The Ramses Project:
Exploring Ancient Egyptian linguistic data
using a richly annotated corpus

St. Polis (F.R.S.-FNRS – ULg) & J. Winand (ULg)
1. Introduction

Outline of the talk

- The Ramses project
  - Background information & history of the project
  - Goals
- Structure and capabilities of Ramses
  - Progress (encoding of texts and annotation)
  - Current state of the IT developments
- Three case studies
  - Graphemics and argument structure
  - Morphological variation: diaphasic and diachronic dimensions
  - Macro-syntax: clause chaining
- Conclusions
1. Introduction
The Ramses project: Background information

Building a richly annotated historical corpus of all Late Egyptian texts
1. Introduction

The Ramses project: Background information

Building a richly annotated historical corpus of all Late Egyptian texts
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The Ramses project: Background information

Building a richly annotated historical corpus of all Late Egyptian texts

1. Introduction

The Ramses project: Background information

- **2006: Start**
  - Jean Winand (head of the project); Stéphane Polis (co-director); Serge Rosmorduc (Paris; IT development and database conception)

- **2007: First funding (University of Liège)**
  - PhD student: Laurence Neven

- **2008: Second funding (National Fund for Scientific Research - Belgium)**
  - PhD students: Stéphanie Gohy & Anne-Claude-Honnay

- **2008-2013: Third funding (“Action de recherche concertée”)**
  - Post-docs: Dominique Lefèvre, Eitan Grossman, Todd Gillen
  - PhD students in Egyptology: Guillaume Lescuyer, Jill Raimondo, Nathalie Sojac, Alessandro Stella
  - PhD students in computer sciences: Benjamin Martin Leon
  - Collaborations with other institutions and laboratories: École Pratique des Hautes Études (Paris); Laboratoire d’Analyse Statistique des Données Textuelles (Liège); NotaBene (Nicolas Mazziotta); etc.

- **2013-…: Online access**

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1. Introduction
The Ramses project: Goal

An efficient tool in philology and linguistics

The corpus supports:
- Ecdotic descriptors (textual criticism is fully integrated)
1. Introduction

The Ramses project: Goal

An efficient tool in philology and linguistics

The corpus supports:

- Ecdotic descriptors (textual criticism is fully integrated)
- Graphemic level (hieroglyphic transcription)

Brief, pBM 10419, Brief des Djehuti-mesu an Hafy

Thesaurus Linguae Aegyptiae (http://aaew.bbaw.de/tla/)

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1. Introduction

The Ramses project: Goal

An efficient tool in philology and linguistics

The corpus supports:
- Ecdotic descriptors (textual criticism is fully integrated)
- Graphemic level (hieroglyphic transcription)
1. Introduction

The Ramses project: Goal

An efficient tool in philology and linguistics

The corpus supports:
- Ecdotic descriptors (textual criticism is fully integrated)
- Graphemic level (hieroglyphic transcription)
- Morpho-syntactic analysis
- Meta-data (with description and categorization of the texts)
- Bibliographical references

with an evolutionary database design
2. Structure and capabilities of Ramses

Current state of the project

IT viewpoint

→ a relational database in SQL where the texts are represented and stored in XML
2. Structure and capabilities of Ramses

Progress in the encoding and annotation

Number of texts

Number of tokens (words)
2. Structure and capabilities of Ramses
Progress in the encoding and annotation

- Administrative documents: 139 annotated, 2242 still pending
- Narratives: 9 annotated, 61 still pending
- Oracular Documents: 185 annotated, 74 still pending
- Wisdom literature and miscellanies: 119 annotated, 23 still pending
- Judicial documents: 239 annotated, 36 still pending
- Letters: 509 annotated, 61 still pending

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2. Structure and capabilities of Ramses

Progress in the encoding and annotation

Number of lemmata

Number of inflexions

Number of spellings
2. Structure and capabilities of Ramses

Structure of the database & software ergonomics

Two basic requirements:

- From the annotator’s point of view, the editing software had to be user-friendly and to meet the criteria of speed and consistency of annotation.
- From the user’s point of view, no loss of information should happen because of the process of encoding and annotating a text.
2. Structure and capabilities of Ramses

