English Purpose Infinitives

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Data

A number of researchers have studied the class of constructions referred to as *purpose infinitives*. These are embedded infinitive phrases or *for*-clauses, with some missing argument co-indexed with an argument of the higher lexical head (Bach 1982; Green 1991; Jones 1991).

(1) a. They hired him$_i$ _$_i$ **to go over the reports**.
b. I bought War and Peace$_i$ **to read** _$_i$ **to the children**.
c. She brought it$_i$ over **for my brother to review** _$_i$.

When a purpose infinitive is missing both its subject and a non-subject argument, the referent of the subject is pragmatically determined, and only the missing non-subject is considered a gap, as in (1b).

In-order clauses

Purpose infinitives are contrasted in the literature with the so-called *in-order* clauses, which are ungapped infinitive VPs or *for* clauses, which may be preceded by *in order*. The examples in (2) are taken from Bach (1982).

(2) a. He bought a piano **(in order) to please his grandmother**.
b. She hired a nurse **(in order) for her daughter to learn Swedish**.

The referent of a missing subject in an *in-order* clause is determined syntactically.

The problem

While interesting in their own right, purpose infinitives have lately been used by researchers working in the HPSG framework as support for the feature ARG_S as a feature appropriate to phrases, and not restricted to words.

Our research seeks to debunk the arguments in Baxter (1999) that motivated such a claim, and to sketch an alternative treatment of purpose infinitives within the HPSG framework.

Baxter's data: Goal Infinitives

Baxter (1999) considers each of the following an example of a Goal Infinitive (GI):

(3) a. Jack went to the market **(in order) (for his friend) to sell the cow**.

b. Jack brought beans$_i$ home **(for his Mom) to plant** _$_i$ **in the garden**.

c. The university hired Sandy$_i$ **to** _$_i$ **teach syntax**.

This (putative) class includes infinitival phrases or *for*-clauses, sometimes preceded by *in order*.

Baxter subclassifies GIs as either Rationale Infinitives (3a), or Purpose Infinitives (3b-3c).

Baxter: Claims about GIs

Baxter claims that GIs are adjuncts modifying either a VP or an N'. Relevant N' examples involve nouns that denote events, and they behave much like their verbal counterparts.

(4) a. Jack's trip to the market **(in order) (for his friend) to sell the cow**

b. Sandy's purchase of beans$_i$ **(for her Mom) to plant _$_i$ in the garden**

c. The university's hiring of Sandy$_i$ **to _$_i$ teach English**

Putative syntactic evidence for adjuncthood of GIs

1. Optionality: GIs may always be omitted without loss of grammaticality.

2. *Do so* replacement:

   (5) Dana [spiked the ball] **to impress Sandy**, and Chris [did so] **to impress Pat**.

3. Iterability:

   (6) Jack went to the market **to sell the cow to please his mother**.

Purpose Infinitives vs. Rationale Infinitives

- Rationale Infinitives (RI) may be preceded by *in order*, while Purpose Infinitives (PI) may not.

  (7) a. Jack went to the market **in order to sell the cow**.
  b. * Jack brought beans$_i$ home **in order (for his Mom) to plant** _$_i$ **in the garden**.
  c. * The university hired Sandy$_i$ **in order to** _$_i$ **teach syntax**.

- PIs are gapped; RIs are not.

  (8) * Jack yelled at the cow merchant$_i$ **in order to intimidate** _$_i$.

Purpose Infinitives have gaps

While the referent of a missing subject in a RI seems to be pragmatically controlled (thus analyzed as PRO), the referent of a missing subject in a PI without any other missing arguments is syntactically determined.

Therefore, Baxter analyzes these missing subjects as gaps. Missing non-subjects are also analyzed as gaps.

(9) a. Jack brought beans$_i$ home **(*in order) to plant _$_i$ in the garden**.
b. The university hired Sandy$_i$ **(*in order) to _$_i$ teach syntax.**

Since the referent of a missing subject of a PI that has a non-subject gap is also pragmatically determined, these subjects are also analyzed as PRO.

