Comparison of Onto-morphological models, especially the Ontolex Morphology Module

Thank you !

Any Questions ???