

The Phase Impenetrability Condition, the Vacuous Movement Hypothesis, and *that-t* effects

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Received 20 September 2002; received in revised form 27 February 2003; accepted 27 February 2003

Abstract

This paper proposes a new analysis of *that-t* effects, which have resisted any principled minimalist account. It is shown that given the Vacuous Movement Hypothesis, *that-t* effects straightforwardly follow from the Phase Impenetrability Condition, an independently motivated principle in the minimalist program. The proposed analysis receives further support from the fact that it accounts for adverb effects and crosslinguistic variations with *that-t* effects.

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Keywords: *That-t* effects; The Phase Impenetrability Condition; The Vacuous Movement Hypothesis

1. Introduction

There has been extensive discussion on the following familiar paradigm:

- (1) a. *Who do you think that *t* saw Bill?
b. Who do you think *t* saw Bill?
c. Who do you think (that) John saw *t*?
d. How do you think (that) John fixed the car *t*?

Unlike *wh*-extraction from a non-subject position, *wh*-extraction from a subject position is excluded when the embedded complementizer is overt in standard

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English. In the Extended Standard Theory, it was widely assumed that the *that-t* effect in (1a) should be attributed to the Empty Category Principle (ECP) (see, among others, Kayne, 1983; Lasnik and Saito, 1984, 1992; Chomsky, 1986; Rizzi, 1990). Although the ECP analyses accommodate the paradigm in (1), they are incompatible with the minimalist program (MP) proposed by Chomsky (1993) and further developed by, among others, Chomsky (1995, 1998, 2000, 2001a, b). This paper proposes a new account of the *that-t* effect which is compatible with the minimalist spirit. Specifically, I will argue that the *that-t* effect straightforwardly follows from the Phase Impenetrability Condition (PIC) coupled with the Vacuous Movement Hypothesis (VMH). The organization of this paper is as follows. Section 2 reviews the ECP approaches to the *that-t* effect. It is shown that although ECP analyses provide a descriptively adequate analysis for the *that-t* effect, they crucially make use of notions which are not available in the MP. Section 3 introduces the PIC and the VMH, arguing that they give a minimalist account of the *that-t* effect. Section 4 discusses adverb effects. It is shown that they also follow our analysis. Section 5 presents crosslinguistic variations with the *that-t* effect, arguing that they also follow from our analysis. Section 6 makes concluding remarks.

2. ECP analyses of the *that-t* effect

In the Extended Standard Theory, it was claimed that the *that-t* effect in (1a) should be subsumed under the Empty Category Principle (ECP). The ECP approaches essentially claim that an adjacent overt functional head, *that* in (1a), prohibits a subject trace from being properly governed and thus induces an ECP violation. In (1c) and (1d), on the other hand, the trace left by non-subject *wh*-extraction satisfies the ECP through proper government irrespectively of whether the embedded complementizer is overt or not.

For concreteness, let us look at Rizzi's (1990, 2000) analysis. Rizzi adopts a formulation of the ECP which requires that a trace should be properly head-governed. According to his analysis, (1a, b) are assigned (2a, b), respectively:

- (2) a. **Who_i** do you think [_{CP} *t'*_i [_{C'} that [_{IP} *t*_i saw Bill]]]
 b. **Who_i** do you think [_{CP} *t'*_i [_{C'} Agr_i [_{IP} *t*_i saw Bill]]]

Rizzi stipulates that in English, a tensed C can be realized as *that* or Agr in terms of (3):

$$(3) C \rightarrow \left\{ \begin{array}{l} \text{that} \\ \text{Agr} \end{array} \right\}$$

Since expansion (3) is optional, we also have an unexpanded tensed C. He also stipulates that while *that* and unexpanded C are inert for government, Agr governs an element coindexed with it through agreement. In (2a), *that* is inert for government. There is nothing which properly head-governs the subject trace *t*; this violates

the ECP. In (2b), on the other hand, Agr agrees with the intermediate trace t' in the Spec of the embedded C by Spec-head agreement and by transitivity with the subject trace t . This coindexing makes it possible for Agr to properly head-govern the subject trace; there is no violation of the ECP.¹

The ECP approaches also explain the lack of the *that-t* effect with extraction from a non-subject position:

- (4) **Who** do you think [that [John saw t_i]]?
 (5) a. **Why** do you think [that [John left early]]?
 b. **How** do you think [that [John fixed the car t_i]]?

Let us first consider (4). Under Rizzi's (1990) analysis, it is assigned structure (6):

- (6) **Who_i** do you think [_{CP} t'_i [_C that [_{IP} John saw t_i]]]

In (6), the object trace t is properly head-governed by the embedded verb *saw*; there is no violation of the ECP. The intermediate trace in the Spec of the embedded C, which is properly head-governed by the matrix verb, also satisfies the ECP (see note 1). Let us next consider adjunct *wh*-movement. Under Rizzi's analysis, (5b) is assigned structure (7):

- (7) **How** do you think [_{CP} t'_i [_C that [_{IP} John [_{VP} [_{VP} fixed the car] t_i]]]]]

In (7), the original trace t , which is adjoined to the embedded VP, is properly head-governed by the embedded I (T in Rizzi's framework) across the transparent VP segment; the ECP is satisfied. Turning to (5a), Rizzi claims that *why* is the *wh*-version of a sentential adverb and directly base-generated in the Spec of C. Under his analysis, (5a), where *why* modifies the embedded clause, is assigned (8). In (8), *why* originates in the Spec of the embedded C and undergoes movement to the Spec of the matrix C:

- (8) **Why_i** do you think [_{CP} t_i [_C that [_{IP} John left early]]]]]

The original trace in the Spec of the embedded C is properly head-governed by the matrix verb (see note 1); the ECP is satisfied.

Although the ECP approaches account for the *that-t* effect, they are incompatible with the minimalist program (MP). The leading idea of the MP is that linguistic principles should be formulated only in terms of notions drawn from the domain of

¹ Rizzi (1990) assumes that for functional heads, intervention is defined in terms of c-command under the Relativized Minimality. In (2a) and (2b), the embedded inflectional element does not protect the subject trace from external government, since the former does not c-command the latter. This enables Agr to properly head-govern the subject trace in (2b). Similarly, the embedded C does not protect the intermediate trace t' in the Spec of the embedded C from external government. The intermediate trace t' satisfies the ECP through proper head-government by the matrix verb.

virtual conceptual necessity. This requires that the theory should only refer to notions indispensable for any theory of language. The ECP approaches, however, employ notions which are not allowed in the MP. For example, Rizzi's analysis extensively makes use of the notions of head government, proper government, and indexing, as we can see from the above discussion. The notions of head government and proper government fall outside the theoretical grasp of the minimalist assumptions. Under the MP, apart from relations like adjacency at PF and scope at LF which are required by the bare output conditions, structural relations are restricted to the specifier-head and head-complement relations. This is because it is hard to see how any theory of language can do without notions of head, specifier, and complement and the relations that come along with them, and therefore the MP requires that we should try to do with only these relations. Hence, the notions of head government and proper government, which extend beyond what obtains between a head and its specifier/complement, should be removed from the inventory of structural relations. In the MP, indices are not allowed either due to the condition of inclusiveness (see Chomsky, 1995). The condition of inclusiveness requires that any structure constructed during a derivation should only consist of elements present in the lexical items selected for the derivation. Hence, indices, which are not elements in the lexical items, should be excluded.²

We therefore need to provide an alternative account for the *that-t* effect which is compatible with the minimalist spirit. In the next section, I will propose a new account of the *that-t* effect, arguing that the *that-t* effect straightforwardly follows from the Phase Impenetrability Condition coupled with the Vacuous Movement Hypothesis.

3. Proposal

In this section, I will first present evidence for the Vacuous Movement Hypothesis (VMH), which claims that subject *wh*-phrases do not move to the Spec of C, but remain in situ. I will then propose a minimalist analysis of the VMH based on the probe-goal theory of movement advocated by Chomsky (2000, 2001a, b). I will argue that given the VMH, the *that-t* effect straightforwardly follows from the Phase Impenetrability Condition, which Chomsky (2000, 2001a, b) argues is a general condition on operations.

² Although we do not go into details, Chomsky's (1986) ECP analysis of the *that-t* effect extensively makes use of the notions of government, antecedent-government, Blocking Category, and barrier, all of which are not compatible with the minimalist spirit. Déprez (1991, 1994) gives an economy account of the *that-t* effect within the MP. Like the EST approaches, however, her analysis also makes use of the ECP and thus crucially relies on the notion of (proper) government. Browning (1996) also presents a minimalist account of the *that-t* effect. As Browning herself admits, however, her analysis crucially makes use of the notions of government and indices, which are not available under the MP.

3.1. *Vacuous Movement Hypothesis*

3.1.1. *Evidence for the Vacuous Movement Hypothesis*

It has been claimed by, among others, [George \(1980\)](#) and [Chomsky \(1986\)](#) that in questions like (9), the subject *wh*-phrase does not move to the Spec of C, but remains in-situ:

- (9) a. **Who** saw Bill?
 b. I wonder **who** saw Bill.

This view is referred to as the Vacuous Movement Hypothesis (VMH), which claims that vacuous movement, i.e., a movement operation whose effect cannot be observed, should not be allowed. George and Chomsky present arguments for the VMH, three of which are to be presented below.³

First, [George \(1980\)](#) re-examines [Ross's \(1967\)](#) coordinate structure constraint (CSC) (10), which is instrumental in excluding sentences like (11) ([Ross, 1967: 88–89](#)):

- (10) Coordinate Structure Constraint (CSC)
 In a coordinate structure, no conjunct may be moved nor may any element contained in a conjunct be moved out of that conjunct.
- (11) a. *What sofa will be put the chair between [some table and *t*]?
 b. *The lute which Henry [plays *t* and sings madrigals] is warped.

In (11a) and (11b), the *wh*-phrase and relative pronoun are extracted out of the conjuncts. (11a) and (11b) are therefore ruled out by the CSC (10).

There are, however, cases which suggest that the CSC (10) is not sufficient. In (12a) and (12b), although the relative pronoun is extracted out of a conjunct, the result is acceptable:

- (12) a. Students who fail the final exam or do not do the reading will be executed.
 b. They removed the prisoner, who(m) the judge has sentenced and the warden will execute.

This fact led Ross to assume a qualification of the CSC (10) in the form of the exception condition (13):

- (13) ... unless the same element is moved out of all conjuncts.