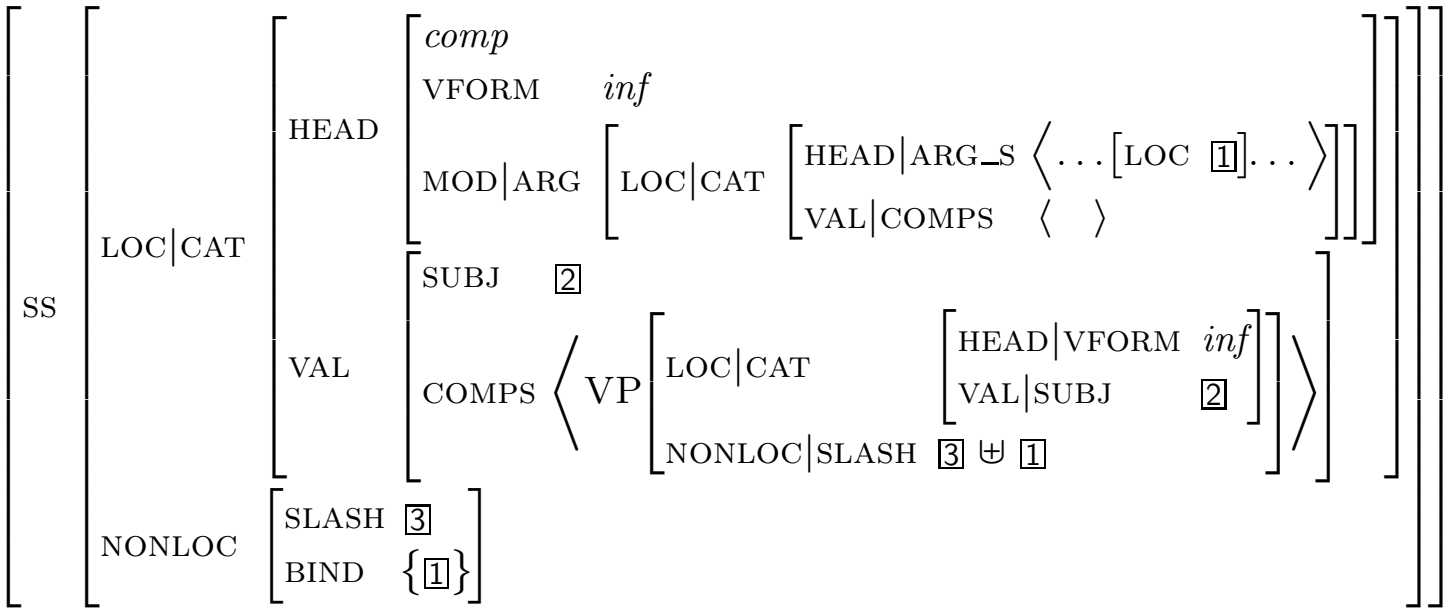
Purpose Infinitives: Problem and Solution

Baxter claims that the gap in a PI is always co-referential with "some" argument of the modified verb or noun.

Assuming that Baxter has the facts right, there is a visibility problem: when a PI has a gap identified with an argument realized within the VP or N' it modifies (i.e. a complement), it has no access to information about that complement, given normal assumptions about the value of the MOD feature ($synsem$), and information available in $synsem$ objects.

Baxter's solution is to include ARG_S as a $head$ feature, thereby giving the PI access to all arguments at the VP or N' level.

Lexical entry for PI-*to*



Problem: Assuming PIs are in fact adjuncts, this account incorrectly predicts that the gap in a PI can be identified with anything on the ARG_S list of the modified thing.

Evidence against the solution

Nowhere in the data Baxter presents is a PI gap identified with an (agentive) subject or dative object (goal), and trying to construct such an example results in ungrammaticality.

(10) a. Jack carried a cell phone$_i$ **for his mother to call him on** _$_i$.
b. * Jack$_i$ carried a cell phone **for his mother to call** _$_i$ **on it**.
c. Jack handed a sweater$_i$ to his mother **to take** _$_i$ **on the plane**.
d. * Jack handed his mother$_i$ a sweater **to make** _$_i$ **comfortable on the plane**.

