

## A wide-angle photograph of a coastal landscape. In the foreground, a sandy beach is nestled between steep, green cliffs. The sea is visible on the left, and the sky is filled with large, white clouds. The cliffs are covered in lush green vegetation, and the beach is a mix of sand and small rocks. In the background, a small white building and a lighthouse are visible on a hill.

for the DELPH-IN  
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# Prologue-2



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# Constituent Questions in the Grammar Matrix

for the DELPH-IN summit  
Cambridge, UK

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July 2019

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# Constituent (aka Wh-) Questions

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- ▶ *Who did Kim see?*
- ▶ *Who did what?*
  - ▶ *\*What did who?*
  - ▶ *\*Who what did?*
  - ▶ *...But **what** did **who** do?*
  - ▶ *which thing did which person do?*
- ▶ *Do you know what Kim did?*
  - ▶ *Which thing do you not know whether Sandy did?*
  - ▶ *Whose friend's book do you know that Sandy took?*

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# Related libraries in the Grammar Matrix

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- ▶ Morphotactics
- ▶ Lexicon
- ▶ Clausal complements

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# In the GM but not quite working for me

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- ▶ Adverbs
- ▶ Prepositions
- ▶ Filler-Gap rules

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# Related work

- ▶ ERG
- ▶ JACY
- ▶ Grammar engineering course grammars
- ▶ What else? (Zhong? Indra? HAG?)

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# The new library's structure

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- ▶ Questionnaire
  - ▶ Fronting and other choices, only fronted are being actively developed
- ▶ Development grammars
  - ▶ Russian, English, Japanese, Chukchi, Yukaghir, Abui
  - ▶ Only Russian is being actively developed
- ▶ Pseudolanguages (aka regression tests)
- ▶ (Evaluation on held-out grammars)



# Sample fronting choices

In **matrix** questions (*Who did you see?*):

- ☐ A single constituent can be fronted
- ☐ All constituents can be fronted
- ☐ Wh-phrases cannot be fronted (stay in-situ)

There is **obligatory** fronting:

- ☐ of at least one wh-phrase
- ☐ of all wh-phrases
- ☐ of all wh-pronouns and adverbs (but not phrases with determiners)

Superiority Effects (*\*What did who do?*):

☐ **Multiple pronoun wh-arguments** are extracted in order of their obliqueness (least oblique have priority, so, in single fronting, only subject can be fronted; in multiple fronting, fronted subject precedes fronted object etc. Note that this does not apply to *which*-type wh-phrases (with determiners) or to wh adjuncts).

Pied-piping: Wh-determiners cannot be extracted separately from ☐ nouns and ☐ prepositions.

## Other choices

### Other choices

Information structure:

Question words may bear an overt focus marking:

- ☐ which is the same
- ☐ or different from the regular focus marking you defined on the Information Structure page.
- ☐ Overt focus marking overrides superiority effects.

Auxiliary-subject inversion in ☐ matrix clauses and ☐ embedded clauses with questions.

- ☐ A question particle: ☐ clause initial ☐ clause final ☐ after the question word  
☐ after the entire question phrase (e.g. the NP or the PP)

Spelling:

- ☐ **Verbal inflection:** Checking this box enables a feature called `QUESTION` with possible value `plus` for use in defining lexical rules on the morphology page. Defining lexical rules that specify `[QUESTION plus]` will produce lexical rules in the grammar that add the semantics of questions.
- ☐ **Interrogative verbs** (if you check this box, please add appropriate entries on the Lexicon page).

