

# Linguistic Inquiry

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# Linguistic Inquiry

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# Is There LF *Wh*-Movement?

Peter Cole  
Gabiella Hermon

## 1 Introduction

In this article we examine the analysis of the position in Quechua and other languages of *wh*-question words like *ima* 'what' and *pi* 'who'. We draw our data primarily from the Quechua languages—although we also consider the implications of facts from English, Spanish, and especially Chinese, as well as from another Amerindian language, Lakhota. We argue that Quechua provides evidence against a widely accepted analysis of in situ *wh*-question words, the Logical Form (LF) movement analysis.

Before we develop our analysis, it may be convenient to review the typology of the placement of *wh*-words. Among the languages of the world there appear to be two major patterns with regard to the position of *wh*-question words. With few exceptions, in European languages like Spanish and English, when there is a single *wh*-phrase, it is moved to clause-initial position and takes scope over the sentence in which the question occurs.<sup>1</sup> This is illustrated in (1) (from Spanish) and (2) (from English).

- (1) a. ¿Qué<sub>i</sub> cree<sub>s</sub> [que ha hecho e<sub>i</sub> Juan]<sub>?</sub>  
      what believe that has done Juan  
      'What do you believe that Juan has done?'  
      b. \*¿Tu cree<sub>s</sub> [que ha hecho qué Juan]<sub>?</sub>  
          you believe that has done what Juan  
          'What do you believe that Juan has done?'  
      c. \*¿Tu cree<sub>s</sub> [que Juan ha hecho qué]<sub>?</sub>  
          you believe that Juan has done what  
          'What do you believe that Juan has done?'

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<sup>1</sup> We do not discuss here *wh*-in-situ that is restricted to main clauses as in French and German. See Aoun 1985 and McDaniel 1989.

<sup>2</sup> The symbol *ε* indicates the place from which movement occurred.

- (2) a. Where, do you think John has gone  $e_i$ ?  
 b. \*You think that John has gone where?<sup>3</sup>

In contrast, in Chinese the *wh*-question word is not fronted, but remains in the same position in which a non-question word fulfilling the same grammatical function would occur, a phenomenon widely referred to as *wh-in-situ*:

- (3) a. [[Ni shuo [[Zhangsan qule nali]](-ne)]?  
 you say Zhangsan went where PARTICLE  
 'Where did you say Zhangsan went?'  
 b. [[Ni shuo [[Zhangsan qule Meiguo]]]].  
 you say Zhangsan went U.S.  
 'You said that Zhangsan went to the U.S.'  
 c. \*[Nali, [ni shuo [[Zhangsan qule  $e_i$ ]]]]?  
 where you say Zhangsan went  
 'Where did you say Zhangsan went?'

In the Quechua languages both of the above patterns are instantiated, often both occurring in the same language. For instance, Imbabura Quechua appears to be similar to Spanish and English in that *wh*-words are obligatorily fronted:

- (4) a. Ima-ta-taj, ya-ngui [Juan  $e_i$  randishka-ta]?  
 what-ACC-Q think-2PL Juan bought-ACC  
 'What do you think Juan has bought?'  
 b. \*Ya-ngui [Juan ima-ta-taj, randishka-ta]?  
 think-2PL Juan what-ACC-Q bought-ACC  
 'What do you think Juan has bought?'

But in Ancash Quechua *wh*-words may appear either fronted or in situ:

- (5) a. May-man-taq, [José munan [María  $e_i$  aywanan-ta]]?  
 where-to-Q Jose wants Maria will go-ACC  
 'Where does Jose want Maria to go?'  
 b. [José munan [María may-man, aywanan-ta]]?  
 Jose wants Maria where-to will go-ACC  
 'Where does Jose want Maria to go?'<sup>4</sup>

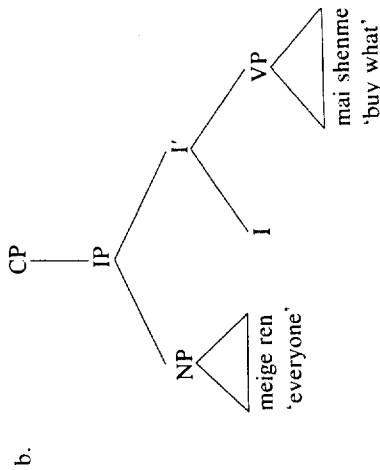
<sup>3</sup> This sentence is ungrammatical as a genuine request for information. There exist other question types (e.g., quizmaster questions and echo questions) in which *wh*-words do not need to undergo fronting. See Cole 1974 for discussion.

<sup>4</sup> An additional pattern occurs in Ancash Quechua, in which *wh*-words may be found in the initial position of a clause intermediate between the clause in which it occurred in D-Structure and the clause over which it takes scope logically. Such sentences are discussed in Cole 1983.

## 2 The Analysis of *Wh*-in-Situ

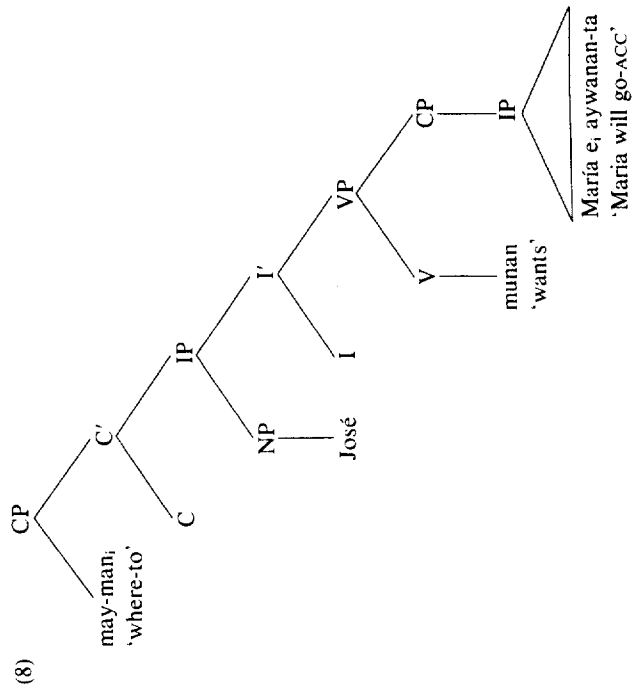
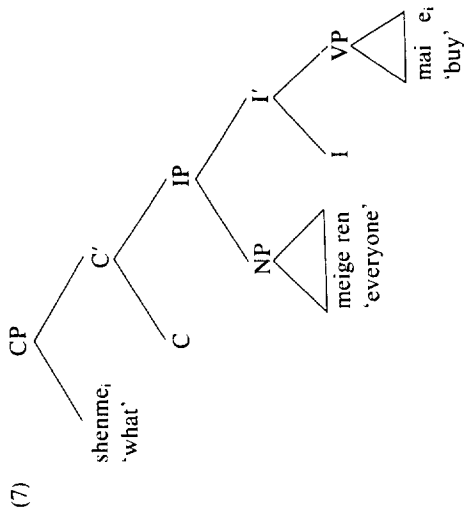
Within generative grammar, sentences displaying *wh*-in-situ in surface structure have been claimed to undergo covert *wh*-movement in the LF component (Chomsky 1973 and Huang 1982, among others). Thus, the LF structure of a Chinese sentence like (3a) has been claimed to be similar to (3c). Among other reasons, this proposal was made in order to account for the fact that *wh*-words that remain in situ appear to take within their logical scope quantifiers that c-command them in surface structure (see May 1985). Thus, in (6) *shenme* 'what' appears to have higher scope than *meige* 'every'.