In (12a) and (12b), across-the-board movement takes place, with the relative pronoun *who/who(m)* being extracted out of both of the conjuncts. (12a) and (12b) are acceptable due to the exception condition (13).

George points out, however, that the CSC together with the exception condition (13) cannot account for the parallelism requirement on across-the-board movement,

³ See [George \(1980\)](#) and [Chomsky \(1986\)](#) for more arguments in favor of the VMH.

i.e., across-the-board movement applies only when relevant *wh*-phrase in each conjunct comes from parallel positions, as shown below:

- (14) a. *They removed the prisoner, who has lost his appeal and the warden will execute.
 b. *They removed the prisoner, who(m) the judge has sentenced and will now appeal.

In order to account for the parallelism requirement under the across-the-board movement analysis, we would need another superfluous complication of the CSC (10). George proposes a simpler alternative that involves ellipsis coupled with the VMH. He argues that (12) and (14) are derived through ellipsis from (15) and (16), respectively:

- (15) a. Students [who fail the final exam] or [who do not do the reading] will be executed.
 b. They removed the prisoner, [who(m) the judge has sentenced] and [who(m) the warden will execute].
 (16) a. They removed the prisoner, [who has lost his appeal] and [who(m) the warden will execute].
 b. They removed the prisoner, [who(m) the judge has sentenced] and [who will now appeal].

While ellipsis applies in (15), it fails in (16). George claims that ellipsis (left peripheral ellipsis in this case) obeys the parallelism requirement, what he calls the law of congruity. Putting technical details aside, one of the conditions in the law of congruity requires that an antecedent should occupy the same structural position in the left conjunct that the target of ellipsis does in the right conjunct. Given the VMH, the *wh*-objects in (15) and (16) move to the Spec of C while *wh*-subjects do not undergo movement but remain in situ. In (15), the two *wh*-phrases occupy the same structural position. In (15a), the two *wh*-phrases occupy the subject position. In (15b), the two *wh*-phrases occupy the Spec of C. Hence, ellipsis applies in (15); (12a) and (12b) are acceptable.

In (16), on the other hand, the two *wh*-phrases are not in the same structural position; the one is in the subject position and the other is in the Spec of C. Hence, ellipsis fails in (16); (14a) and (14b) are deviant. Given the VMH, the ellipsis analysis provides an account for the contrast between (12) and (14) without any additional instruments. The parallelism requirement straightforwardly follows, which constitutes evidence in favor of the VMH.

Second, Chomsky (1986: 48) argues that the VMH accounts for the contrast in acceptability between (17) and (18):

- (17) What_i do you wonder [who saw *t*_i]?
 (18) *?What_i do you wonder [how_j John could solve *t*_i *t*_j]?

Chomsky (1986) claims that while (18) exhibits the *wh*-island effect, (17) does not. Under Chomsky's analysis, the structure of (18) is as follows:

(19) **What_i** do you [_{VP} *t*'_i] [_{VP} wonder [_{CP} how_j [_{IP} John could [_{VP} *t*'_i [_{VP} solve *t*_i] *t*_j]]]]]

In (19), the Spec of the embedded C is occupied by *how*, and thus *what* cannot move to that position on its way to the Spec of the matrix C. Movement of *what* from the embedded VP adjoined position to the matrix VP adjoined position crosses two barriers, i.e., CP and IP, thus violating the subjacency condition. Hence, (18) exhibits the *wh*-island effect. (17), on the other hand, is assigned the following structure given that subject *wh*-phrases do not move to the Spec of C but remain in-situ:

(20) **What_i** do you [_{VP} *t*'_i] [_{VP} wonder [_{CP} *t*'_i] [_{IP} who [_{VP} *t*'_i] [_{VP} saw *t*_i]]]]]]]

It is important to note that the *wh*-phrase *what* can move to the Spec of the embedded C, which is not occupied by the subject *wh*-phrase *who*, on its way to the matrix Spec of C. Movement of *what* does not cross more than one barrier in any link of the chain; there is no subjacency violation. Hence, (17) does not exhibit any *wh*-island effect. (17), however, is not quite perfect. Chomsky claims that this may be due to the fact that at LF *who* moves to the Spec of the embedded C into which another constituent has already moved.⁴

Third, Chomsky (1986) argues that the VMH also accounts for the contrast in acceptability regarding subject parasitic gaps (Chomsky 1986: 58):

- (21) a. ?He's a man that [everyone [who gives presents to *e*]] likes *t*.
 b. *This is a book that [any man [to whom we'll give *e*]] will like *t*.

Under Chomsky's (1986) analysis, where the parasitic gap construction is assumed to involve empty operator movement, the structure of (21a) is (22):

(22) He's a man [_{CP} OP_i that [everyone [_{CP} OP_j [who gives present to *t*_j]]]] likes *t*_i]].

In (22), the relative operator *OP*, which originates in the object position of the verb *like*, moves to the Spec of C, leaving a real gap. It should be noted that given the VMH, the subject *wh*-phrase *who* does not move to the Spec of C but remains in-situ. Hence, the parasitic gap operator, which originates in the object position of *to*, can move to the Spec of C within the subject phrase, forming an operator-variable construction. Chomsky claims that the parasitic gap is licensed when the chain of the real gap and that of the parasitic gap form a composed chain. In (22), the parasitic gap is licensed through an operation of chain composition.

⁴ Given the VMH, the contrast between (17) and (18) also follows from Rizzi's (1990) Relativized Minimality account of the *wh*-island effect. Since the subject *wh*-phrase *who* in (17) does not move to the Spec of the embedded C, it does not function as an intervener for movement of *what* to the Spec of the matrix C.

Let us next consider (21b). The structure of (21b) is (23):

(23) This is a book [_{CP} Op_i that [any man [_{CP} **to whom**_i [we'll give α t_i] will like t_i]]]

In (23), since *to whom* moves to the Spec of C, the parasitic gap α cannot move to the Spec of C, making it impossible to form an operator-variable construction. There is no way of forming a composed chain; the parasitic gap cannot be licensed. This accounts for the unacceptability of (21b).

To summarize, the parallelism requirement on across-the-board movement, the *wh*-island facts, and the subject parasitic gap facts constitute evidence in favor of the VMH, which claims that subject *wh*-phrases do not move to the Spec of C, but remain in-situ. The next subsection presents a minimalist analysis of the VMH.

3.1.2. A minimalist account of the VMH

Before we turn to a minimalist analysis of the VMH, it is necessary to explicate the theory of movement which the discussion to follow assumes. I claim with Chomsky (1998, 2000, 2001a, b) that dislocation consists of an operation of formal features and generalized pied-piping. For concreteness, let us assume Chomsky's (2000, 2001a, b) probe-goal theory of movement.⁵ Under the probe-goal theory, dislocation is forced by uninterpretable formal features. In overt *wh*-movement, the following uninterpretable formal features are involved; the Q-feature of C, the *wh*-feature of a *wh*-phrase, and the EPP-feature of C:⁶

(24) [_C_[Q, EPP] [. . . wh-phrase_[Q, wh]. . .]]

The uninterpretable Q-feature of C, which counts as a probe, seeks a goal, namely, a matching feature. Chomsky argues that an element only functions as a goal when it is made active by its uninterpretable feature and thus able to implement an operation, Agree or Merge. In this case, the uninterpretable *wh*-feature makes the *wh*-phrase active, selecting it as a candidate for Agree. The Q-feature of C enters into a matching relation with that of the *wh*-phrase, which is interpretable.

The Q-feature of the probe C and the *wh*-feature of the goal *wh*-phrase, being uninterpretable, both undergo erasure. The Q-feature of the *wh*-phrase, being interpretable, remains intact:

(25) [_C_[~~Q~~, EPP] [. . . wh-phrase_{[Q, ~~wh]~~}. . .]]

The EPP-feature of C, being a selectional feature, merges the *wh*-phrase in a position locally related to C. Since EPP-feature is uninterpretable, it undergoes erasure:

⁵ It should be noted that the analysis to be presented below is also compatible with Chomsky's (1998) theory of movement, where dislocation consists of Attract-F and generalized pied-piping of the rest of the category.

⁶ Here and in relevant structures to follow, only relevant formal features are represented.

(26) [wh-phrase_[Q] [C_[EPP] [... t_{wh-phrase} ...]]]

This is essentially the mechanism responsible for overt *wh*-movement. Note that under the probe-goal theory of movement, Move is a complex operation consisting of Agree (the erasure of the uninterpretable features of a probe and a goal), selection of a phrase P as a candidate for Merge, and Merge of P.

Let us now return to the main discussion, taking (9a) (repeated here as (27)) as an example:

(27) **Who** saw Bill?

As a minimalist way of accommodating the VMH, I claim that only Agree takes place, with a *wh*-subject remaining in-situ (cf. Agbayani 1998).⁷ I argue that this analysis follows as a natural consequence of Chomsky’s (2000, 2001a, b) probe-goal theory of movement.

During the derivation of (27), we come to CP, where the Q-feature of C, being a probe, seeks a goal:

Essentially following Kayne (1994), Agbayani (1998), and Saito and Fukui (1998), we assume that overt category movement creates an adjunction structure, a multi-segmented category, and the adjoined phrase is defined as Spec when its merger is triggered by the EPP-feature of the head of the target phrase.⁸ In Fig. 1, the subject *wh*-phrase *who*, which originates in the Spec of *v*, is adjoined to TP and defined as

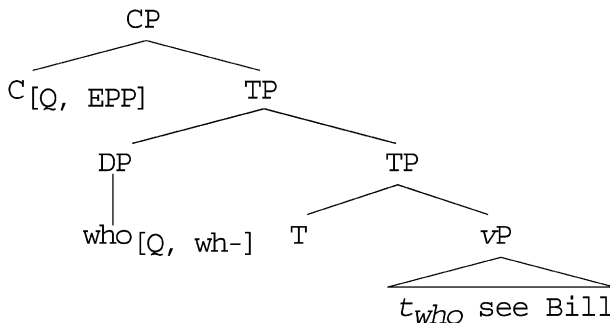


Fig. 1.

⁷ Agbayani (1998) assumes Chomsky’s (1998) theory of movement, claiming that only the set of all formal features of a *wh*-subject moves, with the category remaining in-situ. Our analysis is essentially a reinterpretation of his analysis under the more recent minimalist framework. See Agbayani (1998) for arguments in favor of such an analysis of the VMH.

⁸ See Kayne (1994), Agbayani (1998), and Saito and Fukui (1998) for further arguments in favor of this view.