# Customization so far

- ▶ Added wh-pronouns
- ▶ Added “intersective” adverbs
- ▶ Added “simple” prepositions
- ▶ Relaxed a number of clause constraints to allow non-empty QUE

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Wh-pronouns ( := *norm-hook-lex-item* & *basic-icons-lex-item* & *non-mod-lex-item* )

...directly from Emily's GE course instructions:

|               |                                      |   |
|---------------|--------------------------------------|---|
| LOCAL         | CAT                                  | $\left[ \begin{array}{ll} \text{HEAD} & \text{noun} \\ \text{VAL} & [\text{SPR } \langle \rangle, \text{SUBJ } \langle \rangle, \text{SPEC } \langle \rangle, \text{COMPS } \langle \rangle] \end{array} \right]$   |
|               | CONT                                 | $\left[ \begin{array}{l} \text{RELS} \quad \left\langle \begin{array}{l} [\text{LBL } \# \text{larg}, \text{ARG0 ref-ind \& } \# \text{arg0}] \\ [\text{PRED "which-q-rel", ARG0 } \# \text{arg0}, \text{RSTR } \# \text{harg}] \end{array} \right\rangle \\ \text{HCONS} \quad \langle [\text{HARG } \# \text{harg}, \text{LARG } \# \text{larg}] \rangle \end{array} \right]$ |
| NON-LOCAL.QUE | $\langle ! \# \text{arg0} ! \rangle$ |   |

# Who sees a dream? MRS

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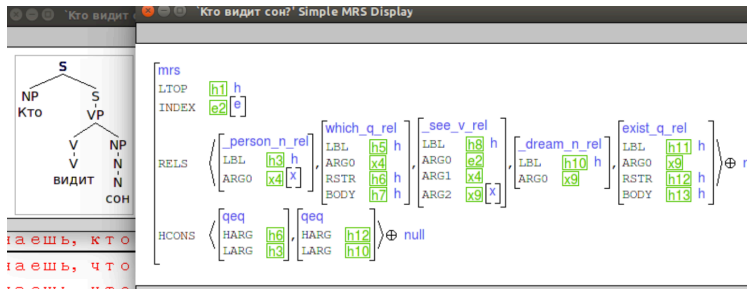
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# Adverb: intersective-mod-lex with hcons

```
; OZ 2019-05-23
; All nonscopal modifiers take the modified expression as their semantic
; argument (such as ARG1), which does not require HCONS.
; Some have empty HCONS lists (as opposed to
; scopal modifiers which all have at least one qeq on the HCONS relating their ARG1 to
; their MOD's LTOP).
; Others (e.g. adverbs like "where", "which place")
; have decomposed lexical semantics, including quantifiers on their RELS list,
; which means they'll have non-empty HCONS lists
; linking the handles of relations.
```

```
basic-intersective-mod-lex := lex-item &
  [ SYNSEM [ LOCAL.CAT.HEAD.MOD < [ LOCAL intersective-mod &
    [ CONT.HOOK.INDEX #ind ] ] >,
    LKEYS.KEYREL.ARG1 #ind ] ].
```

```
intersective-mod-lex := basic-intersective-mod-lex & no-hcons-lex-item.
```

```
intersective-adverb-lex := basic-intersective-mod-lex.
```

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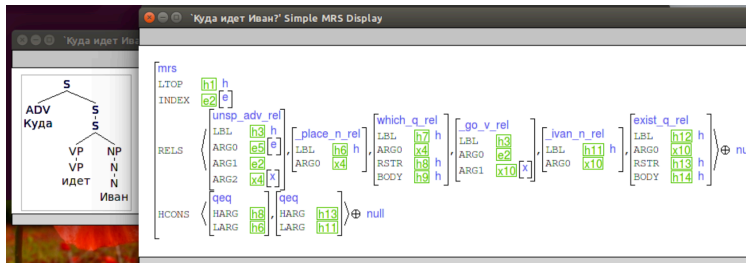
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# Adposition ( $\text{:= norm-sem-lex-item \& basic-intersective-mod-lex}$ )

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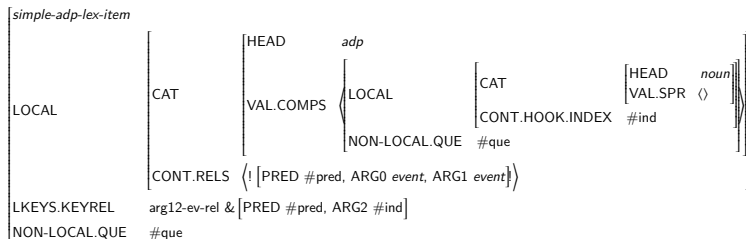
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# Filler-Gap rule

