A Typology of Non-Projective Patterns in Unas's and Teti's Pyramid Texts

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Abstract

The aim of this paper is to study the use of non-projective structures in Unas's and Teti's Pyramid Texts (ca. 2321–2279 BC) annotated in the Egyptian-UJaen treebank. It offers the first typology of non-projective patterns in Old Egyptian, and it discusses the causes for non-projectivity in the Old Egyptian language of Unas's and Teti's Pyramid Texts to conclude that non-projectivity is an exceptional phenomenon in these texts.

1 Introduction

The Egyptian-UJaen treebank in Universal Dependencies (hereafter UD-EUJA treebank) holds now 21,945 words and 2,192 sentences, most of them from Unas's and Teti's Pyramid Texts (ca. 2321–2279 BC) written in Old Egyptian (ca. 2700–2000 BC). [1] It allows the search for any morphosyntactic feature in those texts.

The analysis of non-projective structures in Unas's and Teti's Pyramid Texts is intended to shed light on the way they were formed and the morphosyntactic rules that govern their use. This will enable us to develop digital tools for the automatic translation of Egyptian texts.

This paper is divided into the following parts:
— A conceptual explanation of "projectivity" and "non-projectivity" in dependency grammar (2).
— A critical review of the analysis of "non-projectivity" in Egyptian philology (3).
— A typology of non-projective structures in Unas's and Teti's Pyramid Texts according to five patterns (4).
— A discussion of syntactic and pragmatic factors when dealing with non-projective structures in Unas's and Teti's Pyramid Texts (5).
— A conclusion (6).

2 Concept

"Projectivity" and "non-projectivity" are two key concepts coined in dependency grammar in the 1960s (Lecerf, Ihm, 1960, Hays, 1964, 519 and Marcus, 1965, 181–192). "Projectivity" is used as a label for a *continuous structure* whose dependents are close to their heads in word order (Osborne, 2019, 199 and 203). There are no intersections of connection lines in a dependency tree showing a projectivity structure (Hays, 1964, 519), for example:

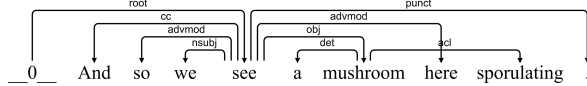1) UD_English-ParTUT@2.15, id-sent 872:
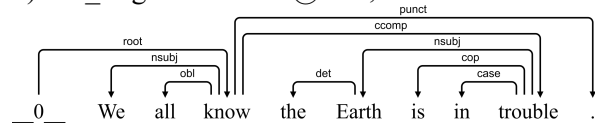
By contrast, non-projectivity refers to structures whose dependents are separated from their heads by one or more words causing a discontinuity. This results in crossing lines in a tree (Osborne, 2019, 213). Although non-projective structures arise from ungrammatical sentences, such as **Whose do you like answer?* (Groß and Osborne, 2009, 43), there are grammatically accepted non-projective sentences, for example:

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[1] The Pyramid Texts have been edited by Sethe (1908–22) and by Allen (2013). Both works have been used for the annotation of the Pyramid Texts in the UD-EUJA treebank. The present paper is based on the latest version of the treebank published in UD release 2.16 (May 2025). For a general description of the UD-EUJA treebank see Díaz Hernández and Passarotti 2024.
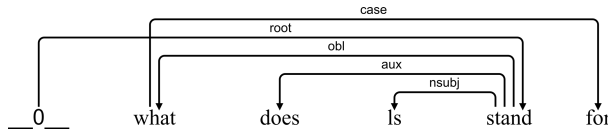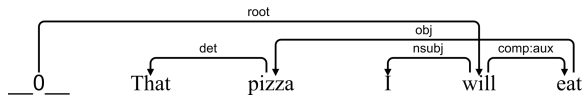
2) UD_English-ParTUT@2.15, id-sent = 896:

root · cc · advmod · nsubj · advmod · obj · det · punct · acl
__0__ And so we see a mushroom here sporulating .

The continuous structure between "mushroom" (*head*) and "sporulating" (*dependent*) is broken by the adverb "here" governed by the verb "see". This causes a discontinuity in the word order of sentence 2 and an intersection of lines in the tree.

Grammatical non-projective structures follow patterns governed by syntactic rules. However, it should be noted that non-projective patterns may vary according to the dependency theory applied to syntactic analysis. For example, there are three patterns of non-projectivity in English according to the traditional dependency grammar (Osborne, 2019, 204): *wh*-fronting (ex. 3), extraposition (ex. 2), and topicalization (ex. 4).

3) UD_English-Atis@2.15, id-sent 0033.train; a *wh*-question and preposition at the end of a sentence:

case · root · obl · aux · nsubj
__0__ what does ls stand for

4) Topicalization:

root · det · obj · nsubj · comp:aux
__0__ That pizza I will eat

However, according to the Universal Dependencies approach, the root of a verbal sentence is the verb (De Marneffe *et al.*, 2021, 257 and Nivre *et al.*, 2016, 1662), but not an auxiliary so that examples of topicalization such as 4 are considered to be projective structures:

5)

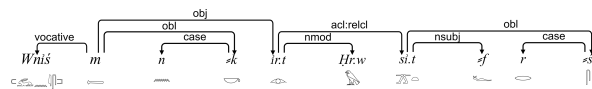root · det · obj · nsubj · aux
__0__ That pizza I will eat
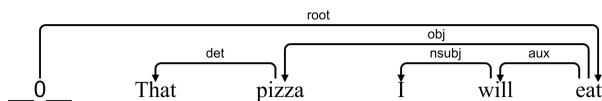
In this paper, only Egyptian structures considered to be non-projective according to the traditional dependency theory and Universal Dependencies have been selected for study. If a sentence is considered non-projective just in terms of traditional dependency theory, it has been left out.

3 Non-projectivity in Egyptian philology

The issue of non-projectivity in Egyptian has been discussed so far only by Landgráfová, who, in her paper on the function of resumptive pronouns in Middle Egyptian, concluded that they are used in order to avoid non-projective structures, especially in relative forms (Landgráfová, 2002, 282). However, syntactic tree diagrams of relative clauses do not support such a conclusion. Given a sentence with the relative form *sı̓.t* "which went":

6) UD_EUJA-150 = PT 31a W

vocative · obl · obj · case · acl:relcl · nmod · nsubj · obl · case
Wnı̓ś *m* *n* *ꞽk* *ꞽr.t* *Ḥr.w* *sꞽ.t* *ꞽf* *r* *ꞽś*

LT.:[2] "Unas (*Wnı̓ś*), take (*m*) for (*n*) yourself (*ꞽk*) the eye (*ꞽr.t*) of Horus (*Ḥr.w*) which-went (*sꞽ.t*) he (*ꞽf*) to (*r*) it (*ꞽś*, referring to the eye)."
FT: "Unas, take the eye of Horus for which he went."

