Temporal/Locative WHs and Null-P Incorporation*

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Abstract

This paper is an investigation on the categorial status of locative and temporal WHs. We argue, based on empirical data, for the null P hypothesis proposed by Huang (1982), and against the proposal of Murasugi and Saito (1992) that *when* and *where* are sentential arguments. We suggest that the problem raised in Murasugi and Saito (1992) for the null P analysis can be solved by the null P incorporation hypothesis. We further address the issues related to the applications of the P incorporation.

1. Introduction

The categorial status of locative and temporal WHs has been of some interest in investigations in the literature. In the next section we will review two theories bearing on this issue. Huang (1982) assumes a phonetically null P in order to explain the argument-like pattern of *when* and *where* observed in covert movement, while Murasugi and Saito (1992) propose, instead of this null P, that *when* and *where* are actually arguments of the sentence. We point out in Section 2.3 that Murasugi and Saito's analysis is inadequate in handling some data related to overt movement, such as relativization. We thus suggest maintaining Huang's null P hypothesis. Nevertheless, the examples given by Murasugi and Saito indeed pose a problem for Huang's null P theory. The goal of this paper is to look for an analysis so that we can preserve the null P on the one hand, and give a plausible account for the relevant examples in question. The answer, we believe, lies in an LF process, the Null-P incorporation, which we discuss in detail in Section 3.

2. On the distribution of temporal and locative WHs
2.1 Huang (1982)

One of the curious generalizations reported in Huang (1982) is about the categorial status of locative and temporal WH-phrases. Huang observes that in Chinese when *nali* 'where' and *shemeshihou* 'when' undergo LF movement, they behave like arguments rather than adjuncts. The following examples involve a WH-phrase in-situ within the Complex NP.

(1) a. ni   du guo   [NP [CP shei   xie   de] shu]
       you read-ASP   who   write DE book
    'You read the book who wrote?'
   b. ni   du guo   [NP [CP Lisi zai nali   xie   de] shu]
       you read-ASP   Lisi at where write DE book
    'You read the book Lisi wrote where?'
   c. ni   du guo   [NP [CP Lisi shemeshihou   xie   de] shu]
       you read-ASP   Lisi when   write DE book
    'You read the book Lisi wrote when?'
   d.*ni   du guo   [NP [CP Lisi weisheme   xie   de] shu]
       you read-ASP   Lisi why   write DE book
    'You read the book that Lisi wrote why?'

The generalization is that argument WHs such as *shei* 'who' in (1a) can occur within an island, whereas adjunct WHs like *weisheme* 'why' in (1d) cannot. Huang argues that (1b,c) are well-formed because *nali* 'where' and *shemeshihou* 'when' appear in the categorial position of [PP P [NP ___]], where the prepositions can be phonetically null. Thus, *nali* and *shemeshihou* are complements of the Ps and are on a par with *shei* 'who' in (1a) in being arguments (although the PPs containing *nali* 'where' and *shemeshihou* 'when' are adjuncts).

The same analysis extends to English as well. (2a) and (2b) show the familiar argument/ adjunct asymmetry: while the former can stay in-situ, the latter cannot. As the grammaticality of (2c) shows, *when* and *where* pattern with argument (i.e. *what*) in this respect. This follows naturally under Huang's analysis, since, as shown in (3), *when* or *where* is a complement and thus an argument of the null P.

(2) a. Who bought what?
    b.*Who bought that book why/how?
    c. Who bought that book when/where?
(3) Who bought that book [PP [P *e*] when/where]

Under Huang's (1982) analysis, (2a) and (2b) have the following LF representations in (4a) and (4b), respectively.

(4) a. [what$_j$, who$_i$]$_i$ t$_i$ bought t$_j$
    b.*[why/how$_j$, who$_i$]$_i$ t$_i$ bought that book t$_j$?

The LF representation in (4a) satisfies the ECP which requires that a non-pronominal empty category must be head governed or antecedent governed. The subject trace is antecedent-governed by the COMP (via Comp Indexing Mechanism see Aoun, Hornstein, and Sportiche (1981)) and the object trace is head governed by the verb *bought*. In contrast, (4b) violates the ECP. Although the subject trace is antecedent governed by the COMP, the adjunct trace is neither head nor antecedent governed. As the LF representation in (5) illustrates, the grammaticality of (2c) is attributed to the presence of the null P: the trace of *when/where* is head-governed by this P, satisfying the ECP. Since the subject trace is also governed by the COMP, the ECP is satisfied in this example.

