A Note on Transfer Timing: The Variability of That-Trace Effect

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https://doi.org/10.15017/7182189

出版情報：九大英文学. 66, pp.23-36, 2024-03-31. The Society of English Literature and Linguistics, Kyushu University
バージョン：
権利関係：

A Note on Transfer Timing: The Variability of *That*-Trace Effect*

Kodai Suenaga

1. Introduction

This paper discusses the timing of Transfer, providing a new approach to the variability of the *that*-trace effect under the recent minimalist framework. Crucial in the discussion is Sobin's (1987) empirical observation that not all speakers of English are sensitive to the *that*-trace effect like (1), which shows that overt *that* can be present although the *wh*-subject is extracted from an embedded clause.

(1) %Who do you think that loves Mary?

We will argue based on this fact that the complement of a phase head (PH_n) is transferred to the interfaces when the phase level operations of the immediately higher phase head (PH_{n+1}) are completed.

In this paper, we suggest a way to deduce the relevant variability under the spirit of Strong Minimalist Thesis (SMT), which is an innovative effort to explore the possibility that the computational system for human language is a perfect system meeting the interface conditions (see Chomsky (1995, 2000) and in subsequent work). Of note, Chomsky (2015) argues that, under the SMT, the best scenario is that phenomena can be explained by interaction of the simplest computational operation Merge. As for Merge, Chomsky holds that it applies freely in a way satisfying third-factor principles (Free Merger). Thus, this paper attempts to analyze the data by appealing to Free Merger alone.

First, we will briefly review Chomsky's (2015) analysis to the *that*-trace effect in the following section after briefly going over the Labeling Algorithm framework. Then, in section 3, we present the main proposal to demonstrate that it has desirable

consequences for the analysis of the "*that*-trace" variability. Section 4 shows that our analysis can be extended to cover other syntactic phenomena. Section 5 mentions an open issue and concludes the paper.

2. Labeling Analysis (Chomsky (2015))

2.1. *That*-Trace Effect

Chomsky argues that Merge is applied freely only if labels are legible at the interfaces. To determine labels, he introduces the Labeling Algorithm by Minimal Search. When a head and phrase undergo Merge, the head provides the label. When two phrases undergo Merge, there are two strategies for labeling: either (i) agreeing features provide the label (e.g. <φ, φ>, <Q, Q>), or (ii) by raising one of two phrases, the remaining one becomes the label since copies are ignored for Minimal Search.

In addition to this algorithm, he proposes the notion of weak heads.

(2) English T and root R in all languages are too weak to serve as a label.

This notion requires that the weak heads should be strengthened by <φ, φ> labeling; hence, T must agree with a subject and R must agree with an object, deducing the structural parallelism between the CP and *v**P phases.

Crucially, based on the notion above, subject elements in English must stay within Spec-TP for labeling by Minimal Search, which leads to the *that*-trace effect.

(3) a. *Who do you think that loves Mary? (unacceptable)

b. {$_{\beta}$ that {$_{\alpha}$ who T {$_{R\text{-}v^*}$ ~~who~~ love Mary}}}

c. {$_{\beta}$ that {$_{\alpha}$ who T {$_{R\text{-}v^*}$ ~~who~~ love Mary}}}

As (3) shows, the *wh*-subject *who* must stay within Spec-TP to strengthen the weak head T; if it leaves there, T cannot be labeled since Minimal Search cannot see copies. In this case, however, *who* is trapped within the Transfer domain α (the complement of *that*), so that it cannot move to the matrix Spec-CP. In this regard, the derivation is doomed to crash, deriving the relevant effect from labeling.

2.2. Problems

Although Chomsky's labeling analysis successfully offers a theoretical explanation to the *that*-trace effect, it has to face some serious problems.

First, the notion of weak T cannot explain the derivation of infinitival clauses. If

English T is weak, the label of the infinitival T head should never be determined since it is hard to assume that φ-agreement between a subject and infinitival *to* can be obtained (see also Mizuguchi (2017) and Hayashi (2020)). For this reason, such a theoretically problematic notion cannot be an effective tool to account for the *that*-trace effect.

