Some Consequences of MERGE and Determinacy

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1. Introduction

Chomsky et al. (2019) clarify the concept workspace WS and reformulate (small) Merge as (capital) MERGE as an operation on WS, not particular syntactic object (SO), where WS is taken to be the stage of the derivation at any given point:

(1) MERGE

MERGE maps WS = [X, Y] to WS' = [{X, Y}]

Chomsky et al. argue that (capital) MERGE should apply in a deterministic fashion based on the principle of Determinacy (2), which bans ambiguous rule applications, though its explications and consequences left untouched.

(2) The Principle of Determinacy

If Structural Description (SD) for a rule holds for some WS, then Structural Change (SC) must be unique.

This paper explicates the principle of Determinacy, arguing that if we define Determinacy as a condition on the *input* of (capital) MERGE, it gives us a unified account of various phenomena, which have been explained by different constraints or principles.

The organization of this paper is as follows. Section 2 explicates the principle of Determinacy, proposing that Determinacy apply at the *input* of (capital) MERGE. We will then investigate an ambiguous rule application problem with (capital) MERGE. More specifically, it is shown that if Internal Merge (IM) applies to the same element more than once, it always causes an

ambiguous rule application problem, which results in a Determinacy violation. We will argue that such an ambiguous rule application problem should be resolved by the Phase Impenetrability Condition (PIC). Section 3 explicates consequences of Determinacy. It is shown that Determinacy provides us with a unified account of various phenomena such as the Subject Condition, the Specificity Effect, the *that*-trace effects, no vacuous topicalization, non-existence of complementizer-less subject relatives, freezing effects with topics, Merge-over-Move, further raising, island violation repairs, no superfluous steps in a derivation, and so on. Section 4 discusses how Determinacy handles with successive cyclicity, especially the intermediate copies of so called "A-movement." We will also present alternative views regarding the intermediate copies. Section 5 makes a concluding remark.

2. The Principle of Determinacy

2.1 Recursion

Before turning to the principle of Determinacy, we briefly look at the notion of recursion, which is crucial in the discussion to follow. We adopt Chomsky et al.'s (2019) notion of recursion (3):

(3) Recursion

Any syntactic object (SO) once generated in WS remains accessible to further operations.

"MERGE, applying recursively so that any generated object is accessible to further operations, thus suffices to account for the basic properties of discrete infinity and displacement." [from Chomsky et al. (2019: 4)]

"All syntactic objects in the lexicon and in the workspace WS are *accessible* to MERGE; there is no need for a SELECT operation (as in, e.g., Chomsky 1995). WS represents the stage of the derivation at any given point. The

basic property of recursive generation requires that any object already generated be accessible to further operations."

[from Chomsky et al. (2019: 19)]

Let us consider WS (4) as an example:

(4) WS = [{a, {b, {c, d}}}]

According to the notion of recursion (3), *a*, *b*, *c*, *d*, *{c, d}*, *{b, {c, d}}* and *{a, {b, {c, d}}}* in WS (4) are all accessible to further operations including (capital) MERGE.

2.2 Chomsky et al.'s (2019) Notion of Determinacy

Chomsky et al. (2019) claim that Determinacy requires subsequent rules to apply in a deterministic fashion, ensuring that WS should be kept minimal throughout a derivation:

"For instance, does MERGE(X,Y) *add* {X,Y} to WS = [X,Y] (where X, Y are LIs or complex elements), yielding WS′ = [X,Y,{X,Y}]? Or does it rather *replace* X and Y in WS with {X,Y}, yielding WS′ = [{X,Y}] (as assumed in Chomsky 1995: 243)? The latter view is more restrictive, and arguably more in line with basic desiderata for optimal generation: the generative procedure constructs a *single* object to be mapped onto PHON and SEM, not a multiplicity of objects; and considerations of computational efficiency suggest that WS should be kept minimal throughout a derivation. The same conclusion is suggested by the fact that a workspace WS′ = [X,Y,{X,Y}] derived by MERGE(X,Y) would not ensure that **subsequent** operations can apply in a determinate fashion: any rule referencing X or Y would ambiguously refer to the individual objects X, Y or to the terms of K = {X,Y}. Indeterminacy of rules in this sense is formally unproblematic and in fact a

familiar property of phrase-structure grammars; but a sensible question to ask is whether it should be permitted in an optimal I-language at all, given that it raises various technical complications (for instance with regard to the distinction between copies and repetitions, to which we return below). If the answer is negative, we are led to a view of simplest MERGE as mapping WS = [X,Y] onto WS′ = [{X,Y}], reducing its complexity and **avoiding indeterminate rule application**." [from Chomsky et al. (2019: 19); the bold underline is our emphasis – NG and TI]

In other words, Chomsky et al. claim that Determinacy applies at the *output* of (capital) MERGE (5) (see also Epstein, Kitahara and Seely 2018 for a similar view on Determinacy):

(5) Chomsky et al.'s (2019) Notion of Determinacy
Determinacy applies at the *output* of (capital) MERGE.

Under Chomsky et al.'s notion of Determinacy (5), if (capital) MERGE creates WS that could potentially pose an ambiguous rule application problem for *subsequent* derivation, a Determinacy violation occurs. Suppose, for example, that (capital) MERGE takes WS1 as its input and then maps it to WS2, which is the case of Internal Merge (IM) of *c*, *i.e.* movement of *c* in the traditional sense, as shown in (6):

(6) a. WS1 = [{a, {b, c}}, d]
b. WS2 = [{**c**, {a, {b, c}}}, d]

It should be noted that according to the notion of recursion (3), any syntactic object generated in (6) is accessible to (capital) MERGE. Under Chomsky et al.'s system, Determinacy (5) applies at the *output* of (capital) MERGE, *i.e.* at WS2 (6b). In

WS2, there are two copies of *c*. This poses an ambiguous rule application problem for *subsequent* derivation, since if we apply IM to *c* in subsequent derivation, for example, there would not be a unique way to apply IM to *c* due to its two copies. Hence, (6) induces a Determinacy violation under Chomsky et al.'s system. Under Chomsky et al.'s notion of Determinacy (5), therefore, no IM is ever allowed, which is clearly an undesirable result. Chomsky et al. does not present a way out of this ambiguous rule application problem induced by (capital) MERGE.[1]

2.3 A Proposal

2.3.1 Determinacy at the *Input* of (capital) MERGE

Contrary to what Chomsky et al. claim, we argue that Determinacy apply at the *input* of (capital) MERGE in that if there is an ambiguous rule application at the *present* stage of a derivation (not at a subsequent stage of a derivation), a Determinacy violation occurs:

(7) Our Notion of Determinacy

Determinacy applies at the *input* of (capital) MERGE.

Let us consider (6) (repeated here as (8)) again:

(8) a. WS1 = [{a, {b, c}}, d]

b. WS2 = [{**c**, {a, {b, c}}}, d]

[1] One possible way out of this problem is to suppose that such an ambiguous rule application problem can be resolved by the shortest movement corollary, which says that given two options, the shorter move wins. In (6b), for example, there are two copies of *c*, but the shortest movement corollary selects the higher copy of *c*, and the lower copy of *c* is not accessible. So, there would be no Determinacy violation (see Epstein, Kitahara, and Seely 2018 and Komachi, Kitahara, Uchibori, and Takita 2019 for relevant discussion). However, we do not take this view because, as we will see soon below, such an ambiguous rule application problem can be resolved solely by an independently motivated condition on Transfer, *i.e.* the Phase Impenetrability Condition (PIC).

According to our notion of Determinacy (7), Determinacy applies at the *input* of (capital) MERGE, *i.e.* at WS1 (8a). Since there is only one copy of *c* in WS1, we have only one option to create WS2, *i.e.*, to move *c* in the base position; there is no ambiguous rule application. Hence, under our notion of Determinacy, there is no Determinacy violation in (8).

Suppose further that (capital) MERGE takes WS2 as its input and then maps it to WS3, *i.e.*, we apply IM to *c* again, as shown in (9):

(9) a. WS2 = [{**c**, {a, {b, c}}}, d]

b. WS3 = [{**c**, {c, {a, {b, c}}}}, d]

In (9), we have two copies of *c* at the input of (capital) MERGE, *i.e.* at WS2 (9a). We have two options to create WS3 (9b), *i.e.*, either to move the higher copy of *c* or the lower copy of *c*. This ambiguous rule application violates our notion of Determinacy (7). It should be noted that under our notion of Determinacy, unless we are to apply (capital) MERGE to WS2, a Determinacy violation does not occur.

This shows that under our notion of Determinacy (7), if we apply IM to the same element more than once, it always results in a Determinacy violation. This incorrectly predicts that no successive-cyclic movement is allowed. We will argue in the next subsection that such an ambiguous rule application problem induced by multiple applications of (capital) MERGE should be resolved by the Phase Impenetrability Condition (PIC).

2.3.2 An Ambiguous Rule Application Problem with (capital) MERGE and its Resolution by the Phase Impenetrability Condition (PIC)

Let us consider (10) as an example of successive-cyclic movement:

(10) **What** did you say that John bought ***t***?

a. [RP **what** [R(BUY) what]]

b. [CP **what** [C [TP John [T [*v*P John [*v*-R(BUY) [RP what [R(BUY) what]]]]]]]]

c. [*v*P you [*v**-R(SAY) [RP **what** [R(SAY) [CP what [C-that [TP John [...

d. [CP **what** [C-that [TP you [T [*v*P you [*v*-R(SAY) [RP what [R(SAY) [CP what ...