Spec of T, since this merger is triggered by the EPP-feature of T. When we come to Fig. 1, *who* is made active as a goal by its uninterpretable *wh*-feature. The Q-feature of C enters into a matching relation with the Q-feature of *who*. The Q-feature of C and the *wh*-feature of *who* both undergo erasure:

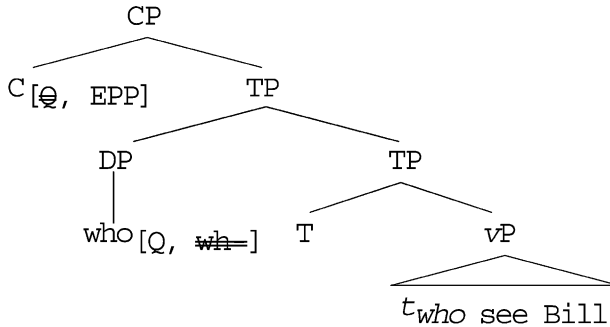


Fig. 2.

The EPP-feature of C requires *who* to be merged in a position locally related to C, that is, in the minimal domain (MD) of C. The present discussion assumes Chomsky's (1995) definition of the notion of MD. To define the notion of MD, we first define the notion of domain:

- (28) The domain $\delta(H)$ of H is the set of categories included in $\text{Max}(H)$, the smallest maximal projection including H, that are distinct from and do not contain H.

We then define the notion of MD:

- (29) The minimal domain $\text{Min}(\delta(H))$ of H is the smallest subset K of $\delta(H)$ such that for any $\gamma \in \delta(H)$, some $\beta \in K$ reflexively dominates γ .

In (29), we assume the standard notion of domination (see, among others, May, 1985 and Chomsky, 1986):

- (30) α dominates β if every segment of α dominates β .

The subset K in (29) just includes the categories locally related to the head. According to this definition of the notion of MD, the subject *wh*-phrase *who*, which is adjoined to TP and thus not dominated by TP, is in the MD of C and thus locally related to C in Fig. 2. Since *who* is already in a position locally related to C, the EPP-feature of C undergoes erasure without any further operation:

Hence, in Fig. 3, only Agree takes place, with the *wh*-subject remaining in-situ. The VMH regarding *wh*-subjects naturally follows from the probe-goal theory of movement.

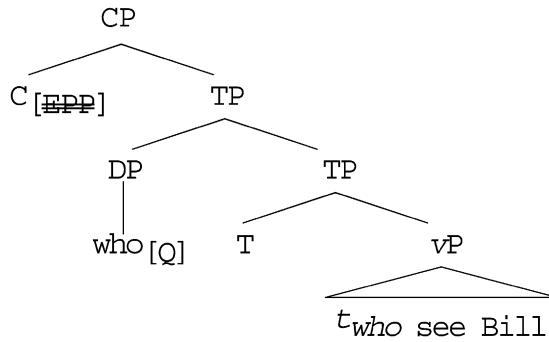


Fig. 3.

It should be noted that there is an alternative derivation where the Q-feature and EPP-feature of C and the *wh*-feature of *who* are satisfied, that is, the subject *wh*-phrase *who* undergoes movement to the Spec of C. This derivation should be banned, however, given the economy condition that simpler operations should be preferred over more complex ones (see Chomsky, 2000). This is because Move, which involves Agree, selection of a phrase P for Merge, and Merge of P, is more complex and thus less economical than Agree.⁹

3.2. The Phase Impenetrability Condition and the *that-t* effects

Given the analysis of the VMH proposed in the last section, let us consider the *that-t* effect. Chomsky (2000, 2001a, b) proposes the notion of phase, arguing that derivations proceed phase by phase. We adopt Chomsky's (2000) definition of phase, claiming that a phase is *vP* or CP.¹⁰ Based on the notion of phase, we

⁹ Essentially following the theory of clausal typing proposed by Cheng (1991), I claim that a clause is interpreted as interrogative when a *wh*-phrase, which has an interpretable Q-feature, is in a position locally related to C. Otherwise, it is interpreted as noninterrogative. In (i), for example, although the *wh*-phrase *who* remains in-situ, it is locally related to the embedded C.

(i) John asked [who saw Bill].

The embedded clause counts as interrogative and thus the selectional restriction of the matrix verb *ask*, which states that it takes an interrogative clause as its complement, is properly satisfied.

¹⁰ Chomsky (2001a, b) makes a distinction between strong and weak phases. While weak phases are *vP* and CP, strong phases are *v*P* and CP, where *v** is a transitive/experiencer *v* in a construction with full argument structure. Only strong phases, but not weak phases, are relevant to the Phase Impenetrability Condition (PIC). Although the discussion to follow also holds good under Chomsky's (2001a, b) conception of weak/strong phases, I will assume Chomsky's (2000) view for expository purposes. It should also be noted that although the following discussion assumes Chomsky's (2000) original view that both CP and *vP* count as phases, the analysis to be presented below holds good irrespectively of whether *vP* constitutes a phase or not.

define the Phase Impenetrability Condition (PIC) (adapted from Chomsky, 2000: 108):¹¹

- (31) In phase α with head H, only H and its edge are accessible to operations outside α .

I claim that given $HP = [X [H Y]$, where HP is a phase, we take X to be its edge, an element which asymmetrically c-commands H. The definition of c-command is as follows (Chomsky, 1986: 8):

- (32) α c-commands iff α does not dominate β and every γ that dominates α dominates β .

The PIC (31) yields a strong form of subjacency, requiring that A'-movement targets the edge of every phase, CP and vP .

With the above discussion in mind, let us look at the *that-t* effect, considering (1a) (repeated here as (33)):

- (33) ***Who** do you think [that [*t* saw Bill]]?

During the derivation of (33), we come to the stage where we construct the embedded CP phase:

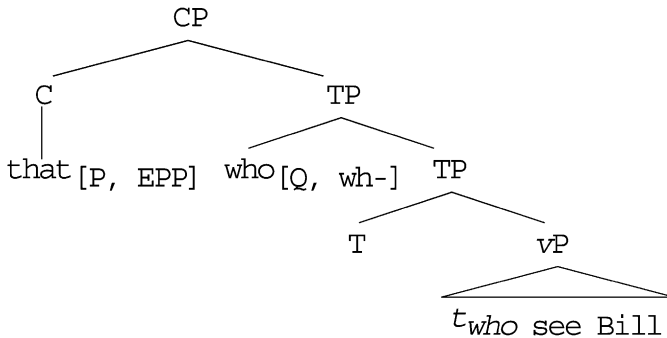


Fig. 4.

¹¹ Chomsky (2001a, b) proposes a different definition of the PIC (adapted from Chomsky, 2001a: 14):

- (i) In $[_{ZP} Z \dots [_{HP} \alpha [H YP]]$, where HP is a strong phase and ZP is the smallest strong phase, the domain of H is not accessible to operations at ZP; only H and its edge are accessible to such operations.

Although the discussion to follow remains valid under this definition of the PIC, I assume Chomsky's (2000) definition of the PIC for expository purposes. See Uriagereka (1999) for a similar condition.

In Fig. 4, the embedded *vP* constitutes an independent phase. Since the subject *wh*-phrase *who*, which originates in the Spec of *v*, asymmetrically c-commands *v*, it is the edge of *v* in the embedded *vP* phase. According to the PIC (31), *who* is accessible to operations outside the embedded *vP* phase. It raises from within *vP* and adjoins to TP, satisfying the EPP-feature of T. Chomsky (2000) claims that the head of a phase may be assigned an EPP-feature, which provides an “escape hatch” for successive cyclic A'-movement through the edge of a phase (Chomsky, 2000: 109):

(34) The head H of a phase Ph may be assigned an EPP-feature.

To allow the probe-goal theory of movement to apply to successive cyclic A'-movement without change, Chomsky assumes that the head of a phase may also be assigned a non-specific peripheral feature (P-feature), which is contingent on the assignment of the EPP-feature. P-feature belongs to the peripheral system like force, topic, and focus. In Fig. 4, C, the head of the embedded CP phase, is assigned a P-feature and an EPP-feature. P-feature is non-specific in the sense that it is not specified as a force, topic, or focus feature. It may enter into a matching relation with any feature that belongs to the peripheral system.

Given our analysis of the VMH proposed in the last section, when we come to Fig. 4, only Agree takes place, with the subject *wh*-phrase *who* remaining in-situ. This yields Fig. 5:

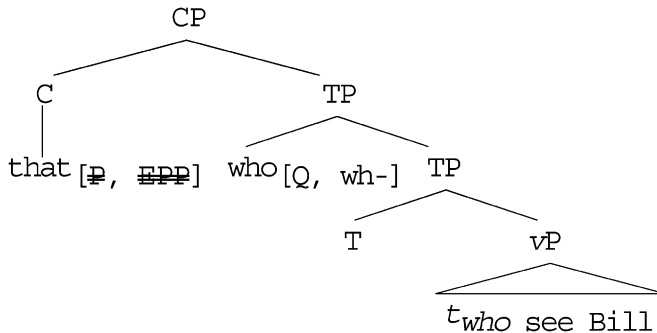


Fig. 5.

In Fig. 5, the P-feature of C undergoes erasure through entering into a matching relation with the Q-feature of *who*, a force feature. Since the subject *wh*-phrase is in the MD of C, the EPP-feature of C also undergoes erasure without any further operation. I claim that P-feature is “defective” in the sense of Chomsky (2000). A “defective” probe feature is not capable of erasing the feature which activates the matched goal. In Fig. 5, the P-feature of C, being “defective,” does not erase the feature which makes the goal *wh*-phrase active,

that is, the *wh*-feature of the subject *wh*-phrase *who*. This enables *who* to undergo successive cyclic *wh*-movement.¹²

We then come to the matrix *v*P phase level and construct Fig. 6, where the verb *think* takes the embedded CP phase, i.e., Fig. 5, as its complement:

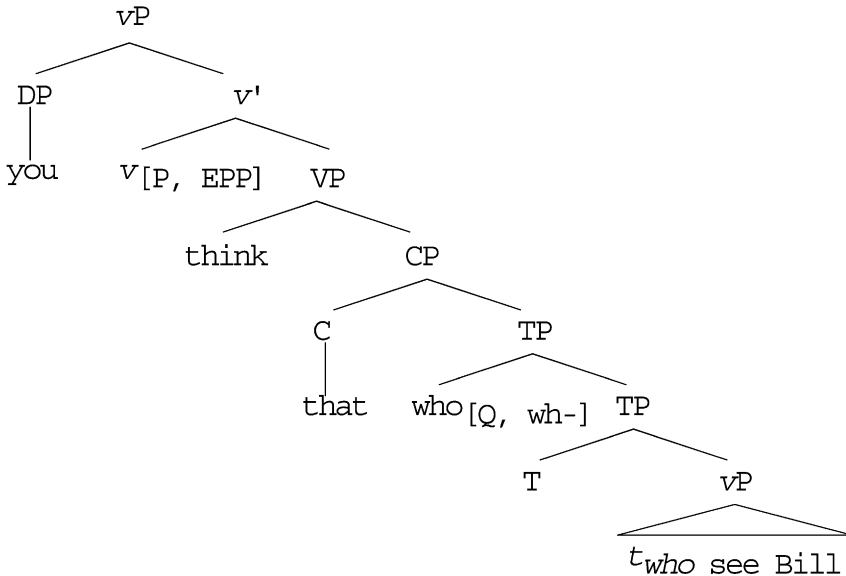


Fig. 6.

