

1st International Workshop on Digital Platforms  
and Resources for Access to Literary Heritage

# Bilingual Word Indices to the 9th Century Didactic Gospel

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Project: The Vocabulary of Constantine of Preslav's  
Uchitel'noe evangelie ('Didactic Gospel'):

Old Bulgarian-Greek and Greek-Old Bulgarian Word Indices  
Funded by Bulgarian National Science Fund (КП-06-Н50/2)



Slavonic scripts  
started a new  
written tradition in  
9th century Europe

Constantine of Preslav's  
Didactic Gospel  
(Uchitel'noe evangelie)  
from about 886-893 AD  
is the first systematic  
collection of sermons  
for Slavic liturgies

# Word Alignment and Word Indexing

- Word Alignment
  - Word alignment is difficult, thus done mostly at sentence-level
  - extremely insightful
- Not yet alignment for Didactic Gospel
- Word Indices are the critical step to it
  - Identification of translation sources
  - Possible co-authorship
  - Genealogy of copies

# Manuscript traditions

## Slavonic

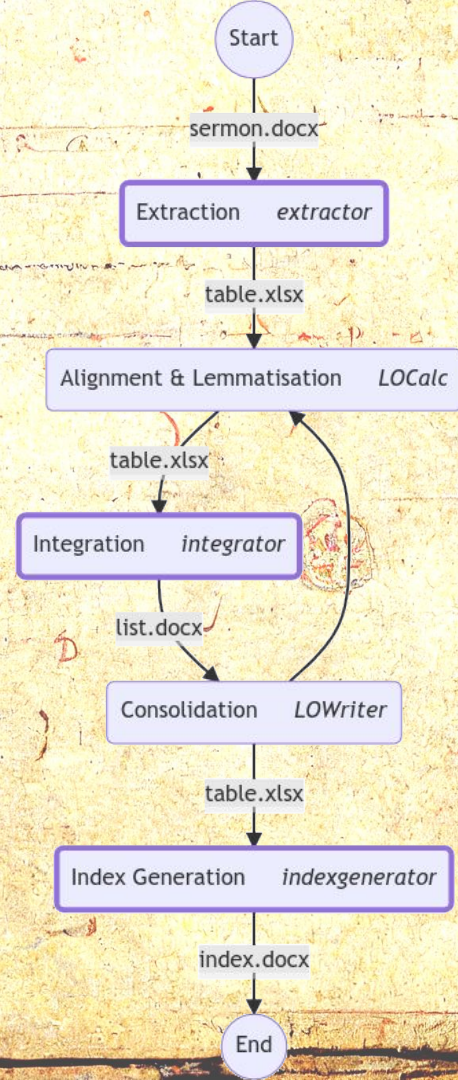
- Preserved copies
  - ГИМ, Син. 262 (S) dated to the late 11th or mid-12th Century
  - РНБ, Гильф. 32 (G) of the year 1286
  - ÖNB, Cod. Slav. 12 (W) of the 14th century
  - Hil 385 (H) of the year 1344
- Diplomatic edition by Tihova and corrections by Kryś'ko

## Greek

- No identified single text or diplomatic edition
- Partial overlaps with
  - John Chrysostom's Gospel homilies
  - Greek Gospel catenae published by Cramer

# Workflow

- Starting from transcribed (Transkribus) and annotated (Word Processor comments) document
- Alignment & Lemmatisation is manual work (Spreadsheets)
- Consolidation
  - Review lists
  - Modify spreadsheet
- Index is ready for pre-publishing



# Extraction - extractor

Input from Word Processor (sermon.docx)

Export to Spreadsheet (table.xlsx)

128b		
1	МЪ ОУБО БРАТНЕ	
2	ВЪЗДАЮБЛЕННА•	
3	СНАОУ СНХЪ СЛОВЕ-	+ да G
4	СЪ Н ОУГОТОВН-	
5	МЪ СНА ПРЪЖДЕ	
6	СЖДА ДОБРЫМНН	USER 01/02/2021 12:37
7	ДЪЛЫ• БЕЗВЪ-	
8	СТЫНЪ БО ІЕСТЪ	+ съ G
9	ДЪНЬ СЪМЪРТЬ-	
10	НЫН• Н ІАКО ТА-	USER 01/02/2021 12:38
11	ТЬ НОЦЬЮ ПРИ-	
12	ДЕТЬ• БЪДНМЪ	om. WG
13	ЖЕ НЕ ОУСЫПАЮ-	
14	ЩЕ• СВЪЩА	
15	ВЪЖЪГЪШЕ•	USER 01/02/2021 12:39
16	КЪНА ЖЕ СВЪ-	
17	ЩА• МНОСТЫН	ТЪМЪ W
18	НЮ ГЛАГОЛЮ• Н	
19	УНСТОТЪ ТЪБАСН•	USER 01/02/2021 13:20
20	ТЪ БО ІЕСТЕ СВЪЩН	
21	ДЪХОВЪНЪН• ТЪ НМЪ-	ДЪШВНЪН W ДЪШВНЪН Н
		USER 01/02/2021 13:21