In (10), the *wh*-phrase *what* undergoes successive-cyclic movement. In (10a), we apply IM to *what*; *what* moves from its base position to the Spec of Root (R) (for phi-phi labeling; see Chomsky 2013, 2015). In (10b), we apply IM to *what* again to move it to the embedded Spec of C. We assume with Chomsky (2013, 2015) that *v* becomes invisible because of pair-Merge with R so that R inherits phasehood from *v*; the phase-R-complement undergoes Transfer. Although there are two copies of *what*, *i.e.* the copy in the Spec of R and the copy in the base position, the copy in the base position, which is within R-complement, is not accessible because of the PIC after the phase-R-complement Transfer.[2] There is only one accessible copy of *what*, *i.e.* the one in the Spec of R; there is no Determinacy violation. In (10c), we apply IM to *what* again. Only the copy of *what* in the embedded Spec of C is accessible and all the other copies of *what* are not accessible because of the PIC after the phase-C-complement (TP) Transfer. There is no Determinacy violation in (10c). Similarly, the PIC avoids Determinacy violations in (10d).

[2] Following Chomsky (2000; 2001; 2004; 2013; 2015) and Chomsky et al. (2017), we assume that upon the completion of a phase, the phase-head-complement becomes inaccessible to further operation:

> "In phase α with head H, the domain of H is not accessible to operations outside α; only H and its edge are accessible to such operations."
> [from Chomsky 2000: 108]

> "[Given structure [ZP Z … [HP α [H YP]]], with H and Z the heads of phases]: The domain of H is not accessible to operations at ZP; only H and its edge are accessible to such operations." [from Chomsky 2001: 14]

Hence, the PIC resolves the problem of an ambiguous rule application induced by multiple applications of (capital) MERGE.

In the next section, we will look at various empirical consequences of our notion of Determinacy (7) coupled with the PIC. It is shown that our notion of Determinacy (7) is more desirable in that it gives us a unified account of various phenomena, which have been analyzed by different constraints or principles.

3. Consequences of MERGE and Determinacy

3.1 The Subject Condition

3.1.1 The Subject Condition and its Cancellation

First, the Subject Condition such as (11) (cf. Chomsky 1973; Huang 1982) follows from our notion of Determinacy (7). The derivation of (11) is represented in (12):

(11) * **Who** did [pictures of ***t***] please you?

(12) [CP **who** [C-did [TP [pictures of <u>who</u>] [T [*v*P [pictures of <u>who</u>] [*v* [...

In (12), if we are to move *who* to the Spec of C, there are two accessible copies of *who*, *i.e.* the one within the Spec of T and the other within the Spec of *v*. This is an ambiguous rule application; (12) violates Determinacy. Hence, Determinacy accounts for the Subject Condition effect.

As pointed out by Lasnik and Park (2003) and Stepanov (2007), when an expletive appears in the Spec of T, the Subject Condition effect is canceled as shown in (13). The derivation of (13) is represented in (14):

(13) **Who** is there [a picture of ***t***] on the wall? (Stepanov 2007: 92)

(14) [CP **who** [C-is [TP there [T [*v*P [a picture of <u>who</u>] [*v* [...

In (14), since the Spec of T is occupied by the expletive *there*, there is only one accessible copy of *who*, which is within the Spec of *v*. Hence, there is no Determinacy violation; cancellation of the Subject Condition effect with expletives follows. The Subject Condition effect and its cancellation with expletives are also observed in Dutch as shown in (15), which follows from Determinacy in the same way:

(15) *Dutch*

a. **Wat** hebben er [***t*** voor mensen] je moeder bezocht?
what have-3PL there for people your mother visited
'What sort of people have visited your mother?'

b. * **Wat** hebben [***t*** voor mensen] je moeder bezocht?
what have-3PL for people your mother visited
'What sort of people have visited your mother?'

(Broekhuis 2006: 65)

Unlike extraction out of a subject, extraction out of an object such as (16) is allowed (but see Section 3.1.4):

(16) **Who** did you see [a picture of ***t***]?

Our notion of Determinacy (7) correctly predicts this subject-object asymmetry with respect to extraction. The derivation of (16) is represented in (17):

(17) [CP **who** [C-did [TP you [T [*v*P you [*v*-R(SEE) [RP [a picture of <u>who</u>] [R(SEE) [a picture of who]]]]]]]]]

In (17), when we are to move *who* to the Spec of C, there are two accessible copies of *who*, *i.e.* the one within the Spec of R and the other within the complement of R.

The copy within the complement of R, however, is not accessible because of the PIC after the phase-R-complement Transfer; there is no Determinacy violation in (17).

We can also account for the fact that extraction out of an ECM subject is allowed as exemplified by (18):

(18) Of which car did they believe [the picture ***t***] to have caused a scandal?
(Chomsky 2008: 153)

In (18), the *wh*-phrase *of which car* is extracted out of the ECM subject. The derivation of (18) is represented in (19):

(19) [CP **of which car** [C-did [TP they [T [*v*P they [*v*-R(BELIEVE) [RP [the picture <u>of which car</u>] [R(BELIEVE) [[the picture of which car]]]]]]]]]

In (19), although there are two accessible copies of *of which car*, *i.e.* the one within the matrix Spec of R and the other within the complement of R, the copy in the complement of R is not accessible because of the PIC after the phase-R-complement Transfer. Hence, there is no Determinacy violation.

3.1.2 Absence of the Subject Condition Effects in Japanese, Spanish, and Icelandic

Our notion of Determinacy (7) also accounts for the absence of the Subject Condition effects in Japanese, Spanish, and Icelandic. It has been pointed out by Kayne (1983), Lasnik and Saito (1992), Ishii (1997; 2011), Saito and Fukui (1998) *inter alia* that Japanese lacks the Subject Condition effects as shown in (20), where *dare-ni* 'who-Dat' is scrambled out of the subject phrase. The result is slightly degraded, but this is due to the fact that it involves extraction out of the complex NP:

(20) *Japanese*

?**Dare-ni** [John-ga [[Mary-ga *t* atta] koto]-ga mondai-da to]
who-DAT John-NOM Mary-NOM met fact-NOM problem-is that
omotteru] no
think Q
Lit. 'Who, John thinks that [the fact that Mary met *t*] is a problem.'

We assume with Fukui (1986) and Kuroda (1988) *inter alia* that subjects in Japanese stay in the Spec of *v* throughout a derivation. The derivation of (20) is represented in (21):

(21) [CP **dare-ni** [C [TP T [*v*P [Mary-ga dare-ni atta koto]-ga [*v* [...
who-DAT Mary-NOM who-DAT met fact-NOM

In (21), there is only one accessible copy of *dare-ni* 'who-Dat' within the Spec of *v*; there is no Determinacy violation. The absence of the Subject Condition effect in Japanese follows.

In Spanish, as pointed out by Uriagereka (1988) and Gallego (2007), when the subject appears after verb, there is no subject condition effect as shown in (22a). This is in contrast with (22b), which shows that when the subject appears before verb, the subject condition effect emerges:

(22) *Spanish*

[CP **De qué conferenciantes**$_i$ [C te parece que . . .
of what speakers CL-to-you seem-3.SG that

a. ... (?) [TP T_s mez van a impresionarv [*v**P [las propuestas t_i]
CL-to-me go-3.PL to impress-INF the proposals
*v** t_Z t_V]]]?

b. ... * [TP [las propuestas t_i]j T_s mez van a impresionarv

the proposals CL-to-me go-3.PL to impress-INF
[*v**P t_j *v** t_Z t_V]]]?
'Which speakers does it seem to you that the proposals by will impress me?' (Uriagereka 1988: 118; Gallego 2007: 294)

This contrast between post-verbal and pre-verbal subjects also follow form Determinacy if we assume with Uriagereka and Gallego that post-verbal subjects appear in the Spec of *v* whereas pre-verbal subjects appear in the Spec of T. The derivations of (22a) and (22b) are represented in (23a) and (23b) respectively:

(23) a. [CP **de qué conferenciantes** [C [TP [T me van a
of which speakers CL-to-me go-3.PL to
impresionar [*v*P [las propuestas <u>de qué conferenciantes</u>] [*v* [...
impress-INF the proposals of which speakers

b. [CP **de qué conferenciantes** [C [TP [las propuestas <u>de qué</u>
of which speakers the proposals of which
<u>conferenciantes</u>] [T me van a impresionar
speakers CL-to-me go-3.PL to impress-INF
[*v*P [las propuestas <u>de qué conferenciantes</u>] [*v* [...
the proposals of which speakers

In (23a), when we are to move the *wh*-phrase *de qué conferenciantes* 'of which speakers' to the embedded Spec of C, there is only one accessible copy of *de qué conferenciantes* 'of which speakers' within the Spec of *v*; there is no Determinacy violation. In (23b), on the other hand, when we are to move *de qué conferenciantes* 'of which speakers' to the embedded Spec of C, there are two accessible copies of *de qué conferenciantes* 'of which speakers,' the one within the Spec of T and the other within the Spec of *v*; this violates Determinacy.

As noted by Kitahara (1994), Icelandic also lacks the Subject Condition

effects as shown in (24), where *hverjum* 'who-Dat' is moved out of the subject phrase:

(24) *Icelandic*

?**hverjum** heldur þú að [myndir af ***t***] séu til sölu?
who think you that pictures of are on sale
'Who do you think that pictures of *t* are on sale?' (Kitahara 1994: 243)

This fact also follows form Determinacy if we assume with Holmberg and Hróarsdóttir (2003) that *wh*-phrases in Icelandic move directly from the Spec of *v* to the Spec of C.[3] The derivations of (24) is represented in (25):

(25) [CP **hverjum** [C-að [TP [T [*v*P [myndir af <u>hverjum</u>] [*v* [...
who that pictures of who

[3] With this assumption, Holmberg and Hróarsdóttir (2003) explain the following difference in agreement:

(i) Manninum virðast *t* hestarnir vera seinir
the manDAT seemPL the horsesNOM be slowNOM
'The man finds the horses slow' (Holmberg and Hróarsdóttir 2003: 654)

(ii) *Hvaða stúdent veist þú að finnast *t* tölvurnar ljótar?
which studentDAT know you that findPL the computersNOM uglyNOM
'Which student do you know considers the computers ugly?'
(Holmberg and Hróarsdóttir 2003: 654)

In (i), the dative NP is moved to subject position and the matrix verb agrees with the nominative subject of the infinitival clause. In (ii), on the other hand, the dative NP is *wh*-moved and the matrix verb does not agree with the nominative subject of the infinitival clause. To account for the difference, Holmberg and Hróarsdóttir claim that "the whP must move directly from specVP to specCP, without passing through specTP. If it did pass through specTP, Agree would not be able to tell the difference between (28b)[=(i)], where the experiencer is a plain NP, and (29b)[=(ii)], where it is a whP." (p. 661)

In (25), there is only one accessible copy of *hverjum* 'who' within the Spec of *v*; there is no Determinacy violation. Hence, the absence of the Subject Condition effects in Japanese, Spanish, and Icelandic follows from Determinacy.