The matrix light verb *v*, which is the head of the matrix *v*P phase, is assigned a P-feature and an EPP-feature. The P-feature should be satisfied by entering into a matching relation with the Q-feature of *who*. The EPP-feature should be satisfied by merger of *who* in the MD of *v*.¹³ It should be noted, however, that *who* is not the head of the embedded CP phase. Neither is *who* the edge in the embedded CP, since *who*, which is adjoined to TP, does not asymmetrically c-command the embedded C. According to the PIC (31), the subject *wh*-phrase *who* is not accessible to operations outside the embedded CP phase, specifically those at the matrix *v*P phase level. Hence, *who* is not accessible to the operations triggered by the

¹² One might argue that the uninterpretable *wh*-feature of *who*, which remains unerased, leads the derivation to crash at LF within this phase. I argue, however, that although P-feature does not erase the feature which activates the matched goal, the former deletes the latter. Let us assume with Chomsky (1995) that deletion makes formal features invisible at LF, and erasure, a strong form of deletion, not only makes formal features invisible at LF but also inaccessible to a computation. Then, the *wh*-feature, which undergoes deletion and thus becomes invisible at LF, does not lead the derivation to crash at this phase level, though it is still accessible to a computation.

¹³ I assume that P-feature and EPP-feature assigned to the head of a phase must be satisfied by the same element, which excludes the possibility that the EPP-feature of *v* in Fig. 6 is satisfied by the matrix subject *you*.

P-feature and EPP-feature of the matrix v . There is no way of satisfying the P-feature and EPP-feature. These uninterpretable features remain at LF; the derivation crashes at the matrix vP phase level. The deviancy of (33) follows. It should be noted that if the matrix v were not assigned any P- or EPP-feature, the derivation would crash at the matrix CP phase level. This is because there would be no way of satisfying the uninterpretable Q-feature and EPP-feature of the matrix C.

It is important to note that our analysis evaluates derivations locally, specifically at each phase level. Recall that in (33), there are two possible derivations where the P-feature and EPP-feature of the embedded C are satisfied: (I) the subject *wh*-phrase *who* remains in situ, and (II) the subject *wh*-phrase *who* undergoes movement to the Spec of C. Between these two derivations, (I) is chosen. This is because both (I) and (II) converge at the embedded CP phase level and (I), where only Agree takes place, is more economical than (II), where Move takes place. Although (I) eventually crashes at the higher phase level, such information is irrelevant for local evaluation of the derivations at the present phase level. If the derivations were evaluated globally, on the other hand, we would lose an explanation of (33). (II) would be chosen given that economy conditions only compare convergent derivations. This is because (I) crashes at LF at a higher phase level due to the fact that the uninterpretable Q/P-feature and EPP-feature remain unsatisfied. If (II) were chosen, the *wh*-phrase would be the edge of C in the embedded CP phase and thus accessible to operations at the matrix vP phase. This would predict that (33) is acceptable, contrary to fact.

Let us next consider (1b) (repeated here as (35)):

(35) **Who** do you think [*t* saw Bill]?

Following, among others, Bošković (1997), I claim that complements not introduced by overt complementizers are TP.¹⁴ Since a phase is restricted to vP/CP , the embedded clause in (35), being a TP, does not constitute an independent phase. The *wh*-subject *who* can be extracted out of the embedded clause without crossing any CP, as shown in (36):

- (36) a. $P_2 = [{}_{vP} \text{ who}_{[Q, \text{wh-}]} [{}_{vP} \text{ you } [{}_{v[~~e~~] \text{ think } [{}_{TP} \text{ } t_{\text{who}} [{}_{TP} \text{ T } P_1]]]]]]]$
 b. $P_1 = [{}_{vP} \text{ } t_{\text{who}} [{}_{v} \text{ [see Bill]]}]$

In (36), the subject *wh*-phrase *who*, which originates in the Spec of v in the embedded vP phase, first moves to the Spec of T and then to the Spec of the matrix v . This derivation converges. Our analysis can correctly predict that (35) is acceptable.

Our analysis also explains the lack of the *that-t* effect with extraction from non-subject positions like (37) and (38):

¹⁴ See Bošković (1997) for arguments for this view.

- (37) **Who** do you think [that [John saw *t*]]?
 (38) **How** do you think [that [John fixed the car *t*]]?

In the derivation of (37), we come to (39):

- (39) a. $P_2 = [_{CP} \text{who}_{[Q, \text{wh-}]} [_{CP} \text{that}_{[E, \text{EPP}]} [_{TP} \text{John} [_{TP} T P_1]]]]$
 b. $P_1 = [_{vP} t'_{\text{who}} [_{vP} t_{\text{John}} [v_{[E, \text{EPP}]}] [_{VP} \text{saw } t_{\text{who}}]]]$

In (39), the object *wh*-phrase *who* raises from the outer Spec of *v* to the Spec of C. Since *who* is the edge of C in P_2 , it is accessible to operations at the matrix *vP* phase. This derivation converges; there is no *that-t* effect. Similarly, we can explain (38), where the adverbial *wh*-phrase *how*, being a VP-adverb, originates under VP.

Let us finally consider the case where the adverbial *wh*-phrase *why* is extracted from a *that*-clause:

- (40) **Why** do you think [that [John left early]]?

As shown in (40), *why* does not exhibit any *that-t* effect (see, among others, Huang, 1982 and Lasnik and Saito, 1984). Let us assume with, among others, Rizzi (1990), Ishii (1997), and Epstein (1998) that *why* is the *wh*-version of a sentential adverb. It is directly merged into the MD of the C of a clause which it modifies, where it satisfies the P-feature and EPP-feature of C as in (41):

- (41) a. $P_2 = [_{CP} \text{why} [_{\text{that}} [_{TP} \text{John} [_{TP} T P_1]]]]$
 b. $P_1 = [_{vP} t_{\text{John}} [v [_{VP} \text{left early}]]]$

Since *why* is the edge of C in P_2 and thus accessible to operations at the matrix *vP* phase, this derivation also converges.¹⁵

¹⁵ There are some speakers who do not allow extraction of *why* across *that* (see, among others, Aoun et al., 1987). For those speakers, (40) is not ambiguous while (i) is:

- (i) *Why* do you think John left early?

This might be explained as follows. Suppose that for those speakers, *why* is adjoined to TP just like non-*wh*-sentential-adverbs. Then, the embedded CP phase of (40) would be as follows:

- (ii) a. $P_2 = [_{CP} \text{that} [_{TP} \text{why} [_{TP} \text{John} [_{TP} T P_1]]]]$
 b. $P_1 = [_{vP} t_{\text{John}} [v [_{VP} \text{left early}]]]$

In (ii), since *why* is in the MD of C, only Agree takes place, with *why* remaining in-situ. *Why* is not accessible to operations at the matrix *vP* phase. This accounts for the fact that *why* is not extractable across the overt complementizer *that* for some speakers.

3.3. The *that-t* effects with empty operator movement

It has been observed by, among others, [Bresnan \(1977\)](#) that the *that-t* effect is not only observed with *wh*-movement but also with empty operator movement:

- (42) Relative Clauses
 a. *the woman that the committee predicts that *t* will win the election
 b. the woman that the committee predicts *t* will win the election
- (43) The Cleft Construction
 a. *It is her Alfa that she told us that *t* was stolen.
 b. It is her Alfa that she told us *t* was stolen.
- (44) The Comparative Construction
 a. *I solved more problems than I'd predicted that *t* would be solved by all of us.
 b. I solved more problems than I'd predicted *t* would be solved by all of us.

Let us assume with, among others, [Chomsky \(1986\)](#) and [Browning \(1987\)](#) that these constructions involve empty operator movement.

Let us consider how our analysis explains the *that-t* effect with empty operator movement, taking (42a) as an example. I claim that the probe feature of empty operator movement is an uninterpretable operator-related feature (OP-feature), since it is plausible to assume that empty operators have an interpretable OP-feature. During the derivation of (42a), we construct the embedded CP:

- (45) a. $P_2 = [_{CP} \text{that}_{[E, \text{OP}]} [_{TP} \text{OP}_{[OP, U]} [_{TP} \text{will } P_1]]]$
 b. $P_1 = [_{vP} t_{OP} [v [_{VP} \text{win the election}]]]$

To make the theory of movement consistent, I assume that an empty operator has an uninterpretable feature U which makes it active as a goal, though nothing crucial hinges on this assumption. In (45), the empty operator originates in the Spec of the embedded *v* and then moves to the Spec of the embedded T. Given our analysis of the VMH, only Agree takes place, with the empty operator staying in-situ. This erases the P-feature and EPP-feature of the embedded C.

We then come to the stage where the P-feature and EPP-feature of the matrix *v* are to be satisfied. Since the empty operator is not the head of the embedded CP phase or the edge of the embedded C, it is not accessible to operations at the matrix *v*P phase. This derivation crashes at the matrix *v*P phase level. Note that if the matrix *v* were not assigned any P- or EPP-feature, this derivation

crashes at the matrix CP phase level. This is because there would be no way of satisfying the uninterpretable OP-feature of the matrix C. (43a) and (44a) can be explained in the same way. (42)–(44b) can be explained along the lines of (35) given the assumption that complements not introduced by overt complementizers are TP.

