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### PARAMETERS OF NOMINAL DEFICIENCY IN COMPLEX PREPOSITIONS
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## 1. ROADMAP

"Complex prepositions": roughly, polymorphemic sequences with "prepositional meaning" or the same distribution as monomorphemic prepositions; described for many languages (e.g., Quirk and Mulholland 1964, Huddleston and Pullum 2002, Melis 2003, Villada Moirón 2005, Fagard and De Mulder 2007, Hüning 2014, Fagard et al. 2020, a.o.)

Scope (see, e.g., Stosic and Fagard 2019 for more possibilities):

(1) **denominal**

    a.   à   l'   intérieur   de                    French
          at/to  DEF interior   of/from
          *inside*

    b.   v  tečenie + GEN                   Russian
          in  flow
          *during*

    c.   in   de  richting   van              Dutch
          in   DEF direction   of
          *towards*

(2) **deverbal**

    a.   concernant                       French
          *concerning*

    b.   ne.smotrʲa   na                 Russian
          NEG.look.GER on
          despite

    c.   blijkens                      Dutch
          appear.INF.GEN
          *as appears from*

(3) **adverbial**

    a.   contrairement   à                French
          contrary.ADV   to
          *contrary to*

    b.   otnositelʲno + GEN               Russian
          relatively
          *in relation to*

    c.   strijdig   met                 Dutch
          conflicting   with
          *contrary to*

The only truly productive class is preposition-noun-preposition sequences (PNPs), as in (1)

Proposal (cf. Matushansky and Zwarts 2019): PNPs form *non-constituent parts of* regular PPs (cf. Seppänen et al. 1994) formed on the basis of a **weak relational nominal**:

