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# On the Minimal Link Condition in Comparison to the Phase Impenetrability Condition \*

Yuya Sakumoto

# 1. Introduction

The aim of this paper is to claim that the violation of Minimal Link Condition (MLC) is weaker than that of Phase Impenetrability Condition (PIC) by specifically focusing on *wh*-extraction from non-finite *wh*-clauses, as shown in (1) and (2).

(1) a. ?What<sub>i</sub> do you wonder how<sub>j</sub> to repair  $t_i t_j$ ?

(Lee (1996: 58))

b. \*What<sub>i</sub> do you wonder how<sub>j</sub> Mary repaired  $t_i t_j$ ?

(Manzini (1992: 51))

(2) a. ?What<sub>i</sub> did you wonder whether to fix  $t_i$  ?

b. \*What<sub>i</sub> did you wonder whether he fixed  $t_i$ ?

(Coopmans and Stevenson (1991: 359))

It is well known that *wh*-island effects can be voided if the relevant clause is a nonfinite clause, as a number of analyses have been proposed for that phenomenon in the previous literature<sup>1, 2</sup>. In order to explain the lack of *wh*-island effects, Kanno (2008) proposes that non-finite clauses do not constitute any phases. This, however, cannot explain the exact grammaticality of (1a) and (2a): why the grammaticality of sentences in (1a) and (2a) is degraded even though their complement clauses do not constitute any phases. No previous study has systematically investigated this degradation. Based on Kanno (2008), this paper therefore proposes that the grammaticality of (1a) and (2a) arises from not the PIC but the MLC.

The organization of this paper is as follows. Section 2 outlines the main

theoretical background of this paper. In section 3, we will briefly review the previous literature on wh-extraction from non-finite clauses and point out that they cannot explain the exact grammaticality of the observed phenomenon. In section 4, based on Kanno (2008), we propose that the violation of the MLC is weaker than that of the PIC. Section 5 provides analyses of the extraction from the non-finite clauses in order to show that our proposal can sufficiently capture these facts and demonstrates that related phenomena, which are prima facie counterexamples to our proposal, can be solved. Section 6 concludes the discussion.

# 2. Theoretical assumptions

## 2.1 Phase Theory

Since Chomsky (2000), movement constraints have been explained under the phase theory, which was further developed in Chomsky (2001, 2004, 2008). Chomsky argues that phases are computational units of syntactic derivations, and transitive vP (v\*P) and CP form a phase since they constitute a proposition. Under the phase theory, sentences are generated separately phase by phase. Once syntactic operations in phases are completed, a phase head transfers its complement to the Conceptual-Intentional (C-I) interface and the SensoriMotor (SM) interface.

(3) Phase



Furthermore, no element within the complement of phase can be accessed since the complement has already been transferred to the interfaces. This constraint is named the Phase Impenetrability Condition (PIC), as illustrated in (4).

(4) Phase Impenetrability Condition

In phase  $\alpha$  with Head H, the domain of H is not accessible to operations outside  $\alpha$ , only H and its edge are accessible to such operations. (Chomsky (2000: 108))

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This serves to reduce computational burdens as well as to rule out illicit movement operations. The phase-based approach, however, predicts some facts incorrectly, as illustrated in (6a, b).

(6) a. ?What<sub>i</sub> do you wonder how<sub>j</sub> to repair  $t_i t_j$ ?

(=(1a))

b. \*What<sub>i</sub> do you wonder how<sub>j</sub> Mary repaired  $t_i t_j$ ?

(=(1b))

Under the phase theory described above, the complement clauses in both (6a) and (6b) constitute phases, thereby any extractions involving them are not allowed due to PIC, even in the case of the control complement in (6a). To solve this, we will introduce Kanno (2008) in the section 3.2.

## 2.2 Minimal Link Condition

Since Chomsky (1995), MLC is incorporated into the system in order to exclude any illicit application of movement.