	A	B	C	D	E	F	G
432					26/128b09	ДЪНЬ	ДЪНЬ СЪМЪРТЬ-
433	+ съ G				26/128b09		ДЪНЬ СЪМЪРТЬ-
434					26/128b09	СЪМЪРТЬНЪ	ДЪНЬ СЪМЪРТЬ-
435					26/128b10	Н	НЫН• Н ІАКО ТА-
436					26/128b10	ІАКО	НЫН• Н ІАКО ТА-
437					26/128b10	ТАТЬ	НЫН• Н ІАКО ТА-
438					26/128b11	НОЦЬЮ	ТЬ НОЦЬЮ ПРИ-
439					26/128b11	ПРИДЕТЬ•	ТЬ НОЦЬЮ ПРИ-
440					26/128b12	БЪДНМЪ	ДЕТЬ• БЪДНМЪ
441					26/128b13	ЖЕ	ЖЕ НЕ ОУСЫПАЮ-
442					26/128b13	НЕ	ЖЕ НЕ ОУСЫПАЮ-
443					26/128b13	ОУСЫПАЮЩЕ	ЖЕ НЕ ОУСЫПАЮ-
444					26/128b14	СВЪЩА	ЩЕ• СВЪЩА
445					26/128b15	ВЪЖЪГЪШЕ	ВЪЖЪГЪШЕ•
446					26/128b16	КЪНА	КЪНА ЖЕ СВЪ-
447	om. WG				26/128b16	ЖЕ	КЪНА ЖЕ СВЪ-
448					26/128b16	СВЪЩА•	КЪНА ЖЕ СВЪ-
449					26/128b17	МНОСТЫНЪ	ЩА• МНОСТЫ-
450					26/128b18	ГЛАГОЛЮ•	НЮ ГЛАГОЛЮ• Н
451					26/128b18	Н	НЮ ГЛАГОЛЮ• Н
452					26/128b19	УНСТОТЪ	УНСТОТЪ ТЪБАСН•
453					26/128b19	ТЪБАСН•	УНСТОТЪ ТЪБАСН•
454	ТЪМЪ W				26/128b20	ТЪ	ТЪ БО ІЕСТЕ СВЪЩН
455					26/128b20	БО	ТЪ БО ІЕСТЕ СВЪЩН
456					26/128b20	ІЕСТЕ	ТЪ БО ІЕСТЕ СВЪЩН
457					26/128b20	СВЪЩН	ТЪ БО ІЕСТЕ СВЪЩН
458	ДЪШВНЪН				26/128b21	ДЪХОВЪНЪН	ДЪХОВЪНЪН• ТЪ НМЪ-
459					26/128b21	•	ДЪХОВЪНЪН• ТЪ НМЪ-

one word per row  
in column F

# Extraction - extractor

Input from Word Processor (sermon.docx)

Export to Spreadsheet (table.xlsx)

128b	
1	МЪ ОУБО БРАТНЕ
2	ВЪЗДАЮБЛЕННА•
3	СНАОУ СХЪЗ СЛОВЕ-
4	СЪ Н ОУГОТОВИ-
5	МЪ СНА ПРЪЖДЕ
6	СЪДА ДОБРЫМНН
7	ДЪЛЫ• БЕЗВЪ-
8	СТЫМЪ БО ИЕСТЪ
9	ДЪНЬ СЪМЪРТЬ-
10	НЫН• Н ИАКО ТА-
11	ТЬ НОЩЮ ПРИ-
12	ДЕТЬ• БЪДНМЪ
13	ЖЕ НЕ ОУСЫПАЮ-
14	ЩЕ• СВЪЩА
15	ВЪЖЪГЪШЕ•
16	КЪНА ЖЕ СВЪ-
17	ЩА• МНОСТЫ-
18	НЮ ГЛАГОЛЮ• Н
19	УНСТОТЪ ТЪБЛЕН•
20	ТЪ БО ИЕСТЕ СВЪЩН
21	ДЪХОВЪНЪН• ТЪ НМЪ-

+ да G

USER  
01/02/2021 12:37

+ съ G

USER  
01/02/2021 12:38

om. WG

USER  
01/02/2021 12:39

ТЪМЪ W

USER  
01/02/2021 13:20

ДЪШВЪНЪН W ДЪШВЪНЪН H

USER  
01/02/2021 13:21

address composed from sermon, page and row in column E

	A	B	C	D	E	F	G
432					26/128b09	ДЪНЬ	ДЪНЬ СЪМЪРТЬ-
433	+ съ G				26/128b09		ДЪНЬ СЪМЪРТЬ-
434					26/128b09	СЪМЪРТЬНЪ	ДЪНЬ СЪМЪРТЬ-
435					26/128b10	Н	НЫН• Н ИАКО ТА-
436					26/128b10	ИАКО	НЫН• Н ИАКО ТА-
437					26/128b10	ТАТЬ	НЫН• Н ИАКО ТА-
438					26/128b11	НОЩЮ	ТЬ НОЩЮ ПРИ-
439					26/128b11	ПРИДЕТЬ•	ТЬ НОЩЮ ПРИ-
440					26/128b12	БЪДНМЪ	ДЕТЬ• БЪДНМЪ
441					26/128b13	ЖЕ	ЖЕ НЕ ОУСЫПАЮ-
442					26/128b13	НЕ	ЖЕ НЕ ОУСЫПАЮ-
443					26/128b13	ОУСЫПАЮЩЕ	ЖЕ НЕ ОУСЫПАЮ-
444					26/128b14	СВЪЩА	ЩЕ• СВЪЩА
445					26/128b15	ВЪЖЪГЪШЕ	ВЪЖЪГЪШЕ•
446					26/128b16	КЪНА	КЪНА ЖЕ СВЪ-
447	om. WG				26/128b16	ЖЕ	КЪНА ЖЕ СВЪ-
448					26/128b16	СВЪЩА•	КЪНА ЖЕ СВЪ-
449					26/128b17	МНОСТЫНЪ	ЩА• МНОСТЫ-
450					26/128b18	ГЛАГОЛЮ•	НЮ ГЛАГОЛЮ• Н
451					26/128b18	Н	НЮ ГЛАГОЛЮ• Н
452					26/128b19	УНСТОТЪ	УНСТОТЪ ТЪБЛЕН•
453					26/128b19	ТЪБЛЕН•	УНСТОТЪ ТЪБЛЕН•
454	ТЪМЪ W				26/128b20	ТЪ	ТЪ БО ИЕСТЕ СВЪЩН
455					26/128b20	БО	ТЪ БО ИЕСТЕ СВЪЩН
456					26/128b20	ИЕСТЕ	ТЪ БО ИЕСТЕ СВЪЩН
457					26/128b20	СВЪЩН	ТЪ БО ИЕСТЕ СВЪЩН
458	ДЪШВЪНЪН				26/128b21	ДЪХОВЪНЪН	ДЪХОВЪНЪН• ТЪ НМЪ-
459					26/128b21	•	ДЪХОВЪНЪН• ТЪ НМЪ-