The word order of this sentence is clearly projective (fig. 1, cf. Landgráfová, 2002, 279, no. 35 and 36). It consists of the root *m* "take" governing *Wnı̓ś* as its vocative, *n ꞽk* "for yourself" an adverbial phrase, and *ꞽr.t* "eye" its direct object, followed by two modifiers—the name Horus (*Ḥr.w*) and the relative form *sꞽ.t* "which went". This relative form governs its own subject (*ꞽf* "he") and an adverbial phrase consisting of the preposition *r* "for" and the resumptive pronoun *ꞽś*, which semantically refers to the antecedent of the relative form (*ꞽr.t* "eye"), but is syntactically governed by the relative form (*sꞽ.t*). The absence of that resumptive pronoun would not cause any discontinuity in the sentence, nor an intersection of connection lines—either the relative form would lack a prepositional phrase (*) or the preposition to which it is attached would stand alone (**):
(*)
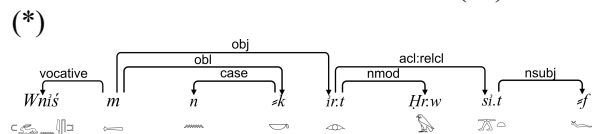
vocative · obl · obj · case · acl:relcl · nmod · nsubj
Wnı̓ś *m* *n* *ꞽk* *ꞽr.t* *Ḥr.w* *sꞽ.t* *ꞽf*

(**)
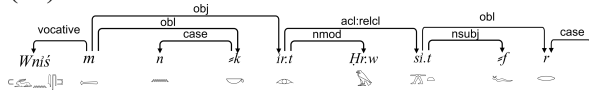
In any case, the sentence would be syntactically ungrammatical, rather than non-projective. In spite of this, Landgráfová's pioneering work is inspiring because it invites us to search for real types of non-projective structures in Egyptian texts.

4 Non-projective patterns in Unas's and Teti's Pyramid Texts

The UD-EUJA treebank is available in GREW-MATCH for morphosyntactic queries.[3] The search for non-projective structures in the latest version of this treebank using GREW-MATCH yields 31 cases of non-projectivity, of which 17 are found in Unas's Pyramid Texts and 10 in Teti's Pyramid Texts[4] (see table in the Appendix). This represents 1.37 % of all sentences from the Unas's Pyramid Texts and 1.42 % of all sentences from the Teti's Pyramid Texts in the UD-EUJA treebank. Five types of non-projectivity can be distinguished:
1) Extraposition by inserting an adverbial phrase (EUJA-654, 871, 942, 1291, 1313, 1390, 1415, 1511, 1758, 1769, 1835, 2050, 2101, 2119).
2) Extraposition by inserting a vocative (EUJA-117, 981, 1406, 1753).
3) Extraposition by inserting a verb of utterance (EUJA-1455, 1507, 2038).
4) Extraposition of the nisba adjective *n(.t)* in the so-called "indirect genitive" (EUJA-442, 1290, 1294, 1338, 1614).
5) Discontinuity due to a dislocated element in a sentence with an emphatic subject (EUJA-385).

4.1 Extraposition by inserting an adverbial phrase

This type is also found in English (see ex. 2, above). It is the most common type of non-projectivity in Unas's and Teti's Pyramid Texts. It consists of a noun phrase acting as a head, whose modifier is extraposed by an adverbial phrase linked to the root and inserted between the head

and its modifier. The adverbial phrase (AP) can be an oblique adjunct (obl, ex. 7, 8, 9, 10), an oblique argument (obl:arg, ex. 11 and 13) or a noun in adverbial function (obl, ex. 12). The extraposed modifier (EM) is usually an attribute in the form of an adjective (adj, ex. 7) including a nisba adjective (nadj, ex. 8),[5] a verb conjugated in the Old Semitic suffix conjugation and used in attributive function (OSSC, ex. 9), a participle (part, ex. 10) and a relative form (RF, ex. 11). A noun used in apposition (appos, ex. 12) or in a conjunct relation to its head (conj, ex. 13) can also be extraposed.

7) EUJA-1313 = Pyr. 424a, Unas, AP = obl and EM = adj (*cf*. fig. 1):
č(t) mṯw ik rr Wniś ʿn.t ꞊f tn ir ꞊k iꜣb.t (...)
LT: "Saying (*č(t)*) a speech (*mṯw*): 'Unas (*Wniś*) shall-dart (*ik*) indeed (*rr*) this (*tn*) left (*iꜣb.t*) thumb-nail (*ʿn.t*) of his (*꞊f*) against (*ir*) you (*꞊k*) (...).'"
FT: "Recitation: 'Unas shall dart indeed this left thumb-nail of his against you (...).'"

The prepositional phrase *ir ꞊k* "against you" is inserted between *ʿn.t ꞊f tn* "this thumb-nail" and its attribute *iꜣb.t* "left". Violation of the word order is due to the fact that *ir ꞊k* is governed by the verb *ik*.

8) EUJA-2119 = Pyr. 734a–b, Teti, AP = obl and EM = nadj (*cf*. fig. 2):
(...) irč.t ꞊k n ꞊k im.t mnč(.wi) mw.t ꜣś.t
LT: "(...) Your (*꞊k*) milk (*irč.t*) (is) for (*n*) you (*꞊k*) which-is-from (*im.t*) the breasts (*mnč(.wi)*) of Mother (*mw.t*), Isis (*ꜣś.t*)."
FT: "(...) Your milk, which comes from the breasts of Mother Isis, is for you."

The predicate of this adverbial sentence is *n ꞊k* "for you". The syntactic discontinuity is caused by the placement of the predicate between the subject (*irč.t ꞊k*) and its nisba adjective (*im.t*).