(4)   a.
```
              PP₁                          b.            PP₁
          ／      ＼                                  ／      ＼
        P₁         NP                              P₁         DP
        |       ／    ＼                            |       ／    ＼
        à      N        PP₂                         à     D⁰        NP
               |      ／   ＼                              |      ／    ＼
             côté   P₂      DP                            l'     N        PP₂
                    |       /\                                   |      ／   ＼
                    de   la voiture                            insu   P₂      DP
                                                                      |       /\
                                                                      de    l'avocat
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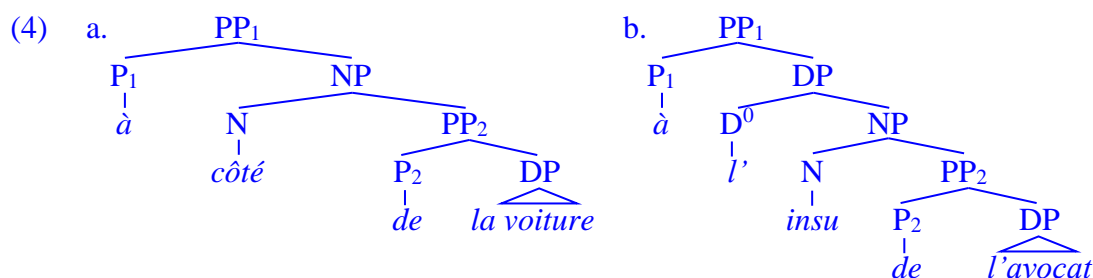
Several issues to discuss:
- ➢ evidence for this view
- ➢ (accounting for the) variation
- ➢ relation to other "complex prepositions"
- ➢ cross-linguistic coverage

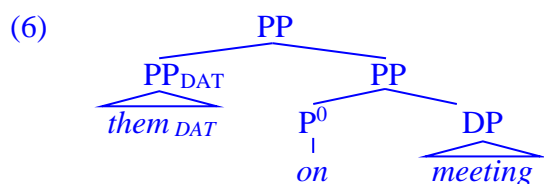Elevator pitch:  (a)  there are no "complex prepositions"
(b)  PNPs are not a uniform category
(c)  variation is determined by a cluster of properties (the presence/lack of an article, of $P_1$ and $P_2$, modification and possessivization restrictions)

Caveat: not all PNPs have the structure in (4), see Philippova [to appear] for the evidence that dative PNPs like (5) involve a possessive PP complex (Matushansky et al. 2020):

(5)   a.    Ona    posmotrela  v-sled    emu.                          <span style="color:blue">Russian, Philippova 2018</span>
            she    looked      in-step   him.DAT
            *She stared after him (watched him go).*

      b.    Maša    bežala    na-vstreču    im.
            Masha   ran       on-meeting    them.DAT
            *Masha was running to meet them halfway.*

Following Corver 1992, Broekhuis and Cornips 1997, Broekhuis et al. 1996, Matushansky et al. 2020, Matushansky 2021, and Philippova [to appear]:

(6)
```
                PP
           ／        ＼
      PP_DAT           PP
       /\           ／    ＼
    them_DAT      P⁰        DP
                  |        /\
                  on     meeting
```

The lexical NP *im* 'them.DAT' here is not a dependent inside the PP

## 2.   DECOMPOSING PNPs

It seems obvious that PNPs consist of several different parts. Two points of contention:
- ➢ the nature of the inner lexical part (§2.1, noun for us, the functional head AxPart for Svenonius 2006, 2010 and a lot of follow-up work (Muriungi 2006, Pantcheva 2006, Fábregas 2007, Takamine 2007, Botwinik-Rotem 2008, Roy and Svenonius 2009, Romeu 2014, etc.))
- ➢ internal constituency (§2.2) and variation (§2.3)

### 2.1.   On the nominal core of PNPs

Main evidence: the fact that $N_1$ is so very often a lexical noun: *direction/richting/napravlenie* 'direction', *dessus/verx* 'top', etc.

It combines with a preposition ($P_1$)

It has nominal syntax, like the article (or a possessive):

(7)    a.      The chamber pot can be found **at the foot** of the bed.        M&Z
        b.      The grandfather clock is **to the left** of the wardrobe.

The determiner shows gender and number agreement with $N_1$ and undergoes the *en/au* alternation (see Cornulier 1972, Zwicky 1987, Miller et al. 1997, Matushansky 2015, a.o.) characteristic of the interaction of the P+D complex with gender in French:

(8)    a.      en    tête    du      train        French, Roy 2006b
             in    head.F of.the   train
             *in the front section of the train*

        b.      au        pied    de   l'arbre
             to.the.M   foot.M of    the+tree
             *at the foot of the tree*

        c.      in    ons     midden        Dutch
             in    our.N   middle.N
             *in our midst*

In languages with case-marking the noun shows case morphology (which can be irregular, as in (9b), see also section 5.1):