3.1.3 Verb Particle Constructions

Our analysis of the Subject Condition can be extended to verb particle constructions. Recall that our analysis of the Subject Condition claims that when a subject undergoes movement within CP phase, that movement creates two copies of a *wh*-phrase within the subject, which results in a Determinacy violation when we are to move the *wh*-phrase to the Spec of C. A similar pattern is observed in particle movement within RP phase. Lasnik (2001) and Boeckx (2012) observe that, when the object appears after particle, extraction out of the object is allowed as shown in (26a, 27a). When the object appears between verb and particle, on the other hand, extraction out of the object is not possible as shown in (26b, 27b):

(26) a. **Who$_1$** did Mary call up [friends of ***t$_1$***]?
b. * **Who$_1$** did Mary call [friends of ***t$_1$***]$_2$ up t_2? (Lasnik 2001: 111)

(27) a. **Who$_1$** did you pick up [friends of ***t$_1$***]?
b. * **Who$_1$** did you pick [friends of ***t$_1$***]$_2$ up t_2? (Boeckx 2012: 22)

We assume with Lasnik and Boeckx that when an object appears between verb and particle, the object moves from post-particle position to the pre-particle position. The derivation of (26b), for example, is represented in (28):

(28) [*v*-R(CALL) [RP **who** [R(CALL) [friends of who] up [friends of who]]]]

In (28), if we are to move *who* to the Spec of R (for phi-phi labeling under successive-cyclic movement), there are two accessible copies of *who* within the RP

phase, *i.e.* the one after the particle *up* and the other before the particle *up*. When we are to move *who* to the Spec of R, a Determinacy violation occurs. (27b) can be accounted for in the same way. Hence, we can account for this contrast regarding extraction between pre-particle and post-particle positions under Determinacy.

3.1.4 The Specificity Effect

It is well known since Chomsky (1973) that extraction from specific DPs, namely DPs that have a definite interpretation, is not allowed (see also Chomsky 1981; Fiengo and Higginbotham 1981; Enç 1991; Diesing 1992; Stepanov 2007; Haegeman et al. 2014; Goto 2016):

(29) a. **Who** did you see [pictures of *t*]?
b. * **Who** did you see [the picture of *t*]?

This fact, which is often called the Specificity Effect, follows from Determinacy if we assume with Diesing (1992), Mahajan (1992), and Stepanov (2007) that at least in a language like English, specific DPs move out of VP (RP, in our terms) prior to *wh*-extraction out of them.[4] The derivation of (29a) and (29b) are represented in (30) and (31), respectively:

(30) [CP **who** [C-did [TP you [T [*v*P you [*v*-R(SEE) [RP [pictures of who] [R(SEE) [picture of who]]]]]]]]

(31) [CP **who** [C-did [TP you [T [*v*P you [*v*-R(SEE) [RP [the picture of who] [R' [the picture of who] [R(SEE) [the picture of who]]]]]]]]]

[4] We put aside the issue of whether the movement in question is semantically motivated (Diesing 1992; Borer 1994) or syntactically motivated (Stepanov 2007; Mahajan 1992).

A crucial difference between (30) and (31) is whether the movement in question for specific interpretation takes place. In (30), it does not take place because *[pictures of who]* is not specific. In (31), on the other hand, it takes place because *[the picture of who]* is specific. In (30), when we are to move *who* to the Spec of C, there are two accessible copies of *who*, *i.e.* the one within the Spec of R and the other within the complement of R, but as we have already argued in (17) above, the copy within the complement of R is not accessible because of the PIC after the phase-R-complement Transfer; there is no Determinacy violation in (30) (note that the movement of *[pictures of who]* to the Spec of R is required for phi-phi labeling). In (31), on the other hand, even after the phase-R-complement Transfer is applied, there are still two accessible copies of *who* when we are to move *who* to the Spec of C, *i.e.* the one within the inner Spec of R and the other within the outer Spec of R; there is a Determinacy violation in (31). It should be noted here that in addition to the movement to the inner Spec of R for phi-phi labeling, *[the picture of who]* is required to move to the outer Spec of T for the specific interpretation. Hence, Determinacy accounts for the Specificity Effect.

Uriagerela (1988; 1996) observes that in Galician, the Specificity Effect is cancelled by determiner incorporation into a selecting verb:

(32) *Galician*

a. *De quén liches **os** mellores poemas de amigo?
of whom read.2SG the best poems of friend

b. (?)De quén liches-**los** mellores poemas de amigo?
of whom read.2SG-the best poems of friend
'Who did you read the best poems of friendship by?"

(Uriagereka 1996: 270)

In (32a), *de quén* 'of which' is extracted from the specific DP *[os mellores poemas de amigo*] 'the best poems of friendship by' and the Specificity Effect occurs.

However, in (32b), the Specificity Effect is cancelled by the determiner incorporation of *los* 'the' into the selecting verb *liches* 'read' from the specific DP. The presence of the Specificity Effect in (32a) can be accounted for in the same way as under the assumption that specific DPs move out of RP prior to *wh*-extraction as in (31). What is important to us is that the cancellation of the Specificity Effect in (32b) also follows from Determinacy if we assume with Stepanov (2012) and Goto (2017) that {H, XP} structures, H a head, XP a phrase, originally have a syntactic status of H and is labeled as H as in {H, XP} = H (see Chomsky 2008; 2013; 2015 for relevant discussion), but once H undergoes head-movement from the constituent as in H_i … {t_i, XP}, then the status of the resulting syntactic structure is modified so that it gets the label of the remaining head of XP as in {t_i, XP} = X.[5] If this is the case, it follows that the syntactic status of DP in (32b) as (originally) specific is modified to non-specific after the determiner incorporation of *los* 'the' into the verb *liches* 'read': the status of the syntactic structure with no determiner incorporation (*[$_{DP}$ los [$_{NP}$ mellores poemas [de amigo de de quén]]]*) is a specific DP, but the status of the syntactic structure with determiner incorporation (*liches-los*$_i$*…[$_{DP}$ t_i [$_{NP}$ mellores poemas [de amigo de de quén]]]*) is modified to a non-specific NP. As we have shown in (30), non-specific NPs do not have to undergo movement for specific interpretation, there is no Determinacy violation in (32b). Hence, the cancellation of the Specific Effect with determiner incorporation follows.

Note that some languages do not exhibit the Specificity Effect. Mahajan (1992) observes that for Hindi, and Stepanov (2007) observes that for German (Mahajan argues that in (33) the specific interpretation of the noun phrase is ensured by overt object shift with Case agreement):

[5] For a similar view on {XP, YP} structures, see Moro (2000) and Chomsky (2013; 2015). They argue that in {XP, YP}, if XP undergoes movement from the constituent as in XP_i … {t_i, YP}, then the status of the resulting syntactic stucture is modified so that it gets the label of Y as in {t_i, YP} = Y.

(33) *Hindi*

Kiskii tum socte ho ki Mohan-ne kitaab curaaii thii?
Whose you think that Mohan-ERG book-FEM stolen-FEM be-PAST-FEM
'Of whom do you think that Mohan stole the book.' (Mahajan 1992: 514)

(34) *German*

Über Chomsky$_i$ habe ich [den letzten Film *t*] leier nicht gesehen
about Chomsky have I the last film unfor nicht seen
'Unfortunately, I have not seen the last film about Chomsky.'
(Stepanov 2007: 107)

These facts also follow from Determinacy if we assume Stepanov's (2007) view of the necessity of movement for specific interpretation in these languages. On the basis of binding tests and reconstruction effects in scrambling, he reaches the conclusion that "specific DPs in Hindi [and in German] do not undergo movement, […], they remain in situ, by the time extraction takes place" (pp. 105-108) (see also Neeleman 1994 for German). Since we have assumed with Chomsky (2013; 2015) that objects universally move from its base position to the Spec of R for phi-phi labeling, we take it as given that specific DPs in Hindi and German undergo movement for phi-phi labeling (like in English and Galician), but do not for specific interpretation (unlike in English and Galician). The derivation of (33) and (34) are represented in (35) and (36), respectively:

(35) [CP kiskii [C-ho [T [*v*P Mohan-ne [*v*-R [RP [kitaab kiskii] [R [kitaab kiskii]]]]]]]

(36) [CP Über Chomsky [C-habe [T [*v*P ich [*v*-R [RP [den letzten Film über Chomsky] [R [den letzten Film über Chomsky]]]]]]]

Notice in (35) and (36) that the speicifc DPs (*kiskii kitaab* 'the book of whom' and *den letzten Film über Chomsky* "the last film about Chomsky") move from their base positions to the Spec of R for phi-phi labeling, but do not undergo movement for specific interpretation. In (35), when we are to move *kiskii* 'whose' to the Spec of C, there are two accessible copies of *kiskii*, *i.e.* the one within the Spec of R and the other within the complement of R, but the copy within the complement of R is not accessible because of the PIC after the phase-R-complement Transfer; there is no Determinacy violation. Similarly, in (36), when we are to move *über Chomsky* 'about Chomsy' to the Spec of C, there are two accessible copies of *über Chomsky*, *i.e.* the one within the Spec of R and the other within the complement of R, but the copy within the complement of R is not accessible because of the PIC after the phase-R-complement Transfer; there is no Determinacy violation. Hence, the absence of the Specificity Effect in Hindi and German follows.[6]

3.2 No Vacuous Topicalization

Determinacy also accounts for the contrast between (37a) and (37b). As has been well-known, particularly since Lasnik and Saito (1992), vacuous topicalization of subjects is not allowed in English as shown in (37a):

(37) a. * **John**, ***t*** came yesterday.

b. **Mary**, John likes ***t***.