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[3]Grewmatch (https://universal.grew.fr/) has proven to be an effective digital tool for studying non-projective structures in French, see Perrier, 2021, 41–42.
[4] The sentences EUJA-236, 441 and 729 are from Pepi II's Pyramid Texts, which are not included in this study. The sentence EUJA-2172 contains an annotation error which causes a non-projectivity structure–the word *čwi.w* is used as an apposition of *ḥ(n)ḳ.t*, rather

than *sp*. This error will be corrected in the next release of the treebank.
[5] In Semitic languages, such as Arabic, "nisba" is used to label an ending added to nouns, and rarely to prepositions and pronouns, to form (relative) adjectives and nouns (see Schulz 2010, 86). The addition of the nisba ending to prepositions to form adjectives and nouns is a common feature in Egyptian.

9) EUJA-1390 = Pyr. 451b–c, Unas, AP = obl and EM = OSSC:[6]
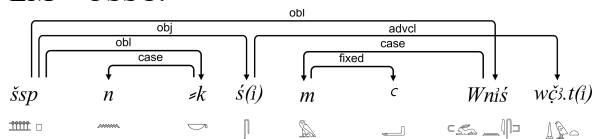
LT: "Accept (*šsp*) for (*n*) yourself (*ꞏk*) it (*ś(i)*) from-the-hand-of (*m-ꜥ*) Unas (*Wniś*) being intact (*wč₃.t(i)*) (...)"
FT: "Accept it from Unas intact (...)"

The verb *wč₃* is conjugated in the 3rd. f. sg. person of the OSSC and used in an attributive function. Its head is the dependent pronoun *ś(i)* used as a direct object of the verb *šsp*. The prepositional phrase *m-ꜥ Wniś* is inserted between the pronoun *ś(i)* and *wč₃.t(i)* and it causes a non-projective structure, as the prepositional phrase is governed by the root (*šsp*).

10) EUJA-1511 = Pyr. 500a, Unas, AP = obl and EM = part (*cf.* fig. 3):[7]
ič ꞏk n ꞏk Wniś ḥnꜥ ꞏk ḥnꜥ ꞏk nfꜥ n ꞏk š₃p.t (...)
LT: "You (*ꞏk*) shall-take (*ič*) Unas (*Wniś*) for (*n*) you (*ꞏk*), with (*ḥnꜥ*) you (*ꞏk*), with (*ḥnꜥ*) you (*ꞏk*), he-who-drives-away (*nfꜥ*) storms (*š₃p.t*) for (*n*) you (*ꞏk*) (...)"
FT: "You shall take Unas for you, with you and with you, he who drives away storms for you (...)"

The active present participle *nfꜥ* "he who drives away" is governed by the king's name *Wniś* used as a direct object of the verb *ič*. Non-projectivity is caused by the double insertion of *ḥnꜥ ꞏk* between *Wniś* and its participle, as *ḥnꜥ ꞏk* is a prepositional phrase linked to the root of the sentence (*ič*).

11) EUJA-1758 = Pyr. 599b-c, Teti, AP = obl:arg and EM = RF (*cf.* fig. 4):
(...) int ꞏf mẖn.t tf n.t Mr-n(.i)-ẖ₃ n Tti č₃₃.t ꞏf nčr(.w) im ꞏś (...)
LT: (...) that-he-may-bring (*int*) that (*tf*) boat (*mẖn.t*) belonging-to (*n.t*) Merenkha (*Mr-n(.i)-ẖ₃*) to (*n*) Teti (*Tti*) which-ferries (*č₃₃.t*) he (*ꞏf*) the gods (*nčr(.w)*) in (*im*) it (*ꞏś*) (...)."
FT: "(...) that he may bring to Teti that boat of Merenkha in which he ferries the gods (...)."

According to the Old Egyptian word order, the oblique argument (obl:arg) consisting of the preposition *n* plus a noun and used as an indirect object should follow the direct object of a sentence (Schenkel, 2012, 68–69). Example 11 shows that

this rule is obeyed even if the oblique argument (*n Tti* "to Teti") causes a discontinuity between the direct object (*mẖn.t* "boat") and its attribute (*č₃₃.t ꞏf* "on which he ferries").

12) EUJA-1769 = Pyr. 606b-d, Teti, AP = obl and EM = appos (*cf.* fig. 5):
(...) mr s₃i.t Nw.w ft.t iptw nčr.(w)t hrw s₃.n ꞏśn ẖnṭ ₃ś.t Nb.t-ḥw.t Ni.t Śrḳ.t-ḥtw
LT: "(...) As (*mr*) Nu (*Nw.w*) protected (*s₃i.t*) these (*iptw*) four (*ft.t*) goddesses (*nčr.(w)t*) the day (*hrw*) (that) they (*ꞏśn*) protected (*s₃.n*) the throne (*ẖnṭ*), Isis (*₃ś.t*), Nephthys (*Nb.t-ḥw.t*), Neith (*Ni.t*), Selqet-hetu (*Śrḳ.t-ḥtw*)."
FT: "(...) As Nu protected these four goddesses on the day when they protected the throne, namely Isis, Nephthys, Neith, and Selket."

Nčr.(w)t "goddesses" is used after the numeral *ft.t* "four" in apposition according to Old Egyptian grammatical rules (Schenkel, 2012, 121). The syntactic continuity is broken by inserting the noun *hrw* "day" used adverbially between *nčr.(w)t* and the names of the four goddesses Isis, Nephthys, Neith, and Selket.

13) EUJA-2050 = Pyr. 707a-b, Teti, AP = obl:arg and EM = conj (*cf.* fig. 6):
in n ꞏk irč.t ₃ś.t n Tti ₃gb.i Nb(.t)-ḥw.t (...)
LT: "Bring (*in*) for (*n*) yourself (*ꞏk*) the milk (*irč.t*) of Isis (*₃ś.t*) for (*n*) Teti (*Tti*), the flood (*₃gb.i*) of Nephthys (*Nb(.t)-ḥw.t*) (...)."
FT: "Bring to Teti, the milk of Isis, the flood of Nephthys (...)"

The insertion of *n Tti* "for Teti" between two noun phrases in a coordinate relation causes a non-projective structure. However, it is probably an error because *n* + king's name appears in a projective structure between n *ꞏk* and the first noun phrase (*irč.t* "milk") in the Pyramid Texts witness of Pepi II (Pyr. 707a, N).
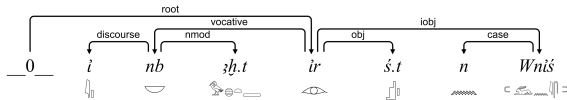
4.2 Extraposition by inserting a vocative

A noun phrase, especially a name, can be used as a vocative preceding or following the root of the sentence, for example:

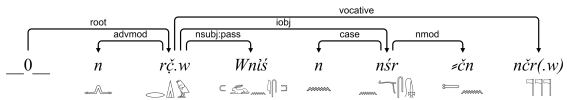[6] Sim. EUJA-942, 1291, 1415, 1835 and 2101.