(5) [when/where$_j$, who$_i$]$_i$ t$_i$ bought that book [$_{PP}$ [$_P$ e] t$_j$]

2.2 Murasugi and Saito (1992)

More recently, however, Murasugi and Saito (1992) have argued against Huang's null P hypothesis. Their argument is based on examples in which *where* and *when* appear within NPs. Consider the following.

(6) a. Who read [the book on which shelf]?
   b.*Who read [the book where]?
(7) a. Who won [the Olympics in which year]?
   b.*Who won [the Olympics when]?

The grammaticality of (6a) and (7a) is expected under Huang's (1982) analysis, because, as in (2a), the WH-phrases *which shelf* and *which year* are in complement positions of P. But the ungrammaticality of the (b)-examples is not predicted under his analysis, for if the null P were present, the following S-Structures for (6b) and (7b) should be possible.

(8) a.*Who$_i$ t$_i$ read [$_{NP}$ the book [$_{PP}$ [$_P$ e] where]]?
   b.*Who$_i$ t$_i$ won [$_{NP}$ the Olympics [$_{PP}$ [$_P$ e] when]]?

In these representations, *where* and *when* are in complement positions as well, which means that the ECP should be satisfied here in the same manner as in (6a) and (7a). As shown in (9), the LF representations of (6b) and (7b) show that the ECP is satisfied.

(9) a. *[where$_j$, who$_i$]$_i$ t$_i$ read [the book [$_{PP}$ [$_P$ e] t$_j$]] ?
   b. *[when$_j$, who$_i$]$_i$ t$_i$ won [the Olympics [$_{PP}$ [$_P$ e] t$_j$]] ?

Thus, Huang's analysis incorrectly predicts that (6b) and (7b) are grammatical.
     Murasugi and Saito (1992) claim that Huang's null P analysis is untenable for this reason. Instead they argue that the ungrammaticality of (6b) and (7b) can be explained by assuming that temporal and locative phrases can have argument status in sentences but not in NPs. More precisely, they claim that temporal and locative phrases are arguments of INFL or the event predicate associated with V, and that they are pure adjuncts when they occur within NPs. This provides a simple account of the contrast in (6) and (7), assuming that there is no null P associated with *where* and *when* . Now let us reconsider (6), repeated as (10), under their analysis.

(10) a. Who$_i$ t$_i$ read [the book [$_{PP}$ on which shelf]]?
    b.*Who$_i$ t$_i$ read [the book where]?

In (10a), the WH-phrase *which shelf* is in the object position of the P *on*. Thus the ECP would be satisfied via head-government at LF.

(11) [which shelf$_j$, who$_i$]$_i$ t$_i$ read [the book [$_{PP}$ on t$_j$]]?

In contrast, the ungrammaticality of (10b) is due to the lack of the P, according to Murasugi and Saito (1992). The ECP is violated, since the trace of *where* is neither head-governed nor antecedent-governed if we assume that antecedent-government is somehow blocked by the presence of the object NP node.[1]

(12) [where$_j$, who$_i$]$_i$ t$_i$ read [the book t$_j$]?

As for the example in (2c), repeated below, its grammaticality also follows straightforwardly under Murasugi and Saito's (1992) analysis. Since *when* and *where* are arguments of INFL or the event predicate, the trace left by LF WH-movement of *when* or *where* is properly governed by INFL (or the event predicate), thereby satisfying the ECP.

(13) Who bought that book when/where?

2.3 Problems

Although Murasugi and Saito's (1992) analysis is quite simple and attractive, there are some facts which lead us to question their conclusions. First, as discussed in Huang (1982), *when* and *where* pattern not with arguments but with adjuncts as far as overt movement is concerned.

(14) a. ?This is the book which$_i$ I wonder [where$_j$ you bought t$_i$ t$_j$].
    b. *This is the day when$_j$ I wondered [what$_i$ you bought t$_i$ t$_j$]
    c. *This is the place where$_j$ I wondered [what$_i$ you bought t$_i$ t$_j$]
    d. *This is the reason why$_j$ I wonder [what$_i$ you bought t$_i$ t$_j$]
<div align="right">(Huang 1982: 537)</div>

All the examples are degraded, since Subjacency (WH-island) is violated in each case. Still, (14b-d) are far worse than (14a). This is not expected if *when* and *where* are arguments of INFL (or the event predicate). (14a-c) should have the same status and contrast with (14d), according to Murasugi and Saito's analysis. Huang's (1982) analysis, on the other hand, has the potential of accounting for the facts in (14). For example, (14b-c) have two possible structures under his analysis, depending on what category (PP or NP) moves across the WH-island.

