

Semantic constraints on syntactic analyses of NPs in grammar engineering: Appendix

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Appendix A: *Ezafe*

In Farsi, when an NP contains adjectival modifiers, the *-i* suffix may appear on the head noun or on the last adjective. The facts are further complicated by the phenomenon of *ezafe* in which non-final elements of an NP are marked with a suffix *-ye/-e*, if they do not bear the *-i* suffix.

- (1) a. xane-ye bozorg-e nou
 house-EZAFE big-EZAFE new
 ‘the big new house’
- b. xane-i bozorg-e nou
 house-INDEF big-EZAFE new
 ‘a big new house’
- c. xane-ye bozorg-e nou-i
 house-EZAFE big-EZAFE new-INDEF
 ‘a big new house’
- d. *xane bozorg-e nou
- e. *xane bozorg nou
- f. *xane-ye bozorg-i nou

Appendix B: MRS Technial Details

MRS primer

An underspecified MRS representation consists of:

- RELS: A set of elementary predications, each labeled with a handle. Predicates with the same scope (those interpreted as being conjoined) share the same handle. Scopal predicates have one or more arguments which take handles instead of indices as their values.
- HCONS: A set of constraints on possible scopings among the elementary handles of the form $h_1 \text{ qeq } h_2$, ‘ h_1 is equal modulo quantifiers to h_2 ’
- HOOK: A small collection of pointers to information available for further composition:
 - LTOP: the handle of the highest scoping elementary predication of a constituent, modulo quantifiers.
 - INDEX: the index (individual or event) associated with a constituent
 - XARG: the index of the external argument of a constituent

An English example

Target representation

For ease of exposition, we are suppressing event variables for the *probable* and *disqualify* relations in these representations.

(2) RELS: <h1:def_q(x,h2,h3)
 h4:probable(h5)
 h6:winner(x,y)
 h7:every(y,h8,h9)
 h10:medal(y)
 h11:disqualify(z,x)>
 HCONS: < h2 qeq h4
 h5 qeq h6
 h8 qeq h10 >
 HOOK: LTOP h11

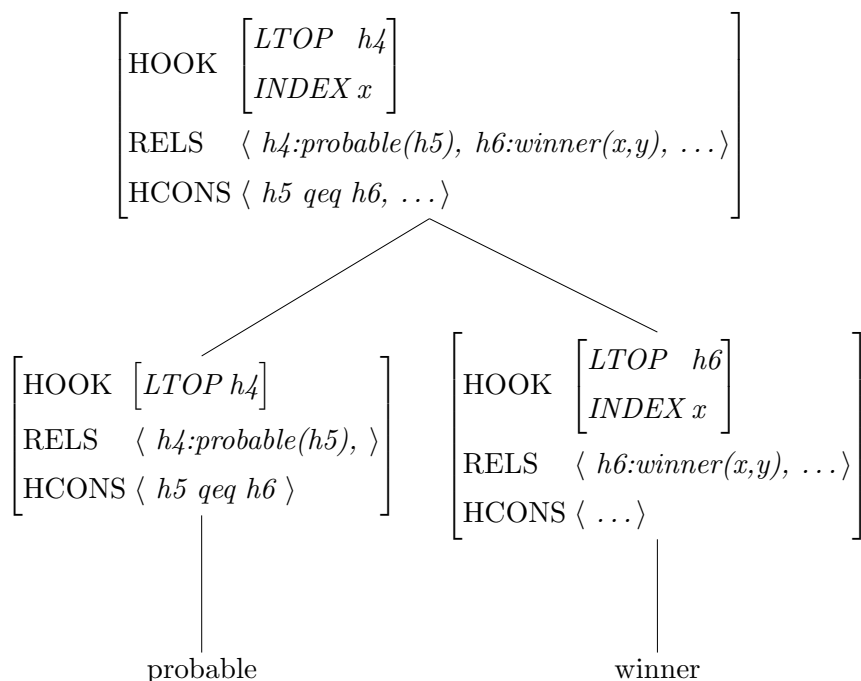
This underspecified MRS is compatible with the following three fully-scoped representations, corresponding to the three readings on slide 9, and the trees on slides 22-24.

- (3) a. every(y,medal(y),def_q(x,probable(winner(x,y)),disqualify(z,x)))
 b. def_q(x,every(y,medal(y),probable(winner(x,y))),disqualify(z,x))
 c. def_q(x,probable(every(y,medal(y),winner(x,y))),disqualify(z,x))

This set of possible scope-resolved MRSs is constrained by general conditions on well-formed MRSs (e.g., no unbound nominal indices) and the qeq constraints (‘equality modulo quantifiers’) in the target semantic representation (2).