3.4. The *for-t* effect

As observed by, among others, Bresnan (1977), Pesetsky (1981), and Culicover (1991), the *that-t* effect also holds for the complementizer *for*:¹⁶

- (46) a. ***Who** would it be instructive for *t* to emulate the teacher?
 b. **Who** would it be instructive for her to emulate *t*?
 c. **How** would it be instructive for her to fix the car *t*?
 d. **Why** would it be instructive for her to leave early?

As shown in (46a), extraction from a subject position over the complementizer *for* is deviant. This is in contrast with extraction from a non-subject position over the complementizer *for*, which is exemplified by (46b–d). I argue that the *for-t* effect also follows from our analysis.

Let us consider (46a). During the derivation of (46a), we construct the embedded CP:

- (47) a. $P_2 = [_{CP} \text{for}_{[E, \text{EPP}]} [_{TP} \text{who}_{[Q, \text{wh-}]} [_{TP} \text{to } P_1]]]$
 b. $P_1 = [_{vP} t_{\text{who}} [v \text{emulate the teacher}]]]$

In (47), the subject *wh*-phrase *who* is raised to the Spec of T in order to satisfy the EPP-feature of T. The complementizer *for*, being the head of the embedded CP phase, is assigned a P-feature and an EPP-feature. Given our analysis of the VMH, only Agree takes place, with the subject *wh*-phrase *who* staying in the Spec of T. When we come to the stage where the P-feature and EPP-feature of the matrix *v* are to be satisfied, *who* is not accessible to operations at the matrix *vP* phase. This derivation crashes. In the case of (46b) and (46c), on the other hand, the *wh*-phrase undergoes movement to the Spec of the embedded C to satisfy the P-feature and EPP-feature of the complementizer *for*. In the case of (46d), recall that *why*, being the *wh*-version of a sentential adverb, is directly merged in the Spec of the embedded C, where *why* satisfies the

¹⁶ Note that (i), where the offending complementizer *for* is absent, is unacceptable:

- (i) *Who would it be instructive *t* to emulate the teacher?

This is presumably because *for* must be present in order for the following DP to be assigned Case, as shown by the unacceptability of (ii) shows:

- (ii) *It would be instructive her to emulate the teacher.

P-feature and EPP-feature of the embedded C. These derivations converge. Hence, (46b–d) are acceptable.¹⁷

4. Adverb effects

I have argued in the last section that the PIC coupled with the VMH gives a minimalist account of the *that-t* effect. In this section, I will discuss adverb effects, arguing that they also follow from our analysis. The adverb effect therefore constitutes further evidence in favor of our analysis.

As observed by, among others, Bresnan (1977), Culicover (1991, 1993), and Browning (1996), the *that-t* effect is suspended when there is a sentential adverbial between the complementizer *that* and a subject trace (Bresnan, 1977: 194):¹⁸

- (48) a. **Who** did she say [that [tomorrow *t* would regret his words]]?
 b. **Which doctor** did you tell me [that [during an operation *t* had had a heart attack]]?

Suspension of the *that-t* effect with an intervening adverbial element is called the adverb effect. Little attention, however, has been given to the fact that the adverb effects like (48) show sensitivity to prosody. Specifically, the *that-t* effect is only suspended if the sentential adverbial bears focal stress. If the sentential adverbial does not get any focal stress, the result is deviant just like a normal *that-t* effect.

¹⁷ Pesetsky (1981) and Culicover (1991) claim that the complementizer-*t* effect also holds with *whether/if* given that *whether/if* are complementizers:

- (i) a. *Who were you wondering whether/if *t* lost the notebook?
 b. ?What were you wondering whether/if John lost *t*?

Although (ib) exhibits a weak *wh*-island violation due to extraction over *whether/if*, it is in clear contrast with (ia), which is severely deviant. It is not entirely clear, however, whether the contrast in (ia-b) is due to the complementizer-*t* effect. This is because unlike in the case of *that/for*-complements, extraction of an adjunct *wh*-phrase is severely deviant in the case of *whether/if*-complements:

- (ii) a. *How were you wondering whether/if John fixed the car *t*?
 b. *Why were you wondering whether/if John left early?

This might suggest that the contrast in (i) reflects the complement/non-complement asymmetry generally observed with extraction out of an island, which needs an independent account. Furthermore, there are some studies which argue that while *if* is a complementizer, *whether* is a *wh*-phrase (see, among others, Katz and Postal, 1964; Larson 1985; Borer, 1989). The fuller study of this subject is beyond the scope of this paper. I leave this important subject for future research.

¹⁸ See Culicover (1991) and Browning (1996) for ECP analyses of the adverb effects. As argued in Section 1, ECP analyses, which crucially make use of notions like government, head government, antecedent government, proper government, and indexing, are incompatible with the MP.

The adverb effect and its sensitivity to prosody straightforwardly follow from our analysis if we assume with Culicover (1991, 1993) that a functional head called Pol(arity) appears between *that* and the subject trace, and that focalized elements appear in the Spec of Pol.¹⁹ Let us consider (48a) as an example. Under the PolP analysis, if the sentential adverbial *tomorrow* bears focal stress, the embedded CP of (48a) is assigned (49):

- (49) a. $[_{CP} \text{that}_{[P, EPP]} [_{PolIP} \text{tomorrow} [_{Pol} [_{TP} \text{who}_{[Q, wh-]} [_{TP} \text{would } P_1]]]]]$
 b. $P_1 = [_{vP} t_{who} [v \text{ [regret his words]]}]$

In (49), the sentential adverbial *tomorrow*, being focalized, appears in the Spec of Pol. I argue that in (49a), Pol is assigned an focus-related feature. The focalized sentential adverbial *tomorrow* is merged in the Spec of Pol to satisfy that feature. It should be noted that since the *wh*-subject *who* is not in the MD of *that*, it cannot satisfy the P-feature and EPP-feature of *that* through Agree. The subject *wh*-phrase *who* must undergo movement to the Spec of C to satisfy those features in the embedded CP phase as in (50):

- (50) $P_2 = [_{CP} \text{who}_{[Q, wh-]} [_{\text{that}}_{[P, EPP]} [_{PolIP} \text{tomorrow} [_{Pol} [_{TP} t_{who} [_{TP} \text{would } P_1]]]]]]]$

Since *who*, which is the edge of C in P_2 , is accessible to operations at the matrix vP phase, this derivation converges. This accounts for the adverb effect.

Let us assume that unlike focalized sentential adverbials, non-focalized sentential adverbials are adjoined to TP. Then, the embedded CP of (48a) is assigned (51) when the sentential adverbial *tomorrow* does not bear any focal stress:

- (51) a. $P_2 = [_{CP} \text{that}_{[P, EPP]} [_{TP} \text{tomorrow} [_{TP} \text{who}_{[Q, wh-]} [_{TP} \text{would } P_1]]]]]$
 b. $P_1 = [_{vP} t_{who} [v \text{ [regret his words]]}]$

Since *tomorrow* is adjoined to TP, the subject *wh*-phrase *who* is in the MD of C. Given our analysis of the VMH, only Agree takes place, with *who* staying in situ. *Who* is not accessible to operations at the matrix vP phase; this derivation crashes. The absence of the adverb effect with a non-focalized sentential adverbial follows.²⁰

¹⁹ It should be noted that our analysis only relies on the existence of a functional head which appears between C and T and whose Spec is occupied by a focalized element. Although the present discussion assumes Culicover's PolP analysis, our analysis is also compatible with other analyses like the one proposed by Rizzi (1997, 2000), who claims that a functional head called Focus appears between C and T and a focalized element appears in the Spec of Focus.

²⁰ The complementizer *for* does not exhibit any adverb effect (see Culicover, 1991, 1993):

- (i) a. We were hoping for you to stay.
 b. *Who were you hoping for *t* to stay?
 c. *Who were you hoping for under any circumstances *t* to stay?

This is presumably due to the fact that *for* must be adjacent to the DP in order to assign Case.

Our analysis also explains the adverb effect induced by an negative adverbial like (52) irrespectively of whether negative inversion takes place or not:

- (52) Leslie is the person [who I said [that [under no circumstances would *t* run for president]]].

If negative inversion takes place in (52), as argued by Culicover (1993), the embedded CP phase of (52) is as follows:

- (53) a. $P_2 = [_{CP} \text{who}_{[Q, \text{wh-}]} [_{CP} \text{that}_{[E, \text{EPP}]} [_{\text{PolP}} \text{under no circumstances} [_{\text{Pol}} \text{would} [_{TP} t'_{\text{who}} [_{TP} t_{\text{would}} P_1]]]]]]]$
 b. $P_1 = [_{vP} t_{\text{who}} [v \text{ [run for president]]}]$

In (53a), the auxiliary *would* undergoes negative inversion, raising from T to Pol. On the other hand, if negative inversion does not take place, with *would* staying in situ, as argued by Browning (1996) and Rizzi (2000), the embedded CP phase of (52) is as follows:

- (54) a. $P_2 = [_{CP} \text{who}_{[Q, \text{wh-}]} [_{CP} \text{that}_{[E, \text{EPP}]} [_{\text{PolP}} \text{under no circumstances} [_{\text{Pol}} [_{TP} t'_{\text{who}} [_{TP} \text{would} P_1]]]]]]]$
 b. $P_1 = [_{vP} t_{\text{who}} [v \text{ [run for president]]}]$

In either structure, due to the intervening adverbial, the subject *wh*-phrase *who* must undergo movement to the Spec of C to satisfy the P-feature and EPP-feature of C. This derivation converges; the adverb effect with a negative adverbial follows.

Our analysis receives additional support from the fact that topicalization also suspends the *that-t* effect only when the proposed element gets focalized (cf. Rizzi, 2000: 310):

- (55) a. *a man who I think that *t* knows this book very well
 b. a man who I think that, this book, *t* knows *t* very well

Rizzi (2000) observes that (55b) is deviant when the topic phrase *this book* does not bear any focal stress, but its acceptability improves when it bears focal stress. This fact can also be accounted for along the same line with the adverb effect if we assume that focalized topic appears in the Spec of Pol while non-focalized topic is adjoined to TP (cf. Lasnik and Saito, 1992).

In our PolP analysis of the adverb effect, we have to exclude the possibility of generating Pol only to save a *that-t* violation. Let us consider (33) (repeated here as (56)) as an example:

- (56) *Who do you think [that [t saw Bill]]?