(15) a. *This is the day [$_{PP}$ [$_P$ e] when]$_j$ I wonder [what$_i$ you bought t$_i$ t$_j$]
    b. *This is the day [$_{NP}$ when]$_j$ I wonder [what$_i$ you bought t$_i$ [$_{PP}$ [$_P$ e] t$_j$]]
(16) a. *This is the place [$_{PP}$ [$_P$ e] where]$_j$ I wonder [what$_i$ you bought t$_i$ t$_j$]
    b. *This is the place [$_{NP}$ where]$_j$ I wonder [what$_i$ you bought t$_i$ [$_{PP}$ [$_P$ e] t$_j$]]

Recall that under Huang's (1982) analysis, temporal and locative PPs are adjuncts. Thus, the representations in (15a) and (16a) violate both Subjacency (i.e. WH-island) and the ECP, and those in (15b) and (16b) violate WH-island and the CED (Condition on Extraction Domain), which prohibits an overt extraction out of a non-properly governed domain: the PP from which extraction takes place is an adjunct

and hence is not properly governed, according to Huang (1982). In either case, some constraint in addition to Subjacency (i.e. WH-island) is violated. Hence, the fact that (14b-c) are worse than (14a) is expected under Huang's (1982) account, since (14a) violates only Subjacency (WH-island).

In addition, the presence of P is independently motivated cross-linguistically, at least in the case of locative WHs. In Chinese and Japanese, for instance, adjunct locative phrases, including the WH-phrase corresponding to *where*, always require pre(post)positions.[2]

(17) a. John *(zai) xuexiao yujian Mary
　　　　John　at school　meet Mary
　　　　'John met Mary at school.'
　　 b. John *(zai) nali　　yujian Mary
　　　　John　at where　meet Mary
　　　　'Where did John meet Mary?'
(18) a. John-ga　　gakkoo*(-de) Mary-ni　atta
　　　　John-NOM school-at　　Mary-DAT met
　　　　'John met Mary at school.'
　　 b. John-ga　　doko*(-de)　Mary-ni　atta no
　　　　John-NOM where-at　　Mary-DAT met Q
　　　　'Where did John meet Mary?'

As the (b) examples indicate, Chinese *nali* and Japanese *doko* appear in the configuration [PP P [NP ___]], consistent with Huang's (1982) analysis. Thus, the null hypothesis is that English *where* also occurs in the same environment.[3]

To sum up the review of the two theories, Murasugi and Saito's (1992) claim that *when* and *where* are arguments of INFL (or the event predicate) faces some empirical problems. In contrast, Huang's (1982) analysis employing a null P is more adequate in handling cases like (14), which involve overt movement of *when* and *where*. We will thus assume that Huang's (1982) analysis is essentially correct, that is, temporal and locative WH-phrases appear with a null P across languages. But if so, how do we account for data such as (6b) and (7b), which pose a problem for Huang's theory?

3. Null P incorporation

One potential approach which we will pursue here is the following. Notice that all the bad examples (such as (6b) and (7b)) which Murasugi and Saito (1992) provide as evidence against Huang (1982) have one thing in common: *when* and *where* appear within NPs. Thus, if it is shown that *when* and *where* are excluded from NP-internal positions for independent reasons, then the problem for Huang (1982) ceases to exist.

Let us assume that a null P is affixal in some sense. In particular, we propose the following.

(19) a. the null P (which is [-N, -V] in its specification) is affixal in nature and must incorporate into the closest head.

b. The head to which the P incorporate must be [-N] (or verbal).

Let us consider the structure for (6b) under Huang's (1982) null P hypothesis.

(20) *Who$_i$ t$_i$ read [$_{NP}$ the book [$_{PP}$ [$_P$ e] where]]?

Given the claims in (19), the above example is ruled out because the null P fails to incorporate into the V due to the presence of a closer head, namely, the N *book* (or the D, *the*, under the DP hypothesis). For this purpose, we assume Travis's (1985) Head Movement Constraint (HMC), which has the effect of prohibiting head movement from skipping a potential head position.

(21) *Who$_i$ t$_i$ read [$_{NP}$ the [$_N$ book] [$_{PP}$ [$_P$ e] where]]?

Thus the example in (20) is ruled out as a violation of the HMC. This in effect prevents *when* and *where* from appearing within the projection of N, assuming that there is a null P with *when/where*. In contrast, examples such as (2c), in which *when* or *where* occurs outside the NPs allow the incorporation of the null P into the head, INFL or V, depending on where *when* and *where* appear. Let us assume that the null P associated with *when/where* incorporates into V, although this seems to involve lowering if the locative and temporal WHs are adjoined to VP (we will return to this later).

