

[Article]

A Labeling Account of Extraction out of Subject Phrases*

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1. Introduction

It has often been assumed that subject phrases resist the application of the so-called sub-extraction operation (Boeckx 2012, Huang 1983, and Ross 1967 among others). However, Chomsky (2008) argues that subject phrases do not univocally show resistance to sub-extraction, offering the contrast between the transitive sentence in (1) and the passive or raising sentences in (2) and (3).¹

- (1) *It was the CAR of which [the driver [*t* caused a scandal]]
(Chomsky 2008: 153)
- (2) It was the CAR of which [the driver was found] (Chomsky 2008: 147)
- (3) It is the CAR of which [the driver is likely [*t* to [*t* cause a scandal]]]
(Chomsky 2008: 153)

In (1), the subject occurs with the transitive verb *caused* and the *wh*-phrase *of which* cannot move out of the subject phrase *the driver of which*. On the other

* This is a much revised and extended version of my paper, which was presented at the 36th Conference of the English Linguistic Society in Japan, held in Yokohama National University on November 24-25, 2018 and which was subsequently published as Kanno (2019). I would like to express my gratitude to the audience for their insightful comments and suggestions. I am also grateful to three anonymous reviewers for their invaluable comments. This work is partly supported by JSPS KAKENHI Grant Number JP20K00669. All remaining errors are my own.

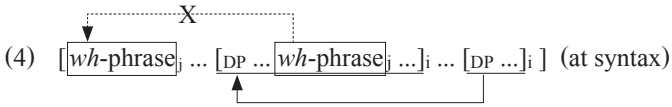
hand, the sub-extraction operation is successfully applied to subject phrases of passive clauses, as in (2), and to those of raising clauses, as in (3).²

In this paper, I offer an alternative approach to distinguish possible sub-extraction cases from impossible cases under a labeling algorithm. This alternative account is theoretically plausible and, more importantly, empirically correct. With respect to empirical points, the inactivity condition proposed by Chomsky (2008) faces some challenges; it cannot account for sub-extraction concerning some linguistic constructions/phenomena including the distinction between stage-level and individual-level predicates; clausal gerunds in subject position; and infinitival clauses. I show that the proposed alternative account in this paper can capture not only the data offered by Chomsky (2008), but also those that constitute counter-examples to Chomsky's account. Finally, I offer some consequences: partial labeling and variation in grammatical judgment among speakers.

The organization of the paper is as follows. Section 2 reviews Chomsky's inactivity condition, which relies on the Case valuation. Section 3 proposes an alternative approach that claims the inactivity condition should apply at the point of Transfer to the semantic interface. Section 4 offers three types of counter-example to Chomsky's analysis. There, I also argue that these counter-examples are explained away by the current proposal. Section 5 shows that the proposed analysis can successfully account for the data in (1)–(3) from Chomsky (2008). Section 6 discusses the consequences emerging from the current proposal. Section 7 concludes the discussion.³

2. The Inactivity Condition

In this section, I show a brief implementation of Chomsky's inactivity condition. Chomsky (2008) claims that the inactivity condition is observed in the following case:



In (4), the whole DP containing a *wh*-phrase (underlined here) undergoes movement and is then assigned a Case value. After the valuation of the Case feature, the whole DP becomes inactive, which means that the *wh*-phrase (boxed here) within the inactive DP cannot move out of the DP (as shown by the dotted arrow in (4)). In short, the inactivity condition states that once a DP receives its Case value, sub-extraction cannot be applied to any item within the DP.

Thus, the inactivity condition developed in Chomsky (2008) can be summarized as follows:

- (5) Case assigned DPs are internally opaque.

Importantly, the activity in (5) is identified based on Case features of DPs.