# Extraction - extractor

Input from Word Processor (sermon.docx)

Export to Spreadsheet (table.xlsx)

128b		
1	МЪ ОУБО БРАТНЕ	
2	ВЪЗДАЮБЛЕННА•	
3	СНАОУ СХЪЗ СЛОВЕ-	+ да G
4	СЪ Н ОУГОТОВН-	
5	МЪ СНА ПРЪЖДЕ	USER
6	СЖДА ДОБРЫМНН	01/02/2021 12:37
7	ДЪЛЫ• БЕЗВЪ-	
8	СТЪМЪ БО ІЕСТЪ	+ съ G
9	ДЪНЬ СЪМЪРТЬ-	
10	НЫН• Н ІАКО ТА-	USER
11	ТЬ НОЩЬЮ ПРН-	01/02/2021-12:38
12	ДЕТЬ• БЪДНМЪ	om. WG
13	ЖЕ НЕ ОУСЫПАЮ-	
14	ЩЕ• СВЪЩА	USER
15	ВЪЖЫГЪШЕ•	01/02/2021 12:39
16	КЫА ЖЕ СВЪ-	
17	ЩА• МНАОСТЫН	ТЪМЪ W
18	НЮ ГАДГОЛО• Н	
19	УНСТОТЪ ТЪБАСН•	USER
20	ТЪ БО ІЕСТЕ СВЪЩН	01/02/2021 13:20
21	ДЪХОВЪНЪН• ТЪ НМЪ-	ДЪШВНЪН W ДЪШВНЪН Н
		USER
		01/02/2021 13:21

	A	B	C	D	E	F	G
432					26/128b09	ДЪНЬ	ДЪНЬ СЪМЪРТЬ-
433	+ съ G				26/128b09		ДЪНЬ СЪМЪРТЬ-
434					26/128b09	СЪМЪРТЬНЪ	ДЪНЬ СЪМЪРТЬ-
435					26/128b10	Н	НЫН• Н ІАКО ТА-
436					26/128b10	ІАКО	НЫН• Н ІАКО ТА-
437					26/128b10	ТАТЬ	НЫН• Н ІАКО ТА-
438					26/128b11	НОЩЬЮ	ТЬ НОЩЬЮ ПРН-
439					26/128b11	ПРНДЕТЬ•	ТЬ НОЩЬЮ ПРН-
440					26/128b12	БЪДНМЪ	ДЕТЬ• БЪДНМЪ
441					26/128b13	ЖЕ	ЖЕ НЕ ОУСЫПАЮ-
442					26/128b13	НЕ	ЖЕ НЕ ОУСЫПАЮ-
443					26/128b13	ОУСЫПАЮЩЕ	ЖЕ НЕ ОУСЫПАЮ-
444					26/128b14	СВЪЩА	ЩЕ• СВЪЩА
445					26/128b15	ВЪЖЫГЪШЕ	ВЪЖЫГЪШЕ•
446					26/128b16	КЫА	КЫА ЖЕ СВЪ-
447	om. WG				26/128b16	ЖЕ	КЫА ЖЕ СВЪ-
448					26/128b16	СВЪЩА•	КЫА ЖЕ СВЪ-
449					26/128b17	МНАОСТЫН	ЩА• МНАОСТЫ-
450					26/128b18	ГАДГОЛО•	НЮ ГАДГОЛО• Н
451					26/128b18	Н	НЮ ГАДГОЛО• Н
452					26/128b19	УНСТОТЪ	УНСТОТЪ ТЪБАСН•
453					26/128b19	ТЪБАСН•	УНСТОТЪ ТЪБАСН•
454	ТЪМЪ W				26/128b20	ТЪ	ТЪ БО ІЕСТЕ СВЪЩН
455					26/128b20	БО	ТЪ БО ІЕСТЕ СВЪЩН
456					26/128b20	ІЕСТЕ	ТЪ БО ІЕСТЕ СВЪЩН
457					26/128b20	СВЪЩН	ТЪ БО ІЕСТЕ СВЪЩН
458	ДЪШВНЪН				26/128b21	ДЪХОВЪНЪН	ДЪХОВЪНЪН• ТЪ НМЪ-
459					26/128b21	•	ДЪХОВЪНЪН• ТЪ НМЪ-

variant readings  
in column A

# Extraction - extractor

Input from Word Processor (sermon.docx)

Export to Spreadsheet (table.xlsx)