(9)    a.      po     povodu    + GEN        Russian
             along   occasion.DAT
             *on the occasion of*

        b.      v-   pered- i       + GEN
             in   front    LOC
             *in front of* (locative)

        c.      v-   pered- 0
             in   front    ACC
             *to the front of* (directional)

It can even be modified (e.g., *in the general direction of*), on which more below

While the distribution of the noun may be limited to the PNP in question…:

(10)   a.      à     l'   insu        de        French
             at/to   DEF unbeknownst   of/from
             *unbeknownst to*

        b.      by dint of

        c.      onder   het    mom   van        Dutch
             under   DEF   guise   of
             *under the pretext of*

…this is unproblematic in view of the existence of **fossil words** (Aronoff 1974, aka cranberry words, Richter and Sailer 2003): freestanding morphemes appearing only in one particular environment or a few:

(11)   a.      **kith** and kin
        b.      mettle (*in high mettle*, *test/prove/show (one's) mettle*, *on (one's) mettle*)

Historically the nominal core of PNPs is clearly a noun. What is its synchronic status?
       ➢      Svenonius 2006, 2010: AxPart (a functional head)
       ➢      Matushansky and Zwarts 2019: weak nouns
       ➢      the PNP view: ?

Any theory *not* treating N as a noun has to account for its nominal syntax

We do not deny that PNPs can evolve into prepositions (cf. Noailly 2006, but also Fagard and De Mulder 2007, Le Draoulec and Rebeyrolle 2021):

(12) a.　une mise en scène style Bob Wilson
　　　　 a　 staging　　　 style Bob Wilson
　　　　 *staging in the Bob Wilson style*

　　 b.　histoire de se　 faire　　 une idée
　　　　 history of REFL make.INF an idea
　　　　 *the matter of getting an idea*

But they are not prepositions (cf. *Place République*) unlike the real preposition *chez*

## 2.2.　Constituency

PNP sequences can't be treated as constituents to the exclusion of the lexical NP

The inner preposition ($P_2$) can be **repeated** across conjunction (for some PNPs, like (13), from Fagard and De Mulder 2007):

(13)　Je travaille à　 l'aide　 **de**　　 jeux　 de rôles et **de** Gestalt-thérapie.
　　　 I　 work　 at/to DEF+help of/from game of　 roles and of　 Gestalt-therapy
　　　 *I work using roleplay and Gestalt-therapy.*

This means that **$P_2$ forms a constituent with the lexical NP** to the exclusion of $P_1$ and $N_1$:

(14)　à l'aide [$_{PP_2}$ **de** jeux de rôles et **de** Gestalt-thérapie]

The combination of $P_2$ and the following NP also pass other constituency tests:

(15)　possessivization (only if $P_2$ is *de* or its equivalent)

　　 a.　a　 son　　 insu　　　　　　　　　　　　　　　　　　　French
　　　　 at/to 3SG.POSS unbeknown
　　　　 *unbeknown to him/her*

　　 b.　in Jans　 richting　　　　　　　　　　　　　　　　　　Dutch
　　　　 in Jan's　 direction
　　　　 *in Jan's direction*

　　 c.　v moem napravlenii　　　　　　　　　　　　　　　　　Russian
　　　　 in my　　 direction
　　　　 *in my direction*

(16)　R-pronominalization

　　 a.　im　　　 Hinblick wor.auf/dar.auf　　　　　German, Trawiński 2003
　　　　 in+the　 view　　 WO+on/DA+on
　　　　 *in terms of what/of it*

　　 b.　in lijn　 er.mee　　　　　　　　　　　　　　　　　　 Dutch
　　　　 in line　 R+with
　　　　 *in accordance with it*

Dislocation (Seppänen et al. 1994) seems to work in English and Dutch:

(17) a.　Of which proposal do they seem to be **in favor**?

　　 b.　Met welk　 voorstel zijn ze　 **in tegenspraak**?
　　　　 with which proposal are　 they in　 conflict
　　　　 *With which proposal are they in conflict?*

Coordinating PNPs with the same $P_1$ can in principle be possible only for a small subset of PNPs (for semantic reasons)

For cardinal points, potential cases of such coordination is structurally ambiguous in English:

(18)  the area [**to the east of the river and (\*the) north of the railway**]
     a.    to the [east of the river and north of the railway]     mostly likely not this structure