- (6) a. Meige ren dou [<sub>VP</sub> maile shenme] (-ne)?  
 everyone all buy what PARTICLE  
 'What did everyone buy?'

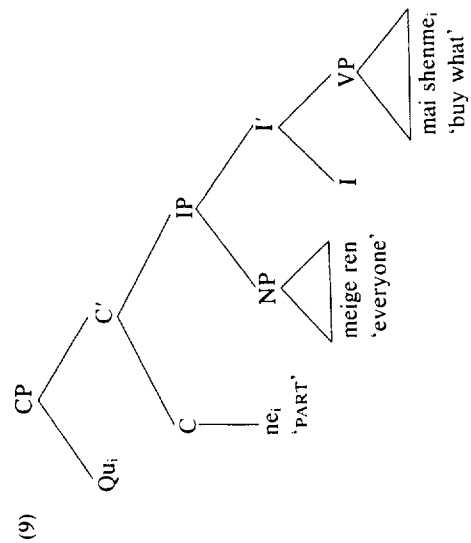


Although *meige* asymmetrically c-commands *shenme* at S-Structure, (6) cannot be interpreted distributively ('For each man, what did he buy?'), as would be expected from the S-Structure form, but only collectively ('What [single item] did everyone buy?'). Although the existence of the collective interpretation is mysterious if *meige* is higher in the tree than *shenme* at every syntactic level, it is predicted if *shenme* has been fronted at LF and therefore takes *meige* in its scope, as in (7), on page 242.

It has generally been assumed that LF *wh*-movement occurs in all languages in which *wh*-in-situ is found. Thus, in Cole 1983 it was presumed that Ancash Quechua sentences with *wh*-in-situ undergo *wh*-movement in the LF component, and that a sentence like (5b) has an LF structure along the lines of (8), an LF structure that is essentially identical to the surface structure of (5a).



More recently, however, in an analysis derived from that of Baker (1970),<sup>5</sup> Li (1992) and Aoun and Li (1993) have argued that, at least in the case of Chinese, there is an alternative to LF *wh*-movement that accounts for the properties of *wh*-in-situ. Extending Baker's proposal to Chinese, Aoun and Li claim that the LF structure of (6a) is not (7), but rather similar to (9).



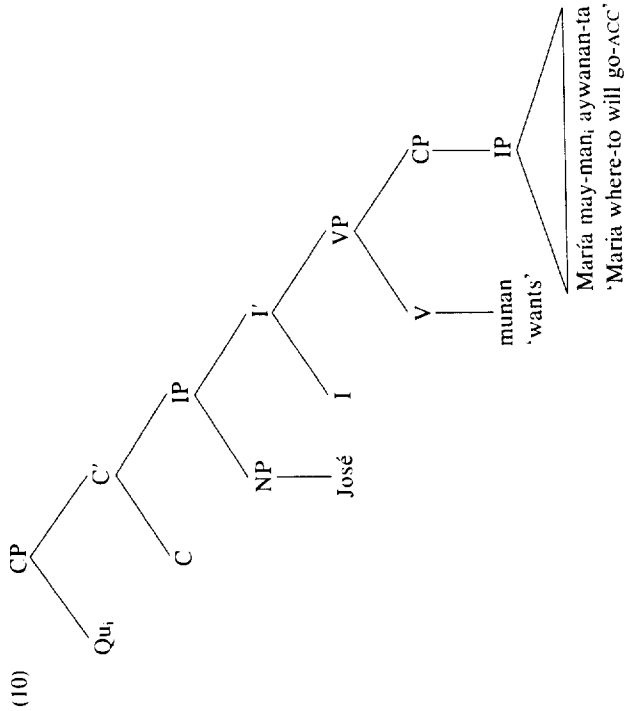
In (9) the question word *shenme* 'what' has not undergone movement. Rather, it is linked by coindexing with a null operator *Qu<sub>i</sub>*.<sup>6</sup> In Aoun and Li's analysis, the correct scope is obtained by treating *Qu* as the quantificational element, and *shenme* as a variable bound by *Qu*. Since *Qu* asymmetrically c-commands *meige* 'every' at S-Structure, it would be expected that the interrogative operator *Qu* would be able to take *meige* in its scope. We shall refer to this analysis as the *wh*-indexing analysis as distinct from the widely assumed LF *wh*-movement analysis.

The question arises whether a *wh*-indexing analysis is appropriate for Quechua (and for languages manifesting *wh*-in-situ in general). For example, an Ancash *wh*-in-situ question like (5b) (repeated here) might have a structure like (10) rather than (8).

- (5) b. [José munan [María may-man, aywanan-ta]]?  
 José wants María where-to will go-ACC  
 'Where does Jose want Maria to go?'

<sup>5</sup> The line taken by Baker (1970) was also developed by Van Riemsdijk and Williams (1981), Mohanan (1984), Pesetsky (1987), and Nishigauchi (1991), among others.

<sup>6</sup> *Qu* is linked in turn by spec-head agreement to a question particle *-ne* (or its null counterpart), which appears in Comp.



In the sections to follow we show that there is a previously unexplained asymmetry between *wh*-question forms in situ and internally headed relative clauses with respect to constraints on extraction in the LF component. This asymmetry remains mysterious if the *wh*-movement analysis is adopted for Quechua but is explained naturally if the *wh*-indexing analysis is adopted.

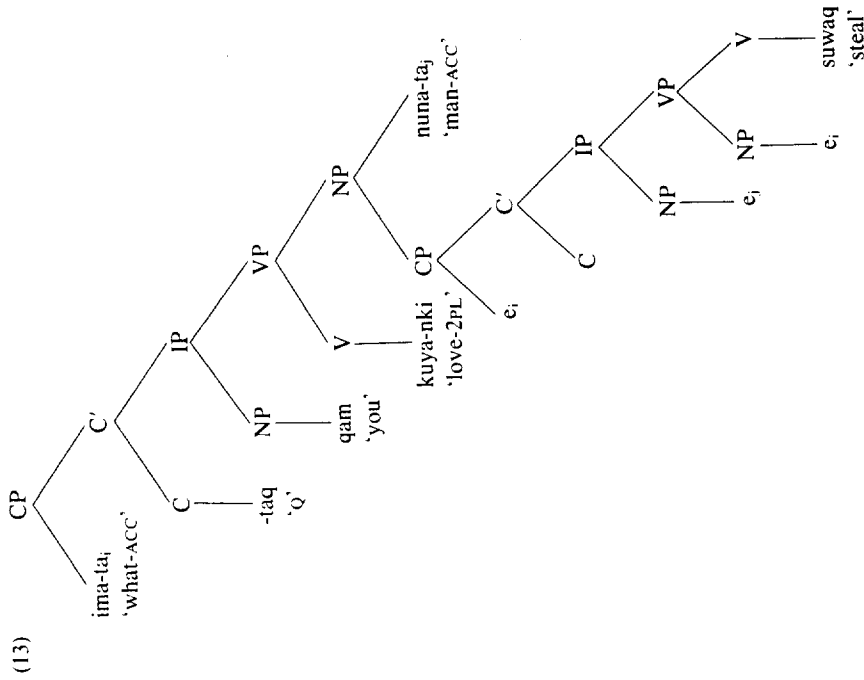
3 *Wh*-in-Situ and Extraction from Islands in Quechua

The existence of *wh*-in-situ in Ancash Quechua was illustrated in (5b), in which the locative adjunct remains in situ within the complement clause. Additional examples of *wh*-in-situ in Ancash are given in (11).