128b		
1	МЪ ОУБО БРАТНЕ	
2	ВЪЗДАЮБАЕННА•	
3	СНАОУ СХЪЗ СЛОВЕ-	+ да G
4	СЪ Н ОУГОТОВИ-	
5	МЪ СНА ПРЪЖДЕ	
6	СЖДА ДОБРЫМНН	USER 01/02/2021 12:37
7	ДЪЛЫ• БЕЗВЪ-	
8	СТЫНЪ БО ІЕСТЪ	+ съ G
9	ДЪНЬ СЪМЪРТЬ-	
10	НЫН• Н ІАКО ТА-	USER 01/02/2021-12:38
11	ТЬ НОЦЬЮ ПРИ-	
12	ДЕТЬ• БЪДНМЪ	om. WG
13	ЖЕ НЕ ОУСЫПАЮ-	
14	ЩЕ• СВЪЩА	
15	ВЪЖЪГЪШЕ•	USER 01/02/2021 12:39
16	КЪНА ЖЕ СВЪ-	
17	ЩА• МНОСТЫ-	ТЪМЪ W
18	НЮ ГЛАГОЛЮ• Н	
19	УНСТОТЪ ТЪБАСН•	USER 01/02/2021 13:20
20	ТЪ БО ІЕСТЕ СВЪЩН	
21	ДЪХОВЪНЪН• ТЪ НМЪ-	ДЪШВЪНЪН W ДЪШВЪНЪН Н
		USER 01/02/2021 13:21

+ indicates no  
correspondence  
in main variant

	A	B	C	D	E	F	G
432					26/128b09	ДЪНЬ	ДЪНЬ СЪМЪРТЬ-
433	+ съ G				26/128b09		ДЪНЬ СЪМЪРТЬ-
434					26/128b09	СЪМЪРТЬНЪ	ДЪНЬ СЪМЪРТЬ-
435					26/128b10	Н	НЫН• Н ІАКО ТА-
436					26/128b10	ІАКО	НЫН• Н ІАКО ТА-
437					26/128b10	ТАТЬ	НЫН• Н ІАКО ТА-
438					26/128b11	НОЦЬЮ	ТЬ НОЦЬЮ ПРИ-
439					26/128b11	ПРИДЕТЬ•	ТЬ НОЦЬЮ ПРИ-
440					26/128b12	БЪДНМЪ	ДЕТЬ• БЪДНМЪ
441					26/128b13	ЖЕ	ЖЕ НЕ ОУСЫПАЮ-
442					26/128b13	НЕ	ЖЕ НЕ ОУСЫПАЮ-
443					26/128b13	ОУСЫПАЮЩЕ	ЖЕ НЕ ОУСЫПАЮ-
444					26/128b14	СВЪЩА	ЩЕ• СВЪЩА
445					26/128b15	ВЪЖЪГЪШЕ	ВЪЖЪГЪШЕ•
446					26/128b16	КЪНА	КЪНА ЖЕ СВЪ-
447	om. WG				26/128b16	ЖЕ	КЪНА ЖЕ СВЪ-
448					26/128b16	СВЪЩА•	КЪНА ЖЕ СВЪ-
449					26/128b17	МНОСТЫНЪ	ЩА• МНОСТЫ-
450					26/128b18	ГЛАГОЛЮ•	НЮ ГЛАГОЛЮ• Н
451					26/128b18	Н	НЮ ГЛАГОЛЮ• Н
452					26/128b19	УНСТОТЪ	УНСТОТЪ ТЪБАСН•
453					26/128b19	ТЪБАСН•	УНСТОТЪ ТЪБАСН•
454	ТЪМЪ W				26/128b20	ТЪ	ТЪ БО ІЕСТЕ СВЪЩН
455					26/128b20	БО	ТЪ БО ІЕСТЕ СВЪЩН
456					26/128b20	ІЕСТЕ	ТЪ БО ІЕСТЕ СВЪЩН
457					26/128b20	СВЪЩН	ТЪ БО ІЕСТЕ СВЪЩН
458	ДЪШВЪНЪН				26/128b21	ДЪХОВЪНЪН	ДЪХОВЪНЪН• ТЪ НМЪ-
459					26/128b21	•	ДЪХОВЪНЪН• ТЪ НМЪ-

# Lemmatisation, Alignment & Consolidation - experts

A	B	C	D	E	F	G	H	I	JK	L	MNOP	Q	R	S
ВЪ WGH	ВЪ	ВЪ + Loc.	1/7d1	оу	оу насъ	<u>оу праер.</u>	<u>оу + Gen.</u>			от.		пар'	παρά	παρά + Acc.

↓  
Slavonic  
main  
lemmas

# Lemmatisation, Alignment & Consolidation - experts

A	B	C	D	E	F	G	H	I	JK	L	MNOP	Q	R	S
Ѣ WG	Ѣ	Ѣ + Loc.	1/7d1	оу	оу насъ		оу праер.	оу + Gen.		от.		παρ'	παρά	παρά + Acc.

Slavonic  
variant  
lemmas

Slavonic  
main  
lemmas

# Lemmatisation, Alignment & Consolidation - experts

A	B	C	D	E	F	G	H	I	JK	L	MNOP	Q	R	S
Ѣ WG	Ѣ	Ѣ + Loc.	1/7d1	оу	оу насъ		оу праер.	оу + Gen.		ом.		пар'	παρά	παρά + Acc.

