Quantifier-Pro and the LF Representation of $\text{PRO}_\text{arb}$

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In this squib I will argue that, in English, PRO\textsubscript{arb} is correctly represented at the level of logical form (LF) as a variable bound by a universal quantifier. In attempting to derive such an LF representation of PRO\textsubscript{arb}, we will be led to the conclusion that pro exists in English and is capable of being interpreted as a universal quantifier. In a large class of constructions containing PRO\textsubscript{arb}, it is pro, interpreted as a universal quantifier, that binds PRO\textsubscript{arb}.

That pro is capable of receiving universal quantifier interpretation is apparently not unique to the non-null subject language English. A reexamination of the data of Suñer (1983) suggests that pro, occupying subject position in the null subject language Spanish, is also capable of receiving universal quantifier interpretation. (Suñer, it should be noted, does not identify the pro-subject she discusses as quantificational, but rather identifies this element as pro\textsubscript{arb}.) Hence, I tentatively assume that this quantificational interpretation of pro is universally available.

Consider the interpretation of the sentence associated with the S-structure (1):

(1) \[s[\text{s It is fun [s[\text{s PRO to play baseball}]][s][s]]]\]

Subject to further refinement, the sentence associated with (1) is interpreted as It is \textit{fun for anyone to play baseball}. Suppose we attempt to formally represent this interpretation by making the natural assumption that, contrary to the above claim that PRO\textsubscript{arb} is a variable, PRO\textsubscript{arb} is a quantifier phrase that obligatorily undergoes Quantifier Raising (QR) in the sense of May (1977). Under this analysis, PRO\textsubscript{arb} is represented at LF as a

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universal quantifier that binds a variable (namely, the LF trace of the quantifier-raised PRO\textsubscript{arb}), said variable occupying the position occupied by PRO\textsubscript{arb} at S-structure.

Notice however that, contrary to the unmarked application of May’s rule of QR, the LF rule raising PRO\textsubscript{arb} is not clause-bounded. The application of a clause-bounded rule of QR would derive from (1) the following LF representation, in which PRO\textsubscript{arb}, a universal quantifier, is adjoined to the S-node immediately dominating it:

(2) \[s [s \text{ It is fun } [s [s (\forall x_1) [s t_1 \text{ to play baseball}]]]]\]

(2) clearly is not the correct LF representation of (1); the scope of the universal quantifier is misrepresented. (2) is the LF representation of a sentence asserting that \textit{If everyone plays baseball, it is fun}. In the correct LF representation of (1), the universal quantifier has wide (matrix) scope. Thus, it appears that PRO\textsubscript{arb} not only can, but must, be quantifier-raised out of its clause.

Notice that the non-clause-bounded LF movement of PRO\textsubscript{arb} must proceed from Comp to Comp, assuming the correctness of Huang’s (1982) proposal that the Empty Category Principle (ECP) applies at LF. It is a theorem of the binding theory (Chomsky (1981; 1982)) that PRO occupies an ungoverned position at S-structure. Consequently, an intermediate trace in Comp is required to properly govern the subject trace of the quantifier-raised PRO.\textsuperscript{1} Thus, for the purposes of satisfying the ECP while also correctly representing the scope of the universal quantifier, the S-structure (1) must be mapped into the LF representation (3):

(3) \[s (\forall x_1) [s \text{ It is fun } [s t_1 [s t_1 \text{ to play baseball}]]]]\]

Another property of the LF movement of PRO\textsubscript{arb} must be accounted for, namely, that this element moves twice and only twice. Recall that PRO\textsubscript{arb} cannot be moved only once, as demonstrated by the inadequacy of the LF representation (2).\textsuperscript{2} That PRO\textsubscript{arb} does not move more than twice can be seen by considering the quantificational interpretation of, for example, (4):

(4) Josh said it is fun to play baseball\textsuperscript{3}
Given the S-structure representation of (4) in (5), if PRO_{arb} is moved three times, the LF representation (6) is derived:

\[(5) \ [s [s Josh_1 \ said [s [s it is fun [s PRO_2 to play baseball]]]]]]\]

\[(6) \ [s' (Vx_2) [s Josh_1 \ said [s' t_2 [s it is fun [s' t_2 [s t_2 to play baseball]]]]]]\]

(6) is the LF representation of a sentence asserting that Josh said something about every x, namely, that it is fun for x to play baseball. This is not the correct LF representation of the quantificational interpretation of sentence (4). The correct LF representation of (5) (again, as in the case of (1)) is derived by moving PRO_{arb} exactly twice: first into the lower Comp, then from Comp to Comp, yielding (7):

\[(7) \ [s' [s Josh_1 \ said [s, (Vx_2) [s it is fun [s, t_2 [s t_2 to play baseball]]]]]]\]

Thus, it appears that if we assume that PRO_{arb} is a quantifier, we require an explanation for the marked LF movement of this element.