A save of this analysis cannot rely on case-mismatch, since a PI gap can be co-indexed with certain passive subjects (Bob Levine, p.c.).

(11) A sweater$_i$ was handed to Jack's mother **to take** _$_i$ **on the plane**.

Reanalysis of Baxter's data

Baxter does not provide convincing evidence that Goal Infinitives should be considered a uniform class of adjuncts.

I argue that the data presented so far involves two classes of phenomena:

1. Ungapped infinitival adjuncts (which may be preceded by *in order*).

2. Gapped infinitival complements, selected by certain verbs and action-denoting nouns.

Class 1: Ungapped infinitival adjuncts

There is ample and uncontroversial evidence that RIs are adjuncts.

- RIs have a relatively unrestricted distribution.

  (12) a. Jack slapped Sandy **(in order) to insult him**.
  b. a visit to the market **(in order) to sell the cow**

- They can remain when a VP is replaced by $do\ so$ (13a).
- They can appear after other VP modifiers (13b).
- They can be iterated (13c).

(13) a. Dana [spiked the ball] **to impress Sandy**, and Chris [did so] **to impress Pat**.

b. Jack went to the market (in the morning) (wearing new jeans and a stylish cap) **to sell the cow**.

c. Jack went to the market **to sell the cow to please his mother**.

Class 2: Gapped infinitival complements

The so-called PIs are (at least superficially) a disjunctive class:

- ungapped infinitive VPs, (missing a subject)
- gapped infinitive VPs, (missing a subject and a non-subject)
- gapped infinitive clauses (missing a non-subject, and preceded by for)

Justification for considering these cases as a class rests on the fact that all three have the same distribution; a verb, adjective, or noun that supports the presence of one supports the presence of all.

Referent of the gap in a PI

The gap in a PI is co-referential with a lexically determined argument of the PI-supporting lexical item.

That argument has been described as the one assigned the role of patient or theme, but regardless of what generalization can be made across PI-supporting lexical items, the co-referent of a PI never varies for any one PI-supporting lexical item.

(14) a. Jack$_i$ brought a puppy$_j$ home **(*in order) _$_j$ to keep him$_i$ company**.
b. Jack brought beans$_i$ home **(*in order) to plant _$_i$ in the garden**.
c. Jack's purchase of a cotton sweater$_i$ **(*in order) for his mother to wear _$_i$ on cool summer nights**

Location of the gap in a PI

On the basis of Baxter's data alone, there is little to show that a single class of purpose infinitives exists which allows either a subject or non-subject gap.

Instead, it appears that all PIs headed by *hire* have subject gaps, while all PIs headed by verbs like *brought* have non-subject gaps.

(15) a. Jack brought beans$_i$ home **(for his Mom) to plant _$_i$ in the garden**.

b. The university hired Sandy$_i$ **to _$_i$ teach syntax**.

Location of the gap in a PI (cont.)

Other researchers provide evidence that:

- a PI headed by *brought* may have only a subject gap (16a) (Jones 1991).

  (16) a. Mary$_i$ brought John$_j$ along **(*in order) _$_j$ to talk to her$_i$**.

- PIs headed by *hire* may have a non-subject gap, meaning that *hire* cannot be considered an object control verb. (Green 1991).

  (17) a. They hired Sandy$_i$ **(*in order) to talk to _$_i$ about Charlie**.
  b. I hired her$_i$ **(*in order) to talk to _$_i$ about my financial problems**.

Extraposition of infinitival relatives?