Slavonic  
variant  
lemmas

Slavonic  
main  
lemmas

Greek  
main  
lemmas

# Lemmatisation, Alignment & Consolidation - experts

A	B	C	D	E	F	G	H	I	JK	L	MNOP	Q	R	S	
Ѣ WGH	ѢѢ	ѢѢ + Loc.	1/7d1	оу	оу насѣ	оу праер.	оу + Gen.			ом.			παρ'	παρά	παρά + Acc.

Slavonic  
variant  
lemmas

Slavonic  
main  
lemmas

Greek  
main  
lemmas

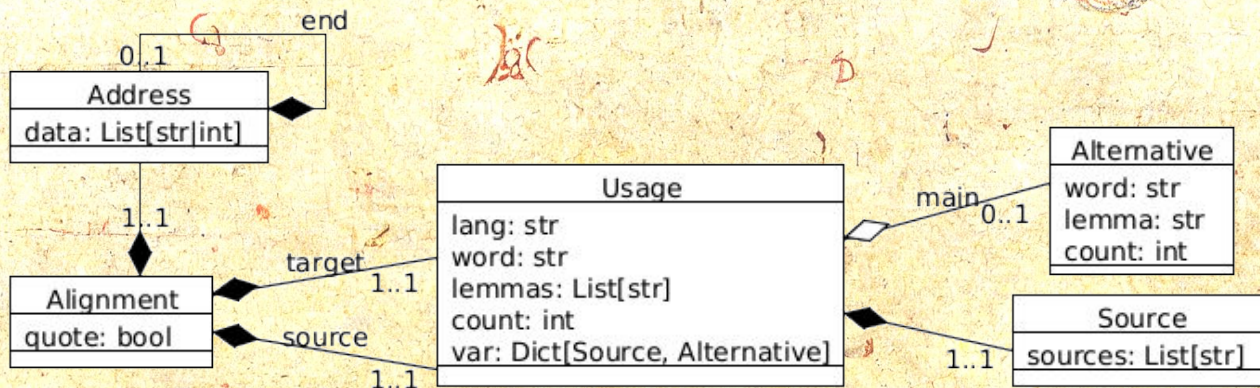
Greek  
variant  
lemmas

# Technical Approach - Two Passes

- **Merger**
  - Dynamic programming - adapting data for parsing

- **Aggregator**

- Hierarchical dictionary



# Integration - *integrator*

Input from Spreadsheet (table.xlsx)

A	B	C	D	E	F	G	H	I	JK	L	MNOP	Q	R	S
въ WGH	въ	въ + Loc.	1/7d1	оу	оу насъ	оу праер.	оу + Gen.		ом.			пар'	παρά	παρά + Acc.

Output to Word Processor

(list.docx)

source language  
lemmas define  
document hierarchy

target language  
lemmas displayed  
as a chain

оу праер.  
| оу + Gen.  
παρά + Acc. → παρά: оу/пар' C (1/7d1<sup>C</sup> » [въ WGH])

# Integration - *integrator*

Input from Spreadsheet

A	B	C	D	E	F	G	H	I	JK	L	MNOP	Q	R	S
вѣ WGH	вѣ	вѣ + Loc.	1/7d1	ου	ου ηαεѣ	ου	праер. ου + Gen.		om.			παρ'	παρά	παρά + Acc.

Output to Word Processor

(list.docx)

word use pair  
Shown after target  
language lemma

address  
shown in  
parentheses

ου праер.  
| ου + Gen.  
παρά + Acc. → παρά: ου/παρ' C (1/7d1<sup>C</sup> » [вѣ WGH])

παρά  
| παρά + Acc.  
вѣ + Loc. → вѣ: παρ' C/вѣ WGH (1/7d1<sup>WGH-C</sup> » ου S)  
ου + Gen. → ου праер.: παρ' C/ου (1/7d1<sup>C</sup> » [вѣ WGH])

# Integration - *integrator*

Input from Spreadsheet

A	B	C	D	E	F	G	H	I	JK	L	MNOP	Q	R	S	
ВЪ WGH	ВЪ	ВЪ + LOC.	1/7d1	ου	ου	насъ	ου праер.	ου + Gen.		om.			παρ'	παρά	παρά + Acc.

Output to Word Processor

(list.docx)

ου праер.  
| ου + Gen.  
παρά + Acc. → παρά: ου/παρ' C (1/7d1<sup>C</sup> » [ВЪ WGH])

possible  
variants shown  
after address

# Integration - *integrator*

## Input from Spreadsheet

A	B	C	D	E	F	G	H	I	JK	L	MNOP	Q	R	S	
вѣ WGH	вѣ	вѣ + Loc.	1/7d1	оу	оу наѣѣ	оу праер.	оу + Gen.			ом.			παρ'	παρά	παρά + Acc.

## Output to Word Processor

(list.docx)

same logic for  
occurrences  
in variants

...and for  
list in other  
direction

вѣ

| вѣ + Loc.

παρά + Acc. → παρά: вѣ WGH/παρ' C (1/7d1<sup>WGH-C</sup> » оу S)

оу праер.

| оу + Gen.

παρά + Acc. → παρά: оу/παρ' C (1/7d1<sup>C</sup> » [вѣ WGH])

παρά

| παρά + Acc.

вѣ + Loc. → вѣ: παρ' C/вѣ WGH (1/7d1<sup>WGH-C</sup> » оу S)

оу + Gen. → оу праер.: παρ' C/оу (1/7d1<sup>C</sup> » [вѣ WGH])

# Index Generation - *indexgenerator*

Input from Spreadsheet (table.xlsx)

A	B	C	D	E	F	G	H	I	JK	L	MNOP	Q	R	S	
εβ̣	WGH	εβ̣	εβ̣ + Loc.	1/7d1	οϣ	οϣ ηα̣ς̣	οϣ <b>πραερ.</b>	οϣ + Gen.		om.			παρ'	<b>παρά</b>	παρά + Acc.