(7) Minimal Link Condition <sup>3</sup>

 $\alpha$  can raise to target K only if there is no legitimate operation Move- $\beta$  targeting K, where  $\beta$  is closer to K than  $\alpha$ .

(Chomsky (1995: 296))

Simply put, this states that a closer element should be moved. Let us see how this works in the *wh*-island example, as shown in (8).

(8) \*What<sub>i</sub> do you wonder how<sub>j</sub> Mary repaired  $t_i t_j$ ?

(=(1b))

In this case, *what* moves from the object position in the embedded clause to the matrix CP Spec. However, *how* is an element which can potentially move to the matrix CP Spec since *how* is both a *wh*-phrase as well as *what* and is closer to the matrix CP Spec than *what*. Hence, the movement operation of *what* violates the MLC. However, the MLC cannot explain why (9) is not completely ungrammatical even though it is violated.

(9) ?What<sub>i</sub> do you wonder how<sub>i</sub> to repair  $t_i t_i$ ?

(=(1a))

## 3. Previous literature

## 3.1 Chomsky (1986)

One previous study on the extraction from non-finite *wh*-clauses is Chomsky (1986). He explains it by appealing to the subjacency condition, under which tensed TP is exceptionally an inherent barrier, while untensed TP is not. Hence, differences between (10a) and (10b) can be captured in his mechanism.

(10) a. ?What<sub>i</sub> do you wonder how<sub>j</sub> to repair  $t_i t_j$  ?

(=(1a))

b. \*What<sub>i</sub> do you wonder how<sub>i</sub> Mary repaired  $t_i t_i$ ?

(=(1b))

Though his analysis is insightful, it faces two problems. First of all, it cannot explain why the grammaticality of (10a) is somehow degraded since in his analysis, nothing is violated in (10a). Secondly, his analysis does not provide any explanation for them in principle, although it can describe the phenomena partially. Since the subjacency condition has been rejected, this phenomenon has been analyzed from the perspective of either the MLC or the PIC. In the next section, we will see phase-based approaches for the extraction from non-finite wh-islands and point out their problems.

## 3.2 Kanno (2008)

Kanno (2008) proposes that the presence of an Agree feature and a tense feature makes CP a phase while the absence of one or both of the two features makes it a nonOn the Minimal Link Condition in Comparison to the Phase Impenetrability Condition Yuya Sakumoto

phase (cf. Grano and Lasnik (2018)) and argues that infinitival complements do not constitute a phase. He assumes that control complements lack both Agree feature and a tense feature. Concerning the Tense feature, he uses temporal morphology as a diagnostic to see if there is a Tense feature on CP. He uses English and Bulgarian to check this. In English, control complements cannot bear any temporal morphology such as *-ed* or *-en*, leading to no tense. In the case of Bulgarian, in which every kind of complement clause must bear temporal morphology. However, as we can see from the sentence in (11), the control complement can occur only in present tense, regardless of the matrix tense. Then, he concludes that there is no Tense feature on the CP of control complements even in Bulgarian.

(11) \*Ivan mozese da procetese/bese procel pismoto.
Ivan could-3sg da read-Imperf.3sg/was-3sg read-Prt letter-the
'Ivan was able to read the letter.'

(Krapova (2001: 118))

He also assumes that control complements do not have an Agree feature. He provides the contrast in (12) as evidence for the lack of an Agree feature in control complements.

(12) a. \*They tried all to leave.

(Baltin (1995: 200))

b. They tried to all like John.

(Baltin (2001: 235))

He argues that given that a quantifier occurs in the same position as the element that it modifies, it follows that PRO does not occur in Spec TP, so that (12) indicates that there is no Agree feature attracting PRO to TP Spec. Hence, control complements lack both a tense feature and an Agree feature, which leads to no phase.

Therefore, the operation across CP is impossible in finite complements due to PIC, as seen in (13a, b), while it is possible in control complements, as shown in (14a, b) since finite complements constitute phases and control complements do not.