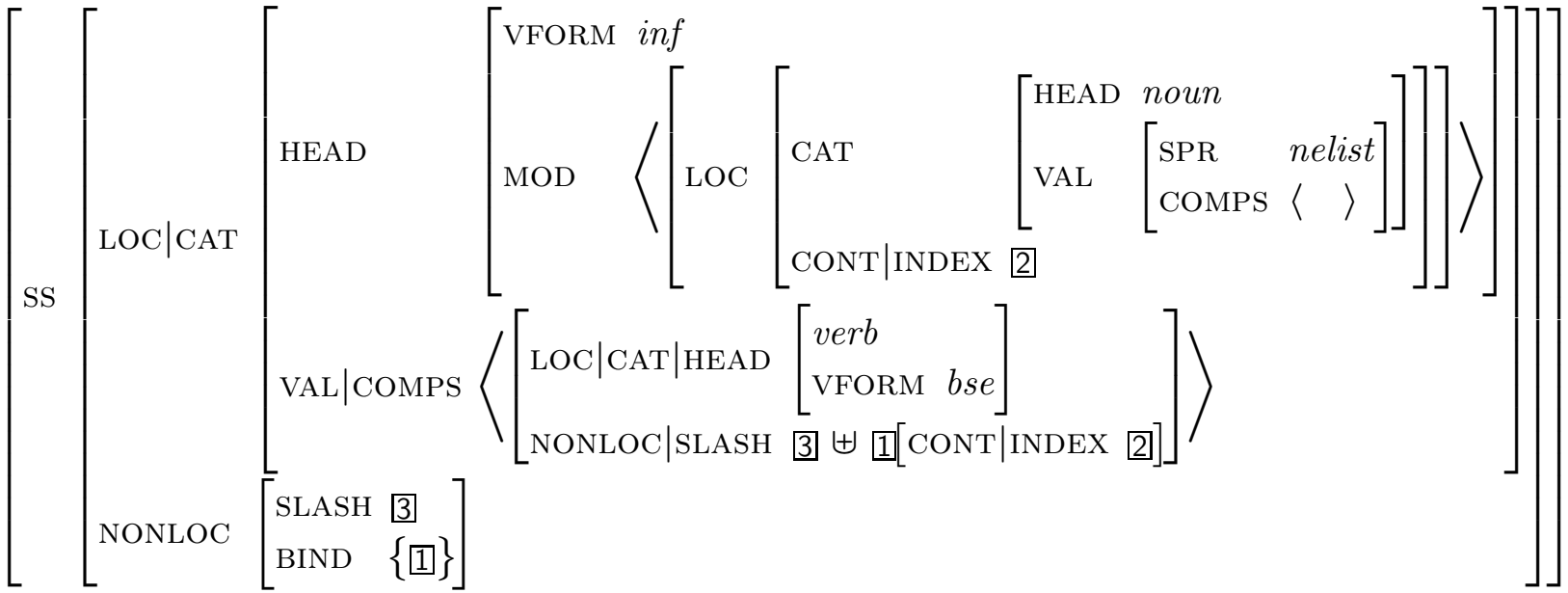


Figure 1: Lexical entry for infinitival *to* as a nominal modifier

One possible analysis of PIs is that they are postnominal modifiers (specifically, infinitival relatives) that can be extraposed.

Extraposition of infinitival relatives? (cont.)

Clearly, gapped infinitives can modify an N' (18), but not all instances of PI can be reduced to extraposition.

(18) Jack brought [some beans$_i$ **to plant** _$_i$ **in the garden**] home.

Extraposition cannot explain the well-formedness of (19a) since the non-extraposed version (19b) is ungrammatical.

(19) a. Sandy gave $War\ and\ Peace_i$ to Kim **to read** _$_i$.
b. * Sandy gave [$War\ and\ Peace_i$ **to read** _$_i$] to Kim.

Evidence for PIs as complements

Unlike RIs, there seems to be little evidence that PIs should be analyzed as adjuncts, and good evidence that they should be analyzed as complements.

- PIs cannot remain when a VP is replaced by *do so* (20a),[1] or occur after VP modifiers (20b).

(20) a. * Sandy [bought tomato seeds$_i$] **to plant** $\__i$ **in the back yard**, and Dana [did so] **to grow** $\__i$ **in pots**.

b. * Jack brought some beans$_i$ to Phil's house (wearing new jeans and a stylish cap) **to plant** $\__i$ **in his garden**.

[1] Bob Levine (p.c.) argues persuasively against Baxter's explanation for why gapped purpose infinitives do not pass the *do so* test for adjuncthood: that *do so* lacks anything on its ARG_S list for the gap to be co-indexed with.