Output to Word Processor

(index.docx)

index is similar to list

**εβ̣** (1<sup>var</sup>)

| εβ̣ + Loc. (1<sup>var</sup>)

- παρά + Acc. → παρά (1<sup>var</sup>): 1/7d1<sup>WGH-C</sup> » οϣ + Gen. S

**οϣ **πραερ.**** (1)

| οϣ + Gen. (1)

- παρά + Acc. → παρά (1<sup>var</sup>): 1/7d1<sup>C</sup> » [εβ̣ + Loc.<sup>WGH</sup>]

**παρά** (1<sup>var</sup>)

| παρά + Acc. (1<sup>var</sup>)

- εβ̣ + Loc. → εβ̣ (1<sup>var</sup>): 1/7d1<sup>WGH-C</sup> » οϣ + Gen. S
- οϣ + Gen. → οϣ **πραερ.** (1): 1/7d1<sup>C</sup> » [εβ̣ + Loc.<sup>WGH</sup>]

...but contains counters, also indicating main or variant

...and focuses only on lemmas, not word usages

# Asymmetry: One-to-Many

Input from Spreadsheet (table.xlsx)

E	F	G	H	I	JK	L	M
10/59a12	ζΑΚΟΝΑ	Η ΠΕΓΔΑ ΖΑΚΟΝΑ ΧΟ-	ΖΑΚΟΝΪ	ΖΑΚΟΝΪ ΔΑΤΗ		ΝΟΜΟΘΕΤΕΪΝ	ΝΟΜΟΘΕΤΕΨ
10/59a13	ΔΑΤΗ	Τ΄ΕΑΠΕ ΔΑΤΗ ΝΟΚ-	ΔΑΤΗ				

Output to Word Processor

(list.docx)

representation  
of phrase

ΔΑΤΗ  
| ΖΑΚΟΝΪ ΔΑΤΗ  
ΝΟΜΟΘΕΤΕΨ: ΖΑΚΟΝΑ ΔΑΤΗ/ΝΟΜΟΘΕΤΕΪΝ (10/59a12-13)  
ΖΑΚΟΝΪ  
| ΖΑΚΟΝΪ ΔΑΤΗ  
ΝΟΜΟΘΕΤΕΨ: ΖΑΚΟΝΑ ΔΑΤΗ/ΝΟΜΟΘΕΤΕΪΝ (10/59a12-13)

ΝΟΜΟΘΕΤΕΨ  
ΖΑΚΟΝΪ ΔΑΤΗ → ΖΑΚΟΝΪ & ΔΑΤΗ: ΝΟΜΟΘΕΤΕΪΝ/ΖΑΚΟΝΑ  
ΔΑΤΗ (10/59a12-13)

# Asymmetry: Grammatical Value

Input from Spreadsheet (table.xlsx)

E	F	G	H	I	J	K	L	M
1/6b16	ρευενο	ο ούχι ρευενο ιεστη	ρεψιη				ειρηται	λεγω
1/6b16	ιεστη	ο ούχι ρευενο ιεστη	βζιτη	gramm.				pass.

Output to Word Processor

(list.docx)

βζιτη

|| gramm.

pass.: ρευενο ιεστη/ειρηται (1/6b16)

ρεψιη

λέγω: ρευενο ιεστη/ειρηται (1/6b16)

a word with  
grammatical  
(value)

λέγω

ρεψιη: ειρηται/ρευενο ιεστη (1/6b16)

pass.

βζιτη gramm.: ειρηται/ρευενο ιεστη (1/6b16)

# Asymmetry: Many-to-Many

Input from Spreadsheet (table.xlsx)

E	F	G	H	I	JK	L	M	N
04/18a11	Δοβρογ	ψα σα· η Δοβρογ	Δοβρβ	Δοβρβ κηζηνη ημβτη		άπολαύοντας	άπολαύω	άπολαύω εϋημερίας
04/18a12	κηζηνη	κηζηνη ημβγ-	κηζηνη			εϋημερίας	εϋημερία	
04/18a12	ημβγψα·	κηζηνη ημβγ-	ημβτη					

Output to Word Processor

(list.docx)

representation of phrase

Δοβρβ  
| Δοβρβ κηζηνη ημβτη  
άπολαύω εϋημερίας → άπολαύω & εϋημερία: Δοβρογ κηζηνη ημβγψα·/άπολαύοντας εϋημερίας (4/18a11-12)

κηζηνη  
| Δοβρβ κηζηνη ημβτη  
άπολαύω εϋημερίας → άπολαύω & εϋημερία: Δοβρογ κηζηνη ημβγψα·/άπολαύοντας εϋημερίας (4/18a11-12)

ημβτη  
| Δοβρβ κηζηνη ημβτη  
άπολαύω εϋημερίας → άπολαύω & εϋημερία: Δοβρογ κηζηνη ημβγψα·/άπολαύοντας εϋημερίας (4/18a11-12)

άπολαύω  
| άπολαύω εϋημερίας  
Δοβρβ κηζηνη ημβτη → Δοβρβ & κηζηνη & ημβτη: άπολαύοντας εϋημερίας/Δοβρογ κηζηνη ημβγψα· (4/18a11-12)