The embedded CP phase of (56) should not be assigned (57), where the subject *wh*-phrase *who* undergoes movement to the Spec of C due to the intervening Pol:

- (57) a. [_{CP} who_[Q, wh-] [_{that}<sub>[~~Q~~, ~~wh-~~]] [_{PolP} Pol [_{TP} *t*_{who} [_{TP} T P₁]]]]]
 b. P₁=[_{vP} *t*_{who} [_v [see Bill]]]</sub>

Essentially following Chomsky (1995), I assume (58).²¹

- (58) An element enters into a numeration (N) only if it is assigned a feature which has an effect on output.

Under the standard minimalist assumptions, the computation (derivation) is a mapping of a numeration (N) selected from the lexicon to linguistic expressions, i.e., PF and LF. (58) claims that no superfluous element is allowed to appear in a derivation, which is a natural consequence from the minimalist spirit. In (57), Pol is not assigned any feature which has an effect on output. Pol, which neither has any phonetic content nor triggers any overt movement, does not have any effect on PF output. Neither does it have any effect on LF output. Such an element should not be allowed to enter into the N of (56). Hence, Pol cannot appear in the derivation of (56). In sentences like (48), on the other hand, when the fronted sentential adverbial bears focal stress, Pol is assigned a focus-related feature. Pol has an effect on LF output, since an element in its Spec is interpreted as a focalized element. Pol also has an effect on PF output, since the focalized sentential adverbial is moved to the Spec of Pol. Pol is allowed to enter into the N of (48). Hence, Pol may appear in their derivation, saving a *that-t* violation.²²

5. Crosslinguistic variations with the *that-t* effects

The above discussion has shown that the PIC coupled with the VMH enables us to explain the *that-t* effect and its cancellation with an intervening element between the complementizer *that* and a subject trace in English. It is well known, however, that there are languages which do not exhibit any *that-t* effect. This section investigates crosslinguistic variations with the *that-t* effect, arguing that they also follow from our analysis.

5.1. Perlmutter's generalization

As originally observed by Perlmutter (1971), null subject languages like Italian and Spanish do not exhibit any *that-t* effects. In Italian, for example, it is possible to

²¹ See, among others, Safir (1993) and Bošković (1997) for similar principles.

²² One might argue that our PolP analysis is against the minimalist spirit in that it assumes an additional functional head Pol. Note, however, that the existence of Pol in (48) is motivated by the minimalist principle (58) and thus in accord with the minimalist spirit.

extract a subject *wh*-phrase across the declarative complementizer *che* ‘that’, as in (59):

- (59) Chi credi che abbia telefonato?
 who you-think that has telephoned
 ‘Who do you think that has telephoned?’

Let us look at how our analysis explains Perlmutter’s generalization, taking (59) as an example. Rizzi (1982, 1990) argues that Perlmutter’s generalization follows from the fact that in null subject languages, a subject can be placed in a postverbal position, which is within VP (see, among others, Rizzi, 1982, Jaeggli, 1982, and Raposo, 1988). He then argues that subject extraction must proceed from a postverbal position in these languages. Given Rizzi’s analysis, the embedded CP of (59) is assigned (60):

- (60) a. [_{CP} *che*<sub>[P, EPP]] [_{TP} *pro* [*abbia* P₁]]]
 b. P₁ = [_{vP} *chi*_{[Q, wh-]] [_{vP} *v*_{[E, EPP]] [_{VP} *telefonato t_{chi}*]]]}}</sub>

The preverbal subject position is filled by the empty pronoun *pro*. In (60b), the subject *wh*-phrase *chi* ‘who’ originates in the postverbal position and undergoes movement to the Spec of *v* to satisfy the P-feature and EPP-feature of *v*. When we come to a stage where the P-feature and EPP-feature of the complementizer *che* ‘that’ are to be satisfied, the subject *wh*-phrase *chi* ‘who’, which is the edge of *v* in P₁, undergoes movement to the Spec of C:

- (61) P₂ = [_{CP} *chi*_{[Q, wh-]] [*che*_{[E, EPP]] [_{TP} *pro* [*abbia* P₁]]]]]}}

Since the subject *wh*-phrase *chi* ‘who’, which is the edge of C in P₂, is accessible to operations at the matrix *vP* phase, this derivation converges. Perlmutter’s generalization, i.e., the lack of the *that-t* effect in null subject languages like Italian and Spanish, straightforwardly follows from our analysis.²³

²³ As observed by Shlonsky (1988), Modern Hebrew does not exhibit the *that-t* effect, either. Extraction of a subject *wh*-phrase across the declarative complementizer *še* ‘that’ is acceptable, as shown in (i):

- (i) Mi at ma’amina [še- lo ohev salat xacilim]?
 who you believe that NEG like salad eggplants
 ‘Who do you believe doesn’t like baba ganouj?’
 (Shlonsky, 1988: 191)

The lack of the *that-t* effect in Modern Hebrew also follows from our analysis if Modern Hebrew is a null subject language as argued by Borer (1984).

5.2. Non-null-subject languages

Suspension of the *that-t* effect is not only observed in null subject languages. There are other languages where the *that-t* violations are acceptable even though null subjects are not allowed. In this subsection, I will argue that suspension of the *that-t* effects in non-null-subject languages also follows from our analysis.

5.2.1. French and dialects of American English

In French, when an embedded subject undergoes *wh*-movement or empty operator movement, the declarative complementizer *que* must be replaced by a special complementizer *qui* (see, among others, Kayne 1976, 1983 and Rizzi, 1990). The examples in (62) are taken from Kayne (1983: 93–94) and those in (63) are taken from Rizzi (1990: 56).²⁴

- (62) a. *Qui crois-tu [**que** [*t* tombera]]?
 who think-you that will fall
 ‘Who do you think *t* will fall?’
 b. Qui crois-tu [**qui** [*t* tombera]]?
 who think-you that will fall
 ‘ho do you think *t* will fall?’
- (63) a. *L’homme [OP [que je crois [**que** [*t* viendra]]]]
 the man that I think that will come
 ‘the man who I think *t* will come’
 b. L’homme [OP [que je crois [**qui** [*t* viendra]]]]
 the man that I think that will come
 ‘the man who I think *t* will come’

In other words, extraction of a *wh/OP*-subject across the complementizer *qui* is acceptable.

Rizzi (1990) claims that the complementizer *qui* occurs when there is a Spec-head agreement between C and the trace of a *wh/OP*-phrase in its Spec. More specifically, the complementizer *qui* carries Agr, which agrees with the trace of a *wh/OP*-phrase in its Spec. Under Rizzi’s analysis, (62b) is assigned the following structure:

- (64) **Qui_i** crois-tu [_{CP} **t_i**’ [_{C_{qui_i}} Agr^t [_{TP} **t_i** Agr_i tombera]]]

Recall that Rizzi assumes that Agr governs an element co-indexed with it through agreement. In (64), Agr of the complementizer *qui* agrees with the intermediate trace

²⁴ I would like to thank an anonymous *Lingua* reviewer for bringing my attention to these French facts and American English facts to follow.

t' in the Spec of the embedded C by Spec-head agreement. Since t' and t are identical, Agr of the complementizer *qui* agrees with the embedded subject trace t by transitivity. This coindexing makes it possible for *qui* to properly head-govern the embedded subject trace t . Hence, there is no ECP violation; (62b) is acceptable. (63b) can be explained in the same way.

There is, however, a restriction on the distribution of the complementizer *qui*, i.e., *qui* only occurs when a *wh/OP*-subject is extracted. Extraction of a *wh/OP*-object cannot be marked by *qui*, as shown below (Rizzi, 1990: 56):

- (65) a. *Que crois-tu [qui [Marie a peint t]]?
 what think-you that Mary has painted
 'Who do you think that Mary has painted t ?'
 b. *L'homme que je crois [qui [Jean connaît t]]
 the man that I believe that John knows
 'the man who I believe that John knows t '

This restriction has led Rizzi to claim that Agr of the complementizer *qui* must be identical to (coindexed with) Agr in T, which agrees with its subject. Let us consider (62b) again as an example. In its structure (64), recall that Agr of the complementizer *qui* agrees with the embedded subject trace t . Since the embedded subject trace t agrees with Agr in the embedded T, Agr of the complementizer *qui* agrees with Agr in the embedded T by transitivity. As shown in (64), these two Agrs are identical to (coindexed with) each other. Hence, (62b), where the embedded complementizer is realized as *qui*, is acceptable. (62a) can be explained in the same way. In (65a), on the other hand, Agr of the complementizer *qui* does not agree with Agr in the embedded T, since while the former agrees with the intermediate trace of the object *wh*-phrase *que* 'what', the latter agrees with the embedded subject *Marie* 'Mary'. Hence, the embedded C cannot be realized as *qui*; (65a) is deviant. (65b) can be explained in the same way.

Rizzi (1990) claims that his analysis can be extended to account for suspension of the *that-t* violations in dialects of American English. Sobin (1987) points out that sentences like (33) (repeated here as (66)) are acceptable in various regional dialects of American English:

- (66) **Who** do you think [that [t saw Bill]]?

Rizzi assumes that *that* in these dialects can carry Agr. Under his analysis, (66) would be assigned the following structure:

- (67) **Who_i** do you think [_{CP} t'_i that_{Agr_i} [_C [_{TP} t_i Agr_i saw Bill]]]

In (67), the subject trace is properly governed by the coindexed Agr in the embedded C *that*; (66) is acceptable.

In the rest of this subsection, I will argue that our analysis can also account for suspension of the *that-t* effects in French and the regional dialects of American English. Let us first consider French. Recall that according to Rizzi (1990), C is

realized as *qui* only when C has Agr which is identical to Agr in T, which in turn agrees with its subject. In other words, under his analysis, the complementizer *qui* is a realization of C which agrees with a subject through the mediation of Agr in C and Agr in T. While adopting his basic insight, I depart from Rizzi in claiming that Agr only resides in T but not in C. I argue that the complementizer *qui* appears only when C is specified as a prefix to T and then C and T undergo Morphological Merger in the sense of Marantz (1988, 1989). In other words, when C is specified as a prefix to T, C and T, although being independent syntactic constituents, merge into a single word and realized as the suppletive form *qui*. Since T has Agr, which agrees with its subject, this morphological merger analysis captures Rizzi's insight that *qui* is a realization of C which agrees with a subject without assuming Agr in C.