3. The Proposal of the Current Paper

This section offers an alternative account for capturing the sub-extraction phenomena including the data of (1) – (3) under the labeling algorithm outlined by Chomsky (2013, 2015). Chomsky clarifies labeling mechanisms: the ways labels are assigned to syntactic objects. Some important aspects of Chomsky’s labeling algorithm come from the notion of breaking symmetric structures (Moro 1997, 2000). For example, when two maximal projections, XP and YP, are merged with each other, what results is the symmetrical structure of the set {XP, YP}. Chomsky (2013) assumes that the symmetrical set cannot be assigned any label because one maximal projection does not have any superior status over the other. In short, symmetric structures produce a labeling problem. However, the symmetric structures become labelable if symmetric relations break (Chomsky 2013, 2015, Moro 1997, 2000). Suppose for expository purpose that

XP moves out of the set $\{XP, YP\}$. The structure then results in $\{\cancel{XP}, YP\}$ where \cancel{XP} indicates the copy left behind by the movement. Assuming that such copy is not entitled to enter into a labeling algorithm, Chomsky claims that the set $\{\cancel{XP}, YP\}$ is labeled YP since \cancel{XP} is no longer “visible” for the labeling purposes.

Chomsky also proposes a reason why a moved object stops at a specific position. Chomsky appeals to a mechanism called feature sharing. Suppose that DP moves to be merged with TP, which creates the symmetric structure $\{DP, TP\}$. In this case, DP does not need to move upward anymore if its head D enters into the ϕ -sharing relation with T. In other words, when shared by D and T, the ϕ -features work as prominent features for the labeling purposes. The set $\{DP, TP\}$ in the relevant case is then assigned the label $\langle\phi, \phi\rangle$.

Under the labeling framework briefly summarized above, I offer an attempt to capture sub-extraction phenomena. In this paper, I would like to pursue the idea in (6).

- (6) the ϕ -island constraint (to be revised)

Sub-extraction is not possible out of ϕ -shared DPs.

(6) states that when a DP enters into a ϕ -labeling relation with a functional head, the DP is identified as being inactive. The inactivity renders the DP internally opaque and blocks the application of sub-extraction to the DP.

In the rest of this section, I show how (6) is derivable under the labeling framework. Specifically, I offer a proposal of the current paper below, and I argue that when the proposal is reinforced with some Minimalist assumptions, we can derive the ϕ -island constraint in (6).

First, the proposal of the current paper is shown in (7).

- (7) The inactivity condition applies at the point of Transfer to the semantic interface.

(7) is a modified version of the inactivity condition, which is sensitive to the application of Transfer.⁴

To clarify what assumptions are necessary to derive (and sharpen) the ϕ -island constraint in (6), I address the following two questions:

- (8) a. What syntactic objects are identified as being “inactive”?
- b. What interpretive procedures apply to DP-copies at the point of Transfer?

Let me address these two questions in turn. For answering (8a), note that under the current proposal, the DP activity cannot be identified in terms of Case features since Case features are uninterpretable features and are not sent to the semantic interface. We therefore have to appeal to another strategy to identify the activity of DPs. Here, I assume labeling to play this role. Under the current Minimalist framework (Chomsky 2013, 2015), labeling is a key in linguistic phenomena such as movement, as summarized above. It is therefore natural to assume that the activity identification is also implemented through labeling, given that labels turn out “visible” at Transfer. One way to relate labeling to the DP activity is as follows:

- (9) The ϕ -shared argument DPs are identified as the inactive items.

At the point of Transfer, labels are assigned (Chomsky 2013, 2015).⁵ Importantly, the labeling information is used for the DP activity.

Let us turn to (8b). To answer this question, we need to clarify interpretive procedures that apply to copies at the syntax-semantic mapping. Here, we clarify two assumptions. The first assumption concerns operator-variable relations. It is quite general in the generative literature to assume that *wh*-sentences are semantically interpreted as operator-variable relations (see, among others, Heim and Kratzer (1998), and see also Chomsky (2007) saying that operator-variable relations come free (Chomsky 2007: 12)).

An important point to be clarified is how an operator-variable relation is established in the course of derivation. In this paper, I follow Chomsky’s (1993) copy and deletion approach to movement. Take a look at (10).