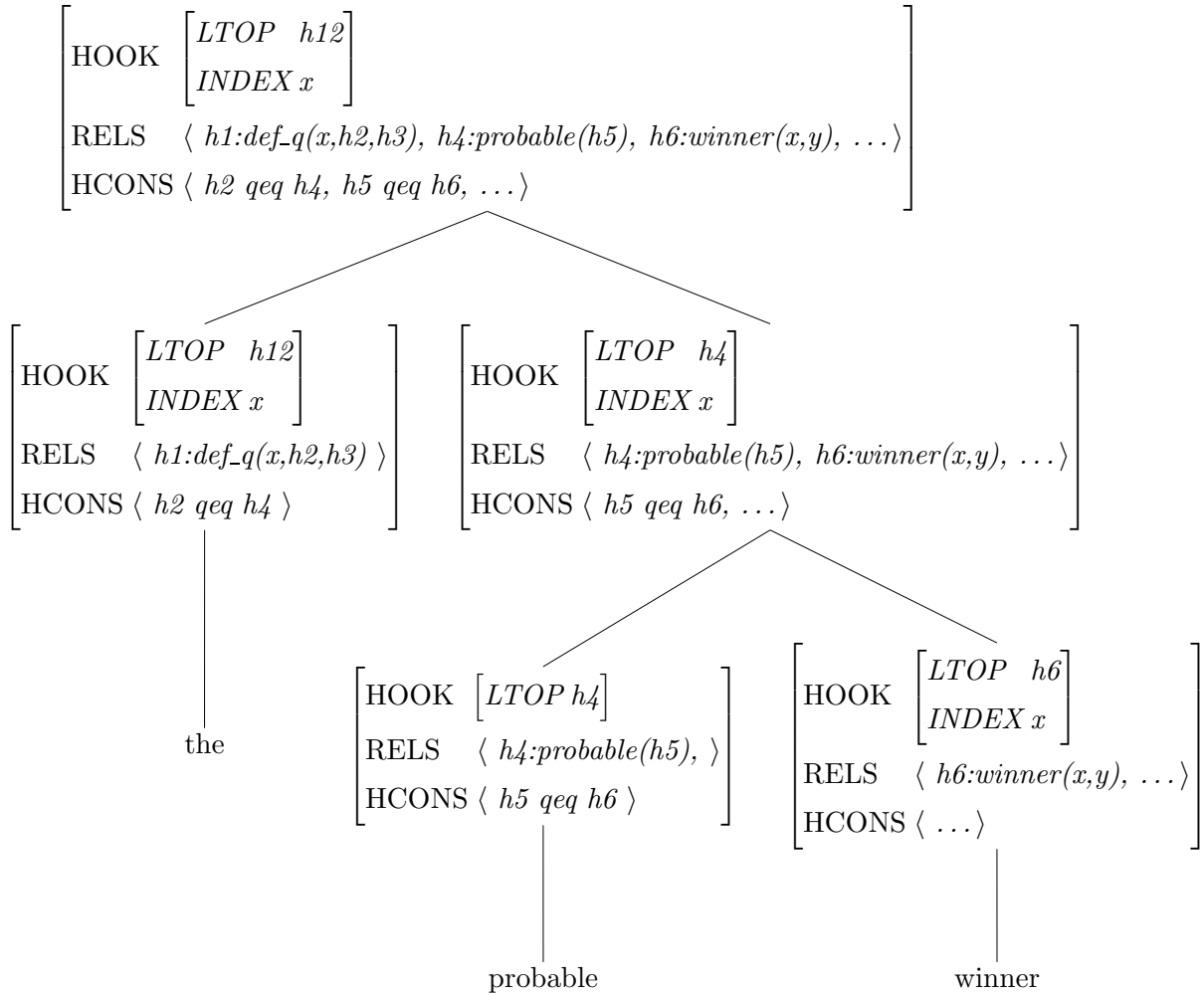
Compositional construction

- *Probable* combines with *winner of every medal* via the head-modifier rule for scopal modifiers:



- RELS: The list (bag) of elementary predications of the mother is the append of the lists of the daughters.
- HCONS: The list (bag) of handle (scope) constraints of the daughter is the append of the lists of the daughters.
- HOOK: The information exposed for further semantic composition consists of a local top handle (LTOP) and an index (INDEX). The INDEX comes from the head daughter (N'). The LTOP comes from the scopal adjective.
- The scopal adjective takes one argument, which is a scopal argument. As such, its value is a handle, that is stated to be ‘equal modulo quantifiers’ (*qeq*) to the LTOP of the modified N'.

- *The* combines with *probable winner of every medal* via the head-specifier rule:



- RELS, HCONS: As above, the append of the RELS, HCONS of the daughters.
- HOOK: The LTOP comes from the specifier daughter *the*, and is deliberately not identified with any particular value in its semantics; nothing should ever constrain the handle of a quantifier. The INDEX comes from the head daughter.
- The lexical entry for the determiner contributes a quantifier (*def_q*) and an associated handle constraint relating the restriction of the quantifier to the LTOP of the N' it attaches to.

If the determiner attaches low

- A lexical rule could add the definiteness inflection while also constructing a quantifier:

$$\left[\begin{array}{l} \text{HOOK} \left[\begin{array}{l} \text{LTOP } h12 \\ \text{INDEX } x \end{array} \right] \\ \text{RELS} \langle h1:\text{def}_q(x,h2,h3) \rangle \\ \text{HCONS} \langle h2 \text{ qeq } h6 \rangle \\ \text{ORTH} \langle \text{winner-the} \rangle \end{array} \right]$$

$$\left[\begin{array}{l} \text{HOOK} \left[\begin{array}{l} \text{LTOP } h6 \\ \text{INDEX } x \end{array} \right] \\ \text{RELS} \langle h6:\text{winner}(x,y) \rangle \\ \text{HCONS} \langle \rangle \\ \text{ORTH} \langle \text{winner} \rangle \end{array} \right]$$

- The next step would be to attach *probable* via the head-modifier rule for scopal modifiers.
- Unfortunately, *probable* requires access to the handle of the winner relation (h6) to construct its qeq.
- Furthermore, the qeq that is already there (h2 qeq h6) should not be part of the representation of the phrase including *probable*.
- MRS doesn't allow for any loss of information in the course of a derivation; we can't remove the offending qeq.

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