     b.    [to the east of the river] and [north of the railway]     probably this structure

Dutch provides unambiguous cases:

(19)  De    buurtschap ligt   ten     [noorden  van  Z  en     zuiden  van  W.]    Dutch
     the    hamlet    lies    to.DEF [north      of    Z  and   south     of    W
     *The hamlet is situated north of Z and south of W.*

Possessivization (15), which breaks the linear sequence $P_1$-N, can also be taken as evidence

## 2.3. Variation

The syntax of PNP sequences is not uniform

Major points of variation (Quirk and Mulholland 1964, Melis 2003, Stosic and Fagard 2019, etc.):
- ➤ the presence of the article
- ➤ compatibility with a demonstrative
- ➤ possibility of modification
- ➤ possibility of possessivization
- ➤ variation in the outer preposition
- ➤ n-forms in Russian
- ➤ lexical restriction on $N_1$

We will only tackle some of these points

| Main proposal: the lexical core of PNP sequences is a **weak noun** |
|---|

## 3.    WEAK NOUNS AND THEIR PROPERTIES

Barker 2005, Carlson and Sussman 2005, Aguilar-Guevara and Zwarts 2010, 2013, Klein 2011, Aguilar-Guevara 2014, etc.) weak nouns are characterized by:
- ➤ non-referential interpretation (§3.1)
- ➤ resistance to modification and pluralization (§3.2)
- ➤ alternation with a bare NP (§3.3)
- ➤ enriched interpretation (§3.4)
- ➤ distributional restrictions (§3.5)

Most of these properties also characterize PNP nominal cores

## 3.1. Non-referentiality

Non-referentiality can be diagnosed by sloppy identity under ellipsis (impossible to check for relational nouns) and by resistance to anaphora
Original examples mostly from references, PNP examples are ours

(20)  sloppy identity                                            Carlson and Sussman 2005
     a.    Mary heard about **the riot** on the radio, and Bob did, too.     same riot
     b.    Mary heard about the riot **on the radio**, and Bob did, too.     different radios

For PNPs, if the lexical NP is different, so is the referent, and if it is the same, the difference in reference may be due to a different process (for nouns like *side*). And yet:

(21) Dominique a complété son projet **à l'aide de** l'ordinateur, et
     Dominique has completed their projet to the+help of the+computer, and

     Frédérique aussi.
     Frédérique also
     *Dominique completed their projet with the help of the computer, and Frédérique too.*

The help that the computer has rendered in the two cases may be very different

A bare PNP varies under a quantifier:

(22) Elke aannemer werkte in opdracht van de overheid.        Dutch
     each contractor worked in order of the government
     *Each contractor worked by order of the government.*

Wide scope is impossible, suggesting that this is not an indefinite

Anaphora removes the weak interpretation:

(23) resistance to pronominalization          Aguilar-Guevara and Zwarts 2010
     a. Alice did a solo on **the saxophone**. ?She did not realize **it** was out of tune.
     b. The government acted in **the light of his suggestions**. ?**It** was very clear.

With PNPs pronominalization of just the nominal core is simply impossible

## 3.2. Invariability

Weak nouns resist modification and retain their number (usually, singular):

(24) resistance to modification          Carlson and Sussman 2005
     a. He went to the 5-story hospital.
     b. Each man listened to the red radio on the picnic table.

(25) a. ?in the bright light of his suggestions
     b. ?to the cold north of the city

Most PNPs, like most weak nouns, are singular, yet plural ones are also possible. The change in number removes the "weak" interpretation:

(26) a. If you get lost in the mountains, walk down.
     b. If you get lost on the mountain, walk down.        no weak reading

(27) a. sous les auspices de, aux alentours
     b. ?sous l'auspice de, *à l'alentour

(28) resistance to pluralization
     a. Bob and Mary went to the hotels/#the hospitals.
     b. ?in the lights of these suggestions, at the risks of minor inflections