- (11) a. María pi-wan-taq parlan?  
 María who-with-Q speaks  
 'With whom is María speaking?'  
 b. Krei-nki [[José ima-ta rantinan-ta] munanqan-ta]:  
 believe-2PL María Jose what-ACC buy-ACC want-ACC  
 'What do you believe María wants Jose to buy?'

In contrast to overt extraction, *wh*-in-situ in Ancash does not exhibit Subadjacency effects. For example, overt extraction of a *wh*-question from a complex NP is ungrammatical, as illustrated in (12), the structure of which is shown in (13).

- (12) \*Ima-ta-taq (qam) kuya-nki suwaq nuna-ta?  
 what-ACC-Q you love-2PL steal man-ACC  
 \*'What do you love the man who stole?'



But the occurrence of *wh*-in-situ in a complex NP is well formed, as shown by (14), the structure of which is (15).

- (14) (Qam) kuya-nki ima-ta suwaq nuna-ta?  
 you love-2PL what-ACC steal man-ACC  
 'You love the man who stole what?'

<sup>7</sup> The English translation of (14) is somewhat misleading. The Quechua sentence is a normal request for information rather than an echo question.

- (16) *Extraction of complement object*  
 Ima-ta-taq Fuan musyan [Rosa t ruranqan-ta]?  
 what-ACC-Q Juan knows Rosa made-ACC  
 'What does Juan know that Rosa made?'
- (17) *Ill-formed extraction of complement subject*  
 \*Pi-taq Fuan musyan [e tanta-ta ruranqan-ta]?  
 who-Q Juan knows bread-ACC made-ACC  
 'Who does Juan know that made bread?'

Turning now to *wh*-in-situ, an unmoved *wh*-word in complement subject position does not induce an ECP violation:

- (18) *Wh-in-situ in complement subject position*  
 Fuan musyan [pi tanta-ta ruranqan-ta]?  
 Juan knows who bread-ACC made-ACC  
 'Juan knows that who made bread?'

Finally, consider the distribution of *wh*-forms in adjuncts. Whereas overt extraction of an adjunct from an adjunct is ill formed, as in (19), in situ *wh*-adjuncts in adjuncts are well formed, as in (20).

- (19) \*<sub>[CP May-chaw-taq, I<sub>IP</sub> (qam) Maria-ta rikarqonki [CP PRO t<sub>i</sub> kaykar]]</sub>?<sup>9</sup>  
 where-in-Q you Maria-ACC saw  
 'Where, did you see Maria while she was being t<sub>i</sub>?'
- (20) <sub>[CP (Qam) Maria-ta rikarqonki [CP PRO may-chaw kaykar]]</sub>?<sup>10</sup>  
 you Maria-ACC saw where being  
 'Where, did you see Maria while she was being t<sub>i</sub>?'

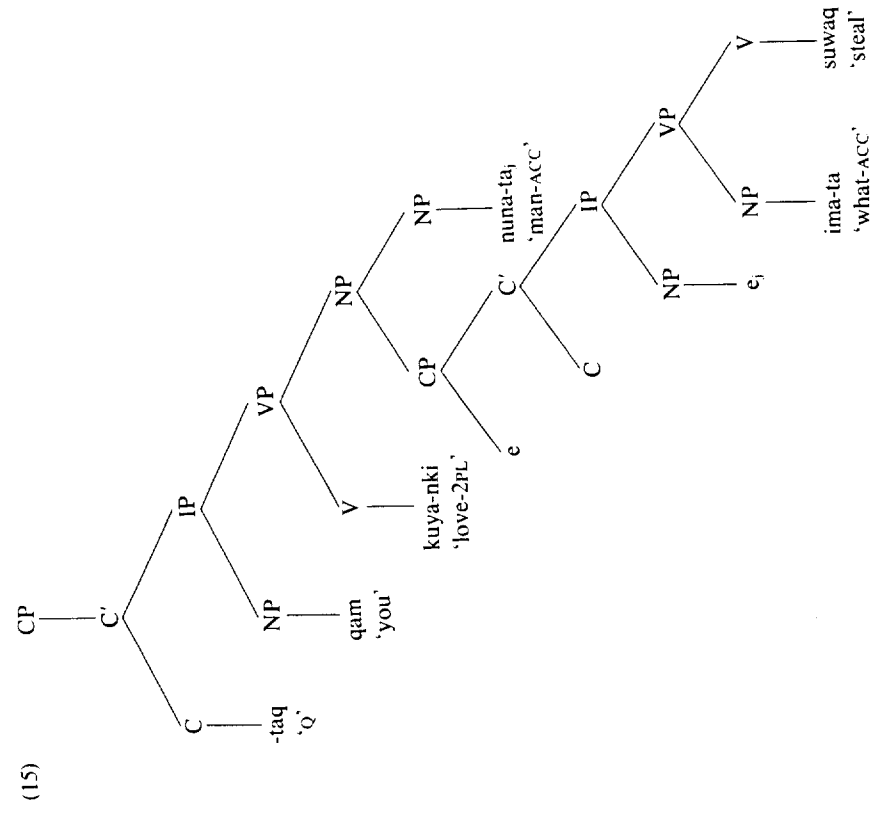
Following standard assumptions, we take the ungrammaticality of (19) to be due to the ECP. Thus, the grammaticality of (20) shows that *wh*-in-situ does not engender ECP effects.

4 Internally Headed Relative Clauses and Extraction from Islands in Quechua

We now turn to internally headed relative clauses (IHRCs). As in most OV languages, relative clauses in Quechua typically manifest heads on the right:

- (21) <sub>[NP<sub>[CP Nuna e<sub>i</sub> rantishqan] bestiya<sub>i</sub>] alli bestya-m.</sub>  
 man bought horse good horse-EVIDENTIAL  
 'The horse the man bought is a good horse.'</sub>

<sup>9</sup> The morphology of the clause *kaykar* unambiguously identifies it as an adverbial switch reference clause and, hence, an adjunct. (See Hermon 1985.)  
<sup>10</sup> Following the general line taken by Fringuo et al. (1988), we assume that L.F. pied piping is not a plausible explanation for the grammaticality of sentences like (20).



Analogous examples can be provided showing the contrast between *wh*-in-situ and overt *wh*-extraction with regard to other islands.