Structure of the database & software ergonomics

LexiconEditor → TextEditor ← SyntaxEditor
2. Structure and capabilities of Ramses
Structure of the database & software ergonomics
2. Structure and capabilities of Ramses

Structure of the database & software ergonomics
2. Structure and capabilities of Ramses
Structure of the database & software ergonomics

- LexiconEditor
- TextEditor
- SyntaxEditor
2. Structure and capabilities of Ramses

Structure of the database & software ergonomics
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Structure of the database & software ergonomics

Two basic requirements:

- From the annotator’s point of view, the editing software had to be user-friendly and to meet the criteria of speed and consistency of annotation.
- From the user’s point of view, no loss of information should happen in the process of encoding and annotating a text
  - Unanalyzed chunks of graphemes
2. Structure and capabilities of Ramses

Structure of the database & software ergonomics
2. Structure and capabilities of Ramses

Structure of the database & software ergonomics

Two basic requirements:

- From the annotator’s point of view, the editing software had to be user-friendly and to meet the criteria of speed and consistency of annotation.
- From the user’s point of view, no loss of information should happen because of the process of encoding and annotating a text
  - Unanalyzed chunks of graphemes
  - Coding of ambiguities
2. Structure and capabilities of Ramses

Structure of the database & software ergonomics
2. Structure and capabilities of Ramses

Structure of the database & software ergonomics
2. Structure and capabilities of Ramses

Structure of the database & software ergonomics

Diagram:

- LexiconEditor
- TextEditor
- SyntaxEditor

Diagram arrows indicate relationships between the editors.
2. Structure and capabilities of Ramses

Structure of the database & software ergonomics
2. Structure and capabilities of Ramses

Encoding of metadata
2. Structure and capabilities of Ramses

Encoding of metadata

LexiconEditor → TextEditor → SyntaxEditor

BibEditor → Text/Document Editor

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2. Structure and capabilities of Ramses

Encoding of metadata
2. Structure and capabilities of Ramses

End-user modules

- SearchEngine
- TextEditor
- SyntaxEditor
- BibEditor
- Text/Document Editor
2. Structure and capabilities of Ramses

End-user modules

- SearchEngine
- ExportTool
- LexiconEditor
- TextEditor
- SyntaxEditor
- BibEditor
- Text/Document Editor
2. Structure and capabilities of Ramses

End-user modules

<table>
<thead>
<tr>
<th>Kanais, 18</th>
</tr>
</thead>
<tbody>
<tr>
<td>rdl,l</td>
</tr>
<tr>
<td>verb</td>
</tr>
<tr>
<td>anom/tr</td>
</tr>
<tr>
<td>inf/abs</td>
</tr>
<tr>
<td>donner</td>
</tr>
</tbody>
</table>

| 2 | TRADUCTION: Quant à quiconque attaqueraient une personne parmi eux, et qui (les) replaceraient vers un autre lieu,
3. New avenues for linguistic research

Introduction

Description of the SearchEngine

- Defining the corpus
  - Whole corpus
  - Sub-corpora (filters on the metadata about genres, date, provenance, writing support, writing system, etc.)
3. New avenues for linguistic research

Introduction

Description of the SearchEngine
3. New avenues for linguistic research

Introduction

Description of the SearchEngine

- Defining the corpus
  - Whole corpus
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- Queries build step by step
3. New avenues for linguistic research

Introduction

Description of the SearchEngine
3. New avenues for linguistic research

Introduction

Description of the SearchEngine

- Defining the corpus
  - Whole corpus
  - Sub-corpora (filters on the metadata about genres, date, provenance, writing support, writing system, etc.)
- Queries build step by step
- Results
  - Sorting facilities
  - Visualization and export
3. New avenues for linguistic research