Next, a lot of studies have presented various empirical evidence that *wh*-subjects move to Spec-CP in English (see Pesetsky and Torrego (2001), Mizuguchi (2014), Bošković (2016, 2019), and Messick (2020), among others). If English T were counted as a weak head, such movement would not be allowed in principle.

Last but not least, there is an empirical fact that "*that*-trace constructions" like (1) are acceptable to some speakers (e.g., Sobin (1987, 2002), Culicover (1993), Rizzi and Shlonsky (2007), and Pesetsky (2017), among others). If Chomsky's analysis is truly tenable, this fact can never be explained since *wh*-subjects in English should be trapped in the Transfer domain (i.e., Spec-TP) for the sake of labeling.

To recap, in this section we have reviewed the labeling analysis developed by Chomsky (2015), and then observed theoretical and empirical problems with his analysis. In the next section, we will attempt to provide a way to deduce the variability of *that*-trace effect in terms of Chomsky's labeling theory, while overcoming the problems above in a conceptually desirable way.

3. Proposal and Analysis

As discussed so far, there are theoretical and empirical problems with Chomsky's analysis of the *that*-trace effect in the labeling framework. To solve these problems, we make two assumptions which will be described below.

3.1. Elimination of Weak Heads

First, we assume with Hayashi (2020) that all heads are strong enough to serve as labels, eliminating the notion of weak heads proposed by Chomsky. If this is on the right track, infinitival T can be labeled without <φ, φ> labeling since all heads are strong (see Hayashi (2020)). Furthermore, since T is no longer weak, *wh*-subjects in English do not have to stay within Spec-TP for labeling, which also leads to support the evidence that *wh*-subjects are allowed to occupy Spec-CP (see Mesick (2020)).

3.2. Timing of Transfer

Next, we will discuss the timing of Transfer in this subsection. Since Chomsky (2000, 2001, 2004), it has been assumed that Transfer is an operation to send narrow-syntax representations to the interfaces. More specifically, the complement of phase heads (PH) is transferred, whereby no syntactic operations can be accessible to the Transfer domain (the Phase Impenetrability Condition). The operation has been exploited in numerous studies, but some of its mechanisms are still unclear. One of those issues is when Transfer is applied. In this paper, we propose that the complement of a phase head (PH_n) is transferred to the interfaces when the phase level operations of the immediately higher phase head (PH_{n+1}) are completed, which will be demonstrated in the following simplified structure.

(4) { PH_{n+1} … { PH_n, XP }} (Merge of PH_{n+1})

(4) shows the stage where the higher phase head PH_{n+1} is introduced in the derivation, and then the phase level operations of PH_{n+1} will be launched. When the operations come to an end, the label of the set headed by PH_n is identified by Minimal Search, which is one of the phasal operations of PH_{n+1}. If we strictly assume with Chomsky (2000) that CP and (transitive/unergative) *v**P constitute phases, the complement domain of them should be transferred. In this sense, we suggest that Transfer should target the relevant domain after the phase labels (CP and *v**P) are identified. That is, upon the completion of the phase level operations of PH_{n+1}, Transfer applies to XP (the complement of PH_n), only if the set headed by PH_n is recognized as *phase*.

This proposal leads us to deduce the fact that Transfer does not apply to the complement of *v** in the derivation. Chomsky (2015) assumes that R is universally raised to *v** by Internal pair-Merge for principled reasons of root-categorization, thereby *v** becomes invisible to Minimal Search, as shown below.

(5) a. { *v** {$_{XP}$ … R …}} (Merge of *v**(PH_n))
b. { R-*v** {$_{XP}$ … ~~R~~ …}} (R-to-*v** raising)
c. { C … { R-*v** {$_{XP}$ … ~~R~~ …}}} (Merge of C (PH_{n+1}), Minimal Search)

In this case, Minimal Search cannot identify the *phase label* *v**P since *v** is pair-Merged by R, which leads to cancel the Transfer of XP (the complement of *v**). In fact, Chomsky claims that the R-*v** amalgam formed by pair-Merge serves as the label (i.e., there is no projection corresponding to *v**P). Hence, under our proposal, it naturally follows that XP (the complement of *v**) does not undergo Transfer since the phase label cannot be identified, which also allows objects within XP to move further.