[6] As is obvious from the analyses presented above, the presence or absence of the Specificity Effect and the resulting violation of Determinacy crucially rely on the presence or absence of movement for specific interpretation prior to *wh*-extraction. Respecting the previous theories of the behavior of specific DPs, especially the theory of Stepanov (2007), we assume here that it is required for languages like English and Galician, but not for languages like Hindi and German. Needless to say, more investigation is necessary to understand what makes the fundamental difference.

We assume with Chomsky (1977), Rizzi (1997), Hiraiwa (2010), and Grohmann (2011), among many others, that a topicalized phrase targets a Spec of C, and gets topic interpretation at the CP periphery (*pace* Lasnik and Saito 1992 or Bošković 1997; they assume that a topicalized phrase targets a Spec of T).[7] The derivation of (37a), for example, is represented in (38):

(38) [CP **John** [C [TP John [T [*v*P John [*v* [...

In (38), if we are to move *John* to the Spec of C for topic interpretation, there are two accessible copies of *John*, *i.e.* the one within the Spec of T and the other within the Spec of *v*. This is an ambiguous rule application; (38) violates Determinacy.

Unlike topicalization of subjects, topicalization of objects is allowed as shown in (37b). Determinacy correctly predicts this subject-object asymmetry with respect to topicalization. The derivation of (37b) is represented in (39):

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[7] Independent evidence for this comes from the fact that topicalization is impossible when there is no CP structure, as shown in (i):

(i) a. I want [TP him to clean the car].
b. * I want [**the car** [TP him to clean ***t***]. (Grohmann 2011: 32, fn. 3)

(i) is an ECM-structure that lacks C, where topicalization is impossible, as in (ib). As Bošković (1997) argues, if *that*-less embedded clauses in English are generally TPs, then the following contrast can also be evidence for this assumption:

(ii) a. John didn't believe that **Mary**, Bill kissed ***t***.
b. * John didn't believe **Mary**, Bill kissed ***t***. (Bošković 2016: 32, fn.15)

In (iia), since the complementizer *that* appears and the embedded clause projects up to CP, C can provide a position for the topicalized phrase *Mary*. However, in (iib), since the complementizer *that* does not appear and the embedded clause does not project up to CP, there is no position for the topicalized phrase *Mary* to appear. In passing, we assume that the embedded clause of a sentence like (iia) is layered, as shown in (iii):

(iii) [CP [C-*that* [CP *Mary* [C […

In (iii), the complementizer *that* occupies the higher C head and a topicalized phrase occupies the lower Spec of C (see Section 3.3.4 for relevant discussion).

(39) [CP **Mary** [C [TP John [T [*v*P John [*v*-R(LIKE) [RP Mary [R(LIKE) Mary]]]]]]]

In (39), when we are to move *Mary* to the Spec of C for topic interpretation, there are two accessible copies of *Mary*, *i.e.* the one within the Spec of R and the other within the complement of R. The copy within the complement of R, however, is not accessible because of the PIC after the phase-R-complement Transfer; there is no Determinacy violation in (39). The contrast between (37a) and (37b), and more generally, "anti-locality" effects (cf. Abels 2003; Grohmann 2003) follow from Determinacy.

Similarly, Determinacy can also account for the non-existence of complementizer-less subject relatives in English such as (40):

(40) *the man [*t* likes Mary] (Bošković 1997: 26)

Before looking at how to rule out (40), let us consider the structure of a complementizer-less relative. Complementizer-less relatives are potentially ambiguous in that they can be either TPs or CPs. (41), for example, can be assigned either (42a) or (42b):

(41) the man [John likes *t*]

(42) a. the man [TP OP [TP John likes *t*]]
b. the man [CP OP [C' C [TP John likes *t*]]]

The empty operator *OP* adjoins to TP in (42a), whereas it moves to the Spec of C in (42b). Bošković (1997) proposes the Minimal Structure Principle (MSP) (43), which is a modified version of the principle of economy of representation proposed by Law (1991):

(43) *The Minimal Structure Principle* (Bošković 1997: 25)

Provided that lexical requirements of relevant elements are satisfied, if two representations have the same lexical structure and serve the same function, then the representation that has fewer projection is to be chosen as the syntactic representation serving that function.

In (43), "lexical structure" refers to structure involving projections of heads bearing categorial features, and satisfaction of lexical requirements refers to the satisfaction of l-/s-selection requirements and checking of features specified in lexical entries. The MSP requires that structures should contain only as many functional projections as needed to satisfy lexical requirements. It then follows from the MSP that complementizer-less relative (41) should be assigned TP structure (42a), a more economical option.

It should be noted that in contrast to complementizer-less relatives, *wh*-relatives have a *wh*-relative pronoun that has to be licensed by a functional head; *wh*-relatives like *the man who(m) John likes* are CPs in spite of the MSP.

If we follow this view that complementizer-less relatives are TPs, complementizer-less subject relatives like (40) can be excluded by Determinacy as shown below:

(44) the man [TP **OP** [TP OP [*v*P OP likes Mary]]]

If we are to adjoin *OP* to TP, there are two accessible copies of *OP*, i.e. the one in the Spec of T and the other in the Spec of *v*. This is an ambiguous rule application; (44) violates Determinacy.

Unlike in English, complementizer-less subject relatives are allowed in null subject languages like 15th century Italian and Shakespearean English:

(45) Ch'è faccedenda tocca a noi

for is matter concern to us

'For this is a matter that concerns us.' (Rizzi 1990: 71)

(46) a. There is a lord will hear you play tonight. (*Taming of the Shrew)*

b. Youth's a stuff will not endure. (*Twelfth Night*) (Bošković 1997: 185)

Complementizer-less subject relatives in null subject languages can be accounted for by Determinacy. The derivations of (45) and (46) proceed as follows:

(47) Ch'è faccedenda [$_{TP}$ **OP** [$_{TP}$ ex [$_{vP}$ tocca a noi <u>OP</u>]]].

for is matter concern to us

(48) a. There is a lord [$_{TP}$ **OP** [$_{TP}$ ex will [$_{vP}$ <u>OP</u> hear you play tonight]]].

b. Youth's a stuff [$_{TP}$ **OP** [$_{TP}$ ex will [$_{vP}$ <u>OP</u> not endure]]].

In (47) and (48), the Spec of T is occupied by a null expletive (ex). When *OP* is to adjoin to TP, there is only one accessible copy of *OP*, which is in the Spec of *v*; there is no Determinacy violation.

The present analysis is compatible with the Vacuous Movement Hypothesis (VMH), first proposed by George (1980) and adopted, e.g. by Chomsky (1986b; 2013), Ishii (2004), and Agbayani (2006), which states that a *wh*-subject does not move locally to the Spec of C, as shown in (49a):

(49) Who left?

a. [$_{TP}$ **who** [T [$_{vP}$ <u>who</u> [*v*-R(LEAVE) […

b. * [$_{CP}$ **who** [C [$_{TP}$ <u>who</u> [T [$_{vP}$ <u>who</u> [*v*-R(LEAVE) […

In (49a), there is only one accessible copy of *who*, which is within the Spec of *v*; there is no Determinacy violation. In (49b), on the other hand, there are two

accessible copies of *who*, *i.e.* the one within the Spec of T and the other within the Spec of *v*; there is a Determinacy violation. Hence, the VMH follows from Determinacy.

3.3 The *That*-trace Effects

3.3.1 The *That*-trace Effects in English

The *that*-trace effects that have received much attention in the literature (Kayne 1983; Lasnik and Saito 1992; Chomsky 1986a; Rizzi 1990; Ishii 2004; Mizuguchi 2008; Abe 2015; Bosković 2016, among many others) also follow from Determinacy. Pairs of examples that call for an explanation are like those in (50):

(50) a. * **Who** do you think that ***t*** saw Bill?
b. **Who** do you think ***t*** saw Bill?

The derivation of (50a) is represented in (51):

(51) [CP **who** [C-that [TP who [T [*v*P who [*v*-R(SEE) [RP Bill [R(SEE) [...

In (51), if we are to move *who* to the embedded Spec of C, there are two accessible copies of *who*, *i.e.* the one within the Spec of T and the other within the Spec of *v*. This is an ambiguous rule application; (51) violates Determinacy. Hence, Determinacy accounts for the *that*-trace effect.[8]

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[8] The same account extends to so-called complementizer-*trace* effects:

(i) a. ***Who** do you wonder whether/if ***t*** saw Bill?
b. ***Who** do you prefer for ***t*** to see Bill?

The derivations of (ia, b) are represented in (iia, b), respectively:

(ii) a. [CP **who** [C-whether/if [TP who [T [*v*P who [*v* […
b. [CP **who** [C-for [TP who [T-to [*v*P who [*v* […

If the complementizer *that* does not appear, the *that*-trace effect is canceled as shown in (50b). We assume with Chomsky (2015) that when the complementizer *that* does not appear, C is deleted, T inherits phasehood from C, and the phase-T-complement (*v*P) undergoes Transfer. The derivation of (50b) is represented in (52), where Ø stands for C-deletion of the complementizer *that*:

(52) [RP **who** [R [C(that) → Ø [TP who [T [*v*P who [*v*-R(SEE) [...