- (10) a. Who did you buy pictures of?
 b. [wh x] [x a person] did you buy [DP pictures of [x]]

Chomsky (1993) assumes that the semantic interface takes (10b) as the output of the syntactic derivation of (10a) (see also Chomsky 2013: 40). Specifically, the “QR-like” operation converts *who* into [wh x] [x person] (or [wh x, x a person]) at the operator position, and the deletion operation deletes the repeated materials and creates the variable [x] (or ~~who~~) in the base position (Chomsky 1993). Furthermore, I assume that the QR-like and deletion operations apply at the point of Transfer (that is, at the mapping of syntactic derivation to the semantic interface). This assumption is plausible when we take the inclusiveness condition into consideration.

The second interpretive/semantic procedure to be clarified is the selection of LF-positions of DPs, especially indefinite DPs in the case of sub-extraction. See (11) as a specific example with its structure.

- (11) a. A man laughed.
 b. [TP a man T [vP a man [laughed]]]
 (12) a. [TP ~~a man~~ T [vP a man [laughed]]]
 b. [TP a man T [vP ~~a man~~ [laughed]]]

The sentence in (11a) has two copies of the subject DP, as shown in (11b). Here, one of the copies is selected as an LF-position (Diesing 1992). At this point, I follow Tsai (1999), who extends Chomsky’s (1993) copy and deletion approach for the selection of LF-positions. Tsai argues that (11a) is ambiguous in its interpretation because the deletion operation can apply in the two ways, as in (12a) and (12b), and both (12a) and (12b) are legitimate at the semantic interface. Depending on which copy is deleted, the sentence is given a different interpretation at the semantic interface. Specifically, in (12a) where the higher copy is deleted and the lower copy remains, the subject phrase receives a non-specific interpretation. By contrast, in (12b) where the higher copy remains, the subject is specific in interpretation.

Note here that the term “LF-position” is sometimes used for the positions on which syntactic items receive semantic interpretations (that is, [Spec, vP] in (12a) and [Spec, TP] in (12b)). However, I use the term interpretive positions henceforth, instead of LF-positions, the purpose of which is to avoid the confusion potentially caused from the term “LF,” given that there is no independent LF-level in the recent Minimalist framework (see Epstein and Seely 2006).⁶

In short, we can say that (i) Transfer offers labels to syntactic objects, (ii) it selects interpretive positions of DPs, and (iii) it establishes operator-variable relations. Given that Transfer applies cyclically (Chomsky 2008), we can say that the cyclic application of Transfer makes syntactic derivation readable to the semantic interface.

So far, I have answered the two questions in (8) and offered the necessary assumptions for the current discussion. With these assumptions in mind, let us see how inactive DPs are incompatible with sub-extraction. Consider (13).

(13) a. In the following structure, the relation between the *wh*-operator and the variable [x] is not legitimate at Transfer (i.e. the mapping to the semantic interface):

b. [wh x] [x a thing] ... [_{<φ, φ>} [DP ... [X] ...] [FP F ...] ...

Suppose that in (13b), the DP enters into a ϕ -sharing relation with the functional head F. In this case, the DP is inactive and it is internally opaque (see (9)). The shade on DP in (13b) indicates its internal opacity. After the whole structure is mapped onto the semantic interface, the *wh*-phrase in (13b) needs to establish an operator-variable relation with the variable [x]. However, the variable is contained within the opaque DP. The opacity prevents such a relation from being properly established. In other words, the *wh*-operator cannot “see” the inside of the DP. This produces the structure of a so-called vacuous quantification, which is illegitimate at the syntax-semantic interface. Therefore, the internal opacity of inactive DPs is tantamount to an illegitimate operator-variable relation, that is, vacuous quantification.⁷

To sum up, labeling does not take place in the course of syntactic deri-

vation, and labels are assigned at the point of Transfer. I have proposed that exactly at this point, the inactivity condition applies, and φ -shared DPs become inactive. If a constructed structure produces a vacuous quantification configuration, the configuration is not a legitimate object at the semantic interface. We dub the internal opacity of this type the φ -island constraint, which is revised as in (14).⁸

(14) the φ -island constraint (the final version)

Sub-extraction is not possible out of a copy that is in φ -shared position.