In short, Transfer is driven by *immediately higher phase*.

3.3. (Un)Acceptability of *That*-Trace Effect

Now, we are in a position to figure out the relevant variability. Under the present proposal, the derivation of *that*-trace constructions proceeds as in (6), where the *wh*-subject will not be trapped within the *that*-clause.

(6) a. Who do you think that loves Mary? (= (1), acceptable)
b. … R(*think*) { that {$_{<\varphi, \varphi>}$ who$_{[\varphi]}$ T$_{[v\varphi]}$ {$_{R\text{-}v^*}$ ~~who~~ loves Mary}}}

(6b) shows the stage where Merge has already formed the CP structure. According to Chomsky's (2015) analysis, *who* should be trapped within the Transfer domain (Spec-TP) because of labeling. However, under the current analysis, *who* can move further (to the matrix Spec-CP). This is because, the TP complement of *that* does not undergo Transfer until the completion of the next higher phasal operations, during which the phase label CP will be identified by Minimal Search. Accordingly, the *wh*-subject can escape from within the *that*-clause after agreeing with T.

However, a significant question arises here: why are the *that*-trace constructions like (6) acceptable to some speakers of English, but not others? As for this variability, we assume that it is attributed to a difference in the movement step of *wh*-subjects during the derivation.

Recently, lots of studies have argued that *wh*-subjects move directly to Spec-CP from the argument position without stopping over Spec-TP (e.g., McCloskey (2000), Bošković (2016, 2019), and Messick (2020), among others). Indeed, following Hayashi's (2020) proposal that English T is not weak, this one-fell-swoop view may well be tenable. Furthermore, as observed by Bošković (2016, 2019), Messick (2020), and references therein, this view has been attested in many languages. If we speculate that the one-fell-swoop movement step of *wh*-subjects is adopted in the grammar of speakers who are sensitive to the *that*-trace effect, the relevant derivation is doomed to crash in their grammar, which will be described below.

(7) a. *Who do you think that loves Mary? (unacceptable)
b. {$_{\beta}$ who$_{[\varphi]}$ that {$_{\alpha}$ T$_{[u\varphi]}$ {$_{R\text{-}v^*}$ ~~who~~ loves Mary}}} (α = T)

Here, contrary to cases like (6), *who* directly moves to Spec-CP as in (7b). Based on the spirit of Free Merger, nothing bans this kind of movement. Moreover, since T is not weak and *who* occupies the spec-position of *that*, there is no labeling and Transfer-trapping problems. Crucially, however, [*u*φ] on T remains unvalued in this case since

the agreement relationship between *who* and T can never be established within Spec-TP, causing the derivation to crash at the interfaces (see Hayashi (2020)).[1]

At this point, we should address the fact that the data can be acceptable even for the relevant speakers when *that* is null, as shown below.

(8) Who do you think loves Mary? (null C: acceptable)

Regarding this intriguing contrast, we assume with Mizuguchi (2008) and Suenaga (2022) that T-to-C raising is applied by Internal pair-Merge, which establishes the agreement relationship between *who* and T(-C). Following their analyses, the relevant derivation proceeds as follows.

(9) a. $\{_{\beta}$ who$_{[\varphi]}$ C $\{_{\alpha}$ T$_{[u\varphi]}$ $\{_{\text{R-}v^*}$ ~~who~~ loves Mary$\}\}\}$

b. $\{_{\beta}$ who$_{[\varphi]}$ T$_{[u\varphi]}$-C $\{_{\alpha}$ ~~T~~ $\{_{\text{R-}v^*}$ ~~who~~ loves Mary$\}\}\}$ (T-to-C raising)

c. $\{$ *v** … $\{_{\beta}$ who$_{[\varphi]}$ T$_{[v\varphi]}$-C $\{_{\alpha}$ ~~T~~ $\{_{\text{R-}v^*}$ ~~who~~ loves Mary$\}\}\}\}$ (Merge of *v**)