(13) a. \*Sam, who I know when you said you saw t,...

b. \*The Matterhorn, which I found out why he announced that he climbed t,...

(14) a. Sam, who I know when to try to see t,...

b. The Matterhorn, which I've decided when to attempt to climb t,...

(ibid.)

Yet, we need to explain why the sentence in (15) is degraded despite not violating PIC.

(15) ?What<sub>i</sub> do you wonder how<sub>i</sub> to repair  $t_i t_i$ ?

(=(1a))

An anonymous reviewer of Kanno (2008) suggests that the actual grammatical status of (14) is marginal and also suggests that the marginality of (14) is due to an intervention effect and the more degraded case of (13) is attributed to an intervention and a violation of the PIC. Based on these suggestions, Kanno (2008) argues that the differences of the grammaticality arise from the number of constraints that are violated. Given this suggestion, in the next section, I propose the violation of the MLC is weaker than that of the PIC.

# 4. Proposals

## 4.1 PIC vs. MLC

In this section, based on Kanno (2008), I will propose a novel analysis for this. Before doing so, I will review Kitahara (1997) since his assumption is crucial to my proposal. Originally, Pesetsky (1982, 1987) proposes the Nested Dependency Condition, which is shown in (16) to explain the grammaticality of (17).

(16) Nested Dependency Condition (NDC)

If two wh-trace dependencies overlap, one must contain the other.

(Pesetsky (1987: 105))

(17) a. ??Whati did you wonder whomj John persuaded tj to buy ti?

b. ?\*Whomi did you wonder whati John persuaded ti to buy ti?

(Kitahara (1997: 73))

By assuming *wh*-trace dependencies as LF chain structures formed by *wh*-movement, Pesetsky provides the chain structures (18a, b) to (17a, b) respectively: On the Minimal Link Condition in Comparison to the Phase Impenetrability Condition Yuya Sakumoto



The NDC is satisfied by the LF structure of (17a) but not the LF structure of (17b). Kitahara (1997) reduces the NDC to the MLC and proposes that a derivation employing a greater number of illegitimate steps induces a greater degree of deviance. Hence, (17a) violates the MLC violation only once, which is marginal deviance, whereas (17b) violates the MLC twice, leading to severe deviance. However, his analysis cannot account for why the grammaticality of (17a) is worse than that of (19a, 20a, 21a). I assume that this arises from the violation of the PIC in (17a). As discussed above, non-finite clauses do not constitute a phase, so that (19a, 20a, 21a) only violate the MLC, while (17a) violates both the PIC and the MLC <sup>4, 5</sup>.

(19) a. What subject *i* do you know who *j* to talk to  $t_j$  about  $t_i$ .

b. \*Who<sub>j</sub> do you know what subject<sub>i</sub> to talk to  $t_j$  about  $t_i$ .

(Pesetsky (1982: 267))

(20) a. ?What book<sub>i</sub> don't you know who<sub>i</sub> to persuade  $t_i$  to read  $t_i$ ?

b. \*Who<sub>i</sub> don't you know what book<sub>j</sub> to persuade  $t_i$  to read  $t_j$ ?

(Pesetsky (1987: 105))

(21) a. ?This is one book which I do know who to talk to  $t_i$  about  $t_j$ .

b. \*John is one guy who; I do know what book; to talk to  $t_i$  about  $t_j$ .

(Pesetsky (1987: 105))

It follows from these facts that the MLC is a weak violation. Thus, we need to check the case of the PIC:

(22) At least one professor claims/tends to read every journal.  $(\forall > \exists)$ 

(Grano and Lasnik (2018: 467))

(23) \*At least one professor claims that Ann reads every journal.  $(\forall > \exists)$ (*ibid*.: 2)

Concerning Quantifier Raising (QR), since May (1977) it has been well known that QR is 'clause-bounded'. Under the phase theory, Cecchetto (2004), Miyagawa (2011), Takahashi (2010), and Wurmbrand (2013) give an account for QR. They claim that QR is a syntactic movement which also obeys the PIC. Therefore, (22) is possible because the control complement does not constitute a phase, while (23) is not since the finite complement constitutes a phase. However, if one violation makes the status of grammaticality marginal, (23) should be marginal too despite a violation of the PIC. Based on these facts, we can therefore propose (24).