Introduction
3. New avenues for linguistic research

Case study 1: Graphemics and argument structure

Verbs of motion in Late Egyptian

- Specific morphological and constructional behavior
  - Excluded from some inflectional patterns, like the so-called perfective, which is limited to transitive verbs (complementary constructions are used instead)
  - Some aspectual oppositions are expressed in a different way if compared with other verbal semantic classes

\[
\begin{align*}
\text{sw} & \quad \text{hr} & \quad \text{ir.t} & \quad f \\
\text{he} & \quad \text{on} & \quad \text{do\INF} & \quad \text{It} \\
\text{“he is doing It” / “he does”}
\end{align*}
\]

\[
\begin{align*}
\text{sw} & \quad \text{hr} & \quad \text{iy.t} \\
\text{he} & \quad \text{on} & \quad \text{come\INF} \\
\text{“he comes”}
\end{align*}
\]

\[
\begin{align*}
\text{sw} & \quad \text{m} & \quad \text{iy.t} \\
\text{he} & \quad \text{in} & \quad \text{come\INF} \\
\text{“he is coming”}
\end{align*}
\]

- A typical narrative construction (“And then he went to …”, lit. “It is going to … what he did”) appears to be compatible only with verbs of motion
3. New avenues for linguistic research

Case study 1: Graphemics and argument structure

Verbs of motion in Late Egyptian

- Specific morphological and constructional behavior
  - Excluded from some inflectional patterns, like the so-called perfective (complementary constructions are used)
  - Some aspectual oppositions are expressed in a different way with respect to other verbal semantic classes
  - A narrative construction ("And then he went to …", lit. "It is going to … what he did") appears to be compatible only with such verbs of motion

- Possible research questions
  - Do all the verbs belonging to this category behave the same way?
  - What kinds of variation in terms of argument structure are attested in the material for this semantic class (transitivity alternation, types of prepositional phrase, etc.)?

- Desiderata
  - Need to identify the verbs belonging to the semantic class “verbs of motion”
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Case study 1: Graphemics and argument structure

How can we identify the semantic class “Verbs of Motion” thanks to Ramses?

- Graphemic classifiers:
  - What is a graphemic classifier? A graphic morpheme, always appearing at the end of a word, having a categorizing or classifying function; see e.g.:
    - wD3 + [BUILDING]  
      “storehouse”

- Classifiers referring to [MOTION]:
  - 
  - &
3. New avenues for linguistic research

Case study 1: Graphemetics and argument structure

How can we identify the semantic class “Verbs of Motion” thanks to Ramses

- Building the query in the SearchEngine
3. New avenues for linguistic research

Case study 1: Graphemics and argument structure

How can we identify the semantic class “Verbs of Motion” thanks to Ramses

- Building the query in the SearchEngine
- Results of the first query
  - Verbs of motion [MOTION = subject], as e.g. 
    - pri “to go out”
  - Verbs of transfer, etc. [MOTION = object], as e.g.
    - h3b “to send”
3. New avenues for linguistic research

Case study 1: Graphemics and argument structure

How can we identify the semantic class “Verbs of Motion” thanks to Ramses

- Building the query in the SearchEngine
- Results of the first query
- Refining the query:
3. New avenues for linguistic research

Case study 1: Graphemics and argument structure

Results:

- A list of all verbs of motion attested in Late Egyptian is automatically produced, which allows to test the research question raised above.
3. New avenues for linguistic research
Case study 2: Variation between 3rd pl. suffix pronouns

Status quaestionis
- In LEg, there is a shift in the expression of the 3rd pl. suff. pr.
  - From OEG onwards down to the 18th dyn., the pronoun is uniformely written 
    -sn
  - By the end of the 20th dyn., the change to a new suff. pr. -w has been made fully
effective
- From a linguistic point of view, it is interesting to study how -sn was
  gradually superseded by -w
3. New avenues for linguistic research

Case study 2: Variation between 3rd pl. suffix pronouns

Methodology

- Looking for 3rd pl. suff. pronouns and poss. article with 3rd pl. possessor
3. New avenues for linguistic research

Case study 2: Variation between 3rd pl. suffix pronouns

Results

- The results can be sorted out according to morphology (-sn vs. -w) and chronology
- The results are quite numerically important (more than 5500 occ.)
- There is a sharp contrast between the data dating from the beginning of the NK (18th dyn) and …

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3. New avenues for linguistic research