[7] Sim. EUJA-654 and 871.

14) EUJA-894 = Pyr. 277a, Unas:

LT: "O (*i*) lord (*nb*) of Akhet (*ꜣḫ.t*)! Make (*ir*) a place (*ś.t*) for (*n*) Unas (*Wniś*)."
FT: "O lord of Akhet! Make a place for Unas."

15) EUJA-1049 = Pyr. 323d, Unas:

LT: "Unas (*Wniś*) will-not-be-given (*n rč̣.w*) to (*n*) your (*≠čn*) flame (*nśr*), (you) gods (*nčr(.w)*)."
FT: Unas will not be given to your flame, you gods.

A non-projective structure with a vocative occurs when the noun phrase used as a vocative is inserted between a noun governed by the root and its nominal dependent, thus violating the word order, for example:

16) EUJA-981 = Pyr. 306d, Unas:
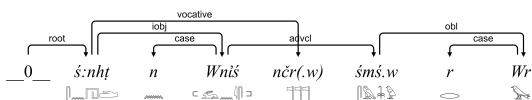
LT: "Make-salutation (*ś:nhṭ*), to (*n*) Unas (*Wniś*), (you) gods (*nčr(.w)*), who-is-older (*śmś.w*) than (*r*) the Great-One (*Wr*)."
FT: "Make salutation, you gods, to Unas, who is older than the Great-One."

The vocative *nčr(.w)* "gods" is governed by the root and it is inserted between *Wniś* as an indirect object (obl:arg) and *śmś.w* which is a participle used as an attribute of *Wniś*.

17) EUJA-1406 = Pyr. 457a–b, Unas (*cf.* fig. 7):
ś:bꜣḳ r ≠k Wniś m šı̣ ≠k pw sꜣb.y sꜣb ś:wꜥb.ıw ≠k nčr(.w) ı̣m ≠f
LT: "Make-bright (*ś:bꜣḳ*) indeed (*r ≠k*) Unas (*Wniś*) in (*m*) this (*pw*) jackal (*sꜣb.y*) lake (*šı̣*) of yours (*≠k*), (O) Jackal (*sꜣb*), which-cleansed (*ś:wꜥb.ıw*) you (*≠k*) the gods (*nčr(.w)*) in (*ı̣m*) it (*≠f*)."
FT: "Make Unas bright in this jackal lake of yours, O Jackal, in which you cleansed the gods."

The noun *sꜣb* "Jackal" acts as the vocative of the causative verb *ś:bꜣḳ* "make bright". It is inserted between an adverbial phrase (*m šı̣ ≠k pw sꜣb.y*) governed by the root and a relative form (*ś:wꜥb.ıw ≠k*) used as an attribute of *šı̣* "lacke". This results in

a non-projective structure because *sꜣb* breaks the continuity between *šı̣ ≠k* and its relative form.

18) EUJA-117 = Pyr. 22a, Unas (*cf.* fig. 8):
ḳbḥ(.w) ≠k ı̣pn Wśr(.w) ḳbḥ(.w) ≠k ı̣pn hꜣ Wniś pr.w ḫr sꜣ ≠k (...)
LT: "These (*ı̣pn*) libations (*ḳbḥ(.w)*) of yours (*≠k*), (O) Osiris (*Wśr(.w)*), these (*ı̣pn*) libations (*ḳbḥ(.w)*) of yours (*≠k*), O (*hꜣ*) Unas (*Wniś*), came (*pr.w*) from (*ḫr*) your (*≠k*) son (*sꜣ*) (...)"
FT: "These libations of yours, O Osiris, these libations of yours, O Unas, came from your son (...)"

Wśr(.w) "Osiris" acts as a vocative of the root (*pr.w*). It follows a noun phrase which is a subject (*ḳbḥ(.w) ≠k ı̣pn*) and is repeated after *Wśr(.w)* "Osiris". A discontinuity of word order happens because the repeated noun phrase is linked in a coordinate relation (conj) to the subject, whereas *Wśr(.w)* "Osiris" is governed by the root. Similarly, in the following example, the vocative (*Mꜣ-ḥꜣ-≠f*) is governed by the root (*rś*) and is inserted between two adverbial phrases linked by a coordinate relation (conj):

19) EUJA-1753 = Pyr. 597a, Teti (*cf.* fig. 9):
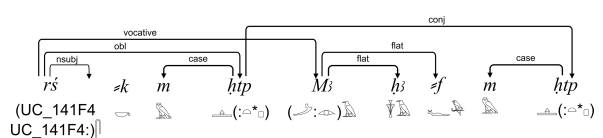
LT: "You (*≠k*) shall-awake (*rś*) in (*m*) peace (*ḥtp*), O Mahaef (*Mꜣ-ḥꜣ-≠f*), in (*m*) peace (*ḥtp*)."
FT: "You shall awake in peace, O Mahaef, in peace."

4.3 Extraposition by inserting a verb of utterance

If a verb of utterance is inserted into a direct speech text by means of a parataxic relation, and the root of the sentence governs the elements of the direct speech text, there is no syntactic discontinuity:

20) EUJA-512 = Pyr. 147b, Unas:

LT: "'You (*kw*) (are) distinguished (*čn*)', said (*ı̣.n*) they (*≠śn*), 'in (*m*) your (*≠k*) name (*rn*) belonging-to (*n(.i)*) god (*nčr*).'"
FT: "'You are distinguished', said they, 'in your name of god.'"

5

The root (*čn* "be distinguished") governs both—the verb of utterance (*i.n ≠śn* "they said") and the extraposed prepositional phrase in the direct speech sentence (*m rn ≠k n(.i) nčr* "in your name of god".)

A non-projectivity structure occurs when the second part of the direct speech text is not governed by the root, but rather by a component in the first part of the direct speech text which is separated from its second part by the verb of utterance (see examples 21–23).