Merge forms the structure like (9a), where *who* internally merges to the embedded Spec-CP headed by null C. Then, as in (9b), T-to-C raising is applied by Internal pair-Merge. After that, as (9c) shows, the matrix phase head *v** is introduced into the derivation. In this case, based on the φ-agreement relation between *who* and T undergoing pair-Merge to C, [*u*φ] can be valued. Additionally, by virtue of this agreement, the seemingly problematic XP-YP structure $\{_{\beta}$ *who*, { T-C, …$\}\}$ can be labeled as <φ, φ>. Thereafter, *who* will move to the matrix Spec-CP. On the other hand, in the unacceptable cases like (7) above, T-to-C raising cannot be applied since the C head position is occupied by overt *that*, thereby the valuation of [*u*φ] on T can never be achieved, which also deduces the *that*/null C contrast (without resorting to Chomsky's (2015) peculiar operation "C-deletion in syntax").

To sum up, in this section we have provided a way to deduce the variability of the *that*-trace effect under the spirit of Free Merger, while not appealing to the problematic notions like the label weakness of T. In the following section, we will extend our analysis to other syntactic phenomena.

4. Extension of Analysis

This section shows that our proposed analysis can be extended to cover other syntactic phenomena related to Transfer.

4.1. *Wh*-Movement Pied-Piping CP

To begin with, we will address a topic concerning the application of Transfer. The topic relates to the constructions like (10), where the movement of a *wh*-phrase pied-piping the CP structure is the key point.

(10) Which claim [that John was asleep] was he willing to discuss?

(Chomsky (1993: 36))

In (10), the *wh*-phrase containing CP (*that John was asleep*) moves to the sentence-initial position. In this case, as argued by Obata (2017), Transfer has applied to the CP domain before the implementation of *wh*-movement, so that ungrammatical output may be generated (**Which claim that [ ] was he willing to discuss [John was asleep]*?). For that kind of reason, Chomsky (2013) and Obata (2017) state that representations do not disappear even after Transfer because syntactic objects that are already transferred can undergo further movement, which is known as "Weak Transfer."[2] Following the present proposal, we can cope with this issue without postulating the weak type of Transfer independently.

(11) a. Which claim that John was asleep was he willing to discuss? (= (10))

b. … R(*discuss*) { which claim { that {$_{TP}$ John was asleep }}}

As the simplified structure in (11b) shows, under our analysis, the complement of *that* (TP: *John was asleep*) does not undergo Transfer until the completion of the next higher phasal operations: i.e., the (CP phase) label of the set headed by *that* is still unidentified. Hence, the TP complement has not been transferred yet at this point, whereby it can undergo further movement as part of the bigger phrase (the *wh*-phrase containing CP), making it possible to appear in the surface position.

4.2. Binding Effect

Next, we will discuss the data in terms of Binding Theory. The point here is that, as indicated in (12) below, the R-expression *John* cannot be coindexed with *he*.

(12) *Which claim that John$_i$ was asleep was he$_i$ willing to discuss? (= (10))

In this case, Condition C should never be violated since *he* does not bind the R-expression *John* on the surface. Indeed, such coreference is available in the following data quite similar to (12), in which *John* can refer to *he*.

(13) Which claim [that John$_i$ made] was he$_i$ willing to discuss?

(Chomsky (1993: 36))

We will try to solve this paradox without relying on the specific implementation of

reconstruction, sideward movement, or Weak Transfer developed in the literature.

Although binding effects were handled by the notion of "Government" developed in the GB theory, some recent studies argue that they are associated with "phase" in terms of the Minimalist Program. For instance, Quicoli (2008) proposes that NP (anaphor/pronoun/R-expression) must be accessible to the material c-commanding it at the phase level, to establish an anaphoric (Condition A) or disjoint (Condition B, C) relation between them. In his analysis, the operation of Transfer plays a crucial role in making the relevant NP inaccessible to its antecedent. As noted by Quicoli himself, however, the phase-based analysis of binding effects faces a painful dilemma. Indeed, it fails to cope with the application of Condition C.[3]

(14) a. *He$_i$ thinks [that Mary loves John$_i$].

b. [$_{v*P}$ He [v* [$_{VP}$ thinks [$_{CP}$ that …]]]]

In this case, *John* must be accessible to *He* at the phase level; otherwise, the disjoint relation between them cannot be established. However, the TP complement of *that* had already been transferred when *He* appeared in the matrix v*P structure as in (14b); hence, *John* should be inaccessible to *He* at the phase level. To avoid this nasty issue, we have no choice but to stipulate that *John* remains accessible even after Transfer, which is an encouraging sign for our proposal. Under the current analysis, *He* is still able to access the R-expression *John* at the matrix v*P phase level since Transfer has not been applied to the TP complement (including *John*) yet, which leads to establish the disjoint relation between them at the phase level.[4]

Now, it is time to figure out the paradoxical issue.