(22) Who [$_{VP}$ [$_V$ [$_P$ e] [$_V$ bought]] that book [$_{PP}$ [$_P$ t] where]

Since V is [-N], nothing prevents the incorporation of the null P in this case. If this analysis is on the right track, then it eliminates the potential problem for Huang's (1982) null P analysis.

Independent support for the conjecture in (19b), namely that the target of the null P-incorporation must be a [-N] (or verbal) head, comes from the discussion of P-incorporation (or reanalysis) in Anderson (1979). She claims that prepositions can (occasionally) adjoin to the adjacent verbs. But she shows that Ps cannot incorporate into the adjacent nouns. One piece of evidence for her claim comes from the examples which involve Negative Polarity Item (NPI) licensing. Roughly put, an NPI is licensed if it is in the scope of negation. In (23a), the NPI *anything* is c-commanded by *few students* and hence licensed. In contrast, (23b) is ungrammatical because the NP *few students* fails to c-command the NPI *anything*: the latter is not in the scope of the former.

(23) a. Few students said anything about it.
      b.*[Teachers [who teach few students]] said anything about it.

Given this, consider the following examples from Anderson (1979).

(24) a. I refer to very few authors with any enthusiasm.
    b.*My reference to very few authors with any enthusiasm is typical.
    cf. My reference to very few authors with l's in their names is typical.
(25) a. He spoke to very few people about anything important.
    b.*His speeches to very few people about anything important were typical.
    cf. His speeches to very few people about politics were typical.

(Anderson 1979: 48)

The (a) examples show that the NPI *any* is licensed when its licenser occurs within a PP. Yet, this does not mean that the PP node is irrelevant for calculating c-command, as the ungrammaticality of (b) examples indicates. The crucial difference between (a) and (b) is the categorial status of the head of the projection in which the PP (with *few* in it) appears: it is V in (a) and is N in (b). On the basis of this contrast, Anderson suggests that the NPI is licensed in the (a) examples because of the reanalysis between V and P. As a result of this process, there is no longer a PP node to block the c-command of the NPI by *few (authors/people)*. In contrast, Anderson argues that the N-P reanalysis is impossible. This means that the NPIs *any(thing)* in the (b) examples are not licensed since *few* does not c-command them, hence the ungrammaticality of (b). Thus, our claim in (19b) is independently motivated in this respect.[4]

Several questions need to be addressed, however, concerning the proposed null P incorporation analysis.

(26) a. At which level does the incorporation apply: at S-structure, PF or LF?
    b. How does the incorporation apply when the PP in question has moved to the specifier of CP (as in the example shown below)?
(27) $[_{PP}$ *e* $[_{NP}$ where$]]_i$ did John meet Mary t_i?

We will first consider the question in (26b), since its answer bears on (26a). One obvious possibility is that the P-stranding is optional with a null P, so that the question in (26b) does not arise. However, extracting only the NP *when/where* by stranding the null P would be a violation of the CED, since we are assuming with Huang that the whole PP (i.e. the null P plus *when/where*) is an adjunct. Now assuming that the P moves along with *when/where*, we still have two possibilities to consider. First, if the null P can incorporate into the C head, then it satisfies the requirement of the null P, (i.e. [-N]), if we assume that C is [-N]. Nevertheless, as illustrated in (28), this derivation involves a lowering movement, which is generally ruled out by the Proper Binding Condition of Fiengo (1974).

(28) $[_{CP}$ $[_{PP}$ t $[_{NP}$ where$]]$ $[_C$ $[_P$ e$]$ $[_C$ did$]]$ $[_{IP}$ John meet Mary t$]]]$?
    |_____|

Let us therefore seek an alternative possibility that does not involve lowering operation, which is based on the following.

(29) Movement is a copy & deletion process (cf. Chomsky 1981, 1993).

Given this assumption, let us consider the following S-structure representation.

(30) [$_{CP}$ [$_{PP}$ *e* [$_{NP}$ where]] did [$_{IP}$ John meet Mary t]]?

Here the null P has been pied-piped along with the NP *where*, and the null P is not within a projection of V. According to copy & deletion analysis of movement, however, (30) can be analyzed as having the following S-structure representation.

(31) [$_{CP}$ [$_{PP}$ *e* [$_{NP}$ where]] did [$_{IP}$ John meet Mary [$_{PP}$ *e* [$_{NP}$ where]]]]?