In (52), when we are to move *who* from the embedded Spec of T to the matrix Spec of R, there are two accessible copies of *who, i.e.* the one within the Spec of T and the other within the Spec of *v*. The copy within the Spec of *v*, however, is not accessible because of the PIC after the phase-T-complement (*v*P) Transfer. Hence, there is no Determinacy violation in (52); cancellation of the *that*-trace effect with C-deletion follows.[9]

In (iia, b), if we are to move *who* to the embedded Spec of C, there are two accessible copies of *who, i.e.* the one within the Spec of T and the other within the Spec of *v*. This is an ambiguous rule application; both (iia, b) violate Determinacy.

[9] One might wonder if the account of the Subject Island effect given in (12), repeated below in (i), is consistent with the account of the cancellation of the *that*-trace effect given in (52), repeated below in (ii):

(i) *Who did [pictures of _] please you?
[CP **who** [C(did) [TP [pictures of who] [T [*v*P pictures of who] [v [... (= (12))

(ii) Who do you think _ saw Bill?
[RP **who** [R [C(that)→Ø [TP who [T [*v*P who [*v*-R(SEE) [... (= (52))

As argued in (ii), if the extraction of the subject *wh*-phrase from the embedded clause is allowed when the embedded C is null, it should be predicted that the Subject Island effect in (i) disappears if it is embedded within the sentence with no overt C. However, this prediction is not borne out; consider (iii):

(iii) *Who do you think [pictures of _] will please you?

The question we need to answer here is why (i) and (iii) yield a Determinacy violation, while (ii) does not.

We suggest that the PIC implies (iv) and (iii) has the derivation as in (v):

3.3.2 Skipping Strategy

The present account of the *that*-trace effect also accommodates Rizzi and Shlonsky's (2007) "skipping strategy," which express a generalization that captures apparent violations of the *that*-trace effect. In English, as pointed out by Rizzi and Shlonsky (2007), when the expletive *there* appears in the Spec of T, the *that*-trace effect is canceled as shown in (53b):

(53) a. * **What** do you think that ***t*** is in the box?

b. **What** do you think that there is ***t*** in the box?

(Rizzi and Shlonsky 2007: 126)

Also in French, if the complementizer is the relative pronoun *qui*, the effect is canceled as shown in (54b) (Kayne 1976, 1983; Rizzi 1990):

(54) *French*

a. * **Quelle étudiante** crois-tu que ***t*** va partir?
which student believe-you that go leave

b. **Quelle étudiante** crois-tu qui ***t*** va partir?

(iv) When an element X undergoes successive-cyclic movement, X must stop by the edge of a phase.

(v) [RP **who** [R [C(that)→Ø [TP who [T' [pictures of who] [T [*v*P pictures of who] [*v* [...

In (v), there are two accessible copies of *who*, *i.e.* the one within the inner Spec of T and the other within the outer Spec of T. The inner copy of *who* is necessary to ensure phi-phi labeling, and the outer copy of *who* is necessary to satisfy the requirement of (iv). In this situation, if we are to move *who* to the matrix Spec of R, a Determinacy violation occurs.

Note that in (i) and (ii), unlike in (iii), there is no need to have a copy of *who* in the outer Spec of T. In (i), since T is not a phase head, (i) does not have to satisfy the requirement of (iv). In (ii), since *who* in the Spec of T can satisfy the requirement of (v) by itself, it does not have to stop by the outer Spec of T anymore. In this way, given (iv), the accounts of (i) and (ii) can be maintained while accommodating the fact in (iii).

which student believe-you that go leave

Lit. 'Which student do you believe that is going to leave?'

(Rizzi and Shlonsky 2007: 131)

The contrasts above follow from Determinacy if we assume with Taraldsen (2001) and Rizzi and Shlonsky (2007) that the suffix *-i* of the complementizer *qui* in French (54b) is an expletive-like element. The derivation of (53b) and (53b) are represented in (55) and (56), respectively:

(55) [CP **what** [C-that [TP there [T-is [*v*P <u>what</u> [*v* [...

(56) [CP **quelle étudiante** [C-que [TP i [T [*v*P <u>quelle étudiante</u> [*v* [...

which student that which student

In (55), since the Spec of T is occupied by the expletive *there*, there is only one accessible copy of *what*, which is within the Spec of *v*. Hence, there is no Determinacy violation. Likewise, in (56), since the Spec of T is occupied by the expletive-like element *-i*, there is only one copy of *quelle étudiante* 'which student,' which is within the Spec of *v*. Hence, there is no Determinacy violation.

A similar pattern is also found in a variety of languages such as Swedish, Danish, and Yiddish as shown in (57)-(69):

(57) *Swedish*

a. * Vilken elev trodde ingen att skulle fuska?
which pupil thought nobody that would cheat

b. Vilken elev trodde ingen att han skulle fuska?
which pupil thought nobody that he would cheat
'which pupil didn't anyone think would cheat?' (Engdahl 1982: 166)

(58) *Danish*

a. * Vennen (som) han påstod at havde
firend-Def (that) he claimed that had borrowed
lånt bogen var forsvundet.
book-Def was disappeared

b. Vennen (som) han påstod at der havde
firend-Def (that) he claimed that there had borrowed
lånt bogen var forsvundet.
book-Def was disappeared
'The friend that he claimed had borrowed the book had disappeared.'

(Engdahl 1985: 21)

(59) *Yiddish*

a. * **Ver** hot er moyre az vet ***t*** kumen?
who has he fear that will come

b. **Ver** hot er moyre az es vet ***t*** kumen?
who has he fear that Expl will come
'Who does he fear will come?' (Diesing 1988: 137)

These contrasts can also be accounted for in the same way as those of English (53) and French (54) if we assume with Mizuguchi (2008) and Abe (2015) that the resumptive pronoun *han* 'he' in Swedish (57b), the expletive *der* 'there' in Danish (58b), and the expletive *es* in Yiddish (59) are merged to the Spec of T. The derivation of (57b), for example, is represented in (60):

(60) [CP **vilken elev** [C-att [TP han [T [*v*P <u>vilken elev</u> [*v* […
which pupil that he which puipl

In (60), since the embedded Spec of T is occupied by *han* 'he,' there is only one accessible copy of *vilken elev* 'which pupil,' which is within the Spec of *v*. Hence, there is no Determinacy violation. (58b) and (59b) can be accounted for in the same way; the absence of the *that*-trace effect in theses languages follows.

3.3.3 Absence of the *That*-trace Effects in Pro-Drop Languages, Japanese, and Icelandic

Determinacy also accounts for the absence of the *that*-trace effects in pro-drop languages such as Italian, Spanish, and Greek. As originally observed by Perlmutter (1971), these languages do not exhibit *that*-trace effects, as illustrated in (61)-(63) (cf. Rizzi 1982, 1990; Uriagereka 1988):

(61) *Italian*

Chi credi [che ***t*** vincerà]?
who think that win
'Who do you think that *t* will win?' (Rizzi and Shlonsky 2007: 127)

(62) *Spanish*

Quién dijiste [que ***t*** salió temprano]?
who said-you that left early
'Who did you say left early?' (Perlmutter 1979: 103)

(63) *Greek*

Pjo nomizis [oti ***t*** tilefonise]?
who think-2s that telephoned
'Who do you think called?' (Roussou 2002: 40)

We assume with Rizzi (1982, 1990) that in these languages the small pro appears in the Spec of T (to satisfy the Extended Projection Principle, EPP), or with Goto (2017) that a verb with rich agreement is merged to the Spec of T (for phi-phi labeling). The derivation of (61), for example, is represented in (64):

(64) [CP **chi** [C-che [TP pro/vincerà [T [*v*P <u>chi</u> [*v*-R(VINCERÁ) [...

In (64), since the embedded Spec of T is occupied by pro/*vincerà* 'win,' there is only one accessible copy of *chi* 'who,' which is within the Spec of *v*. Hence, there is no Determinacy violation. (61)-(63) can be accounted for in the same way; the absence of the *that*-trace effect in pro-drop languages follows.[10]

As originally pointed out by Ishii (2004), Japanese does not exhibit *that*-trace effects, as shown in (65), where the subject null operator OP is scrambled out of a *that*-clause:

(65) *Japanese*

[**OP** [John-ga [***t*** Mary-ni hanasikaketa to] omotteiru] yorimo]
John-NOM Mary-DAT talked to that think than
harukani ookuno hito-ga Susy-ni hanasi tagatte ita
far more people-NOM Susy-DAT wanted to talk
'Far more people wanted to talk with Susy than John thinks that talked to Mary.' (Ishii 2004: 212)

[10] Examples like the following may lend credence to the theory of Goto (2017) that agreement plays a key role in cancelling the *that*-trace effect:

(i) *Barvarian*
a. **Es Kinda** hot da Hauns gfrogt [***t*** ob-s ***t*** hamkummts]
your children has the John asked if-2pl home-come
b. * **Es Kinda** hot da Hauns gfrogt [***t*** ob-Ø ***t*** hamkummts]
your children has the John asked if home-come
'lit. Your children, John asked if t will come home.' (Mayr 2010: 121)

According to Mayr (2010), the suffix *-s* attached to the embedded complementizer *ob* in (ia) is a manifestation of agreement, and subject extraction (or rather, the *if*-trace effect; see footnote 8) is allowed only if there is such an agreement. Given that *-s* is a manifestation of agreement rather than a manifestation of pro, the Barvarian fact could easily be accounted for in the same manner as those in pro-drop languages under Goto's approach.