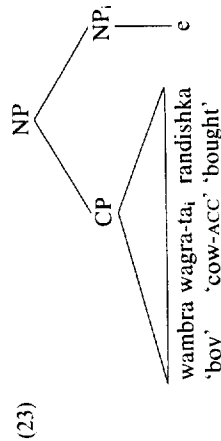
A similar situation prevails with regard to the Empty Category Principle (ECP). Ancash, like other Quechua languages, exhibits strong constraints against the extraction of complement subjects, constraints that parallel *that-t* effects in English.<sup>8</sup>

<sup>8</sup> There is no pronounced Comp in most Quechua languages. We assume a phonologically null Comp (as distinct from an empty Comp node)—for example, in the terms of Rizzi (1990), an "inert" Comp that does not contain Agr and therefore cannot head-govern the subject trace. See also Hermon 1985 for a detailed discussion of the ECP facts in Quechua.

In addition to right-headed relative clauses, most (perhaps all) Quechua languages manifest IHRCs as well:

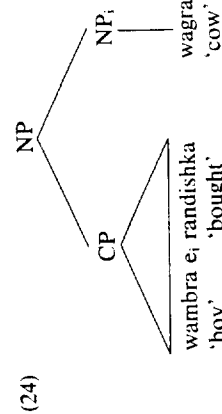
- (22) a. *IHRC in Imbabura Quechua*  
 Wambra wagra-ta randishka ali wagra-mi.  
 boy cow-ACC bought good cow-EVIDENTIAL  
 'The cow that the boy bought is a good cow.'  
 b. *IHRC in Ancash Quechua*  
 Nuna bestya-ta rantishqan alli bestya-m.  
 man horse-ACC bought good horse-EVIDENTIAL  
 'The horse the man bought is a good horse.'  
 c. *IHRC in Wanka Quechua* (from Cerrón-Palomino 1979)  
 Hwan-pa kawalu lanti-s'a-n-ka? pastu-ka mikuykan.  
 Juan-GEN horse buy-PART-3PL-the hay-ACC is eating  
 'The horse that Juan bought is eating hay.'

It can be seen that *wagrata* in (22a) (like the analogous NPs in the other examples) is internal to the modifying clause because it appears in accusative case rather than in the nominative case that would be expected of the subject of *alli bestyam* 'good horse'.<sup>11</sup> It was argued in Cole 1987 that the S-Structure form of sentences like (22a-c) is roughly (23), in which the position of head on the right is filled by a phonologically null NP.



We shall refer to structure (23) as *rel-in-situ*.

Furthermore, there is evidence that at LF IHRCs have a structure similar to that of headed relative clauses. It is claimed that (24) is the LF structure of the relative clause in (22a).



<sup>11</sup> These facts are shown by word order rather than case in the Wanka example.

In (24) the NP *wagra* has been moved from a position within the modifying clause to the position of head, a movement reminiscent of the proposals of Brame (1967), Schachter (1973), and Vergnaud (1974). We shall refer to this movement as *head formation*.<sup>12</sup>

There are several reasons to believe that head formation has applied in sentences like (22a-c). The most persuasive evidence comes from constraints on the distribution of the nominal interpreted as the head. The position of this nominal is subject to the ECP and Subadjacency. For example, the nominal interpreted as the head can occur freely in complement object position, as in (25).

- (25) *Internally headed relativization of complement object in Imbabura Quechua*  
 [NP]<sub>CP</sub> Marya [CP Juan wawa-ta, rikushka-ta] nishka] e] lughshirka.  
 Maria Juan child-ACC saw-ACC said left  
 'The child that Maria said that Juan saw left.'

However, it cannot occur in complement subject position:<sup>13</sup>

- (26) *Internally headed relativization of complement subject in Imbabura Quechua*  
 \*[NP]<sub>CP</sub> Marya [CP warmi, Juan-ta rikushka-ta] nishka] e] lughshirka.  
 Maria woman Juan-ACC saw-ACC said left  
 'The woman that Maria said that saw Juan left.'

The contrast between the grammaticality of (25) and the ungrammaticality of (26) would be unexplained if the nominal understood as the head did not move out of the modifying clause at LF. But if LF movement is assumed, the contrast in grammaticality of internally headed relativization of the complement subject and the complement object is explained. The ill-formedness of subject relativization is explained on the same basis as in headed relativization: extraction of a complement subject in Quechua violates the ECP.

A similar argument can be given on the basis of Subadjacency.<sup>14</sup> Our example involves internally headed relativization into a headed relative clause. The occurrence of the element understood as the head within a headed relative clause is ill formed:

<sup>12</sup> An alternative treatment of IHRCs is proposed by Culy (1990). According to Culy's Government-Binding Theory analysis (he also provides Head-Driven Phrase Structure Grammar and Lexical Functional Grammar analyses), IHRCs lack a syntactic head at either S-Structure or LF. As in our analysis, however, the nominal understood as the head (NP<sub>mod</sub> in Culy's terms) undergoes LF movement to an S-external position. What is significant for purposes of this article is that in Culy's analysis, like ours, NP<sub>mod</sub> undergoes LF movement to an A-position external to the S in which it occurs at S-Structure. Other works that provide arguments for the LF raising of the NP interpreted as the head are Williamson 1987 and Barsz et al. 1991. The various works cited differ with regard to the details of the LF structures proposed. It should be noted that Quechua, unlike Lakhotia, presents no evidence that the internal head must be indefinite. Thus, we do not adopt those aspects of Williamson's analysis designed to ensure that the internal head must be indefinite.

<sup>13</sup> Recall that we assume the presence of an unpronounced Comp in complementation structures.

<sup>14</sup> Following Fiengo et al. (1988), we assume that Subadjacency constrains LF movement.

## (27) Internally headed relativization into headed relative clause

a. *Imbabura Quechua*

\*[<sub>NP</sub>]<sub>CP</sub> Juan [<sub>NP</sub>]<sub>CP</sub> *warmi*<sub>i</sub> <sub>t</sub><sub>j</sub> *japi-shka* [<sub>NP</sub>]<sub>CP</sub> *sisa-kuna*<sub>j</sub> *gushaj*<sub>i</sub> e]<sub>i</sub>  
 Juan woman pick-PAST flower-PL like  
 juyalla-mari.  
 beautiful-EVIDENTIAL

'The woman who Juan likes the flowers that (she) picked is very beautiful.'

b. *Ancash Quechua*

\*[[<sub>NP</sub>]<sub>CP</sub> [<sub>e</sub> *nuna-ta*<sub>i</sub> *kuyaq* *warmi-ta*<sub>j</sub> *reqinqa-ta*]<sub>i</sub> e]<sub>i</sub> *wary* *tomorrow*  
 Maria man-ACC love woman-ACC know-ACC  
 shamunqa.  
 will come

'The man who Maria knows the woman that loves (him) will come tomorrow.'