(15) a. *Which claim that John$_i$ was asleep was he$_i$ willing to discuss?

b. { he { v*… { which claim { that {$_{TP}$ John was asleep }}}}}

(15b) briefly shows the stage where the subject *he* comes in the v*P structure. Crucially, at this stage, the TP complement containing *John* has not been transferred yet, whereby the disjoint relation between the R-expression and *he* is established. Thus, *he* cannot bind *John*, observing Condition C.

Then, why can *John* refer with *he* in the following case?

(16) Which claim [that John$_i$ made] was he$_i$ willing to discuss? (= (13))

The point in this case is that CP (*that John made*) contained by the moved *wh*-phrase corresponds to adjunct. If we assume with Chomsky (2004) that pair-Merge is applied to the adjunct-CP, this contrast can also be solved under the current analysis.

(17) a. < which claim { that {$_{TP}$ John made ~~which claim~~ }}>

b. { he { *v** … < which claim { that {$_{TP}$ John made ~~which claim~~ }}>}}

(17a) shows the stage where *which claim* undergoes pair-Merge, which makes the *that*-clause including the TP complement invisible to syntax. Of course, the TP complement has not been transferred at this point yet. As indicated in (17b), however, *he* is no longer accessible to the R-expression *John* since pair-Merge has already made the *that*-clause containing *John* invisible. Hence, the disjoint relationship between *John* and *he* is not established in this case.[5]

4.3. Selection and Transfer

Lastly, we will briefly go over a selection matter relevant to the domain of Transfer. Notably, some recent studies argue that Transfer targets *full phases*, not phasal complements (e.g., Bošković (2016) and Ke (2021), among others). While the "full phase Transfer" assumption has certain empirical and theoretical consequences (e.g., Transfer of root CP, CP-preposing), it may cause a big problem with selection.

It is usually assumed that the selection requirement is satisfied by merging a selecting element (like a verb) to a head that are selected. Obata (2017) argues that, except for the case of root clauses at least, Transfer should be applied only to the complement of phase heads for the sake of selection, providing relevant data from Cape Verdean Creole (a Portuguese-based creole language spoken on the islands of Cape Verde) as follows.

(18) Cape Verdean Creole

a. Joao pensa ki/*ma/*Ø Maria kunpra libru.
John think C Mary bought book
'John thinks Mary bought the book.'

b. Joao fra-m ma/*ki/*Ø Maria kunpra libru.
John tell+me C Maria bought book
'John told me Mary bought the book.'

(Obata and Baptista (2009))

In this language, interestingly, the phonological realization of C varies depending on verbs that select the C head. Specifically, the verb *think* in (18a) forces C to be realized as *ki*. On the other hand, when C is selected by the illocutionary verb *tell*, it must be realized as *ma* as in (18b). If the full CP phase undergoes Transfer before the merge of selecting elements (verbs here), the selection requirement should never be satisfied.

The domain of Transfer remains unclear under the current minimalist framework, so that such an issue is very tough to solve completely here. However, even if Transfer may target full phases, we can deal with the matter of selection. Recall that, under our proposal, Transfer is driven by *immediately higher phase*. If so, the full CP structure including the relevant heads (*ki* and *ma*) does not undergo Transfer until the completion of the next higher phasal operations. Accordingly, the selecting verbs can be merged to the full CP structure before the application of Transfer, satisfying the selection requirement without a hitch.

As shown above, the present proposal can be extended to cover various syntactic phenomena associated with Transfer. However, it should be noted that there are other related constructions that need to be examined in more detail. Needless to say, a wide range of cross-linguistic analysis is also necessary. Hence, we need further investigation, which will be left for future research.