Again we assume with Fukui (1986) and Kuroda (1988) that subjects in Japanese stay in the Spec of *v* throughout a derivation. The derivation of (65) is represented in (66):

(66) [CP **OP** [TP [*v*P OP [RP Mary-ni R(HANASIKAKE)] *v*-R(HANASIKAKE)]
Mary- DAT talk to talk to
T-*ta*] C-*to*]
PAST that

In (66), there is only one accessible copy of OP within the Spec of *v*; there is no Determinacy violation. The absence of the *that*-trace effect in Japanese follows.

As originally noted by Maling and Zaenen (1978), Icelandic does not exhibit *that*-trace effects either, as shown in (67), where the subject *wh*-phrase is *hver* 'who' is moved out of a *that*-clause:

(67) *Icelandic*
Hver sagðir þú að ***t*** hefði borðað þetta epli?
who said you that had eaten this apple
'Who did you say had eaten this apple?' (Maling and Zaenen 1978: 480)

Again we assume with Holmberg and Hróarsdóttir (2003) that *wh*-phrases in Icelandic move directly from the Spec of *v* to the Spec of C. The derivation of (67) is represented in (68):

(68) [CP **hver** [C-að [TP [T [*v*P hver [*v* [...
who that who

In (68), since *hver* 'who' does not appear in the Spec of T, there is only one accessible copy of *hver* 'who', which is within the Spec of *v*. Hence, there is no

Determinacy violation; the absence of the *that*-trace effect in Japanese and Icelandic also follows.

3.3.4 Adverb Effects

We can also account for the so-called adverb effects (see, e.g., Bresnan 1977; Culicover 1991; Browning 1996). It has been observed that when adverbs such as *quickly* or *hardly* appear after *that*, the *that*-trace effect is not cancelled, as shown in (69a, 62a), but when adverbs such as *fortunately* or *tomorrow* appear after the complementizer *that*, the *that*-trace effect is canceled, as shown in (69b, 70b, 71):

(69) a. * **Who** did John say [that [***t*** quickly ran to the store]]?

b. **Who** did John say [that [fortunately ***t*** ran to the store]]?

(Brillman and Hirch 2015: 5)

(70) a. * **Who** did she say [that [***t*** hardly speaks to her]]? (Rizzi 1997: 311)

b. **Who** did she say [that [tomorrow ***t*** would regret his words]]?

(Bresnan 1977: 194)

(71) *Yiddish*

Ver hot er moyre [az [haynt vet ***t*** kumen]]?

who has he fear that today will come (Diesing 1988, p. 138)

We assume with Douglas (2017) that when the adverbs which cancel the *that*-trace effect appear after the complementizer *that*, CP structure is layered, with the complementizer *that* being in the higher C head (C_1) and the adverbs being in the lower Spec of C (C_2). On the other hand, when the adverbs which do not cancel the *that*-trace effect appear after the complementizer *that*, CP structure is not

layered, with *that* being in the C head and the adverbs being in the Spec of T.[11]

The derivation (69a), for example, is represented in (72), where CP is not layered, and *who* is moved from its base position to the higher Spec of T via C-to-T feature-inheritance:

(72) [CP **who** [C-that [TP <u>who</u> [quickly [T [*v*P <u>who</u> [*v* [...

In (72), when we are to move *who* to the embedded Spec of C, there are two accessible copies of *who*, *i.e.* the one within the Spec of T and the other within the Spec of *v*. This is an ambiguous rule application; (72) violates Determinacy. (70a) can be accounted for in the same way.

On the other hand, the derivation of (69b), for example, is represented in (73), where CP is layered by *fortunately*, and *who* is moved from its base position to the lower Spec of C_2 via C_1-to-C_2 feature-inheritance:

(73) [CP1 C_1-that [CP2 **who** [fortunately [C_2 [TP [T [*v*P <u>who</u> [*v* [...

In (73), we assume with Goto (2011) that "in the layered CP structure, either C_1-to-C_2 feature-inheritance or C-to-T feature-inheritance may take place" (p. 36), and that when C_1-to-C_2 feature-inheritance takes place, phi-feature valuation (phi-phi labeling) occurs in the lower Spec of C_2, accompanying phasehood-inheritance from the higher C_1 head to the lower C_2 head. Suppose that in (73) C_1-to-C_2 feature-inheritance takes place, the lower C_2 head inherits phasehood from the higher C_1 head, and the lower phase-C_2-complement (TP) becomes a

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[11] Independent evidence for this comes from the fact that the adverbs like *fortunately* can appear above TP, i.e. a CP field, but the adverbs like *quickly* cannot:

(i) a. John said that **fortunately** Mary ran to the store.
b. * John said that **quickly** Mary ran to the store.
(Brillman and Hirch 2015: 5)

Transfer domain. Then, in (73), when we are to move *who* to the embedded Spec of C_2, there is only one accessible copy of *who* within the Spec of *v*; there is no Determinacy violation. (70b, 71) can be accounted for in the same way.[12]

The same account extends to cases like those in (74)-(76) where the *that*-trace effect is cancelled by having a topicalized phrase in the CP area:

(74) *Yiddish*

Ver$_i$ hot er nit gevolt az [ot di bikher]$_j$ zol t_i leyenen t_j?
who has he not wanted that the books should read

(Diesing 1990: 75)

(75) a. Robin met the man who Leslie said that [to KIM] ***t*** had given the money.
b. I asked who you had claimed that [on the TABLE] ***t*** had put the book.

(Culicover 1993: 98)

(76) 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 (Ishii 2004: 203)

These facts can be accounted for in the same way as the adverb effect on the assumption that the topicalized phrases in the embedded clauses in (74)-(76) are located in the lower Spec of C_2, yielding a layered CP structure, as shown in (72).

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[12] Suppose that in (65) C_1-to-T feature-inheritance takes place, C_1 retains the phasehood, and the phase-C_1-complement (CP_2) becomes a Transfer domain. Then the derivation proceeds as represented in (i):

(i) [CP1 **who** [C_1-that [CP2 [fortunately [C_2 [TP <u>who</u> [T [*v*P <u>who</u> [*v* [...

In (i), when we are to move *who* to the embedded Spec of C_1, there are two accessible copies of *who*, *i.e.* the one within the Spec of T and the other within the Spec of *v*. This is an ambiguous rule application; (i) violates Determinacy. Hence, in (73), to avoid a violation of Determinacy, C_1-to-C_2 feature-inheritance is forced.

The derivation of (74), for example, is represented in (77), where *[ot di bikher]* 'the books' is located in the lower Spec of C_2 for topic interpretation and *ver* 'who' is moved from its base position to a higher position of the lower Spec of C_2 via C_1-to-C_2 feature-inheritance:

(77) [CP1 C_1-az [CP2 **ver** [[ot di bikher] [C_2 [TP [T [*v*P <u>ver</u> [*v* [...
that who the books who

In (77), when we are to move *ver* 'who' to the embedded Spec of C_2, there is only one accessible copy of *ver* 'who' within the Spec of *v*. Hence, there is no Determinacy violation. (75a, b, 76b) can be accounted for in the same way.

3.4 Freezing Effects with Topics

We can also account for freezing effects with topics. It has been noted that extraction is impossible from topicalized phrases, as shown in (78a, b). In (78a), the *wh*-phrase *who* is extracted out of the topicalized phrase *[pictures of who]* and the result is degraded. Similarly, in (78b), the noun phrase *vowel harmony* is extracted out of the topicalized phrase *[articles about vowel harmony]* and the result is degraded. The grammaticality of (78a, b) is based on Lasnik and Saito (1992), but authors vary considerably in their judgments on such examples. In any case, there is a general tendency for topicalized phrases to trigger freezing effects for extraction.

(78) a. ??**Who1** do you think that [[pictures of ***t1***]2 John would like *t2*]?
b. ??**Vowel harmony1**, I think that [[articles about ***t1***]2 you read *t2*]?
(based on Lasnik and Saito 1992: 101)

The derivation of (78a), for example, is represented in (79), where *[pictures of who]* moves from its base position to the lower embedded Spec of C_2 for topic interpretation via the Spec of R and the phase-R-complement undergoes Transfer:

(79) [CP1 **who** [C_1-that [CP2 [pictures of who] [C_2 [TP John [T-would [v*P John [v*-R(LIKE) [RP [pictures of who] [R(LIKE) [pictures of who]]]]]]]]]]

In (79), CP is layered by the topicalized phrase . Under the assumption made in the previous section, there are two possibilities for feature-inheritance, *i.e.,* either to apply C_1-to-C_2 feature-inheritance or C-to-T feature-inheritance. Suppose that in (79) C_1-to-T feature-inheritance takes place, C_1 retains the phasehood, and the phase-C_1-complement (CP_2) becomes a Transfer domain. Then, in (79), when we are to move *who* to the higher embedded Spec of C_1, there are two accessible copies of *who*, *i.e.* the one within the lower Spec of C_2 and the other within the Spec of R. This is an ambiguous rule application; (79) violates Determinacy. (78b) can be accounted for in the same way. Hence, Determinacy accounts for the freezing effect with topics.[13]

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[13] Suppose that in (79) C_1-to-C_2 feature-inheritance takes place, the lower C_2 head inherits phasehood from the higher C_1 head, and the lower phase-C_2-complement (TP) becomes a Transfer domain. Then the derivation proceeds as represented in (i), where *[pictures of who]* is located in the lower embedded Spec of C_2 for topic interpretation and *John* is also located in the lower embedded Spec of C_2 due to C_1-to-C_2 feature-inheritance:

(i) [CP1 C_1-that [CP2 **who** [[pictures of who] [John [C_2 [TP John [T-would [v*P John [v*-R(LIKE) [RP [pictures of who] [R(LIKE) [pictures of who]]]]]]]]]]]

In (i), when we are to move *who* to the embedded Spec of C_2, there is only one accessible copy of *who* within the Spec of C_2; there is no Determinacy violation. This is contrary to our expectation. Then question is why C_1-to-T feature-inheritance is forced in (79). Note here that the derivation in (i) violates the interface condition in (ii) (from Richards 2007: 566):

(ii) Value and Transfer of uFs must happen together.