εϋημερία  
| άπολαύω εϋημερίας  
Δοβρβ κηζηνη ημβτη → Δοβρβ & κηζηνη & ημβτη: άπολαύοντας εϋημερίας/Δοβρογ κηζηνη ημβγψα· (4/18a11-12)

# Variants

## Input from Spreadsheet (table.xlsx)

A	B	CD	E	F	G	H	IJK	L	M
ιεδνηοροδου Η	ΙΕΔΗΗΟΡΟΔΖ		1/W168a34	ΙΕΔΗΗΟΥΕΔΟΥ	ΕΞ ΗΜΕΤΗ ΙΕΔΗΗΟΥΕΔΟΥ	ΙΕΔΗΗΟΥΑΔΖ		μονογενή	μονογενής
			1/W168a28	ΙΕΔΗΗΟΥΕΔΑΓΟ	ΪΡΕ ΙΕΔΗΗΟΥΕΔΑΓΟ ΪΤΡΟΚ	ΙΕΔΗΗΟΥΑΔΖ		μονογενοῦς	μονογενής
ηηουεδαγο G ιεδνηοροδου Η	ΙΕΔΗΗΟΡΟΔΖ Η / ΗΗΟΥΑΔΖ G		1/W168a25	ΙΕΔΗΗΟΥΕΔΟΥ	ΕΡΓΥ(!) ΓΛΕ· ΣΑΛΟΥ ΙΑΚΟ	ΙΕΔΗΗΟΥΑΔΖ		μονογενοῦς	μονογενής
ιεδνηουεδαυ WH Ø G	ΙΕΔΗΗΟΥΑΔΖ		1/5a4	ΗΗΟΥΑΔΖΗ	ΗΖ ΙΑΚΟ ΕΖ· Δ ΗΗΟΥΑΔΖΗ	ΗΗΟΥΑΔΖ		μονογενής	μονογενής

## Output to Word Processor

### (index.docx)

#### ΗΗΟΥΑΔΖ (1 + 1<sup>var</sup>)

- μονογενής (2): 1/5a4 » [ΙΕΔΗΗΟΥΑΔΖ<sup>WH</sup>]; 1/W168a25<sup>G</sup> » ΙΕΔΗΗΟΥΑΔΖ W [ΙΕΔΗΗΟΡΟΔΖ<sup>H</sup>]

#### ΙΕΔΗΗΟΡΟΔΖ (2<sup>var</sup>)

- μονογενής (2): 1/W168a25<sup>H</sup> » ΙΕΔΗΗΟΥΑΔΖ W [ΗΗΟΥΑΔΖ<sup>G</sup>]; 1/W168a34<sup>H</sup> » ΙΕΔΗΗΟΥΑΔΖ W

#### ΙΕΔΗΗΟΥΑΔΖ (3 + 1<sup>var</sup>)

- μονογενής (4): 1/5a4<sup>WH</sup> » ΗΗΟΥΑΔΖ S; 1/W168a25 » [ΙΕΔΗΗΟΡΟΔΖ<sup>H</sup>, ΗΗΟΥΑΔΖ<sup>G</sup>]; 1/W168a28; 1/W168a34 » [ΙΕΔΗΗΟΡΟΔΖ<sup>H</sup>]

#### ΜΟΝΟΓΕΝΗΣ (4)

- ΗΗΟΥΑΔΖ (1 + 1<sup>var</sup>): 1/5a4 » [ΙΕΔΗΗΟΥΑΔΖ<sup>WH</sup>]; 1/W168a25<sup>G</sup> » ΙΕΔΗΗΟΥΑΔΖ W [ΙΕΔΗΗΟΡΟΔΖ<sup>H</sup>]
- ΙΕΔΗΗΟΡΟΔΖ (2<sup>var</sup>): 1/W168a25<sup>H</sup> » ΙΕΔΗΗΟΥΑΔΖ W [ΗΗΟΥΑΔΖ<sup>G</sup>]; 1/W168a34<sup>H</sup> » ΙΕΔΗΗΟΥΑΔΖ W
- ΙΕΔΗΗΟΥΑΔΖ (3 + 1<sup>var</sup>): 1/5a4<sup>WH</sup> » ΗΗΟΥΑΔΖ S; 1/W168a25 » [ΙΕΔΗΗΟΡΟΔΖ<sup>H</sup>, ΗΗΟΥΑΔΖ<sup>G</sup>]; 1/W168a28; 1/W168a34 » [ΙΕΔΗΗΟΡΟΔΖ<sup>H</sup>]

# Variants

## Input from Spreadsheet (table.xlsx)

A	B	CD	E	F	G	H	IJK	L	M
ιεδνηροδου Η	ιεδνηροδζ		1/W168a34	ιεδνηουεδαου	εε ημετη ιεδνηουεδαου	ιεδνηουαδζ		μονογενη	μονογενης
			1/W168a28	ιεδνηουεδαγο	ερε ιεδνηουεδαγο ωτροκα	ιεδνηουαδζ		μονογενους	μονογενης
ηνουεδαγο G ιεδνηροδου Η	ιεδνηροδζ Η / ηνουαδζ G		1/W168a25	ιεδνηουεδαου	εργε(!) Γλε· σαμου ιαυ	ιεδνηουαδζ		μονογενους	μονογενης
ιεδνηουεδαυ WH O G	ιεδνηουαδζ		1/5a4	ηνουαδζηη	ηε ιακο εε· α ηνουαδζηη	ηνουαδζ		μονογενης	μονογενης