The ungrammaticality of (27a) is a mystery if *warmi*, the nominal interpreted as the head, remains in situ at LF, but it receives a natural explanation if that nominal is moved out of the relative clause by head formation, thereby violating Subjacency. Similarly, if *nuna* remains in situ in (27b), the apparent Subjacency violation in that sentence is unexplained. Like *warmi* in (27a), it receives a natural explanation if *nuna* has moved out of the modifying clause in LF.<sup>15</sup>

## 5 Explaining the Asymmetry

In section 3 we showed that the distribution of *wh*-question words in situ is not subject to island constraints. In contrast, as shown in section 4, the distribution of the in situ nominal interpreted as though it were the head of an IHRC is subject to island constraints. If both *wh*-in-situ and rel-in-situ involve LF movement to an A-position, both instances of LF movement would be expected to be subject to the same restrictions on extraction.

The asymmetry between *wh*-in-situ and rel-in-situ can be resolved if the *wh*-indexing analysis of *wh*-in-situ is adopted. Recall that, according to this analysis, *wh*-in-situ is explained by indexing the *wh*-question word with a null *wh*-operator in the CP projection. This indexing does not involve movement. Thus, the *wh*-indexing analysis (unless elaborated further) predicts that *wh*-in-situ will not be subject to Subjacency (unless elaborated further) predicts that rel-in-situ (IHRCs) does require LF movement. Thus, in contrast, we have argued that rel-in-situ (IHRCs) does require LF movement. Thus, the distribution of the nominal interpreted as the head in an IHRC would be expected to be subject to Subjacency and the ECP.

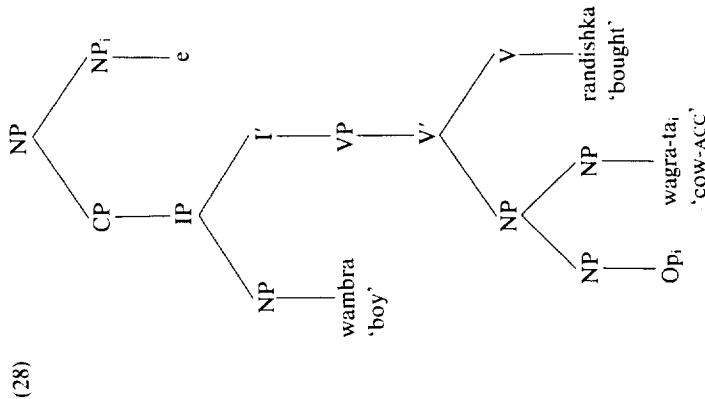
<sup>15</sup> It should be noted that, unlike Pesetsky's proposals for English and Japanese, the indexing strategy for questions is not restricted to "D-linked" *wh*-phrases, but appears to be available for all cases of *wh*-in-situ. We do not have an explanation for why indexing appears to be more restricted in Japanese and English than in Quechua.

An additional discrepancy among languages for which we lack an explanation is that whereas IHRCs are subject to Subjacency in Quechua, they are not in Lakota. See Williamson 1987.

## 6 An Alternative Explanation

A possible alternative to our analysis would be one in which the asymmetry between *wh*-in-situ and rel-in-situ is explained by treating rel-in-situ as involving movement in Syntax and *wh*-in-situ as movement in LF. Until recently it was widely assumed that Subjacency affects syntactic movement but not LF movement (e.g., Huang 1982). If this assumption is correct, it might be proposed that *wh*-in-situ involves LF movement and thus is exempt from Subjacency. In contrast, rel-in-situ involves the syntactic movement of a null operator and thus is subject to Subjacency.

There are several arguments against this counteranalysis. First, there would appear to be no appropriate position within the structure of IHRCs to attach a null operator. Although a null operator might be introduced as in (28), for instance, in which Op is generated in a position adjoined to the nominal interpreted as the head, the occurrence of the null operator would be ad hoc.



Second, although the proposed counterhypothesis provides an account of the differences between *wh*-in-situ and rel-in-situ with respect to Subjacency, it provides no account of the ECP facts. As noted above, the distribution of *wh*-in-situ violates not



only Subadjacency, but also the ECP. It is uncontroversial that the ECP applies at LF. Thus, the proposal that *wh*-in-situ undergoes LF movement and *rel*-in-situ syntactic movement would make the wrong predictions about ECP effects for *wh*-in-situ in Quechua.<sup>16</sup>

Finally, although the data are lacking for Quechua, there is evidence from another language displaying IHRCs, Lakhota, that the NP understood as the head has moved out of its clause by LF. Williamson (1987) shows that certain forms in Lakhota are negative polarity items, for example, *wazini* 'not a' and *tuweni* 'no one'. These forms must be c-commanded by and occur in the same IP with a negative:

- (29) a. Tuweni u pi sni.  
no one come PL NEG  
'No one came.'  
b. \*Tuweni u pi.  
no one come PL  
'No one came.'  
c. \*[[Suka wazini ophethu]] wakuze sni.  
dog not a buy I pretend NEG  
'I didn't pretend to buy a dog.'

It is of particular significance for our purposes that, as is shown in (29c), a negative in a higher clause cannot license *wazini* and *tuweni*.

Although the presence of a negative in the same clause normally licenses these negative polarity items, when the polarity item is an instance of *rel*-in-situ, this is not the case. The ill-formedness of the relative clause with the negative internal to the modifying clause is illustrated in (30a–b). Its well-formedness when the negative is in the matrix clause is shown in (30c).

- (30) a. \*[[Tuweni u pi sni] ki/cha] hena iyokipi.  
no one come PL NEG DETS those happy  
b. \*[[Tuwa u pi sni] ki/cha] hena iyokipi.  
someone come PL NEG DETS those happy  
'Those who didn't come are happy.'  
c. [Suka wazini ophewathu] cha] sape sni.  
dog not a I buy IND black not  
'No dog that I bought is black.'

As these examples show, a negative polarity item that is an instance of *rel*-in-situ is licensed by a negative in the matrix clause rather than by a negative in the modifying clause. If it is assumed that the head of an IHRC remains *in situ* at LF, the facts illustrated in (30) are difficult to explain. But if it is assumed that negative polarity items must be licensed by a negative at LF, and that head formation applies in the LF component, the

<sup>16</sup> We assume that the complement subject position is not properly governed at LF.

facts receive a natural explanation: the nominal interpreted as the head is moved to an IP-external position in LF. Thus, it is outside the scope of a negative in the modifying clause and within the scope of a negative in the matrix clause.<sup>17</sup>

### 7 *Wh*-in-Situ in Chinese and Quechua

We turn now to an asymmetry between Chinese and Ancash Quechua with respect to the ECP. Whereas in Ancash Quechua, as we have shown, *wh*-in-situ shows no ECP effects, in Chinese its distribution seems to be subject to the ECP. The asymmetry between the distribution of *wh*-in-situ in these two languages raises a number of as yet unanswered questions regarding the principles determining the properties of *wh*-in-situ.

Recall that the analysis of *wh*-in-situ in Chinese proposed by Aoun and Li (1993) and Li (1992) provided the inspiration for our analysis of Ancash Quechua. Aoun and Li's analysis of Chinese is motivated by a number of related facts involving the distribution of *only*. A major argument is based on an asymmetry with respect to *only* between the LF movement of quantifiers (so-called Quantifier Raising (QR)) and the putative movement of *wh*-forms at LF (e.g., Huang's (1982) account). Aoun and Li note that the distribution of *zhi* 'only' in Chinese (like that of *only* in English) is subject to the Principle of Lexical Association (PLA) proposed by Tancredi (1990):

- (31) An operator like *only* must be associated with a lexical constituent in its c-command domain [i.e., not with a trace].