- ▶ No time to make the AVMs ;(
- ▶ Generally seems to have lost some of its NON-LOCAL constraints (compared to what was in matrix.tdl)
- ▶ So did some of its ancestors (such as e.g. *interrogative clause*, in matrix.tdl)
- ▶ This isn't inconsistent with e.g. the ERG, so, seems to be the proper course

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# Filler-Gap work, example from Rus grammar

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```
575 experimental-non-rel-clause := clause & head-compositional &
576   [ SYNSEM.NON-LOCAL.REL 0-dlist,
577     HEAD-DTR.SYNSEM [ LOCAL.CONT.HOOK [ INDEX #index,
578       ICONS-KEY.IARG1 #index,
579       CLAUSE-KEY #index ],
580       NON-LOCAL [ QUE 0-1-dlist,
581         REL 0-dlist ] ],
582       C-CONT [ RELS <! !>,
583         HCONS <! !> ] ].
584
585 ; This one differs from interrogative-clause in matrix.tdl in that it does not constrain
586 ; the second daughter to be QUE-empty.
587
588 experimental-interrogative-clause := experimental-non-rel-clause &
589   [ SYNSEM.LOCAL.CONT.HOOK.INDEX.SF ques,
590     C-CONT [ RELS <! !>, HCONS <! !>, ICONS <! !> ] ].
591
```

# Filler-Gap work, example from Rus grammar

```
; This one differs from basic-filler-phrase in matrix.tdl in that it does not constrain  
; the second daughter to be QUE-empty.
```

```
experimental-filler-phrase := binary-phrase & phrasal &
```

```
  [ SYNSEM [ LOCAL.CAT.VAL [ COMPS < >,  
                                SPR < > ],  
    NON-LOCAL.SLASH 0-dlist ],  
  ARGS < [ SYNSEM [ LOCAL #slash & local &  
    [ CAT.VAL [ SUBJ olist,  
      COMPS olist,  
      SPR olist ],  
    CTEXT.ACTIVATED + ],  
    NON-LOCAL.SLASH 0-dlist ] ],  
  [ SYNSEM [ LOCAL.CAT [ VAL.COMPS olist ],  
    NON-LOCAL [ SLASH 1-dlist &  
    [ LIST [ FIRST #slash,  
      REST < > & #last ],  
    LAST #last ],  
    REL 0-dlist ] ] ] > ].
```

```
experimental-head-filler-phrase := experimental-filler-phrase & head-compositional.
```

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```
wh-ques-phrase := experimental-head-filler-phrase & experimental-interrogative-clause &
  head-final &
  [ SYNSEM.LOCAL.CAT [ MC bool,
    VAL #val,
    HEAD verb & [ FORM finite ] ],
    HEAD-DTR.SYNSEM.LOCAL.CAT [ MC na-or-+,
      VAL #val & [ SUBJ < >,
        COMPS < > ] ],
    NON-HEAD-DTR.SYNSEM.NON-LOCAL.QUE <! ref-ind !> ].
```

# Russian development grammar

- ▶ Free word order
  - ▶ Attempted to use proper ICONS constraints; have some extra trees atm...
- ▶ Multiple fronting of arguments and possibly adjuncts
  - ▶ Not implemented yet, though multiple questions are in
- ▶ Ditransitive verbs

| Cov                | Overgen | Pos | Neg | Total |
|--------------------|---------|-----|-----|-------|
| 58.1% (27.5% long) | 6.3%    | 129 | 63  | 192   |

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# Summary

- ▶ Questionnaire: tensions between the needs of the GM and literature which focuses on islands
- ▶ New handy types: adverb, preposition...
- ▶ Additions to the customization system so far mostly tested on the Russian grammar
- ▶ Lots of empty QUE and some empty SLASH constraints went away (problems?..)
- ▶ Lots of work ahead:
  - ▶ Multiple fronting
  - ▶ Focus and information structure
  - ▶ Other development grammars, illustrating other question-forming strategies (particle; question verb; in-situ)
  - ▶ Lots of pseudolanguages
  - ▶ Evaluation

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