Importantly, note that when (14) applies, we need to take interpretive positions into consideration (see (12)). We have already seen that the deletion of an irrelevant copy or copies takes place at Transfer, and one interpretive position “survives” at the semantic interface (see note 6). When the “surviving” copy is in the φ -shared position, the copy is not compatible with sub-extraction (or, to be precise, a legitimate operator-variable relation cannot be established).

4. Counter-Examples to Chomsky (2008)

4.1. Stage-Level and Individual-Level Predicates

Chomsky (2008) assumes that the inactivity condition is a Case-centric constraint. However, in this section, I offer three types of counter-example to his analysis and argue that these are explained using the φ -island constraint, which is sensitive to the point of Transfer.

The first piece of evidence comes from the type of predicate. Chomsky’s account cannot make an appropriate distinction in grammaticality between sentences with a stage-level predicate and those with an individual-level predicate. (15) is specific examples.

- (15) a. ?*Of which masterpiece is [one reproduction t_{PP}] absolutely perfect?
 b. Of which masterpiece is [one reproduction t_{PP}] already available?

(Bianchi and Chesi 2015: 50)

Offering the contrast shown in (15), Bianchi and Chesi (2015) argue that the subject of the stage-level predicate *available* can permit sub-extraction while the same sub-extraction is impossible from the subject of the individual-level predicate *perfect*.

Under Chomsky's (2008) account, the subject phrases in (15) move to be merged with TP, and they become inactive. Therefore, it would be expected that the two sentences in (15) have the same grammatical status: they should be both ungrammatical due to the Case-centric inactivity condition. Hence, if Chomsky's Case-centric inactivity condition illustrated in (4) tries to capture the contrast in (15), some additional assumptions need to be added.

On the other hand, the current proposal is readily able to give an appropriate account for this contrast. Given the assumptions of this paper, the sentences in (15) have the following structures at the point that they are mapped onto the semantic interface:

- (16) a. *... (of) [which x] [x a masterpiece] is
 $[\langle \varphi, \varphi \rangle \text{ [DP one reproduction of [x]]}] \text{ T}_{be} [\text{AP } \{\text{one reproduction of [x]}\} \text{ perfect}]$
- b. ... (of) [which x] [x a masterpiece] is
 $[\langle \varphi, \varphi \rangle \text{ [DP } \{\text{one reproduction of [x]}\} \text{ T}_{be} [\text{AP } \{\text{one reproduction of [x]}\} \text{ available}]]]$

Both (16a) and (16b) share the same derivational stage: the subject noun phrase moves to [Spec, TP] regardless of the type of predicate, and then it enters into the φ -sharing relation with TP, and finally the whole clause undergoes Transfer. The clause is labeled $\langle \varphi, \varphi \rangle$. Note that at the point of Transfer, an important difference emerges between (16a) and (16b). When a sentence contains an individual-level predicate as in (16a), the interpretive position of the subject DP is the higher one, [Spec, TP], and the lower copy is deleted (see Diesing 1992, among others, for the discussion on the relationship between interpretive positions and types of predicates). This is why the lower copy is crossed out. The higher copy then needs to enter into an operator-variable relation with

the *wh*-operator. Notice, however, that the higher position corresponds to the one at which the subject DP has entered into the ϕ -sharing relation. Therefore, the higher copy (shaded here) becomes inactive at the point of Transfer and induces the violation of the ϕ -island constraint. In this case, the *wh*-operator cannot find any variable in its c-command domain. Recall that the vacuous quantification structure is identified as being illegitimate at the syntax-semantic interface. Thus, the sentence in (15a) is ungrammatical. On the other hand, when the sentence contains a stage-level predicate in (16b), the stage-level predicate *available* requires the higher copy to be deleted. The structure involves no violation of the ϕ -island constraint because the lower copy has not been involved in a ϕ -labeling relation at the point of Transfer. The operator-variable relation can be successfully established in a readable way to the semantic interface. Thus, the sentence is judged as a grammatical sentence.^{9,10}

4.2. Clausal Gerunds

Second, contrary to the expectations in Chomsky's (2008) account, the sub-extraction phenomena can be observed in clausal gerunds in a subject position. Before giving concrete examples, I first show that clausal gerunds do not enter into a ϕ -sharing relation with T in a full-fledged way, as shown in (17) and (18).