21) EUJA-1455 = Pyr. 476a–477b, Unas (*cf.* fig. 9):
(...) nfr w(i) ³ m³.w ḥtp w(i) ³ pt(r) i.n ≠śn in nčr(.w) pr.t r ≠f nčr pn ir p.t (...)
LT: "(...) 'How (*w(i)*) lovely (*nfr*) (it is) really (*³*) to see (*m³.w*), how (*w(i)*) pleasing (*ḥtp*) (it is) really (*³*) to behold (*pt(r)*)'—said (*i.n*) they (*≠śn*), namely (*in*) the gods (*nčr(.w)*)—'that this (*pn*) god (*nčr*) ascends (*pr.t*) indeed (*r ≠f*) to (*ir*) the sky (*p.t*)' (...)"
FT: "(...) 'How lovely it is really to see and how pleasing it is really to behold', said they, namely the gods, 'that this god ascends to the sky' (...)"

The verb *nfr* "be lovely, nice" governs *i.n ≠śn* "they said", but not *pr.t* "ascend", which is an infinitive used in an object clause syntactically linked to *pt(r)* "behold" in the first part of the direct speech text.

22) EUJA-1507 = Pyr. 497b, Unas (*cf.* fig. 10):
wč Wniś r ≠k wč św wč św č(t) mṭw sp 4 čṭ(.w) n 4 ipw kh³.w (...)
LT: "'Commend (*wč*) Unas (*Wniś*) indeed (*r ≠k*), commend (*wč*) him (*św*), commend (*wč*) him (*św*)'—saying (*č(t)*) a speech (*mṭw*) four (4) times (*sp*) in-succession (*čṭ(.w)*))—'to (*n*) these (*ipw*) four (4) blustering-winds (*kh³.w*) (...)'"
FT: "'Commend Unas, commend him, commend him'—recitation four times in succession—'to these four blustering winds (...)'"

The verb of utterance is inserted between the oblique argument "to these four blustering winds" (*n 4 ipw kh³.w*) and its head "commend" (*wč*), thus violating the word order of the sentence in the direct speech text. It can also happen that the direct speech text is introduced by the *č(t) mṭw* formula "saying a speech" and its word order is broken by inserting a ritual remark which completes the text of the *č(t) mṭw* formula, as in the following example:

23) EUJA-2038 = Pyr. 702a, Teti (*cf.* fig. 11):
č(t) mṭw n°.w Tti ḥn° ≠k n°w.ti sp 4 čṭ(.w) tp(.i) i³w.(w)t W³č.t
LT: "Saying (*č(t)*) a speech (*mṭw*): 'Teti (*Tti*) will-travel (*n°.w*) with (*ḥn°*) you (*≠k*), Traveller (*n°w.ti*)'—4 times (*sp*) in-succession (*čṭ(.w)*)—'who-is-on (*tp(.i)*) the standards (*i³w.(w)t*) of Wadjet (*W³č.t*).'"
FT: "Recitation: 'Teti will travel with you, O Traveller'—4 times in succession—'who is on the standards of Wadjet.'"

The syntactic relation between *n°w.ti* "Traveller" and its nisba adjective *tp(.i)* "one who is on" is broken by the ritual remark *sp 4 čṭ(.w)* "four times in succession", which completes the text of the *č(t) mṭw* formula "saying a speech/recitation"

4.4 Extraposition of *n.i* "belonging to/of"

This type of non-projectivity is well known to students of Middle Egyptian when dealing with the so-called "indirect genitive". However, it has been overlooked that the extraposition of *n.i* in a *pw* sentence is a case of non-projectivity.

According to the dependency approach, the "indirect genitive" consists of the nisba adjective *n.i* "belonging to" used as an adjectival modifier of its head (amod) and a noun used as an oblique adjunct of *n.i* (obl), for example:
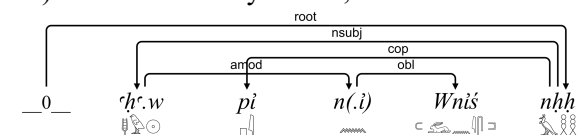
24) EUJA-414 = Pyr. 293a, Unas:
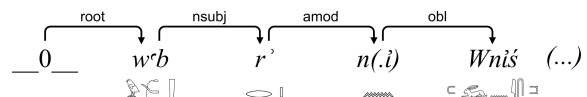
LT: "The mouth (*r'*) belonging-to (*n(.i)*) Unas (*Wniś*) (is) pure (*w°b*) (...)"
FT: "The mouth of Unas is pure (...)"

In a *pw* sentence, non-projectivity occurs when *pw* is used as a copula and inserted between *n(.i)* and its head:

25) EUJA-1290 = Pyr. 412a, Unas:[8]

LT:"The lifetime (*ḥ°.w*) is (*pi*) belonging-to *n(.i)* Unas (*Wniś*) eternity (*nḥḥ*)."
FT: "Unas' lifetime is eternity."

This is a *pw* nominal sentence consisting of *ḥ°.w* as its subject and *nḥḥ* as its root. *Pi* is an older variant

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[8] Sim. EUJA-442 and 1614.

of *pw* and acts as a copula linking the subject and the root. Its insertion between *ḥ ꜥ.w* and *n(.i) Wniś* causes a discontinuity in the word order. It should be noted that there is no discontinuity when *n(.i)* follows the root of a *pw* nominal sentence:
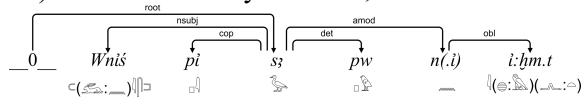
26) EUJA-1373 = Pyr. 445b, Unas:

LT: "Unas (*Wniś*) is (*pi*) Sokar (*Skr*) belonging-to (*n.i*) Rostau (*Rꜣ-sčꜣ(.w)*))."
FT: "Unas is Sokar of Rostau."

The structure is also projective when *pw / pi* is used as a demonstrative determiner instead of a copula:

27) EUJA-1544 = Pyr. 515c-d, Unas:

LT: "Unas (*Wniś*) is (*pi*) this (*pw*) son (*sꜣ*) belonging-to (*n(.i)*) the one-who-is-unknown (*i:ḫm.t*)."
FT: "Unas is this son of the one who is unknown."