Evidence for PIs as complements (cont.)

- PIs have a much more restricted distribution than RIs, as has been noted and described elsewhere, though not taken as evidence for complement-hood (Green 1991).

(21) a. * Jack slapped Sandy$_i$ **to insult** **_**$_i$.
b. * Jack visited the market$_i$ **to burn** **_**$_i$ **down**.
c. * a visit to the market$_i$ **to burn** **_**$_i$ **down**

Evidence for PIs as complements (cont.)

- PIs cannot normally be iterated. Examples that seem to involve iteration, should more likely be analyzed as nested structures, as has been noted by Jones (1991).

(22) a. * Jack brought $\textit{The Farmers Almanac}_i$ on the plane **to read** $\__i$ **to bring** $\__i$ **to his hosts**.

b. Jack brought beans$_i$ home **to give** $\__i$ **to his mother to plant** $\__i$ **in the garden**.

An alternative analysis of purpose infinitives

Analyzing PIs as complements immediately fixes the visibility problem described by Baxter, since both the gapped infinitive and the co-referent occur in the same valence specifications.

Ignoring for the moment the disjunctive nature of PIs in terms of structure, a lexical entry selecting a gapped VP[inf] might look as shown on the following page.

Selecting a purpose infinitive

$$\left[\begin{array}{l}\textsc{ss}\ \left[\begin{array}{l}\textsc{loc}|\textsc{cat}\ \left[\begin{array}{ll}\textsc{head} & \textit{verb}\\ \textsc{val}|\textsc{comps} & \left\langle \textsc{np}\left[\textsc{loc}|\textsc{cont}|\textsc{index}\ \boxed{2}\right],\ \textsc{vp}\left[\begin{array}{ll}\textsc{loc}|\textsc{cat}|\textsc{head} & \left[\begin{array}{ll}\textit{verb} & \\ \textsc{vform} & \textit{inf}\end{array}\right]\\ \textsc{opt} & + \\ \textsc{nonloc}|\textsc{slash} & \boxed{3} \uplus \boxed{1}\left[\textsc{cont}|\textsc{index}\ \boxed{2}\right]\end{array}\right] \right\rangle\end{array}\right]\\ \textsc{nonloc}|\textsc{bind}\ \boxed{1}\end{array}\right]\end{array}\right]$$

Figure 2: Example lexical entry of a verb selecting a gapped infinitive VP

This lexical entry, which selects both an NP and an (optional) VP[inf] as complements, binds a member of the VP[inf]'s SLASH list, while also co-indexing it with the NP complement. Note that the referent of the VP[inf]'s unexpressed subject is unconstrained.

Syntactic description of a PI

What of the disjunctive nature of PIs? Is it possible to characterize them in a uniform way?

A grammar that can license (uncontrolled) subjectless infinitives as clauses will allow a uniform analysis of PI. In fact, infinitival relatives show exactly the same disjunctive properties and pattern of co-reference as do PIs (23).

(23) a. The reports$_i$ **to read** _$_i$ **first** are on the left.
b. The reports$_i$ **for Sandy to read** _$_i$ **first** are on the left.
c. The taxi$_i$ _$_i$ **to take Sandy to the airport** finally showed up twenty minutes late.

Summary and Outlook

- It has been argued that the gapped infinitive constructions known as purpose infinitives should be analyzed as optional complements of a select class of verbs, adjectives, and nouns.

- Under this (empirically motivated) assumption, the kind of visibility problem arising in the Baxter (1999) account is avoided, since the necessary co-indexation between the gap in the purpose infinitive and the appropriate NP can be handled in the lexical entry which, in this account, selects both.

- This re-analysis of the data and alternative account effectively takes purpose infinitives off the list of arguments supporting the inclusion of ARG_S at the phrasal level.

Further questions

The distribution and internal structure of purpose infinitives warrant further investigation.

For example, why do these sentences sound so bad?

(24) a. * Where did you buy it$_i$ to eat _$_i$ for lunch?
b. * I bought it$_i$ to show Sandy that I like _$_i$.

References

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