     c. op het gebied van A en B 'in the area of A and B'        Dutch
     d. ?op de gebieden van A en B 'in the areas of A and B'

Number-neutrality characterizes most shifted interpretations

## 3.3. Alternation with a bare NP

Only a few weak nouns or PNP nouns can alternate, and the choice is often conditioned by dialect or register:

(29) a. Mary went to (the) hospital.
     b. Ziggy played (the) guitar.

(30)  a.  in (the) light of, for (the) sake of, at (the) risk of
       b.  sous (le) prétexte de, à (la) hauteur de        Fagard and De Mulder 2007

For weak nouns, it is easy to see item-specific variation within the same semantic field:

(31)  bare/definite variation        Carlson and Sussman 2005
       a.  Sue went **to college/to prison**.
       b   Sue went **to the university/to the store/to the beach**.

For PNPs within-class variation is more limited:

(32)  a.  on top of, in front of
       b.  at the back of, to the left of

So, *within the class as a whole* we find overt definites and bare cases and only sometimes do we find both possibilities for the same noun

In French classical weak nouns are never bare (see Longobardi 2001), so it is more difficult to argue for a parallel treatment:
Some systematic exceptions to this claim (Beyssade 2011) are bare nouns in the predicate position (Roy 2001, Roy 2006a, de Swart et al. 2005, de Swart et al. 2007, also Lauwers 2014b), in coordination (Roodenburg 2004), and in copular clauses (Lauwers 2012)

(33)  Nous   sommes   allés   au      resto.
       we     are      gone   to+the  restaurant
       *We went to dinner.*

Bare nouns are possible in PPs, for some P-N combinations, e.g.:

(34)  a.  sous    antibiotique-s        Lauwers 2014a
           under   antibiotic-PL
           *on antibiotics*

       b.  sous    surveillance
           under   surveillance
           *under surveillance*

(35)  à pied, à vent, à rebours, à genoux…

Baldwin et al. 2003: article drop is very frequent in PPs with shifted interpretation. These are also likely to involve weak nouns

## 3.4.  Meaning shifts

Weak nouns undergo enrichment: they are taken in their stereotypical use: if someone *goes to the hospital*, the weak reading is only possible if they are there to receive treatment

This is why weak readings are incompatible with unusual goals:

(36)  a.  They went to bed [#to play cards].
       b.  Mary went to the hospital [#to pee].

With PNPs the N is usually metaphorically or metonymically shifted, rather than enriched:

(37)  a.  at the back of        axial information only

       b.  au      pied  de
           at+the  foot  of
           *at the foot of*

The enriched interpretation is one of the reasons why modification of weak nouns is severely limited (more on this below)

The change in meaning is not a special property of PNPs or PPs, as it is also found in idioms, including those with weak nominals (38).

(38)  a.    adding **insult** to **injury**
      b.    think/*act out of **the box**

The change can be predictable (see Lauwers 2014a on *sous*)

## 3.5.  Distributional restrictions

A noun is weak only with certain governors (prepositions or verbs):

(39)  a.    in bed vs. *on bed
      b.    play the piano vs. kick the piano

(40)  à/*de côté de, sous/#sur la botte de

The question remains how the combination of a preposition and a weak nominal is licensed (as both are needed), but is this so different from the question of how idioms are licensed?

## 4.    SYNTACTIC CORRELATES OF SEMANTIC WEAKNESS

Main point: semantic irregularity does not entail irregular nominal syntax (it's unidirectional)

## 4.1.  The presence of the article

The existence of near-minimal pairs shows that the choice between the presence and the absence of an article in PNPs is a low-level property of the weak noun *in the context of the appropriate licenser*:

(41)  a.    à       côte   de
            at/to   side   of