However, the insertion of an adverbial phrase between a noun after *pw* used as a demonstrative determinative and the nisba adjective *n.i* causes a syntactic discontinuity. This is actually a type of nisba adjective extraposed by an adverbial phrase (*cf.* ex. 8, above):

28) EUJA-1338 = Pyr. 434e, Unas (*cf.* fig. 12):
im ꜣf čṭ rn ꜣk pw r ꜣk n.i Nm(.i) sꜣ Nm(i).t
LT: "He (*ꜣf*) shall-not (*im*) pronounce (*čṭ*) this (*pw*) your (*ꜣk*) name (*rn*) against (*r*) you (*ꜣk*) belonging-to (*n.i*) Nemi (*Nm(.i)*), son (*sꜣ*) of Nemit (*Nm(i).t*)."
FT: "He shall not pronounce against you this your name of Nemi, son of Nemet."

Here the noun phrase *rn ꜣk* "your name" is followed by *pw* used as a demonstrative determiner. Non-projectivity is caused by the insertion of the prepositional phrase *r ꜣk* between *rn ꜣk* and the nisba adjective *n.i* because *r ꜣk* is governed by the root of the sentence (*čṭ*).

The word order in the "indirect genitive" is violated by the insertion of an adverbial phrase between the noun and the nisba adjective *n.i*, even if *pw* is not used as demonstrative determiner of the noun:

29) EUJA-1294 = Pyr. 415a–c, Unas (*cf.* fig. 13):
(...) ḥw.(w)t ꜣčn Ḥr.w hrm(.w) r Wniś m ꜥrḳ ꜣf r pḥ ꜣf n(.i) bśk n(.i) i ꜥn
LT: "(...) Your (*ꜣčn*) Horus (*Ḥr.w*) mansions (*ḥw.(w)t*) are-barred (?) (*hrm(.w)*) to (*r*) Unas (*Wniś*), his (*ꜣf*) bent tail (*m ꜥrḳ*), belonging-to (*n(.i)*) the intestine (*bśk*) belonging-to (*n(.i)*) a baboon (*i ꜥn*), (is) at (*r*) his (*ꜣf*) rear (*pḥ*)."
FT: "(...) Your Horus mansions are barred (?) to Unas, his bent tail, of the intestine of a baboon, is at his rear.

Although the meaning of *hrm(.w)* is controversial (Faulkner, 1969, 84 and Sethe, 1936, 176), it acts as the head of this sentence. It is the verb *hrm* conjugated in the 3rd. c. pl. person of the OSSC. Its subject is *ḥw.(w)t ꜣčn Ḥr.w* "your Horus mansions" and the prepositional phrase *r Wniś* belongs to its predicate. It is followed by an adverbial sentence consisting of *m ꜥrḳ ꜣf* as its subject and the prepositional phrase *r pḥ ꜣf* as its predicate, which is inserted between *m ꜥrḳ ꜣf* and its nisba adjective *n(.i)* causing non-projectivity.

4.5 Discontinuity due to a dislocated element in a sentence with emphatic subject

In Earlier Egyptian, an emphatic subject is introduced by the particle *in* and followed by a participle or a future verb form, for example:

30) EUJA-397 = Pyr. 123d-e, Unas:
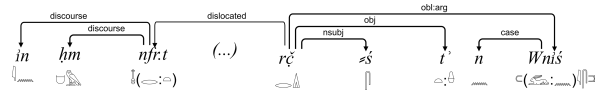
LT: "(It) (is) really (*ḥm*) the-beautiful-one (*nfr*) (...) she (*ꜣś*) will-give (*rč*) bread (*t ꜣ*) to (*n*) Unas (*Wniś*) (...)"
FT: "It is really the beautiful one (...) she will give bread to Unas (...)"

The future verb form *rč ꜣś* "she will give" is placed after the emphasised subject and followed by its direct object *t ꜣ* "bread" and its oblique argument *n Wniś* "to Unas". However, a dislocated element may precede the emphasised subject causing discontinuity in the word order, for example:

31) EUJA-385 = Pyr. 121a, Unas:
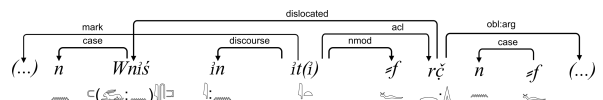
LT: "(...) to (*n*) Unas (*Wniś*), (it) (is) his (*ꜣf*) father (*it(i)*) who-gave (*rč*) to (*n*) him (*ꜣf*)."

FT: "(...) to Unas, it is his father who gave to *n* him."

This sentence has two oblique arguments *n Wniś* "to Unas" and *n ≠f* "to him". The first of them precedes the emphasised subject *in it(i) ≠f* "it is his father" causing discontinuity in the word order. It is in a dislocated relation to the participle *rč* "who gave". The second oblique argument *n ≠f* "to him" follows the participle according to the Earlier Egyptian word order. The first oblique argument (*n Wniś*) can also be emphasised, because it is referred to by the resumptive pronoun in the second oblique argument. However, this case of non-projectivity may be due to an error involving the addition of *n Wniś* before the emphasised subject (*in it(i) ≠f*), since no example of this is found in Egyptian grammars.

5 Factors for the use of non-projective structures in Old Egyptian

Example 11 showed that non-projectivity may be due to syntactic factors, since the rigid word order of Old Egyptian remains unchanged even when an indirect object expressed by the preposition *n* plus a noun is inserted between the direct object and its modifier. Likewise, the discontinuity of *n.i* "belonging to/of" in a *pw* sentence may be caused by the rigid word order in this type of sentence, in which *pw* usually follows the first noun phrase.

There may also have been pragmatic reasons for using non-projective structures in Egyptian, for in some languages non-projective structures are caused by a difference in discourse function between modifier and head, for example an extraposed attribute acts as focus and its head as theme in Wardaman (Croft, 2022, 163). This may have been another reason for the formation of non-projective structures in Old Egyptian. Given a *pw* sentence such as:

32) EUJA-442 = Pyr. 131d, Teti:
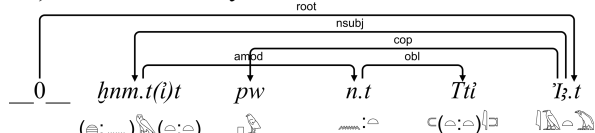
LT: "The nurse (*ḫnm.t(i)t*) is (*pw*) belonging-of (*n.t*) Teti (*Tti*) Iat (*I̓ꜣ.t*)."
FT: "The nurse of Teti is Iat"

The nisba adjectives *n.t* "belonging to (of)" is separated from their head *ḫnm.t(i)t* "nurse" by *pw* acting as the copula so that the sentence causes a case of non-projectivity (type 4). Since the nisba adjective introduces relevant information about its head, the syntactic discontinuity could be due to the will to emphasise the nisba adjective *n.t*: "The nurse, *of Teti*, is Iat."