## Output to Word Processor

(index.docx)

**ηνουαδζ (1 + 1<sup>var</sup>)**

- μονογενης (2): 1/5a4 » [ιεδνηουαδζ<sup>WH</sup>]; 1/W168a25<sup>G</sup> » ιεδνηουαδζ W [ιεδνηροδζ<sup>H</sup>]

**ιεδνηροδζ (2<sup>var</sup>)**

- μονογενης (2): 1/W168a25<sup>H</sup> » ιεδνηουαδζ W [ηνουαδζ<sup>G</sup>]; 1/W168a34<sup>H</sup> » ιεδνηουαδζ W

**ιεδνηουαδζ (3 + 1<sup>var</sup>)**

- μονογενης (4): 1/5a4<sup>WH</sup> » ηνουαδζ S; 1/W168a25 » [ιεδνηροδζ<sup>H</sup>, ηνουαδζ<sup>G</sup>]; 1/W168a28; 1/W168a34 » [ιεδνηροδζ<sup>H</sup>]

**μονογενης (4)**

- ηνουαδζ (1 + 1<sup>var</sup>): 1/5a4 » [ιεδνηουαδζ<sup>WH</sup>]; 1/W168a25<sup>G</sup> » ιεδνηουαδζ W [ιεδνηροδζ<sup>H</sup>]
- ιεδνηροδζ (2<sup>var</sup>): 1/W168a25<sup>H</sup> » ιεδνηουαδζ W [ηνουαδζ<sup>G</sup>]; 1/W168a34<sup>H</sup> » ιεδνηουαδζ W
- ιεδνηουαδζ (3 + 1<sup>var</sup>): 1/5a4<sup>WH</sup> » ηνουαδζ S; 1/W168a25 » [ιεδνηροδζ<sup>H</sup>, ηνουαδζ<sup>G</sup>]; 1/W168a28; 1/W168a34 » [ιεδνηροδζ<sup>H</sup>]

# Variants

## Input from Spreadsheet (table.xlsx)

A	B	CD	E	F	G	H	IJK	L	M
ιεδνηνοροδου Η	ιεδνηνοροδζ		1/W168a34	ιεδνηνουεδαου	εε ημετη ιεδνηνουεδαου	ιεδνηνουαδζ		μονογενη	μονογενης
			1/W168a28	ιεδνηνουεδαγο	ερε ιεδνηνουεδαγο ωτροκα	ιεδνηνουαδζ		μονογενους	μονογενης
ηνουεδαγο G ιεδνηνοροδου Η	ιεδνηνοροδζ Η / ηνουαδζ G		1/W168a25	ιεδνηνουεδαου	εργε(!) Γλε· σαλεου ιακο	ιεδνηνουαδζ		μονογενους	μονογενης
ιεδνηνουεδαυ WH O G	ιεδνηνουαδζ		1/5a4	ηνουαδζηη	ηε ιακο εε· α ηνουαδζηη	ηνουαδζ		μονογενης	μονογενης

## Output to Word Processor

(index.docx)

**ηνουαδζ (1 + 1<sup>var</sup>)**

- μονογενης (2): 1/5a4 » [ιεδνηνουαδζ<sup>WH</sup>]; 1/W168a25<sup>G</sup> » ιεδνηνουαδζ W [ιεδνηνοροδζ<sup>H</sup>]

**ιεδνηνοροδζ (2<sup>var</sup>)**

- μονογενης (2): 1/W168a25<sup>H</sup> » ιεδνηνουαδζ W [ηνουαδζ<sup>G</sup>]; 1/W168a34<sup>H</sup> » ιεδνηνουαδζ W

**ιεδνηνουαδζ (3 + 1<sup>var</sup>)**

- μονογενης (4): 1/5a4<sup>WH</sup> » ηνουαδζ S; 1/W168a25 » [ιεδνηνοροδζ<sup>H</sup>, ηνουαδζ<sup>G</sup>]; 1/W168a28; 1/W168a34 » [ιεδνηνοροδζ<sup>H</sup>]

**μονογενης (4)**

- ηνουαδζ (1 + 1<sup>var</sup>): 1/5a4 » [ιεδνηνουαδζ<sup>WH</sup>]; 1/W168a25<sup>G</sup> » ιεδνηνουαδζ W [ιεδνηνοροδζ<sup>H</sup>]
- ιεδνηνοροδζ (2<sup>var</sup>): 1/W168a25<sup>H</sup> » ιεδνηνουαδζ W [ηνουαδζ<sup>G</sup>]; 1/W168a34<sup>H</sup> » ιεδνηνουαδζ W
- ιεδνηνουαδζ (3 + 1<sup>var</sup>): 1/5a4<sup>WH</sup> » ηνουαδζ S; 1/W168a25 » [ιεδνηνοροδζ<sup>H</sup>, ηνουαδζ<sup>G</sup>]; 1/W168a28; 1/W168a34 » [ιεδνηνοροδζ<sup>H</sup>]

# Other Achievements

- Complex combinations between Asymmetry and Grammatical value
- Complex combinations between Asymmetry and Variant readings
- Work without a diplomatic edition of the Greek texts  
(~30 considered variant readings)



# Thank you!

<https://uchitelnoevangelie.eu/>

Project: The Vocabulary of Constantine of Preslav's  
Uchitel'noe evangelie ('Didactic Gospel'):  
Old Bulgarian-Greek and Greek-Old Bulgarian Word Indices  
Funded by Bulgarian National Science Fund (КП-06-Н50/2)