Case study 2: Variation between 3rd pl. suffix pronouns

**Results**

<table>
<thead>
<tr>
<th>Texte</th>
<th>pos</th>
<th>date</th>
<th>word 0 spelling</th>
<th>word 0 lemma</th>
<th>word 0 inflexion</th>
</tr>
</thead>
<tbody>
<tr>
<td>P. BN 198 III (= P. BN 198... 7</td>
<td>-Ramsès XI 12</td>
<td>w (ls)</td>
<td>w (ls)</td>
<td>w [person 3, number p]</td>
<td></td>
</tr>
<tr>
<td>P. BN 198 III (= P. BN 198... 12</td>
<td>-Ramsès XI 12</td>
<td>w (ls)</td>
<td>w (ls)</td>
<td>w [person 3, number p]</td>
<td></td>
</tr>
<tr>
<td>P. BN 198 III (= P. BN 198... v 2</td>
<td>-Ramsès XI 12</td>
<td>w (ls)</td>
<td>w (ls)</td>
<td>w [person 3, number p]</td>
<td></td>
</tr>
<tr>
<td>P. BN 198 III (= P. BN 198... v 5</td>
<td>-Ramsès XI 12</td>
<td>w (ls)</td>
<td>w (ls)</td>
<td>w [person 3, number p]</td>
<td></td>
</tr>
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<td>P. BN 198 III (= P. BN 198... v 7</td>
<td>-Ramsès XI 12</td>
<td>w (ls)</td>
<td>w (ls)</td>
<td>w [person 3, number p]</td>
<td></td>
</tr>
<tr>
<td>P. Turin 1885+2006 (= P. Turin... r 1.8</td>
<td>-Ramsès XI 12</td>
<td>w (ls)</td>
<td>w (ls)</td>
<td>w [person 3, number p]</td>
<td></td>
</tr>
<tr>
<td>P. Turin 1885+2006 (= P. Turin... r 3.13</td>
<td>-Ramsès XI 12</td>
<td>w (ls)</td>
<td>w (ls)</td>
<td>w [person 3, number p]</td>
<td></td>
</tr>
<tr>
<td>P. Turin 1885+2006 (= P. Turin... r 3.13</td>
<td>-Ramsès XI 12</td>
<td>w (ls)</td>
<td>w (ls)</td>
<td>w [person 3, number p]</td>
<td></td>
</tr>
<tr>
<td>P. Turin 1885+2006 (= P. Turin... r 3.15</td>
<td>-Ramsès XI 12</td>
<td>w (ls)</td>
<td>w (ls)</td>
<td>w [person 3, number p]</td>
<td></td>
</tr>
<tr>
<td>P. Turin 1885+2006 (= P. Turin... r 3.15</td>
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</tbody>
</table>

**FNRS**

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3. New avenues for linguistic research
Case study 2: Variation between 3rd pl. suffix pronouns

The data sorted out by dynasties/reigns and according to text genres
3. New avenues for linguistic research

Case study 2: Variation between 3rd pl. suffix pronouns

Methodology

- Looking for 3rd pl. suff. pronouns and poss. article with 3rd pl. possessor
- Looking for docs that have both –sn and –w
  - looking for the 3rd pl. suff. pron. with the form –sn
  - taking as research corpus the set of texts that have the suff. pron. –sn, and looking for –w
3. New avenues for linguistic research

Case study 2: Variation between 3rd pl. suffix pronouns

An example of a text showing both forms of the 3rd pl. suff. pronoun
3. New avenues for linguistic research

Case study 2: Variation between 3rd pl. suffix pronouns

The reign of R. III seems to be a turning point

- For instance, pTurin 1880 (aka Turin Strike papyrus) displays the following results:
  - $-sn$: 18 occ. (mainly with prepositions)
  - $-w$: 22 occ.
3. New avenues for linguistic research

Case study 2: Variation between 3rd pl. suffix pronouns

The reign of R. III seems to be a turning point
- For instance, pTurin 1880 (aka Turin Strike papyrus) displays the following results:
  - \(-sn\) : 18 occ. (mainly with prepositions)
  - \(-w\) : 22 occ.