Chomsky (1986b) and Lasnik and Saito (1992) note that unlike extraction out of topicalized phrases, extraction out of moved *wh*-phrases is allowed as shown in (80):

(80) ?**Who** are you wondering [how many pictures of ***t***] John bought ***t***?

(Richards 2001: 188)

The present analysis correctly predicts this asymmetry with respect to extraction. The derivation of (80) is represented in (81):

(81) [CP [how many pictures of **who**] [C [TP John [T [*v**P John [*v**-R(BUT) [RP [how many pictures of who] [R(BUY) [how many pictures of who]]]]]]]]]

In (81), when we are to move *[how many pictures of who]* to the embedded Spec of C, there is only one accessible copy of *who*, *i.e.* the one within the Spec of R. Hence, there is no Determinacy violation. The difference between extraction out of topicalized phrases and extraction out of moved *wh*-phrases also follows from Determinacy.

3.5 Further-Raising

Determinacy also accounts for why further-raising from the finite clause is not allowed as shown in (82), where *John* and *who* are moved out of a finite clause:

The derivation (i) violates the condition (ii) because the lower phase-C_2-complement (TP) undergoes Transfer; Value of uFs of C_2 and *John* and Transfer of them do not happen together. Therefore, if (ii) is a rationale for feature-inheritance, as Richards (2007) argues, then C_1-to-T feature-inheritance should be forced in (79).

(82) a. * John seems that reads a book.

b. * Who seems that will leave.

The derivation of (82a), for example, is represented in (83):

(83) [CP **John** [C-that [TP John [T [*v*P John [*v*-R(READ) [...

In (83), if we are to move *John* to the embedded Spec of C, there are two accessible copies of *John*, *i.e.* the one within the Spec of T and the other within the Spec of *v*. This is an ambiguous rule application; (83) violates Determinacy. (82b) can be accounted for in the same way.

As pointed out by Fernández-Salguerio (2004), further-raising is allowed in pro-drop languages such as Italian and Spanish, as shown in (84), where *Juan y Pedro* 'John and Peter' is moved out of a finite clause:

(84) *Spanish*

Juan y Pedro parece que ***t*** son muy listos

John and Peter seems that are very smart

'John and Peter seem to be very smart.' (Fernández-Salguerio 2004: 100)

Again we assume that in pro-drop languages, the small pro (Rizzi 1982, 1990) or a verb with rich agreement (Goto 2017) occupies the Spec of T. The derivation of (84) is represented in (85):

(85) [CP **Juan y Pedro** [que [TP pro/son [T [*v*P Juan y Pedro [*v*-R(SON) [...

In (85), since the Spec of T is occupied by pro/*son* 'seems,' there is only one accessible copy of *Juan y Pedro* 'John and Peter,' which is within the Spec of *v*. Hence, there is no Determinacy violation. The difference between English-type

languages and pro-drop languages with respect to the possibility of further-raising also follows from Determinacy.

3.6 **Merge-over-Move** (Chomsky 1995)

The contrast in (86) which has received much attention in the minimalist literature (see, e.g., Chomsky 1995; 2000; Shima 2000, Toyoshima 2009; Goto 2013; 2017; Epstein, Kitahara, and Seely 2014 for previous proposals) also follow from Determinacy if we assume with Abe (2018) and Goto (2017) that the associate of *there* is located in the Spec of R to receive partitive Case (Belletii 1988; Lasnik 1995):

(86) a. * There seems a man to be in the room.
b. There seems to be a man in the room.

The derivations of (86a, b) are represented in (87a, b), respectively:

(87) a. [**a man** [to [*v*+R(be) [a man[Partitive] [R(be) [a man[uCase] in the room]]]]]]
b. [**there** [to [*v*+R(be) [a man[Partitive] [R(be) [a man[uCase] in the room]]]]]]

In (87a), when we are to move *a man* to the Spec of *to* to derive the surface order, there are two accessible copies of *a man*, *i.e.* the one in the base position and the other in the Spec of R. This is an ambiguous rule application; (87a) violates Determinacy. In (87b), on the other hand, there are two accessible copies of *a man*, *i.e.* the one in the base position and the other in the Spec of R, but *a man* does not undergo any further movement; there is no Determinacy violation in (87b).[14]

[14] If the associate of *there* is always located in the Spec of R to receive partitive Case, we need to reconsider the derivations of (14) and (55) that we previously proposed to explain the fact that when an expletive appears, the Subject Condition effect and the *that*-trace effect are cancelled, repeated here as (i) and (ii):

3.7 Determinacy Violation Repair by Ellipsis

Merchant (2001) observes that the Subject Island effect is cancelled if the extraction site is elided, as shown in (88b):

(88) a. * **Which Marx brother** is [a biography of ***t***] going to appear this year?
b. A biography of one of the Marx brothers is going to appear this year, but I don't know **which (Marx brother)**. (Merchant 2001: 185)

This fact follows from Determinacy if we assume with Merchant (2001) that the subject in (88b) stays in the Spec of *v* throughout a derivation. The derivation of (88b) is represented in (89):

(89) [CP **which (Marx brother)** [TP [T [*v*P [a biography of <u>which (Marx brother)</u>] [*v* [is going to appear]]]]]

(i) **Who** is there [a picture of ***t***] on the wall?
[CP **who** [C-is [TP there [T [*v*P [a picture of <u>who</u>] [*v* [... (= (14))

(ii) **What** do you think that there is ***t*** in the box
[CP **what** [C-that [TP there [T-is [*v*P <u>what</u> [*v* [... (= (55))

We argued that in (i) and (ii), since the Spec of T is occupied by the expletive *there*, there is only one accessible copy of *who/what*, which is within the Spec of *v*. Hence, there is no Determinacy violation. However, if the associate of *there*, *i.e. [a picture of who]* in (i) and *what* in (ii) behave in the same way as those in (87) in the course of derivation, then it is expected that a Determinacy violation should arise when we are to move *who*/*what* from the Spec of R to the matrix Spec of C. Then we stipulate that when the associate of *there* is a *wh*-phrase (or a phrase that contains a *wh*-phrase), the associate is base generated in the Spec of *v* and receives partitive Case in situ after R raises to *v*, as represented below:

(iii) [CP **who** [C-is [TP there [T [*v*P [a picture of <u>who</u>][Partitive] [*v*+R(be) [...

(iv) [CP **what** [C-that [TP there [T-is [*v*P <u>what</u>[Partitive] [*v*+R(be) [...

Needless to say, all these remarks are speculative; there are many other possibilities that require further investigation.

In (89), there is only one accessible copy of *which (Marx brother)* within the Spec of *v*. Hence, there is no Determinacy violation; cancellation of the Subject Condition effect with ellipsis follows.

The same account extends to the fact that the *that*-trace effect is also cancelled if the extraction site is elided, as shown in (90b) (Merchant 2001; Kandybowicz 2006):

(90) a. * John said that someone would write a new textbook, but I can't remember **who** John said that ***t*** would write a new textbook.
b. John said that someone would write a new textbook, but I can't remember **who**. (Merchant 2001: 185)

The derivation of (90b) is represented in (91):

(91) [CP **who** [C-that [TP [T-would [*v*P <u>who</u> [*v* [write a new book]]]]]]]

In (91), there is only one accessible copy of *who* within the Spec of *v*. Hence, there is no Determinacy violation; cancellation of the *that*-trace effect with ellipsis also follows.

3.8 Determinacy Violation Repair by Resumptive Pronouns

Assuming our notion of Determinacy (7), Nakashima (2018) proposes that the Adjunct Condition such as (92) follows from Determinacy, claiming that MERGE maps WS = [X, Y] onto WS' = [{X, Y}, X] *only if X is an adjunct* (in other words, adjuncts may be left in the WS without removed from WS, unlike the derivation (1) where X is removed from WS). The derivation for (92) he proposes is represented in (93):

(92) * **Who** did they leave [CP ***t*** before speaking to ***t***]?

(93) * WS = [{**who**, {C, {TP, {CP <u>who</u>, C'}}}}, {CP <u>who</u>, C'}]

In (93), if we are to move *who* to the matrix Spec of C, there are two accessible copies of *who*, *i.e.* the one within *{C, {TP, {CP <u>who</u>, C'}}}* (main clause) and the other within *{CP <u>who</u>, C'}* (adjunct clause). This is an ambiguous rule application; (93) violates Determinacy. In this way, the Adjunct Condition effect follows from Determinacy, Nakashima argues.

As pointed out by Ross (1967), when a resumptive pronoun instead of a copy appears in the adjunct clause, the Adjunct Condition effect is cancelled as shown in (94):

(94) a. * **Which woman** did John started laughing [after ***t*** kissed Bill]?
b. (Tell me again:) **which woman** was it that John started laughing [after **she** kissed Bill]? (Boeckx 2012: 81)

We suggest that the fact also follows from Determinacy if we assume with Nakashima that adjuncts may be left in the WS without removed from WS. The derivation of (94b) is represented in (95):

(95) WS = [{**which woman**, {C, {TP, {CP <u>which woman</u>, C'}}}}, {CP she, C'}]

In (95), there is only one accessible copy of *which woman* within *{C, {TP, {CP <u>which woman</u>, C'}}}* (main clause). Hence, there is no Determinacy violation; cancellation of the Adjunct Condition effect with resumptive pronouns follows.

The circumvention of island effects with resumptive pronouns is also observed in a complex NP environment as shown in (96), which follows from Determinacy in the same way, given that the *that*-clause selected by N is an adjunct (cf. Stowell 1981):

(96) a. * **Who** did Sue read [the claim that ***t*** was drunk] in the Times?

b. **That man**, Sue read [the claim that **he** was drunk] in the Times?