A reconsideration of the LF representation (3) suggests a possible solution. (For the sake of simplicity, the particulars of the following arguments pertain to the LF representation (3). The arguments, of course, obtain identically for (7) and all similar constructions.) In fact, (3) is an inadequate LF representation of the sentence associated with (1). The inadequacy of this representation becomes apparent upon considering the interpretation imposed on the sentence in question. This sentence is obligatorily interpreted as (Vx) if x plays baseball, it is fun for x. The sentence cannot be interpreted either as (Vx) if x plays baseball, it is fun or as (Vx) if x plays baseball, it is fun for y. The correct LF representation of (1) must contain two argument variables, each bound by the same universal quantifier with matrix scope, namely, a variable occupying subject position of the infinitival and a variable occupying the complement argument NP position to the adjective. The correct LF representation of the sentence is (8):

\[(8) \ [s' (Vx_1) [s It is fun (for) x_1 [s' (for) [s x_1 to play baseball]]]]\]

Syntactic evidence for the existence of these two NP positions (each occupied by a variable in (8)) is provided by, for example, (9):

\[(9) \ It is fun for Lucy for Joe to play baseball\]

The S-structure of (9) is (10):

\[(10) \ [s' [s It is fun for Lucy [s' for [s Joe to play baseball]]]]\]

Furthermore, consider (11):

\[(11) \ It is fun for Lucy to play baseball\]
Notice that a control interpretation can be imposed on this sentence; that is, (11) allows the S-structure analysis shown in (12):

(12)  \[S[S\text{ It is fun for Lucy}, [S[S \text{ PRO, to play baseball}]]]]

That the prepositional phrase for Lucy occurs in the matrix clause in (12) is shown by the fact that it can be preposed, as in (13):

(13)  \[S[S[\text{ For Lucy}, S \text{ it is fun, t}, [S[S \text{ PRO, to play baseball}]]]]\]

Returning to representation (8), assuming the correctness of the Projection Principle (Chomsky (1981)), it follows that if the (θ-marked) complement argument to the adjective is present at LF, then it must be present at all levels of representation. Consequently, the LF representation (8) cannot be derived from the S-structure (1). Rather, it can be assumed (Epstein (1983)) that in the correct S-structure representation of the sentence, so-called PROarb is controlled by (obligatorily coindexed with) a base-generated quantificational empty category, namely, pro, occupying the governed complement NP position to the adjective.5 At LF, then, an unmarked (i.e. clause-bounded) rule of QR applies only to this controller argument.6 In this way PROarb

4 What is at issue here is the preposability of this constituent. I provisionally assume the adjunction structure given in (13).

5 That so-called PROarb reduces to controlled PRO here suggests the possibility that, in general, PRO must be controlled. If, in fact, PRO must be controlled, this would explain why (at least in the standard cases) “PROarb” is possible only in structures in which a controller argument is possible. Thus, for example, the contrast between (ii) and (iv) would be explained:

(i) To play baseball is fun for John
(ii) To play baseball is fun
(iii) *To play baseball is certain for John
(iv) *To play baseball is certain

In (iv), then, there exists an uncontrolled, hence illicit, PRO.

6 This element (pro) receives universal quantifier interpretation in English only if it is antecedentless. In the correct S-structure representation of sentence (4) as well, PRO is controlled by pro. A representation of the coreferential interpretation of PRO is obtained only if pro is freely coindexed with the NP Josh. If pro is freely contraindexed (and is therefore antecedentless), a representation of the quantifier-bound variable interpretation of PRO is derived. The fact that there exist two possible interpretations of sentences such as (4) is thus explained.

For standard theory analysis of sentences such as (4), see for example Grinder (1970), who claims that such sentences are derived by the application of Super-Equi (an unbounded rule, collapsible with the local rule of Equi (see Rosenbaum (1967)), which deletes infinitival subjects under identity).