At the end of the 20th dyn., \(-w\) is used almost exclusively in non-literary texts
- For instance, pLéopold II-Amherst, a text that gives the proceedings of a trial involving robbers of royal tombs, displays the following results:
  - \(-sn\) : only 2 occ. (always with prep. \(im\))
  - \(-w\) : 23 occ.
3. New avenues for linguistic research

Case study 2: Variation between 3rd pl. suffix pronouns

Methodology

- Looking for 3rd pl. suff. pronouns and poss. article with 3rd pl. possessor
- Looking for docs that have both –sn and –w
- We are thus prompted to look for syntactic environments
  - In LEg, the suff. pron. can be used in the following environments:
    - Subject of some inflected forms (perfective, subjunctive, etc.)
    - Subject of some verbal auxiliaries (iw, wn.in, mtw, etc.)
    - Object of infinitives
    - Possessor (with a substantive)
    - After prepositions
    - Component of possessive articles (p3y.sn, etc.)
- In what follows, we restricted the scope to the reign of R. III
3. New avenues for linguistic research

Case study 2: Variation between 3rd pl. suffix pronouns
3. New avenues for linguistic research

Case study 2: Variation between 3rd pl. suffix pronouns

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Results Sorted Out According to the Preceding Word</th>
<th>Results Sorted Out According to the Preceding Word</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temple de Medinet Habu...</td>
<td>Ramses III</td>
<td>HA (derrière)</td>
</tr>
<tr>
<td>O. DeM 0973 (= O. DeM... 5</td>
<td>Ramses III</td>
<td>Hr (sur, au sujet...)</td>
</tr>
<tr>
<td>O. Gardiner 0177 (= O. Ga... r° 2</td>
<td>Ramses III</td>
<td>Hr (sur, au sujet...)</td>
</tr>
<tr>
<td>O. Gardiner 0177 (= O. Ga... r° 5</td>
<td>Ramses III</td>
<td>Hr (sur, au sujet...)</td>
</tr>
<tr>
<td>P. Lee (= P. Lee; id: 1616</td>
<td>Ramses III</td>
<td>Hr (sur, au sujet...)</td>
</tr>
<tr>
<td>P. Lee (= P. Lee; id: 1616</td>
<td>Ramses III</td>
<td>Hr (sur, au sujet...)</td>
</tr>
<tr>
<td>Temple de Medinet Habu...</td>
<td>Ramses III</td>
<td>Hr (sur, au sujet...)</td>
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<td>Ramses III</td>
<td>Hr (sur, au sujet...)</td>
</tr>
<tr>
<td>Temple de Medinet Habu...</td>
<td>Ramses III</td>
<td>Hr (sur, au sujet...)</td>
</tr>
<tr>
<td>P. Turin 1890 (= P. Turin... v° 6</td>
<td>Ramses III 29</td>
<td>Hr (sur, au sujet...)</td>
</tr>
<tr>
<td>P. Turin 1890 (= P. Turin... v° 2</td>
<td>Ramses III 29</td>
<td>Hr (sur, au sujet...)</td>
</tr>
<tr>
<td>Temple de Medinet Habu...</td>
<td>Ramses III</td>
<td>Hr (sur, au sujet...)</td>
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<tr>
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<td>Hr (sur, au sujet...)</td>
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<tr>
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<td>Ramses III</td>
<td>Hr (sur, au sujet...)</td>
</tr>
</tbody>
</table>

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Case study 2: Variation between 3rd pl. suffix pronouns

We then eliminated literary texts in order to have a homogeneous corpus. We also decided to consider only the material coming from Thebes in order to avoid possible dialectal interferences.

The data have been transferred on an Excel sheet for processing.