The PLA is intended to account for the fact that (32b) is well formed whereas (33b) is not.

- (32) a. Ta hen xihuan Mali.  
he very like Mali  
'He likes Mali.'  
b. Mali, ta hen xihuan t<sub>i</sub>.  
Mali he very like  
'Mali, he likes.'  
(33) a. Ta zhi xihuan Mali.  
he only like Mali  
'He only likes Mali.'  
b. \*Mali, ta zhi xihuan t<sub>i</sub>.  
Mali he only like  
'He only likes Mali.'

(33b) is ill formed because *Mali* is not in the c-command domain of *zhi* 'only'.

We shall now summarize Aoun and Li's discussion of the effect of the PLA on quantified NPs and *wh*-forms. We first examine quantified NPs. In sentences like (34), two interpretations are possible.

<sup>17</sup> Culy (1990) proposes an alternative, semantic explanation for the Lakhota facts.

- (34) Meige ren dou bei liangge ren ma guo.  
 everyone all by (PASS) two man scold ASP  
 'There are two (specific) people who scolded everyone.'

or

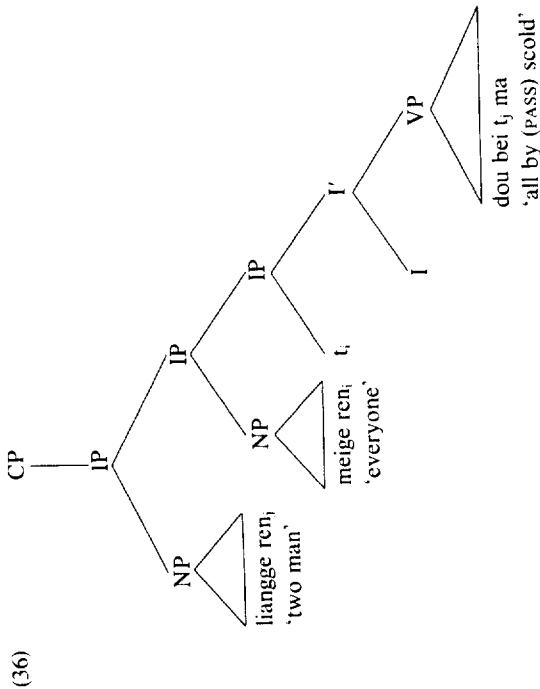
'For each person there were two people (not necessarily the same two) who scolded them.'

Either *meige ren* 'everyone' can take *liangge ren* 'two men' in its scope, yielding the second interpretation, or *liangge ren* 'two men' can take *meige ren* 'everyone' in its scope, yielding the first interpretation.

In contrast to (34), in sentences with *zhi* 'only' like (35), the interpretation in which *liangge ren* 'two men' has higher scope than *meige ren* 'everyone' does not occur.

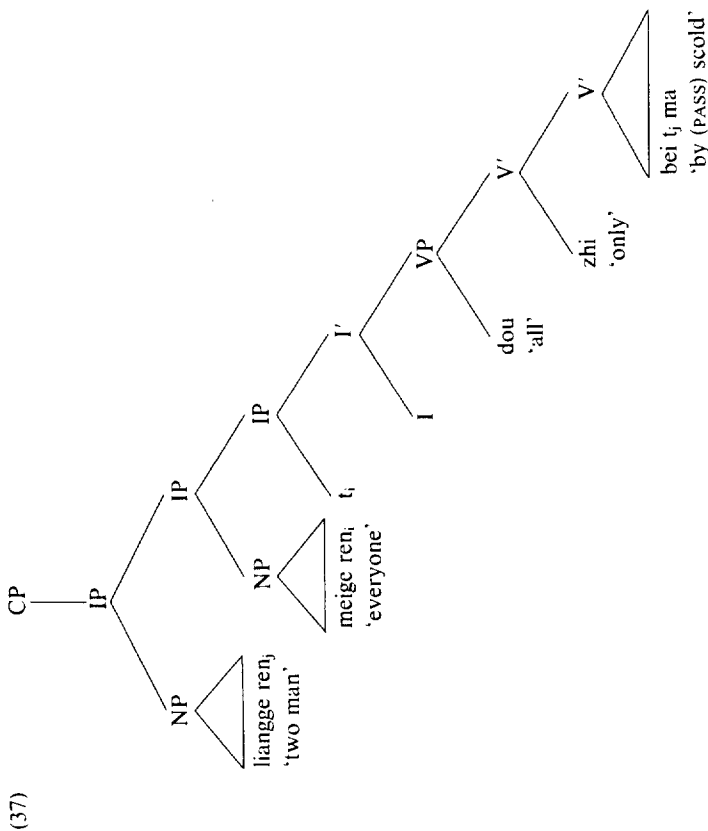
- (35) Meige ren dou zhi bei liangge ren ma guo.  
 everyone all only by (PASS) two man scold ASP  
 'Everyone has only been scolded by two men.'

These facts are predicted by the PLA on the assumptions that (a) the PLA applies at LF, and (b) at the level of LF *liangge ren* 'two men' in (35) (as well as *meige ren* 'everyone') has undergone QR. The application of QR to (34) yields (36).



But as (37) illustrates, this structure is blocked in the case of (35) because *liangge ren* 'two men' is outside the c-command domain of *zhi* 'only' at LF, thereby violating the

PLA.<sup>18</sup> These facts are argued by Aoun and Li to show that quantified NPs undergo movement (i.e., QR) at LF.

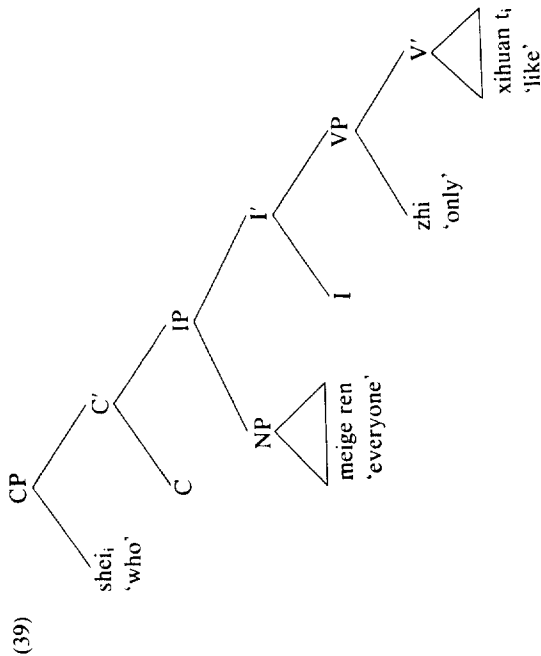


In contrast to quantified NPs, *wh*-forms can have wide scope regardless of whether *zhi* occurs or not:

- (38) Ta zhi xihuan shei?  
 he only like whom  
 'Who does he only like?'