5. Open Issue and Conclusion

In this paper, we have proposed that the complement of PH_n undergoes Transfer upon the completion of the next higher phasal operations of PH_{n+1}, providing a way to derive the variability of the *that*-trace effect without resorting to the problematic notions like weak T. Furthermore, we have also seen that our proposal can be extended to other syntactic phenomena involving the application of Transfer.

Before concluding the study, we should touch on a remaining problem described below. The open issue is when Labeling Algorithm applies. Although the discussion in this study depends on Chomsky's (2015) labeling theory, the timing of labeling is an unclear issue to be clarified under this theory. One possibility based on our proposal is that Labeling Algorithm applies before the application of Transfer. Therefore, phasal complements undergo Transfer after the phase labels are identified.[6] Indeed, Chomsky himself states that information regarding labels can be stored in "phase-level memory" by assuming that labeling can be taken as assigning the feature "label" to heads that are labeled. This implies that labeling is possible even before Transfer. Bošković (2016) also suggests that labeling should be followed by Transfer, solving a chicken-or-the-egg style question regarding phases: to know whether something constitutes a phase, we need to know its label (i.e., the determination of phases requires labeling). It seems that *labeling before Transfer* can be vindicated in principle, but further careful investigation must be needed.

Notes

* Parts of this study are based on my presentation at the 167th Meeting of the Linguistic Society of Japan held at Doshisha University (November 11, 2023). I wish to express my gratitude to Nobuaki Nishioka for his insightful suggestions and comments. Appreciation is also due to the audience at the conference, especially including Hiroshi Terada, Jason Ginsburg, Shin-ichi Tanigawa, and Toru Ishii for helpful discussion. The inadequacies of the paper remain my own.

[1.] Hayashi (2020) proposes that Feature Inheritance is optional, whereby the C head *that* in (7) can keep [*u*φ]. If so, the relevant feature can be valued since *who* with [*v*φ] occupies Spec-CP. However, he argues that Affix Hopping should be disrupted in that case (see Hayashi (2020) in detail); hence, the derivation has to crash.

[2.] As for problems with another type of Transfer ("Strong Transfer"), see Obata (2017) in detail.

[3.] Condition B faces the same problem. For other related issues, see Saito (2017).

[4.] It remains to be unexplored in this study why the data like below are illicit:

(i) a. *John$_i$ thinks [that Mary loves himself$_i$]
b. *John$_i$ thinks [that himself$_i$ will win]

In other words, while *John* should be accessible to *himself* under our proposal, they cannot be coindexed. Nevertheless, we can adduce the following examples (taken from Lasnik and Saito (1992), Haegeman (1994), and Bryant and Charnavel (2021)) for reasons that remain to be investigated.

(ii) a. John$_i$ believes [that a picture of himself$_i$ will be on show at the exhibition]
b. John$_i$ told Mary [that there was a story about himself$_i$ in the paper]
c. John$_i$ thinks [that himself$_i$, Mary likes]

[5.] Perhaps, the following long-distance application of Condition C across multiple phases seems problematic for our analysis.

(i) *He$_i$ says [$_{CP}$ that Mary believes [$_{CP}$ that Naomi thinks [$_{CP}$ that John$_i$ is leaving]]]

For this potential problem, we may manipulate a theory of "phase-cancellation" proposed by Epstein, Kitahara, and Seely (2016), which allows us to assume that External pair-Merge prevents the phasal operations of *v** (PH$_{n+1}$) from applying to the set headed by C (PH$_n$) at each cycle. For another way to cancel the *v**P phase in bridge verb constructions, see Hayashi (2020), who argues that the phasehood of *v** is cancelled by Internal pair-Merge before the completion of the phasal operations.

(ii) { … <R-*v**> { that … { … <R-*v**> { that … { … <R-*v**> { that …}}}}}}

Whichever candidate we may choose, the phase level operations of *v** (PH_{n+1}), corresponding to the immediately higher phase head of C (PH_n), will never be accomplished in cases like (i); hence, the long-distance disjoint relation is established.

[6.] This never means that the simplest operation Merge itself provides labels. We merely suggest a possibility that Labeling Algorithm applies before Transfer.

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