<table>
<thead>
<tr>
<th></th>
<th>noun</th>
<th>infinitive</th>
<th>preposition</th>
<th>poss. article</th>
<th>infl. verbs</th>
<th>conj. bases</th>
</tr>
</thead>
<tbody>
<tr>
<td>-(sn)</td>
<td>0</td>
<td>1</td>
<td>18</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>-(w)</td>
<td>20</td>
<td>47</td>
<td>36</td>
<td>10</td>
<td>16</td>
<td>80</td>
</tr>
</tbody>
</table>
3. New avenues for linguistic research

Case study 2: Variation between 3rd pl. suffix pronouns

Zooming in to single texts

<table>
<thead>
<tr>
<th>–sn</th>
<th>–sn and –w</th>
<th>–w</th>
</tr>
</thead>
</table>
| O. DeM 603  
P. Louvre E 27151 | O. DeM 973 | O. BM 50734  
O. Gardiner 99  
O. Caire CG 25673 |
| P. DeM 26 (16)  
P. Boulaq 10 (8)  
P. Turin 1880 (29) | O. Ashmolean HO 655  
O. BM 5637  
O. Berlin P. 10629  
O. Caire CG 25553 (12)  
O. DeM 569  
O. DeM 580  
O. DeM 592  
O. Florence 2621 (21)  
O. Gardiner 103  
O. OIC 110  
P. Berlin P. 10496 (21)  
P. Rifaud A,B,C (30)  
P. Rollin (30)  
P. Turin 1875 (30) |

This opens up new perspectives in scribal practices
3. New avenues for linguistic research

Case study 3: sequence of verbal forms expressing orders and injunctions

Status quaestionis

- Two possibilities in Late Egyptian:
  - repeating the verbal form, in this case, the imperative,
  - or using a form that is specialized in expressing sequentiality
- For the last option, there are in LEgypt two patterns:
  - The so-called “Sequential” $i\;w\;f\;h\;r\;s\;d\;m$, mainly confined to narrative,
  - The conjunctive $m\;t\;w\;f\;s\;d\;m$, which is mainly used in discourse

Ex.

- $i.\;j\;m$
- $i.\;w\;n\;p\;3\;m\;h\;r$
  “go, open the storehouse!” (pOrbiney 3,1-2)

Ex.

- $i.\;j\;m\;r\;h\;r\;y$
- $m\;t\;w.\;t\;n\;n\;w\;y\;n\;3\;y.\;t\;n\;h\;c\;w$
  “go uphill and fetch your tools” (pTurin 1880, r° 4,19-20)
3. New avenues for linguistic research

Case study 3: sequence of verbal forms expressing orders and injunctions

Methodology

- looking for sequences of imperatives (excluding the verb *dir* “say” as first imperative)
- looking for the sequence imperative + conjunctive (limited to 2\textsuperscript{nd} pers.)
3. New avenues for linguistic research

Case study 3: sequence of verbal forms expressing orders and injunctions

For practical reasons,
- the data are limited to 20th and 21st dynasties
- only non-literary texts have been considered (with the exception of fictional tales)

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<th>Imperative + Conjunctive</th>
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<td>nb of texts</td>
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Starting from this sub corpus, it is possible to test different criteria that can explain the distribution:
- chronology,
- phraseology,
- textual genres,
- scribal traditions, etc.
3. New avenues for linguistic research

Case study 3: sequence of verbal forms expressing orders and injunctions

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**rdi + rdi** : phraseology in letters (well wishes)

Ex. (I say everyday to the gods)

\[
\text{imy n.tn  \text{\textlangle}n}{\text{\textrangle}-\text{wd3-snb  \text{\textlangle}h}{\text{\textrangle}-h{\text{\textrangle} k3 i3w.t 3.t nfr.t}
\text{imy n.tn hsw.t knw}
\text{imy iw.i}
\]

"give them life, prosperity, health, a long life and a beautiful old age give them numerous honors let me come (back) » (pTurin 1972)
3. New avenues for linguistic research

Case study 3: sequence of verbal forms expressing orders and injunctions

In the *Wenamun*, for instance,

- the sequence imperative + imperative is attested 5 times (1,23; 1,39; 2,7; 2,14; 2,52)
- the sequence imperative + conjunctive is attested 2 times (2,49 and 2,73)

In the second scheme, the conjunctive has a semantic value of consequence (an evolution that is above all perceptible in the first person and will grow in Coptic), whereas the first scheme mainly expresses the sequence of two orders.