(17) ?*Him winning and you losing are wonderful. (Ross 1973: 147)

(18) John playing the piano and Fred singing a song {*were/was} terrifying.
(Reuland 1983: 107)

These sentences indicate that clausal gerunds do not enter into ϕ -sharing relations with T, since the *be*-verb cannot inflect in its plural form even when two gerunds are coordinated. Therefore, we can say that clausal gerunds do not have a full set of ϕ -features.

A prediction from the current proposal is that sub-extraction phenomena should be observed in clausal gerunds. This prediction is borne out in (19) and (20).

- (19) Who does baking ginger cookies for *t* tire you out? (Kluender 2004: 119)
- (20) a. For what reason did [PRO bursting into rooms *t*] get John fired
 b. How would [PRO holding off a tiger *t*] make one famous
 (Hegarty 1992: 119)

As (19) and (20) show, sub-extraction is applicable to the clausal gerunds in the subject position. Take (19) as a specific example, and consider its derivational structure in (21).

- (21) [wh *x*] [*x* person] [_{TP} [<sub>Clausal Gerund ... for [*x*]] T
 [_{VP} [_{Clausal Gerund ...for [*x*]] tire you out]]]}</sub>

In (21), the gerund *baking ginger cookies for who* moves to be merged with T, but does not enter into a ϕ -sharing relation with T since the clausal gerund does not have a full set of ϕ -features. Therefore, at the point of Transfer, the operator-variable relation can successfully be established between the *wh*-operator and the variable [*x*] in the clausal gerund without violating ϕ -island. Simply, we can say that our inactivity condition in (7) permits the *wh*-phrase to move out of the clausal gerunds. (To be precise, in (21), one of the two copies of the gerund is deleted and the other copy is selected for interpretive procedures. However, I do not cross out the deleted copy because whichever is deleted, the sentence is grammatical.)¹¹

Furthermore, sub-extraction out of clausal gerunds is also possible, regardless of the predicate types. That is, either a stage-level predicate or an individual-level predicate can appear, as shown in the followings:

- (22) a. Who is preparing rump steaks to already ready?
 (stage-level adjective)
- b. Who is serving rump steaks to very important?
 (individual-level adjective)

The grammaticality of the sentences in (22) indicates that a clausal gerund,

whether it be in the higher position or the lower position at the point of the mapping onto the semantic interface, permits the necessary operator-variable relation to be properly established. Specifically, even when the individual level predicate *important* appears, as in (22b) and the interpretive position of the subject is at the higher position, the sentence is grammatical. This is because the clausal gerunds do not enter into a ϕ -sharing relation.¹²

The discussion here indicates that the possibility of successful sub-extraction is not reducible to predicate types as Bianchi and Chesi (2015) show in (15). According to their analysis, individual-level predicates require the interpretive position to be at the higher position, and the subjects are expected to resist the sub-extraction operation, just as in sentences like (15a). The grammatical status of (22b), however, indicates that the labeling relation matters most: even the copy in the higher position permits sub-extraction when it is not in a ϕ -sharing relation at syntax.¹³

4.3. Infinitival Clauses

Let us turn to the subject phrases in infinitival clauses that constitute counter-examples to Chomsky's analysis. It has been assumed that the raising/ECM infinitival T has an unvalued person feature, [u-person] (Chomsky 2001). Given this assumption, the infinitival T does not establish a ϕ -sharing relation with its subject DP in a full-fledged way. It then follows that extraction phenomena are observed out of infinitival subjects. This prediction is actually borne out, as follows:¹⁴

(23) Of which major_i is it important for [[the students t_i] to take a course in physics]? (Egashira 2015: 151)

(24) [which x] [x major] ...[for [_{DP} the students of [x]] T_{to} [_{VP} [the student of [x]] take ...]]

In (23), the verb in the embedded clause is the transitive verb *take*. Chomsky's analysis expects (23) to have the same ungrammatical status as (1) because the *wh*-phrases in both sentences move out of the subjects of the transitive verbs

and the subject is in the Case-assigned position. The current analysis, on the other hand, can correctly account for the grammatical status. First, consider the lower copy of the DP. This copy constitutes an opaque domain due to the edge condition, which is stated in (25) (see Chomsky 2008).