If *wh*-in-situ were to undergo LF *wh*-movement, a structure like (39) would result.

<sup>18</sup> Presumably, on the grammatical narrow scope reading, *liangge ren* 'two men' does not raise outside the c-command domain of *zhi* 'only'. Thus, either raising must be optional or raising to VP rather than IP must be a possible option. See Aoun and Li 1993 for further details.



This structure is predicted to be ill formed by the PLA because *shei* 'who' is not in the c-command domain of *zhi* 'only' at LF. Thus, the LF movement analysis predicts incorrectly that (38) is ill formed.

There are, however, certain apparent problems for the claim that *wh*-forms in Chinese do not undergo movement. As Huang (1982) shows, the distribution of *wh*-in-situ in Chinese appears to be subject to the ECP. For example, argument-adjunct asymmetries are found that appear to require a movement analysis. However, according to Aoun and Li, certain instances of argument-adjunct asymmetries do not appear to require an LF *wh*-movement analysis. For instance, in (40) an argument, *shenme* 'what', can have wide scope despite the fact that it occurs within a *wh*-island.

- (40) Ta xiang-zhidao shei maile shenme?  
 he wonder who buy what  
 'He wonders who bought what.'  
 \*'What does he wonder who bought?'  
 \*'Who does he wonder bought what?'

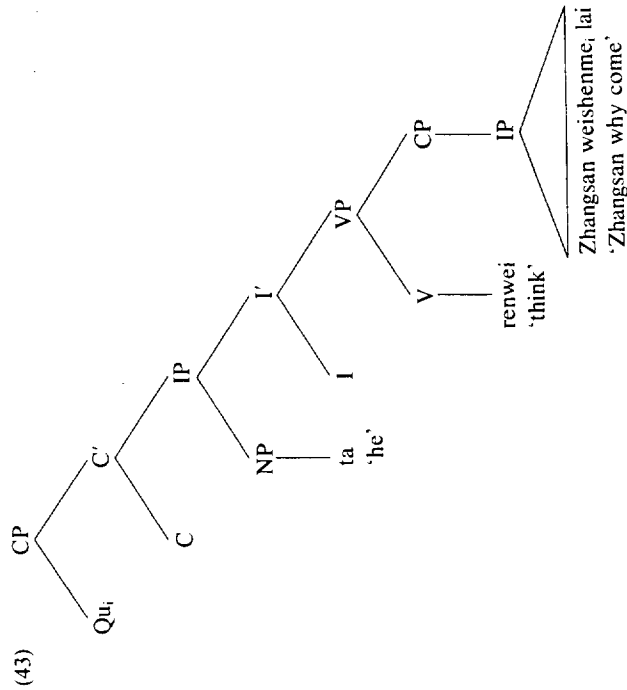
But the wide scope interpretation of an adjunct like *weishenme* 'why' is ill formed:

- (41) Ta xiang-zhidao shei weishenme likai le.  
 he wonder who why leave ASP  
 \*'He wonders who left why?'  
 \*'Why does he wonder who left?'  
 \*'Who does he wonder left why?'

According to Aoun and Li, the ill-formedness of (41) can be explained without movement if it is assumed (a) that in situ *wh*-forms are logical variables bound by a null operator, and (b) that such *wh*-variables are subject to the ECP.

The extension of the ECP to in situ *wh*-elements raises the question of how an in situ *wh*-adjunct might ever receive a long-distance interpretation. In (42), for instance, *weishenme* 'why' has matrix scope, suggesting a structure like (43).

- (42) Ta renwei Zhangsan weishenme lai le?  
 he think Zhangsan why come ASP  
 'Why<sub>i</sub> does he think Zhangsan came t<sub>i</sub>?'



(43) would be expected to be ill formed because by hypothesis *weishenme* 'why' is subject to the ECP, and no antecedent is shown in (41).

In order to account for the well-formedness of (42), Aoun and Li propose that movement is involved in Chinese *wh*-questions, but that the element that moves is not the *wh*-form but a null question operator (Qu), which is base-generated in the clause containing the *wh*-form. Thus, the correct derivation for (42) is (44).

- (44) [<sub>CP</sub> Qu<sub>i</sub> [<sub>IP</sub> ta renwei [<sub>CP</sub> t<sub>i</sub> [<sub>IP</sub> Zhangsan weishenme<sub>i</sub> lai le]]]]  
 in which the Qu operator has moved from CP<sub>2</sub> to CP<sub>1</sub>. The trace of the operator in CP<sub>2</sub>

to this approach, in some languages (e.g., Chinese) *wh*-in-situ would involve LF *wh*-movement, whereas in others (e.g., Ancash Quechua) *wh*-indexing would occur. If this line of investigation were pursued, the next step would be to determine under what circumstances and according to what principles a language would choose LF *wh*-movement rather than *wh*-indexing. It is not clear to us how this question would be answered.

A second approach would be to hypothesize that in some languages (e.g., Chinese) *wh*-in-situ is subject to the ECP, whereas in others (e.g., Ancash Quechua) it is not. If this approach were taken, the natural question would be how the *wh*-elements in the two classes of languages differ and why one should be subject to the ECP, but not the other. It should be noted that the difference between Chinese and Ancash Quechua with respect to *wh*-in-situ could not be that *wh*-elements are logical variables in Chinese and not in Ancash Quechua. Li (1992) argues that the noninterrogative use of *wh*-elements shows that they are variables.<sup>19</sup> In (48) from Ancash Quechua *ima* is interpreted as 'something' rather than as 'what' because it is within the scope of *-pis*, which we interpret to be an existential quantifier binding the variable *ima*.

- (48) *Ima-pis oqrakashqa.*  
 what even got lost  
 'Something got lost.'

Thus, following Li's argument, there is reason to believe that *wh*-in-situ in Ancash Quechua are logical variables despite the fact that their distribution is not subject to the ECP. Thus, it would not appear to be possible to claim that those *wh*-forms that are logical variables are subject to the ECP whereas those that are not logical variables are not.

## 8 Conclusions

We have argued that the facts of Quechua provide strong support for the claim that (at least in Ancash Quechua) *wh*-in-situ is better explained by coindexation between a quantifier-like element in CP and a variable-like *wh*-word in situ than by LF *wh*-movement of the *wh*-word. But Ancash Quechua does not provide support for the hypothesis that variable-like *wh*-words are universally identical in their properties to *wh*-traces in obeying the ECP. The Quechua facts also fail to support the more general hypothesis that it might be possible to eliminate all LF movement rules from the grammar. Our analysis is in fact based on an examination of the differing properties of what we interpret to be LF movement and coindexation in the same language.

The analysis proposed here leaves a number of important questions unanswered: What general principles determine whether a rule can apply in the LF component? Is

<sup>19</sup> A number of other researchers have argued that certain *wh*-phrases act like indefinites and hence can be unselectively bound by overt *c*-commanding quantifiers. See Nishigauchi 1991.

antecedent-governs *weishenme* 'why'. Since the movement of the operator does not violate the ECP in (44), (42) is well formed.