Now notice that there are two instances of the null P, one in the specifier of CP and the other one in its original position, i.e. copy. Then, it is possible that this copy can incorporate into V (assuming that the locative PP appears within the projection of V).
    A technical problem arises with this account of the null P incorporation, however, given the following statement by Chomsky (1995: 304).

(32) Only the head of a chain CH enters into the operation (Attract/Move).

Chomsky suggests that a copy is not visible for computational operations. Although it is not entirely clear if Chomsky's idea is justifiable, let us suppose for the sake of discussion that it is. Then in (31) the copy of the null P should not be affected by any movement operation.
    There is a technical way out of this dilemma. Suppose the following.

(33) Null P incorporation takes place at LF.

Let us now reconsider the example in (31). This is not a legitimate LF representation in that the chain created by the movement of the PP is not an operator-variable construction: this is not a well-formed LF object in Chomsky's (1991) sense. Thus, deletion applies, yielding the following LF representation shown in (34a), which is roughly interpreted as in (34b).

(34) a. [$_{CP}$ [$_{NP}$ where] did [$_{IP}$ John [$_{VP}$ meet Mary [$_{PP}$ *e* [$_{NP}$ t]]]]]?
     b. what is the place x such that John met Mary in x

Under the copy & deletion theory of movement, (34a) is obtained from (31) by deleting the null P in the specifier position of CP and the NP *where* in the original position under identity.[5] Notice that there is only one instance of the null P in this LF representation, which is within the VP. Thus, by assuming that the incorporation of P into the V takes place at LF, this process does not violate Chomsky's claim in (32). This also answers the question that we raised in (26a) concerning the level at which the null P incorporation takes place. According to the present proposal, the null P is an LF affix which must incorporate into a [-N] (or verbal) head without violating the HMC.[6]
    Now that we have motivated the LF null P-incorporation, let us go back to (22), which illustrates the derivation for (2c). If temporal and locative PPs are

adjoined to VP, as we have been assuming throughout, then the null P incorporation into the V would involve lowering, which should be ruled out as a Proper Binding Condition violation.

(35) Who [$_{VP}$ [$_V$ [$_P$ e] [$_V$ bought]] that book [$_{PP}$ [$_P$ t] where]
       |_____|

But this is no longer a problem for us if we follow Chomsky (1991), who argues that in English, V raises to I at LF. Then P-incorporation does not involve lowering since it is an LF process. More specifically, null P incorporation takes place after V raises to I.

4. Conclusion

To summarize, we first reviewed two important works bearing on the grammatical status of locative and temporal WHs: Huang (1982) and Murasugi and Saito (1992). We concluded that Huang's null P hypothesis is essentially correct. We have argued that the counterexamples against Huang's (1982) analysis, provided by Murasugi and Saito (1992), can be independently excluded by assuming that the null P must incorporate into a [-N] (or verbal) head without violating the HMC at the level of LF. We also demonstrated that Huang's insight is empirically motivated by crosslinguistic data.

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[1] Murasugi and Saito (1992) are not very clear about this part. It is true, as observed by Culicover and Rochemont (1992), that overt adjunct extraction from the object NP is prohibited in English, suggesting that the object NP is a kind of barrier for adjunct movement (although it is a complement and hence is L-marked in the sense of Chomsky (1986)). This is illustrated below.
(i) *[On which table]$_i$ did you read [the book t$_i$]?   (Culicover and Rochemont 1992 : 497)
See Murasugi and Saito (1992) and the reference cited there for more discussion.

[2] This pattern is also observed in Serbo-Croatian and Korean.

[3] Also, as Larson (1985) observes, locative phrases in English almost always occur with prepositions, the only exceptions being *place* and *home*, as shown below.
(i) You have lived some place warm and sunny.
(ii) You went home.

[4] The following contrast may also be relevant to our discussions of P-incorporation.
(i) a. John proved that/ø Mary is honest.
    b. John's proof that/*ø Mary is honest
In general, the null C is allowed if the CP which it heads is in the complement position of the V, but not of the N. This is accounted for if we assume that the null C must incorporate into a head with [-N] (cf. Ormazabal 1996).

[5] See Chomsky (1993) for detail.

[6] One empirical problem with this analysis is the grammaticality of examples like the following.
(i) [$_{NP}$ the destruction of the city yesterday]
Here, if *yesterday* is accompanied by the null P, as implied by the present analysis, it is not clear how the P-incorporation is possible. Notice, however, that this type of examples contain a deverbal noun (destroy --> destruction). Thus it may be possible that the null P incorporates into this deverbal noun.

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