            *next to*

      b.    à       l'intérieur   de
            at/to   the+inside    of
            *inside*

(42)  a.    on top of
      b.    at the bottom of

(43)  a.    in de naam van                    b.    uit naam van                    Dutch
            in the name  of                         out name  of
            *in the name of*                        *on behalf of*

From the NP/DP standpoint PNPs do not form a uniform group and it is not clear that a single denomination leads to theoretical insights

Our proposal: the ability of a given weak noun to appear without a definite article is a lexical property of that noun
Possible formal implementation: m-merger (Matushansky 2006)

## 4.2.  Modification

PNPs differ with respect to their ability to have a modified nominal core

For some PNPs, like for some weak nouns and semi-idiomatic PPs, modification is possible (though restricted):
The presence of an overt article makes modification more likely, but this may be because the class of PNPs is not defined and what is a PNP with an article for one would be a regular PP for another

(44)  a.  en   prise  (directe)  avec
          in   grip   (direct)    with
          *in (close) contact with*

      b.  at (great/considerable/tedious/epic) length
      c.  go to (public) school

Some require an adjective:

(45)  a.  on *(good) terms with
      b.  at *(great/public/considerable) expense

In general, only adjectives yielding degree interpretation or kind-level adjectives are possible:

(46)  a.  at great/*unforeseen expense
      b.  by (*late/*sheer/*big) car
      c.  in (sore/desperate) need of

We don't know what makes modification possible for some PNPs and semi-idiomatic PPs, but the constraints seem similar

## 5.   CONCLUSION AND FURTHER QUESTIONS

**Main claim**: PNPs are syntactically regular except for the missing article. This property they share with **weak nouns**, which most frequently appear in semi-idiomatic PPs

There is no insight in treating PNPs as a syntactic class

The hypothesis that the nominal core of PNPs is a weak noun is consistent with the lack of an article (in some PNPs), resistance to modification and number change, non-referentiality and special interpretation

Additional insights might come from PPs without an article (cf. Baldwin et al. 2006)

The special meaning and special syntactic properties need to be encoded in the noun but take into consideration the surrounding context. Similar issues have been tackled in the treatment of idioms by the Distributed Morphology framework (starting with Marantz 1996, who notes that idiomaticity does not change composition)

### 5.1.   Archaic and unpredictable case-marking

Dutch lacks (except on pronouns) both case-marking and the feminine-masculine distinction (the two genders are neuter and common). However, some remnants of both are retained in PNPs and fossilized PPs:

(47)  bare NPs

      a.  te  paard                                        no fossilized case marking
          to  horse
          *on horseback*

      b.  te raad-e      (gaan)                            fossilized case marking
          to advice-E   (go.INF)
          *to consult*

(48)  definite NPs

      a.  te-r       aarde                        feminine, no fossilized case marking
          to-FSG    earth
          on earth

b.　　te-n　　　hemel　　　　　　　　　　　masculine, no fossilized case marking
　　　　to-MSG　heaven
　　　　*to heaven*

(49)　a.　　te-r　　　kerk-e　　　　　　　　　　　feminine, fossilized case marking
　　　　to-FSG　church-E
　　　　*to church*

b.　　te-n　　　kwaad-e　　　　　　　　　　　masculine, fossilized case marking
　　　　to-MSG　evil-E
　　　　*to evil*

What is crucial in (48) and (49) is that the special form of the preposition is historically a P-D amalgam (like the French *du* or the German *am*)

The form of the noun is also case, but these could also be fossil words

This non-cliticized article takes these forms also with other prepositions (and the inflection is also found on demonstratives and adjectives in some fixed expressions):