(24) The violation of the Minimal Link Condition is weaker than that of the Phase Impenetrability Condition.

Furthermore, our proposal is also motivated theoretically. The PIC prohibits any further syntactic operations once syntactic objects are transferred. As such, any violation of the PIC would not be allowed under any circumstances  $^{6}$ .

In the next section, I will explain how this works for the extraction from the non-finite *wh*-clauses and demonstrate that a related issue can be solved well.

## 5. Analysis

#### 5.1. How and Whether

First of all, let us consider the location of *how* and *whether* in (25a, b) and (26a, b).

(25) a. ?What<sub>i</sub> do you wonder how<sub>j</sub> to repair  $t_i t_j$ ?

(=(1a))

b. \*What<sub>i</sub> do you wonder how<sub>j</sub> Mary repaired  $t_i t_j$ ?

(=(1b))

(26) a. ?What<sub>i</sub> did you wonder whether to fix  $t_i$  ?

b. \*What<sub>i</sub> did you wonder whether he fixed  $t_i$ ?

(=(2a, b))

We assume the general idea that *how* in (25a, b) is located in the CP Spec position after the movement. On the other hand, we have to consider the position of *whether* in (26a, b), which is controversial. Nakajima (1996) persuasively gives the following evidence to demonstrate that *whether* behaves the same as the declarative complementizer *that*.

(27) a. I wonder whether/if he's awake.

b. I am not sure whether/if he's awake.

- c. We must answer the question whether/\*if this is correct.
- d. His success depends upon whether/\*if it will be fine.
- e. Whether/\*If he's awake is not certain.
- f. Whether/\*If he's awake, I don't know.
- g. I am not sure, because I have not been at home, whether/\*if he's awake.

(Nakajima (1996: 144))

(28) a. I think that/  $\phi$  he's awake.

b. I am sure that/ $\phi$  he's awake.

- c. We must show the proof that/\* $\phi$  this is correct.
- d. His success depends upon \*that/\* $\phi$  it will be fine.
- e. That/\*φ he's awake is certain.
- f. That/\* $\phi$  he's awake, I don't know.
- g. I am sure, because I have been at home, that/\* $\phi$  he's awake

(*ibid*.: 144)

In addition, Radford (2018) treats whether as a complementizer by showing (29).

- (29) a. They thought John had been attacked, but they weren't sure when/where/ how/why
  - b. \*They thought John had been attacked, but they weren't sure if/whether

(Radford (2018: 230)

The contrast in (29) suggests that whether is not a wh-operator but a C head as well

as *if*, and the ungrammaticality of (29b) may follow if we assume Lobeck's (1995) argument that functional heads can only license the ellipsis of their complement when they agree with their specifier.

However, Kayne (1991) (and see also Borer (1989)) argues that *whether* is located in CP Spec by providing the following data where *whether* is similar to *wh*-phrases, which are taken to be located in CP Spec.

(30) a. He doesn't know whether to go to the movies.

b. He doesn't know when to go to the movies.

(Kayne (1991: 665)

(31) a. Whether they give him a seat or not, he'll be happy.

b. Wherever they put him, he'll be happy.

(ibid.)

Both types of evidence are quite persuasive, but what is crucial here is that *whether* constitutes a *wh*-island unlike the complementizer *that*, as illustrated in (32a, b).

(32) a. \*What<sub>i</sub> did you wonder whether he fixed  $t_i$ ?

b. What<sub>i</sub> did you know that he fixed  $t_i$ ?