Thus, the ill-formedness of *wh*-adjuncts in various island environments is taken to show that the movement of the operator is subject to the ECP. Consider the distribution of *wh*-elements in complex NPs. Although *wh*-arguments can occur in complex NPs (as in (45)), *wh*-adjuncts cannot (as in (46)).

- (45) *Ni xihuan shei xie de shu?*  
 you like who write DE book  
 'Who (x) such that you like the book x wrote?'

- (46) \**Ni xihuan ta weishenme xie de shu?*  
 you like he why write DE book  
 'Why (x) you like the book he wrote x?'

There are several potential derivations for (46):

- (47) a. [<sub>CP</sub> *Qui* [<sub>IP</sub> *ni xihuan* [<sub>NP</sub> [<sub>CP</sub> *ta weishenme*, *xie de*] *shu*]]]  
 b. [<sub>CP</sub> *Qui* [<sub>IP</sub> *ni xihuan* [<sub>NP</sub> [<sub>CP</sub> *t<sub>i</sub>* [*ta weishenme*; *xie de*] *shu*]]]  
 c. [<sub>CP</sub> *Qui* [<sub>IP</sub> *ni xihuan* [<sub>NP</sub> [<sub>CP</sub> *t<sub>i</sub>* [<sub>CP</sub> *t<sub>2</sub>* [*ta weishenme*; *xie de*] *shu*]]]]]

In (47a) *weishenme* 'why' has no local antecedent. Thus, the derivation is ill formed. In (47b) *Qu* has been moved from CP<sub>2</sub> to CP<sub>1</sub> (without adjoining it to CP<sub>2</sub>). In (47b) *t<sub>i</sub>* is neither antecedent- nor head-governed. Thus, the ECP is violated. In (47c) *Qu* has been adjoined to CP<sub>2</sub> and then moved to CP<sub>1</sub>. In this derivation antecedent government is satisfied, but head government is not. On the assumption that both head and antecedent government are necessary, the ECP is violated. Thus, on the assumption that the *wh*-element itself is unmoved, the movement of the *Qu* operator must be subject to the ECP in order to predict the environments in which *wh*-adjuncts may occur in Chinese.

Thus, we would like to emphasize that, although in Aoun and Li's analysis there is no LF *wh*-movement, they do posit movement of a null operator in order to account for the fact that the distribution of *wh*-in-situ in Chinese is subject to the ECP. In sharp contrast to the facts in Chinese, we showed in section 3 that the distribution of *wh*-in-situ in Ancash Quechua is not subject to the ECP; whereas overt extraction of subordinate subjects and adjuncts within adjuncts is ill formed, *wh*-in-situ in these environments is well formed. The absence of ECP effects was taken to constitute a strong argument against an LF movement analysis for Ancash.

The sharply different properties of Chinese and Ancash Quechua with regard to the effect of the ECP on the distribution of *wh*-in-situ raises the question of how these differences might be accounted for. We cannot provide a full account here, but we would like to examine the consequences of two possible approaches. One is that the PLA facts with respect to *wh*-in-situ in Chinese might be given a different explanation from that of Aoun and Li. If this line were taken, there would be no known Chinese-internal reason to believe that Chinese employs *wh*-indexing rather than LF movement. Thus, according

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it the case that all examples of *wh*-in-situ involve coindexation, or do some languages exhibit coindexation and others LF *wh*-movement? More generally, what determines whether *wh*-words will undergo *wh*-movement or coindexation? A reasonable possibility, based in part on proposals by Barss et al. (1991) and Aoun and Li (1993), is that coindexation between *wh*-words and interrogative particles requires (a) the presence of interrogative particles in a language and (b) the possibility for *wh*-words to act as logical variables rather than operators. In the Quechua languages there is evidence that both requirements are met: the Quechua languages use particles for both yes-no and information questions. The existence of interrogative particles in yes-no and information questions in Imbabura Quechua is illustrated in (49)–(50).<sup>20</sup>

(49) Juan Quito-man-*chu* rirka?  
 Juan Quito-to-INTER went  
 'Did Juan go to Quito?'

(50) Pi-wan-*taj* Juan parlarka?  
 who-with-INTER Juan spoke  
 'Who did Juan speak with?'

Furthermore, as shown by (48), there is evidence in Quechua analogous to that cited by Aoun and Li from Chinese that *wh*-words are logical variables: namely, that the forms used for information question words can also be used as noninterrogative indefinites.

But, although the presence of interrogative particles and the use of *wh*-forms as variables may be necessary conditions for coindexation between the interrogative particle and the *wh*-variable, these cannot be sufficient conditions. In Imbabura Quechua, not only do interrogative particles occur in essentially the same environments as in Ancash Quechua, but the equivalent of (48) is well formed:

(51) Pi-pash shamurka.  
 who even came  
 'Someone came.'

But, as shown in section 1, *wh*-in-situ is found in Ancash Quechua but not in Imbabura. Thus, it would appear that the occurrence of coindexation rather than overt movement is not simply a by-product of the existence of interrogative particles and *wh*-variables. This leaves unanswered the general question of what the licensing conditions are for *wh*-indexing as an alternative to *wh*-movement.

<sup>20</sup> A detailed account is needed, however, for how interrogative particles in Quechua could be instances of Comp and yet appear on the surface within IP. We hope to address this and a number of other issues regarding the structure of Quechua questions in the near future.

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# Long Scrambling and Incorporation

In this article we will develop a theory of long scrambling that makes crucial use of the notion of abstract verb incorporation. We will show that an account of long scrambling that is based on the LF operation of head movement is superior to an account that assumes successive-cyclic adjunction of scrambled categories, and, moreover, that it complies with economy-of-derivation requirements that Chomsky (1993) unites under the principle called Procrastinate, which states that ‘‘LF movement is ‘cheaper’ than overt movement.’’ The theory of incorporation that we make use of is based on a modified version of Baker’s (1988) notion of a barrier. The relevance of the theory of incorporation for the analysis of long scrambling is shown to correlate with a restrictive theory of adjunction that will be independently justified on empirical and conceptual grounds.

On the basis of our analysis of long scrambling from German infinitives, we will provide an account for a fundamental yet scarcely noticed asymmetry between remnant topicalization and remnant adjunction, that is, between topicalization and scrambling of categories that contain the trace of a scrambled element. We will argue that this asymmetry can be attributed to the Empty Category Principle (ECP) if the following fundamental theoretical assumptions are made: (a) adjoined categories are barriers for incorporation; (b) barriers at S-Structure are preserved under reconstruction at LF; (c) movement from a specifier of CP (Spec CP) position (hereafter also Top position) to an adjoined position is ruled out; (d) adjunction cannot proceed in a successive-cyclic manner. The explanatory achievements of this account, which extends to analogous phenomena in other languages, further support the incorporation theory of long scrambling on which it is based.

The paper is organized as follows. In section 1 we present descriptive generalizations about long scrambling in German and outline the problem of remnant topicalization versus remnant adjunction. In section 2 we argue that movement of TP to Spec CP is a prerequisite for abstract verb incorporation. We also discuss modifications to Baker’s theory of minimality barriers that seem to be necessary for using this theory as the

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