An attribute may have the same pragmatic function when it is extraposed in a non-projectivity structure (type 1):

33) EUJA-942 = Pyr. 291d, Unas:

LT: "Stronger (*nḫt*) (is) Unas (*Wniś*), than (*r*) they (*≠śn*), appearing (*ḫꜥ(.w)*) upon (*ḥr*) his (*≠f*) shore (*wčb*)."
FT: "Unas, *who appeared upon his shore*, is stronger than they."

In this sentence there is a contrast similar to that in the *pw* sentences with non-projectivity. *Wniś* is used as a theme and subject, while its attribute *ḫꜥ(.w) ḥr wčb ≠f* "appearing upon his shore" introduces relevant information about *Wniś*. The prepositional phrase governed by the root and inserted between *Wniś* and *ḫꜥ(.w)* may be pushed into the background by the extraposition of the attribute, on which the focus is likely to lie (cf. other examples discussed in 4.4., above). Similarly, non-projectivity type 2 may be caused by the intention to highlight an extraposed modifier through the insertion of a vocative. This can be seen in example 19, where *m ḥtp* "in peace" is repeated after the noun used as a vocative *Mꜣ-ḥꜣ-≠f* "Mahaef" to emphasise the action of awaking in peace.

Finally, another factor for non-projectivity in Old Egyptian is the insertion of previously omitted or forgotten information, as occurs when a verb of utterance is inserted in the middle of a direct speech text (type 3, examples 20–23).

6 Conclusion

This paper has shown that the formation of grammatically accepted non-projective structures in Old Egyptian is not accidental, but it rather follows patterns governed by syntactic rules. Five types of non-projective patterns have been identified so far in the UD-EUJA treebank. New

types will probably be found during its full development.

Furthermore, this paper has argued for three factors involved in the formation of non-projective structures in Old Egyptian:

— Maintenance of the word order, even if this leads to syntactic discontinuity due to the extraposition of an attribute.
— Emphasis on an extraposed modifier.
— Addition of omitted or forgotten information by the insertion of a verb of utterance in the middle of a direct speech text.

Finally, the scarce presence of non-projective structures in Unas's and Teti's Pyramid Texts— 1.37 % and 1.42 % respectively— is probably due to the rigid word order of Old Egyptian language.[9] It contrasts with freer word order languages such as Ancient Greek, which has a higher rate of non-projectivity (15.15%) (Mambrini and Passarotti, 2013, 180, Tab. 3).

Acknowledgments

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[9] According to Nirupama and Mondal (2022, 20) rigid word order languages tend to have a low rate of syntactic discontinuity.

A Appendix:

EUJA-	Pyr.	fig.
Category 1, cf. 4.1		
654	202c, Unas	
871	270a–e, Unas	
942	291d, Unas	
1291	412a–413c, Unas	
1313	424a, Unas	1
1390	451b–c, Unas	
1415	460a–b, Unas	
1511	500a, Unas	3
1758	599b–c, Teti	4
1769	606b–d, Teti	5
1835	632b–c, Teti	
2050	707a–b, Teti	6
2101	728a–c, Teti	
2119	734a–b, Teti	2
Category 2, cf. 4.2		
117	22a, Unas	8
981	306d, Unas	
1406	457a–b, Unas	7
1753	597a, Teti	
Category 3, cf. 4.3		
1455	476a–477b, Unas	9
1507	497b, Unas	10
2038	702a, Teti	11
Type 4, cf. 4.4		
442	131d, Teti	
1290	412a, Unas	
1294	415a–c, Unas	13
1338	434e, Unas	12
1614	538c, Teti	
Type 5, cf. 4.5		
385	121a, Unas	

Table: Non-projective structures in Unas's and Teti's Pyramid Texts.

B Supplementary Material—Syntactic Tree Diagrams

Fig. 1: Ex. 7, EUJA-1313 = Pyr. 424a, Unas
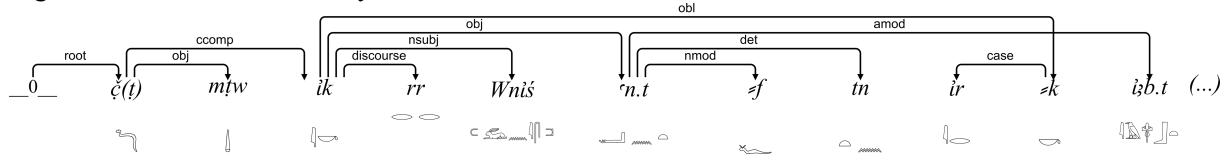
Fig. 2: Ex. 8, EUJA-2119 = Pyr. 734a–b, Teti
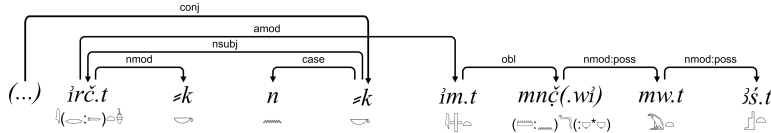
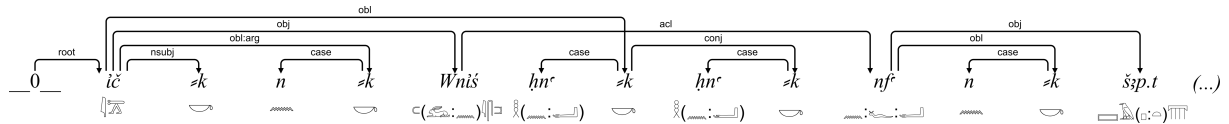Fig. 3: Ex. 10, EUJA-1511 = Pyr. 500a, Unas