Without ignoring Nakajima's (1996) fact that *whether* is located in the C head position, we need to explain why we can see *wh*-island effects in *whether* clauses. Based on evidence from Kayne (1990) and Larson (1985), Sportiche (1998) argues that if *whether* is in the specifier position, the prediction is that violations of *whether*-islands should be on a par with other *wh*-island violations. Additionally, he raises another possibility that *whether* is located in the C head position and that the *wh*-island effect is triggered by the existence of some Spec/head agreement in C. Following this idea, this paper assumes the existence of agreement between CP Spec and C head even in *whether* clauses. Hence, we consider that *whether* is located in C head position and that CP Spec has a *wh*-operator, which constitutes a *wh*-island. This assumption seems to be contradicted by Lobeck's (1995) argument since the complement of *whether* cannot be elided. Takaki (2017) argues that Lobeck's (1995) analysis is problematic by providing the evidence shown in (33a, b). Following Chomsky (2008), ECM (exceptional-Case marking) is taken not to have CP but TP, so that T cannot get phi-

features from C by feature-inheritance. Therefore, she concludes that the T head fails to be in an agreement relation with the ECM subject.

- (33) a. ?They say that Mary doesn't like raisins but Bill believes her to.
  - b. They say that the tower will collapse soon and the bridge is expected to as well.

(Wurmbrand (2014: 406))

(34) John does not like math but Mary seems to.

(ibid.)

Based on the facts described above, we also argue that Spec-Head agreement is not related to ellipsis. Hence, we conclude that *whether* is located in the C head position and its Spec has a *wh*-operator, which constitutes a *wh*-island.<sup>7</sup>

5.2. Extraction from Non-finite Clauses

We now consider the derivation of (35a, b) and (36a, b).

(35) a. ?Whati do you wonder how<sub>i</sub> to repair *ti tj*.?

(=(1a))

b. \*Whati do you wonder how, Mary repaired ti tj?

(=(1b))

(36) a. ?What<sub>i</sub> did you wonder whether to fix  $t_i$ ?

b. \*What<sub>i</sub> did you wonder whether he fixed  $t_i$ ?

(=(2a, b))

First of all, following Kanno (2008), the control complements in both (35a) and (36a) do not constitute phases, while the finite complements in (35b) and (36b) do. As discussed above, CP Spec is not available since *how* in (35a, b) and the null operator in (36a, b) have already occupied in that position. <sup>8</sup> Then, *what* in (35b) and (36b) is transferred and further operations are not allowed because of the PIC. On the other hand, in (35a) and (36a), the PIC is not violated because of the lack of phase in the control complements. What is violated here is only MLC, which explains the degradation of grammaticality in (35a) and (36a). It follows from these facts that violating MLC is a weaker violation than the PIC.

## 5.3. Superiority

In the last section, we propose that a MLC violation is a weaker violation compared to that of the PIC. However, (37a, b) seem to cast doubts on our proposal since (37b) is completely ungrammatical despite only violating the MLC.

#### (37) a. Who saw what?

#### b. \*What did who see?

This issue can be solved if we adapt Sakamoto (2012). He proposes the vacuous movement hypothesis based on the framework in Chomsky (2008) and argues that Edge feature (EF) inheritance is computationally optimal, which applies to all cases by default. Under his system, when [EF] inheritance produces a well-formed derivation, other derivations are not allowed, even though such possible derivations could be well-formed. Using this system, he explains superiority effects. His analysis for (37a, b) is illustrated in (38a, b) respectively.

(38) a. [CP C [TP Who T[AF][EF] [v\*P < who > v\* [vP what saw[AF][EF] < what>]]]]

b. [CP What  $C_{[EF]}$  [TP who  $T_{[AF]}$  [v\*P <who> v\* [VP <what> see[AF][EF] <what>]]]] In (38a), both the Agree feature [AF] and [EF], which contributes to clause typing as a result of merger and valuation, are inherited from C to T. At the phasal v\*P, the object DP establishes a phi-feature agreement relation with the inherited [AF] and values the inherited [EF] via Merge. At the phasal CP, the subject DP enters into a phi-feature agreement relation with the inherited [EF] as [+wh] via Merge. He states that this derivation does not pose any problems.