(Boeckx 2012: 6)

The derivation of (96b) is represented in (97):

(97) * WS = [{**that man**, {C, {TP, {CP that man, C'}}}}, {CP he, C'}]

In (97), there is only one accessible copy of *that man* within *{C, {TP, {CP that man, C'}}}* (main clause). Hence, there is no Determinacy violation; cancellation of the complex NP island constraint t with resumptive pronouns also follows.

3.9 No Superfluous Steps

Determinacy provides us with an important insight to understand the last resort nature of successive-cyclic movement that avoids superfluous steps. Let us compare two possible derivations of (98), which are represented in (98a, b) (where the derivations of the embedded clause are omitted for simplicity):

(98) What did you say that John bought *t*?

a. [CP **what** [that [TP John [*v*P John [*v*-R (BUY) [RP what [R(BUY) [...

b. * [CP **what** [that [TP what [TP John [*v*-R (BUY) [RP what [R(BUY) [...

In (98a), *what* moves from the Spec of R to the Spec of C successive-cyclically, without stopping over the other intermediate positions. In (98b), on the other hand, *what* moves from the Spec of R to the Spec of T before moving to the Spec of C, stopping over (or adjoining to) the intermediate position "superfluously." In the minimalist literature, it has been assumed (particularly since Chomsky 2013; 2015) that the derivation (98a) is favored over the derivation (98b). But the question is why.

In Chomsky (1991; 1993; 1994, and Chomsky and Lasnik 1993), for example, the derivation (98b) with superfluous steps was excluded by the principle of Economy of Derivation, which can be formulated as in (99) (from Müller and Sternefeld 1996: 480-481):

(99) *Economy of Derivation*

If two derivations D_1 and D_2 are in the same reference set and D_1 involves fewer operations than D_2, then D_1 is to be preferred over D_2.

Two derivations D_1 and D_2 are in the same reference set iff they yield the same LF output.

According to this principle (99), the derivation (98a) (D_1) is preferred over the derivation (98b) (D_2) because D_1 involves fewer operations than D_2 in that D_2 requires two applications of movement to the matrix *wh*-phrase *who*, while D_1 requires only one.

The principle of Economy of Derivation follows from Determinacy. In (98a), when we are to move the *what* to the Spec of C, there is only one accessible copy of *what* within the Spec of *v*; there is no Determinacy violation. In (98b), on the other hand, when we are to move *what* to the Spec of C, there are two accessible copies of *what*, *i.e.* the one within the Spec of T and the other within the Spec of *v*; this violates Determinacy. Hence, the last resort nature of successive-cyclic movement, and more generally, the principle of Economy of Derivation follows from Determinacy, which restricts the intermediate landing site of successive-cyclic movement to a phase edge position and forces an element to move out of a phase interior domain to a phase edge.

4. Successive Cyclicity

4.1 A-movement

Taking (100) for example, let us consider how our Determinacy-based approach to successive-cyclic movement leads us to analyze A-movement:

(100) John is likely to be arrested.

On A-movement, two kinds of approaches have been developed in the literature. The first approach assumes that *v*Ps involved in A-movement are not phases and A-movement takes place in one fell swoop (i.e. non-successive-cyclically), skipping the intermediate positions entirely. This approach is advocated by Chomsky (2000; 2007; 2008), according to which (100) is analyzed as in (101):

(101) [TP **John** is [*v*P likely [to [*v*P [be arrested John]]]]]

In (101), *John* moves in one fell swoop from its base position to the matrix Spec of T, without leaving its copies in the intermediate positions. This derivation is supported by Lasnik (1999), Chomsky (1995), Epstein and Seely (2006).

The second approach assumes that *v*Ps involved in A-movement are phases and A-movement takes place successive-cyclically, without skipping over the intermediate positions. This approach is advocated by Legate (2003), according to which (100) is analyzed as in (102):

(102) a. [*v*P **John** [*v* [arrest John]]]

b. [*v*P **John** [*v* [likely [T-to [*v*P John [*v* [arrest John]]]]]]]

c. [TP **John** [T [*v*P John [*v* [likely [...

In (102), *John* moves from its base position to the Spec of the matrix T successive-cyclically phase by phase, leaving its copies in the intermediate positions.

Notice that neither approach violates Determinacy. In (101), even if we are to move *John* to the matrix Spec of T, there is only one accessible copy of *John* in

its base position; there is no Determinacy violation. Also in (102), even if we are to move *John* to the matrix Spec of T, the intermediate copies of *John* become inaccessible because of the PIC after each-phase-*v*-complement (RP) Transfer; there is no Determinacy violation. Hence, our Determinacy-based approach to successive-cyclic movement is compatible with both approaches.

4.2 An Alternative View

If A-movement leaves copies in the intermediate positions, as in (102), that becomes an important open question for any theories that assume the principle of Determinacy. As one of the possible ways out of this problem, Kitahara (2018) suggests a way summarized as follows:

(103) *A copy-deletion approach* (Kitahara 2018)

IM optionally leaves copies.

a. The copy in the base position and the one in the criterial position must be left for θ-interpretation and labeling through feature-sharing, respectively.

b. The copy in the intermediate position may be deleted.

Under this approach, (100) is analyzed as in (104):

(104) [TP John1 is [*v*P ~~John2~~ [likely [~~John3~~ to [*v*P ~~John4~~ [be [~~John5~~ arrested John6]]]]]]]

In (104), the copies of *John* in the intermediate positions, *i.e. John2*, *John3*, *John4*, and *John5*, can be deleted; there is no Determinacy violation.

Sugimoto (2018) also suggests a way, which is summarized as follows:

(105) *Determinacy as an interface condition approach* (Sugimoto 2018)

Determinacy applies at the interfaces. A Determinacy violation occurs if two identical copies of an element occupy two different criterial positions.

Under this approach, even if (100) has the derivation as in (106) (whether before or after Transfer), a Determinacy violation does not occur:

(106) [TP **John1** is [*v*P John2 [likely [John3 to [*v*P John4 [be [John5 arrested John6]]]]]]]

In (106), only one of the copies of *John* occupies only one criterial position at the interfaces, *i.e. John1* in the matrix Spec of T; there is no Determinacy violation.

Both approaches are interesting and seem to merit further consideration. Among other things, Kitahara's approach opens up a new possibility of weakening the No-Tampering Condition (NTC) (cf. Chomsky 2008: 138) (aside from the issue of whether it is on the right track), and Sugimoto's approach promotes a free-Merge system further (cf. Chomsky 2013: 40; 2015: 14).[15] We leave for future research an investigation of how these approaches are compatible with our notion of Determinacy (7).

5. Concluding Remarks

We have proposed that Determinacy applies at the *input* of (capital) MERGE (7), and the PIC resolves an ambiguous rule application problem with (capital) MERGE. Consequently, we have shown that Determinacy provides us with a unified account of various phenomena such as the Subject Condition, the Specificity Effect, the *that*-trace effects, no vacuous topicalization, non-existence of complementizer-less subject relatives, freezing effects with topics, Merge-over-

[15] Sugimoto's approach may provide an answer to the question of why (typically) only one copy is pronounced at the PF interface: if there are two identical copies of an element at PF, a Determinacy violation occurs, so one-copy-pronunciation is forced by Determinacy.

Move, further raising, island violation repairs, no superfluous steps in a derivation, and so on. Furthermore, we have discussed how Determinacy handles with successive cyclicity, especially the intermediate copies of so called A-movement.

Before we conclude the paper, we would like to sketch out some prospects of our theory of Determinacy (7), repeated here as (107):

(107) Our Notion of Determinacy

Determinacy applies at the *input* of (capital) MERGE.

The crucial idea of (107) is that if *one* (lexically) same element creates *two* identical copies in WS, and if the two identical copies in WS are still accessible to (capital) MERGE (that is, if either one of them has not become inaccessible by the PIC), then a Determinacy violation occurs when (capital) MERGE picks up one of the two identical copies from WS for further operations. The advantage with this idea is that traditional asymmetries and cross-linguistic variation related to the CED, the ECP, and so on, can receive a unified explanation, coupled with independently motivated principles of UG, in the recent minimalist framework that attempts to reduce complexity and avoid ambiguity in syntax (Chomsky 2013; 2015; Chomsky et al. 2019). In other words, if our approach is on the right track, then certain locality effects, especially on domains, which Villata, Rizzi, and Frank (2016) call "impenetrability locality," could be derived from Determinacy.

Significantly, given (107), we could think of another story for locality effects: if *two* (lexically) different elements have *one* (or perhaps more) identical feature(s) in WS, and if the identical feature(s) is (or are) still accessible to (capital) MERGE, then a Determinacy violation occurs when (capital) MERGE picks up one of the two (lexically) different elements from WS for further computations. Specifically, if a lexical item is a bundle of features provided by the lexicon (Chomsky 1995) and they play an important role in syntactic computation (Rizzi 1990), then it is natural to extend our Determinacy approach to the problem of feature ambiguity.

If this story is on the right track, then certain locality effects, especially on features, which Villata, Rizzi, and Frank (2016) call "intervention locality," could also be derived from the principle of Determinacy (the Superiority Effects, the Relativized Minimality Effect, etc.). We leave the consequences of this and a detailed analysis of the Superiority Effects and the Relativized Minimality Effect for future research.

Though many questions still remain, Determinacy can, it seems, open up a new possibility of explaining various phenomena that could be dealt with separate notions such as "ambiguous," "multiple," "more than once," etc. under one coherent concept of Determinacy. Perhaps, the most important theoretical consequence of the present study is that (capital) MERGE, which can be deemed "the most elementary property of language" (Chomsky 2008: 137), is (still) constrained by the principle of Determinacy. Why language should have such a property, however, must await future research.

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