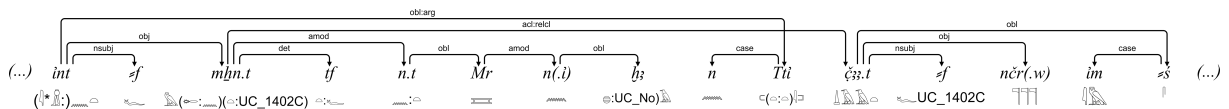Fig. 4: Ex. 11, EUJA-1758 = Pyr. 599b–c, Teti
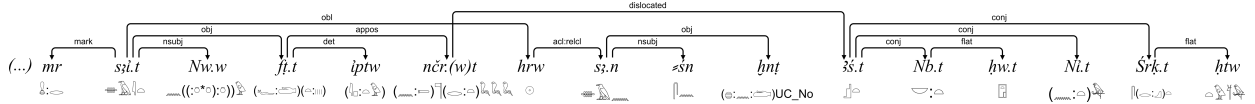
Fig. 5: Ex. 12, EUJA-1769 = Pyr. 606b–d, Teti
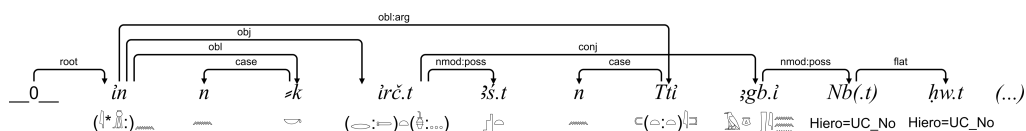
Fig. 6: Ex. 13, EUJA-2050 = Pyr. 707a–b, Teti

Fig. 7: Ex. 17, EUJA-1406 = Pyr. 457a–b, Unas

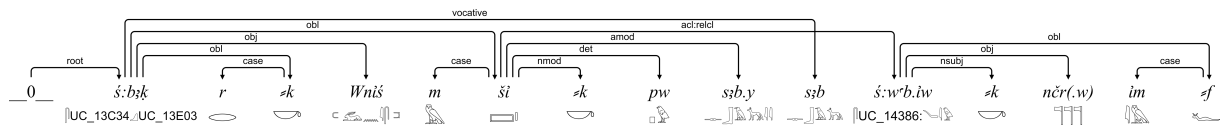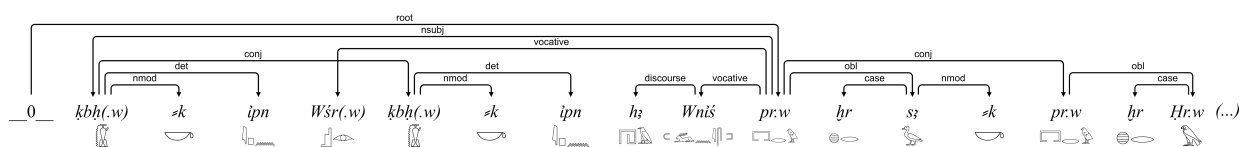Fig. 8: Ex. 18, EUJA-117 = Pyr. 22a, Unas
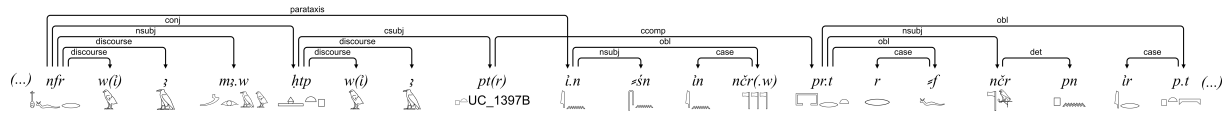
Fig. 9: Ex. 21, EUJA-1455 = Pyr. 476a–477b, Unas

(...) *nfr* *w(i)* *ꜣ* *mꜣ.w* *ḥtp* *w(i)* *ꜣ* *pt(r)* *i.n* *≠śn* *in* *nčr(.w)* *pr.t* *r* *≠f* *nčr* *pn* *ir* *p.t* (...) [UC_1397B]

Fig. 10: Ex. 22, EUJA-1507 = Pyr. 497b, Unas

__0__ *wč* *Wniš* *r* *≠k* *wč* *św* *wč* *św* *č(t)* *mtw* *sp* *4* *čt(.w)* *n* *4* *ipw* *khꜣ.w* *hꜣ.(i)w* *≠k* (...)
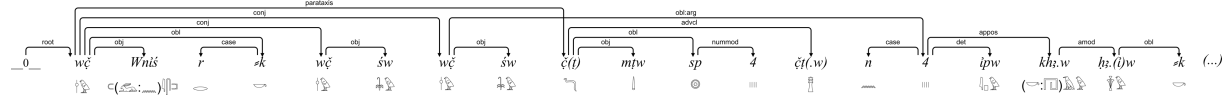
Fig. 11: Ex. 23, EUJA-2038 = Pyr. 702a, Teti

__0__ *č(t)* *mtw* *nꜥ.w* *Tti* *ḥnꜥ* *≠k* *nꜥw.ti* *sp* *4* *čt(.w)* *tp(.i)* *iꜣw.(w)t* *Wꜣč.t*
UC_No UC_No UC_No
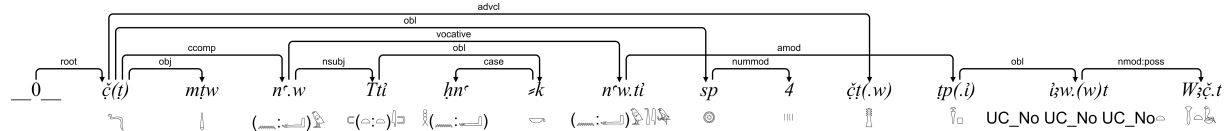
Fig. 12: Ex. 28, EUJA-1338 = Pyr. 434e, Unas
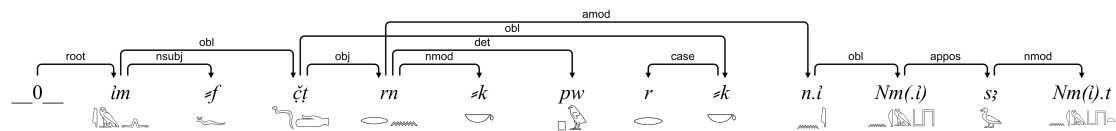
__0__ *im* *≠f* *čt* *rn* *≠k* *pw* *r* *≠k* *n.i* *Nm(.i)* *sꜣ* *Nm(i).t*

Fig. 13: Ex. 29, EUJA-1294 = Pyr. 415a–c, Unas

(...) *ḥw.(w)t* *≠čn* *Ḥr.w* *hrm(.w)* *r* *Wniš* *mꜥrk* *≠f* *r* *pḥ* *≠f* *n(.i)* *bśk* *n(.i)* *iꜥn*