In the case of the derivation in (38b), there is no [EF] inheritance from C to T. Here, *who* merges with TP Spec and *what* merges with CP Spec applying in parallel. He argues that this derivation is not allowed because no inheritance of [EF] makes a redundant merger of the *wh*-object with C. Hence, the asymmetry of (37a, b) can be ascribed to [EF] inheritance. Moreover, his argument can be strengthened with the following data.

- (39) a. What did you buy where?
  - b. Where did you buy what?

(Fanselow (2004: 114))

- (40) a. Who arrived when?
  - b. \*When did who arrive

#### (*ibid*.: 115)

When a *wh*-phrase is in the subject position in (40b), superiority effects can be seen, whereas if it is not, its effects cannot be seen. <sup>9</sup> Although the detailed derivation is the beyond the scope of this paper, it follows from these facts that when the subject is a *wh*-phrase, [EF] inheritance is obligatory, so that the contrast in (37) can be attributed to a different constraint and would not be a counterexample to our proposal.<sup>10</sup>

## 6. Conclusion

In this paper, we have investigated the *wh*-extraction from non-finite *wh*-clauses. In particular, we focus on the reason why grammaticality is degraded even though it does not violate the PIC at all. I have argued that this can be attributed to a violation of the MLC and have proposed that the MLC violation is weaker than the PIC violation.

## Notes

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<sup>1</sup>Boeckx (2001, 2012), Chomsky (1986), Coopmans and Stevenson (1991), Frampton (1990), Grano and Lasnik (2018), Ishii (2006), Lee (1996), Manzini (1992), Munemasa (1998), Rizzi (1990), Ross (1967), Szabolcsi (2006).

<sup>2</sup> If *wh*-phrase is D-linked, its acceptability also gets improved. See Ishii (2006), Pesetsky (1987) and Szabolcsi (2006).

<sup>3</sup> Chomsky (1995) proposes a revision of Relativized Minimality (RM) in terms of the MLC.

Rizzi (2011) argues that the MLC differs from the RM in two other respects:

(i). it is a condition on derivations, not on representations;

(ii). it applies on a specific process, movement, while the RM tries to provide a general, rule independent characterization of locality.

However, this distinction is not related to our topic. Neither of them can correctly capture the fact we are working on here. See also Ishii (2000) for the featural and categorial MLC.

<sup>4</sup> Even though Kitahara (1997) treats (17a) as a marginal deviance, the speakers the author has consulted find it ungrammatical, while they find (19a), (20a) and (21a) more acceptable than (17a).

 $^{5}$ (19a) is marginal from the speakers the author has consulted contra Pesetsky (1982).

<sup>6</sup>I will leave the reason why the MLC is a weak restriction for the further research.

<sup>7</sup> Radford (2018) argues that no overt complementizer allows sluicing of its complement, so it can be assumed that (29b) is ungrammatical.

<sup>8</sup> Multiple Spec in English is not available for some independent reasons as we can see from (i) and (ii). (see Ishii (2000), Richards (1997, 1999), Rudin (1988))

(i) a. \*Where<sub>i</sub> what<sub>i</sub> did you put  $t_i t_j$ ?

b. \*What<sub>i</sub> where<sub>i</sub> did you put  $t_i t_j$ ?

#### (Ishii (2000:321))

(ii) a. \*John wondered what where you put?

b. \*John asked wondered where what you put?

<sup>9</sup> See Fanselow (2004), Obata (2008) Oka (1993a, b) and Ura (2000) for other approaches.

<sup>10</sup> It can be said that (37b) also violates the MLC.

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