(50)　a.　　aan de-n　　　lijf-e
　　　　on　the-MSG　body-E
　　　　*personally*

b.　　in de-r　　　minn-e　(schikken)
　　　　in the-FSG　love-E　reach an agreement
　　　　*to reach an amicable agreement*

Given the existence of the mechanism ensuring a special allomorph in some PDN sequences, can the zero article be a special case of its application?

## 5.2.　Against the nominal nature of the lexical core

Russian: n-augmentation of $3^{rd}$-person pronouns only happens after prepositions (Yadroff and Franks 2002, Philippova 2018):

(51)　a.　　dat[j]　　　ej/*nej
　　　　give.INF　her.DAT

b.　　po　　nej/*ej
　　　　along　her.DAT

(52)　a.　　znat[j]　　　ego/*nego
　　　　know.INF　him.DAT

b.　　bez　　　nego/*ego
　　　　without　him.DAT

And it also happens with PNPs without an overt $P_2$ (i.e., those where the lexical NP surfaces in the genitive):

(53)　a.　　v　　ramkax　　　　　　　nego/ego　　　　　　　　Philippova 2018:55
　　　　in　framework.PL.LOC　it.GEN
　　　　*in its framework*

b.　　vozbuždenie　v　　otnošenii nego/ego ugolovnogo　　dela
　　　　initiation　　in　relation　he.GEN　criminal.GEN　case.GEN
　　　　*initiation of a criminal case with respect to him*

Philippova 2018: in (53) a possessive pronoun is possible as well, but it is not the case that all PN[P]s have all three options

There are no PN[P]s that allow only n-forms

Philippova 2018: n-forms reflect the categorial feature [Prep], variation is due to whether the PNP is analyzed as a morphologically complex P-head or as a syntactic combination of an active P- and N-heads (p. 58)

If PNPs involve a noun, why are n-forms possible? Possible answers:
- (i)    the genitive-marked lexical NP is actually a PP with a genitive-assigning null P (which may also be subcategorized for by comparatives, also taking n-forms)
- (ii)   the feature [Prep] is assigned by the outer preposition ($P_1$), and N is not a barrier for this case-assignment (unlike a regular N, but like noun-like cardinals)

In both approaches the weak noun has special syntax, but the specialness is very different

## 6.    APPENDIX: NON-DIAGNOSTICS FOR CONSTITUENCY

**Apparent PN coordination**:

(54) a.    se      mettre    du      côté  et    au      niveau   du      genou   blessé
            REFL put.INF of+the  side  and at+the level    of+the knee     wounded
            *to place at the side and on the level of the wounded knee*          Stosic and Fagard 2019

   b.    on top and in front of the recycling bin

Alternative analysis: **right-node raising** (Abbott 1976, Bachrach and Katzir 2009, a.o.)

(55)
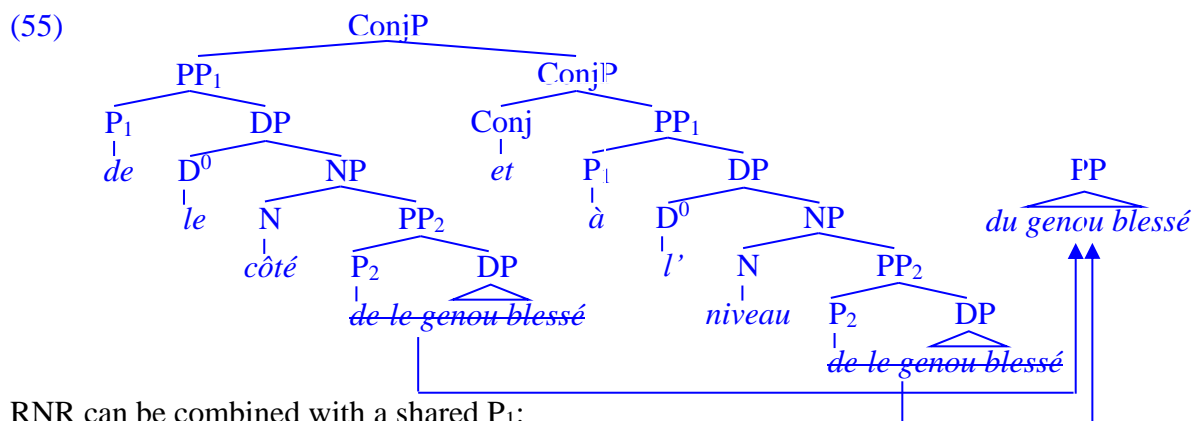

RNR can be combined with a shared $P_1$:

(56) obéir   sous   la   botte et     la   férule   des       pauvres                Lauwers 2014a
        obey    under  the  boot  and    the  rod       of+the  poor
        *to obey under the heel and the rod of the poor*

This also explains cases of coordination of a PNP and a P (Stosic and Fagard 2019):

(57) intervenir     [à cause  de   et    malgré] la   complexité de   la   situation
        intervene.INF at cause  of    and despite   the complexity  of   the  situation
        *to intervene because of and despite the complexity of the situation*

Coordination of nominal cores does not seem to be possible

The **outer preposition ($P_1$) can vary** in function of direction, mode, or polarity:

(58) a.    {**en/par**} dessus   de
            in      by     top        of/from
            *on top of/over*

   b.    {**in/out of**} step with

    c.    {**avec/sans**}   l'aide     de
             with/without  the+help  of
             *with/without the help of*

This suggests that $P_1$ is a preposition with its regular properties

NB: The general invariability of outer prepositions is not a counterargument: it is a property of expressions with fixed meaning independently to PNPs (cf. *in/out of love* vs.*in/#out of stitches*)

## 7.   REFERENCES

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