By contrast, Kimball (1971) identifies a dative argument in the analysis of such sentences. He argues that Equi deletes the infinitival subject under identity with the dative argument and that the dative argument is deleted under the application of Dative Deletion, an unbounded dele-
is correctly represented at LF as a variable bound by this universal quantifier, namely, \textit{pro}, which takes matrix scope. The problem of explaining the marked LF movement of PRO\textsubscript{arb} thus disappears.

In addition, the fact that the correct LF representation contains two argument variables (PRO and the trace of the controlling quantifier-raised \textit{pro}), each bound by the same universal quantifier, namely, \textit{pro}, is explained.

That \textit{pro} is capable of receiving the same universal quantifier interpretation in Spanish is suggested by the data of Suñer (1983). Her glosses of the impersonal \textit{se} construction (her examples (3a–c)) include translations of \textit{pro} as 'one'. Surely, this suggests universal quantifier interpretation of \textit{pro}.\textsuperscript{7}

Under this analysis, PRO\textsubscript{arb} is identified as PRO, controlled at S-structure by a universal quantifier, namely, \textit{pro}.\textsuperscript{8} At LF
PRO\textsubscript{arb} is represented as a variable bound by this quantifier.\textsuperscript{9}

References


\textsuperscript{9} Notice that, whereas the filter (ii) alone correctly rules out (iii) (in a non-null subject language) as well as (i), it does not rule out, for example, (iv):

(iv) *It was arrested \textit{pro}

Such an example reveals that \textit{pro} must not only satisfy the filter (ii), but also be locally determined.

\textsuperscript{9} Notice that in structures such as (i)

(i) [\textit{S} [\textit{S} John\textsubscript{1} knows [\textit{S} how [\textit{S} \textit{PRO\textsubscript{2}} to solve the problem]]]]

\textit{PRO} again receives the interpretation of a variable bound to a universal quantifier. Given this quantificational interpretation, the LF representation of (i) is presumably (ii):

(ii) [\textit{S} (\forall x\textsubscript{2}) [\textit{S} John\textsubscript{1} knows [\textit{S} how [\textit{S} x\textsubscript{2} to solve the problem]]]]

(Notice that the scope facts obtaining in the LF representations of these constructions are apparently identical to those of the adjectival constructions discussed above.) The preceding analysis may fail to cover such constructions as these, in which there is no syntactic A-position in which \textit{pro} could be base-generated. However, see Epstein (1983) for a possible solution to this problem.
MELODIC DISSIMILATION IN AINU
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Although floating melody elements have been strongly motivated within autosegmental tonology (see Goldsmith (1976) for Igbo tonal morphemes and Clements and Ford (1979) for Kikuyu downstep), their counterpart in vowel harmony has played a comparatively minor role in the literature. Previous proposals to introduce floating autosegments (e.g. Clements (1981) for Akan roots with initial labialized consonants, Clements (1977) for Hungarian stems with neutral vowels, and Kenstowicz (1979) for Chukchee roots without vowels) are based on exceptional disharmonic items within overall harmonic systems. In the Ainu\(^1\) system to be presented in this squib, however, the disharmonic pattern is as common, if not more common, than the harmonic pattern. As a consequence, the floating autosegment is undeniably central to the phonology and morphology of the language as a whole. I will show that an explanatory account of the surface forms of various nominal and verbal suffixes in Ainu can be achieved by characterizing one class of roots with a floating melody. This nonlinear analysis has system-internal motivation akin to that of its tonal counterpart, and it more fully justifies autosegmental views on various harmony processes.

1. Ainu has a transitivizing verbal suffix with five surface forms, /æ/, /e/, /i/, /o/, /u/, exhausting the vowel phonemes of the language. To derive the “possessed” form of nouns, the same five vowels are attached as suffixes to nominal stems. Chiri (1952) notes that these suffixes show interesting cooccurrence restrictions with their respective roots and stems.

Let us use the verbal forms to illustrate the phenomenon.

To a monosyllabic verbal root of the form CVC, a vowel suffix is added to form the transitive stem, CVC+V. The monosyllabic root may be either an intransitive stem or a bound root. Of the 25 logically possible combinations of root vowels and suffix vowels, only 15 are regularly attested. The key to this...