Let us consider how this analysis accounts for suspension of the *that-t* violations in French, taking (62b) as an example. During its derivation, we construct the embedded CP phase (68):

- (68) a. $[_{CP} C_{[P, EPP]} [_{TP} qui_{[Q, wh-]} [_{T} P_1]]]$
 b. $P_1 = [_{vP} t_{qui} [_v [tombera]]]$

In (68), let us assume that C is specified as a prefix to T and thus eventually realized as *qui* when morphologically merged with T. According to our analysis of the VMH, in (68a), only Agree takes place, with the *wh*-phrase *qui* 'who' remaining in-situ:

- (69) $[_{CP} C_{[P, EPP]} [_{TP} qui_{[Q, wh-]} [_{T} P_1]]]$

In (69), however, the prefixal property of C cannot be satisfied. C and T are not adjacent to each other in the PF component and thus Morphological merger cannot take place given that the operation requires PF-adjacency (see Marantz 1988, 1989). Let us assume that if an affixal property remains unsatisfied at PF, a derivation crashes at that level. Then, this derivation crashes at PF at this phase level.

There is, however, an alternative derivation where the P-feature and EPP-feature of C are satisfied. The *wh*-phrase *qui* 'who' undergoes movement to the Spec of C:

- (70) $[_{CP} qui_{[Q, wh-]} [_{CP} C_{[P, EPP]} [_{TP} t_{qui} [_{T} P_1]]]$

In (70), C is PF-adjacent to T. The former undergoes Morphological Merger with the latter; the prefixal property of C is satisfied. C undergoes Morphological Merger with T and it is eventually realized as *qui*. Although (70), where Move takes place, is less economical than (69), where Agree takes place, the latter crashes at PF at this phase level. Given that economy conditions only compare convergent derivations at each phase level, (70) is chosen. Since *qui* 'who' is in the edge in (70), it is accessible

to operations in the matrix *vP* phase. This derivation converges. The absence of a *that-t* violation in (62b) follows. (63b) can be accounted for in the same way.²⁵

The lack of the *that-t* effect in the regional dialects of American English can be explained in a similar fashion. In those dialects, the suppletive form created by pre-fixation of C to T happens to be identical with the declarative complementizer *that*. Hence, (66) is acceptable; there is no *that-t* violation in those dialects.

Our analysis also explains why the suppletive form *qui* in French does not appear when a non-subject is extracted by *wh/OP*-movement. Let us consider (65a) (repeated here as (71)) as an example:

- (71) *Que crois-tu [qui [Marie a peint *t*]]?
 what think-you that Mary has painted
 ‘Who do you think that Mary has painted *t*?’

During its derivation, we construct the embedded CP phase:

- (72) a. $P_2 = [CP \text{ que}_{[Q, \text{wh-}]} [CP C_{[\#, \text{wh-}]} [TP \text{ Marie } [TP T P_1]]]]$
 b. $P_1 = [vP t'_{\text{que}} [vP t_{\text{Marie}} [v [a \text{ peint } t_{\text{que}}]]]]$

²⁵ I assume with, among others, Bobaljik (1996) and Agbayani (1998) that adverbs are irrelevant for the adjacency condition on Morphological Merger. In (i), although the adverb *l'année prochaine* ‘next year’ intervenes between C and T, it is irrelevant for adjacency. Hence, C and T can undergo Morphological Merger, which results in a realization of *qui* (Rizzi, 1997: 319)

- (i) Voici l'homme que je crois qui, l'année prochaine, *t* pourra nous aider
 here is the man who I think that next year will be able to us help
 ‘Here is the man who I think that next year *t* will be able to help us.’

In contrast, the dislocated argument *ton livre* ‘your book’, which intervenes between C and T, blocks Morphological Merger in (ii) (Rizzi, 1997: 306):

- (ii) *?Un homme qui, ton livre, *t* pourrait l'acheter
 a man that your book could it-buy
 Lit: ‘A man who, your book, *t* could buy’

Hence, (ii), where *qui* appears, is deviant. I leave the issue of the transparency of adverbs in Morphological Merger for future research. Note in passing that as pointed out by Rizzi (1997), the adverb effects in French are not so robust as those in English. According to Rizzi, there are some French speakers who do not find any adverb effects. Those speakers do not find any improvement in (iiib) in comparison to (iiia). Other speakers find an improvement, but it is not comparable to the robust effect found in English (Rizzi, 1997: 318–319):

- (iii) a. *Voici l'homme que je crois que *t* pourra nous aider l'année prochaine
 here is the man who I think that will be able to us help next year
 ‘Here is the man who I think that *t* will be able to help us next year’
 b. Voici l'homme que je crois que, l'année prochaine, *t* pourra nous aider
 here is the man who I think that next year will be able to us help
 ‘Here is the man who I think that next year *t* will be able to help us.’

I also leave this important issue for future research.

Recall that the suppletive form *qui* only appears when C is prefixed to T. In (72), however, C can never be PF-adjacent to T due to the intervention of the subject *Marie* ‘Mary’ in the Spec of T. Morphological Merger may not apply to C and T; the deviancy of (71) follows. (65b) can be explained in the same way.

5.2.2. Modern Irish

Modern Irish is also immune from the *that-t* effect (see, among others, McCloskey, 1979; Chung and McCloskey, 1987), though it is not a null subject language. In this subsection, I will argue that the lack of the *that-t* effect in Modern Irish also follows from our analysis.

Before we turn to the lack of the *that-t* effect in Modern Irish, it is necessary to explicate complementizers in Modern Irish. Among Modern Irish complementizers, *goN* ‘that’ is the one which normally introduces a declarative embedded clause (McCloskey 1979: 150):

- (73) Shíl mé [CP goN mbeadh sé ann].
 thought I C would-be he there
 ‘I thought that he would be there.’

When a *wh*-phrase or an empty operator is extracted out of a clause, on the other hand, that clause is marked by *aL* ‘that’ (see, among others, McCloskey, 1979; Chung and McCloskey, 1987):

- (74) an fear [CP aL/*goN shíl mé [CP aL/*goN beheadh *t* ann]]
 the man C thought I C would-be there
 ‘the man that I thought *t* would be there’

This suggests that while the CP-phase headed by *aL* ‘that’ may be assigned features which trigger *wh*/operator-movement, i.e. a Q/OP/P-feature and an EPP-feature, the one headed by *goN* ‘that’ may not be assigned any of those features.

With this discussion in mind, let us consider the lack of the *that-t* effect in Modern Irish (McCloskey, 1979):

- (75) a. Cé [CP aL deir siad [CP aL chuman *t* t-amhrán sin]].
 who C say they C composed that song
 ‘Who do they say *t* wrote that song?’
 b. an t-Aire [CP aL deir siad [CP aL dúirt *t* [CP goN raibh an cogadh thart]]]
 the minister C say they C said C was the war over
 ‘the minister that they say *t* said the war is over’

In (75a) and (75b), the clause from which *wh*/operator-extraction takes place is marked by *aL* ‘that’. Although the subject *wh*/operator-phrase is extracted over the

overt complementizer *aL* ‘that’, the result is acceptable. In other words, there is no *that-t* effect.

The lack of the *that-t* effect in Modern Irish follows from our analysis if we assume with, among others, Sproat (1985), Chung and McCloskey (1987), and Holmberg and Platzack (1995) that the VSO word order as in the above Modern Irish examples should be analyzed in terms of verb fronting. Under their analysis, a verb raises to a functional head which is higher than the subject position but lower than C. Let us consider (75a) as an example. The embedded CP phase of (64a) is as follows:

- (76) a. $P_2 = [_{CP} \text{cé}_{[Q, wh-]} [aL_{[F, \text{chuman}]} [_{FP} \text{chuman} [_{TP} t'_{cé} [_{TP} T P_1]]]]]$
 b. $P_1 = [_{vP} t_{cé} [v [t_{\text{chuman}} \text{t-amhrán sin}]]]$

In (76), the verb *chuman* ‘composed’ raises to a functional head designated as F, which is between C and T. Due to the intervening functional projection whose head position serves as the landing site for verb raising, the subject *wh*-phrase *cé* ‘who’ does not remain in-situ but undergoes movement to the Spec of the embedded C to satisfy the P- and EPP-features of the complementizer *aL* ‘that’. Since the subject *wh*-phrase *cé* ‘who’, which is the edge of C in P_2 , is accessible to operations at the matrix *vP* phase, this derivation converges. We can account for the fact that (75a) is acceptable. (75b) can be accounted for in the same way. The lack of the *that-t* effect in Modern Irish follows.

5.2.3. Japanese

In this section, it is first shown that Japanese does not exhibit any *that-t* effect. I will then argue that the lack of the *that-t* effect in Japanese also follows from our analysis.

Although Japanese does not have any overt *wh*-movement, there are constructions which have been argued to involve empty operator. Ishii (1991) and Kikuchi (1987) argue that the comparative deletion construction involves empty operator movement. Although they differ as to the categorial status of the empty operator involved in this construction, we will assume Kikuchi’s analysis for expository purposes. It should be noted that the arguments to follow hold good under either of the analyses. Under Kikuchi’s analysis, the comparative deletion construction (77) is assigned structure (78) (Kikuchi, 1987: 4):²⁶

- (77) John-ga tabeta yorimo Tom-wa keeki-o takusan tabeta
 -Nom ate than -Top cake-Acc many ate
 ‘Tom ate more cakes than John ate’
 (78) [OP_1 [John-ga t_i tabeta] yorimo] Tom-wa keeki-o takusan tabeta

²⁶ Following Kikuchi (1987), we assume that an empty operator moves leftward to the clause-initial position, though the present discussion holds good regardless of the directionality of empty operator movement.

In (78), the empty operator *OP* moves from its original position to the Spec of C. Let us consider the *that-t* effect in Japanese, taking (79) as an example:

- (79) John-ga Mary-ni hanasi kaketa to omotteiru yorimo harukani ookuno hito-ga
 -Nom -Dat talked to COMP think than far more people-Nom
 Susy-ni hanasi tagatte ita
 -Dat wanted to talk
 ‘Far more people wanted to talk with Susy than John thinks talked to Mary.’

Given the empty operator movement analysis of the comparative deletion construction, the structure of (79) is as follows:

- (80) [**OP**_i [John-ga [**t**_i Mary-ni hanasi kaketa to] omotteiru] yorimo] harukani
 ookuno hito-ga Susy-to hanasi tagatte ita

In (80), the empty operator *OP*, which originates in the embedded subject position, undergoes movement to the matrix Spec of C crossing over the embedded overt complementizer *to* ‘that’. The result is acceptable. This shows that Japanese lacks the *that-t* effect.

Suspension of the *that-t* effect in Japanese can be explained if we assume with, among others, Fukui (1986), Kuroda (1988), and Lasnik and Saito (1992) that Japanese subjects do not raise to the Spec of T but stay in situ. Then, the embedded CP phase of (79) is as follows:

- (81) a. P₂ = [CP OP_[OP, U] [TP T P₁] to_[E, COMP]]
 b. P₁ = [_{vP} t_{OP} [_v [Mary-ni hanasi kaketa]]]

When the P- and EPP-features of the embedded C are to be satisfied in the embedded CP phase, the empty operator *OP*, which is base-generated in the Spec of the embedded *v*, undergoes movement to the Spec of the embedded C. Since the empty operator *OP* is the edge of C in the embedded CP phase, it is accessible to operations at the matrix *vP* phase level. This derivation converges; (79) is acceptable. The lack of the *that-t* effect in Japanese follows.

6. Conclusion

This paper has argued that the *that-t* effect can be explained by the PIC coupled with the VMH. It was shown that our analysis is not only compatible with the MP but also supported by the adverb effect and the crosslinguistic variations with the *that-t* effect.

Our analysis also raises interesting theoretical issues. I will briefly point out one of them here. Recall that our analysis crucially assumes that derivations are evaluated

locally, specifically at each phase level. Within the theory of computational complexity, it is generally agreed that local considerations induce less computational burden than global ones (see, among others, Chomsky, 1995, Fukui, 1996, and Ishii, 1997). As argued by Chomsky (1998), however, it is not clear whether computational complexity matters for a cognitive system like language, which does not involve any processing but only stores information. In other words, there is no a priori reason to claim that the computation should be local to avoid the problem of computational complexity, but we need to seek a resolution of this local versus global issue on empirical grounds. Our analysis gives a local analysis of the *that-t* effect, providing support for the language design that language is local in nature.

Acknowledgements

I would like to thank Brian Agbayani, Hiroshi Aoyagi, Lisa Cheng, Naoki Fukui, Hidehito Hoshi, James Huang, Kazue Takeda, Wei-Tien Tsai, and an anonymous reviewer for *Lingua* for their helpful comments on a previous version of this paper. Remaining errors and omissions are, of course, the sole responsibility of the author. This work was supported in part by the Japan Society for the Promotion of Science under grant Scientific Research C2 14510543 and by a grant from the Institute of Humanities at Meiji University.

References

- Agbayani, B., 1998. Feature Attraction and Category Movement. Doctoral dissertation, University of California, Irvine.
- Aoun, J., Hornstein, N., Lightfoot, D., Weinberg, A., 1987. Two types of locality. *Linguistic Inquiry* 18, 537–577.
- Bobaljik, J., 1996. What Does Adjacency Do? Unpublished manuscript, Harvard University.
- Borer, H., 1984. Parametric Syntax. Foris, Dordrecht.
- Borer, H., 1989. Anaphoric AGR. In: Jaeggli, O., Safir, K. (Eds.), *The Null Subject Parameter*. Kluwer, Dordrecht, pp. 69–101.
- Bošković, Z., 1997. *The Syntax of Nonfinite Complementation*. MIT Press, Cambridge, MA.
- Bresnan, J., 1977. Variables in the theory of transformations. In: Culicover, P., Wasow, T., Akmajian, A. (Eds.), *Formal Syntax*. Academic Press, New York, pp. 157–196.
- Browning, M., 1987. Null Operator Constructions. Doctoral dissertation, MIT, Cambridge, MA.
- Browning, M., 1996. CP recursion and that-t effects. *Linguistic Inquiry* 27, 237–255.
- Cheng, L., 1991. On the Typology of wh-Questions. Doctoral dissertation, MIT, Cambridge, MA.
- Chomsky, N., 1986. *Barriers*. MIT Press, Cambridge, MA.
- Chomsky, N., 1993. A minimalist program for linguistic theory. In: Hale, K., Keyser, S.J. (Eds.), *The View from Building 20*. MIT Press, Cambridge, MA, pp. 1–52.
- Chomsky, N., 1995. *The Minimalist Program*. MIT Press, Cambridge, MA.
- Chomsky, N., 1998. Some observations on economy in generative grammar. In: Barbosa, P., Fox, D., Hagstrom, P., McGinnis, M., Pesetsky, D. (Eds.), *Is the Best Good Enough?* MIT Press, Cambridge, MA, pp. 115–127.
- Chomsky, N., 2000. Minimalist inquiries. In: Martin, R., Michaels, D., Uriagereka, J. (Eds.), *Step by Step*. MIT Press, Cambridge, MA, pp. 89–155.
- Chomsky, N., 2001a. Derivation by phase. In: Kenstowicz, M. (Ed.), *Ken Hale: A Life in Language*. MIT Press, Cambridge, MA, pp. 1–52.

- Chomsky, N., 2001b. Beyond explanatory adequacy. MIT Occasional Papers in Linguistics 20. MITWPL, Cambridge, MA.
- Chung, S., McCloskey, J., 1987. Government, barriers, and small clauses in Modern Irish. *Linguistic Inquiry* 18, 173–237.
- Culicover, P., 1991. Polarity, inversion, and focus in English. In: ESCOL '91. Department of Linguistics, Ohio State University, Columbus, pp. 46–68.
- Culicover, P., 1993. Evidence against ECP: accounts of the that-t effects. *Linguistic Inquiry* 24, 557–561.
- Déprez, V., 1991. Economy and that-t effect. In: The Proceedings of the Western Conference on Linguistics. California State University, pp. 74–87.
- Déprez, V., 1994. A minimal account of the that-t effect. In: Cinque, G., Koster, J., Pollock, J.-Y., Rizzi, L., Zanuttini, R. (Eds.), *Paths toward Universal Grammar: Studies in Honor of Richard S. Kayne*. Georgetown University Press, Washington, DC, pp. 121–135.
- Epstein, S.D., 1998. Overt scope marking and covert verb-second. *Linguistic Inquiry* 29, 181–227.
- Fukui, N., 1986. A Theory of Category Projection and Its Applications. Doctoral dissertation, MIT, Cambridge, MA.
- Fukui, N., 1996. On the nature of economy in language. *Cognitive Studies* 3, 51–71.
- George, L., 1980. Analogical Generalization in Natural Language Syntax. Doctoral dissertation, MIT, Cambridge, MA.
- Holmberg, A., Platzack, C., 1995. *The Role of Inflection in Scandinavian Syntax*. Oxford University Press, Oxford.
- Huang, C.-T. J., 1982. Logical Relations in Chinese and the Theory of Grammar. Doctoral dissertation, MIT, Cambridge, MA.
- Ishii, Y., 1991. Operators and Empty Categories in Japanese. Doctoral dissertation, University of Connecticut, Storrs.
- Ishii, T., 1997. An Asymmetry in the Composition of Phrase Structure and Its Consequences. Doctoral dissertation, University of California, Irvine.
- Jaeggli, O., 1982. *Topics in Romance Syntax*. Foris, Dordrecht.
- Katz, J., Postal, P., 1964. *An Integrated Theory of Linguistic Descriptions*. MIT Press, Cambridge, MA.
- Kayne, R., 1976. *French Syntax*. MIT Press, Cambridge, MA.
- Kayne, R., 1983. *Connectedness and Binary Branching*. Foris, Dordrecht.
- Kayne, R., 1994. *The Antisymmetry of Syntax*. MIT Press, Cambridge, MA.
- Kikuchi, A., 1987. Comparative Deletion in Japanese. Ms, Yamagata University.
- Kuroda, S.-Y., 1988. Whether we agree or not: a comparative syntax of English and Japanese. In: *Papers from the Second International Workshop on Japanese Linguistics*. CSLI Publications, Stanford, pp. 103–143.
- Larson, R., 1985. On the syntax of disjunction scope. *Natural Language and Linguistic Theory* 3, 217–264.
- Lasnik, H., Saito, M., 1984. On the nature of proper government. *Linguistic Inquiry* 15, 235–289.
- Lasnik, H., Saito, M., 1992. *Move α : Condition on Its Application and Output*. MIT Press, Cambridge, MA.
- Marantz, A., 1988. Clitics, morphological merger, and the mapping to phonological structure. In: Hammond, M., Noonan, M. (Eds.), *Theoretical Morphology*. Academic Press, New York, pp. 253–270.
- Marantz, A., 1989. Clitics and phrase structure. In: Baltin, M., Kroch, A. (Eds.), *Alternative Conceptions of Phrase Structure*. The University of Chicago Press, Chicago, pp. 99–116.
- May, R., 1985. *Logical Form: Its Structure and Derivation*. MIT Press, Cambridge, MA.
- McCloskey, J., 1979. *Transformational Syntax and Model Theoretic Semantics*. Reidel, Dordrecht.
- Perlmutter, D., 1971. *Deep and Surface Constraints in Syntax*. Holt, Rinehart and Winston, New York.
- Pesetsky, D., 1981. Complementizer-trace phenomena and the nominative island condition. *The Linguistic Review* 1, 297–343.
- Raposo, E., 1988. Romance inversion, the minimality condition, and the ECP. *NELS* 18, 357–374.
- Rizzi, L., 1982. *Issue in Italian Syntax*. Foris, Dordrecht.
- Rizzi, L., 1990. *Relativized Minimality*. MIT Press, Cambridge, MA.
- Rizzi, L., 1997. The fine structure of the left periphery. In: Haegeman, L. (Ed.), *Elements of Grammar*. Kluwer, Dordrecht, pp. 281–337.

- Rizzi, L., 2000. *Locality and Left Periphery*. Ms., University of Siena.
- Ross, J., 1967. *Constraints on Variables in Syntax*. Doctoral dissertation, MIT, Cambridge, MA.
- Safir, K., 1993. Perception, selection, and structural economy. *Natural Language Semantics* 2, 47–70.
- Saito, M., Fukui, N., 1998. Order in phrase structure and movement. *Linguistic Inquiry* 29, 439–474.
- Shlonsky, U., 1988. Complementizer-cliticization in Hebrew and the empty category principle. *Natural Language and Linguistic Theory* 6, 191–205.
- Sobin, N., 1987. The variable status of Comp-Trace phenomena. *Natural Language and Linguistic Theory* 5, 33–60.
- Sproat, R., 1985. Welsh syntax and VSO structure. *Natural Language and Linguistic Theory* 3, 173–216.
- Uriagereka, J., 1999. Multiple spell-out. In: Epstein, S.D., Hornstein, N. (Eds.), *Working Minimalism*. MIT Press, Cambridge, MA, pp. 251–282.