(25) Syntactic Objects in phase edges are internally frozen.

(Gallego and Uriagereka 2007: 9)

Since the current paper focuses on the ϕ -island effects, I do not offer an argument of whether the edge condition is a primitive condition or it can be derived from the third factor principles. Here, I simply take the edge condition to be a descriptively plausible generalization (see Gallego and Uriagereka 2007 for relevant discussion). Therefore, it suffices here to say that due to the edge condition, sub-extraction is not possible out of the lower copy in [Spec, ν VP]. The opacity of the lower copy is illustrated by the shade in (24).

Let us turn to the higher copy in (24). The copy in this position does not share a full set of ϕ -features with T, and hence, the operator-variable relation is successfully readable to the semantic interface when the whole structure is mapped there.^{15, 16}

Note that Chomsky makes the assumption of infinitival T with [u-person] based on the observation of raising/ECM clauses. At this point, I need to ask whether Chomsky's (2008) assumption can be extended to the infinitival T in (23). I suggest that it can. A piece of evidence comes from a Case-assignment property. Chomsky assumes that raising/ECM infinitival T does not have a full set of ϕ -features because it cannot assign a Case value. This also holds for the infinitival T in (23). In (23), the embedded subject receives its Case value from the prepositional complementizer *for*, and the infinitival T does not assign any Case value to the subject. Therefore, the fact that the infinitival T in (23) is similar to raising/ECM infinitival T indicates that Chomsky's assumption on the [u-person] feature can be generalized; both the raising/ECM T and the infinitival T in (23) only have the [u-person] feature.

5. Data from Chomsky (2008)

In this section, let me show that the current proposal correctly accounts for (1)–(3) shown in Chomsky (2008). First, consider (1) repeated here as (26) and the relevant structure in (27), which is the structure mapped onto the semantic interface at the point of Transfer.

(26) *It was the CAR of which [the driver [*t* caused a scandal]]

(27) ... [wh x] [x car] [_{< ϕ , ϕ > DP the driver of [x]] T [_{vP} the driver of [x]] v ...}

As for the higher copy in [Spec, TP], extraction out of it is not permitted due to the violation of the ϕ -island constraint. The internal opacity is illustrated by the shade on the higher copy. As a result, the *wh*-operator cannot make a deep search into the higher copy. Moreover, the lower copy in [Spec, vP] does not offer appropriate operator-variable relation either, because of the edge condition.

Thus, sub-extraction phenomena are not compatible with the subject noun phrases of transitive verbs because of the ϕ -island constraint and the edge condition.

Let us turn to (3) repeated here as (28), with its structure in (29), which is read off at the semantic interface.

(28) It is the CAR of which [the driver is likely [*t* to [*t* cause a scandal]]]

(29) ... [which x] [x car] [<sub>< ϕ , ϕ > DP the driver of [x]] is likely
[TP the driver of [x]] to [_{vP} the driver of [x]] v [_{vP} ...]]</sub>

The highest copy constitutes a ϕ -island environment and sub-extraction is not possible. Furthermore, sub-extraction cannot apply to the lowest copy due to the edge condition. Hence, as argued in Chomsky (2008), the occurrence of the intermediate copy (underlined in (29)) is crucial. The *wh*-operator can establish a legitimate relation with the variable in the intermediate copy, without creating a vacuous quantification structure.

Finally, consider (2) repeated here as (30) with its relevant structure in (31).

(30) It was the CAR of which [the driver was found]

(31) ... [wh x] [x car] [_{<φ, φ>} [DP the driver of [x]]] T_{was} [vP v_{found} [vP t_v [the driver of [x]]]]

The highest copy cannot offer an appropriate variable (due to its being a φ-island). As for the lower copy, it does not enter into a φ-labeling relation because the passive v does not have φ-features. In addition, the lower copy is not on the phase edge. These indicate that the operator-variable relation can be read off at the semantic interface without any violation of φ-island and the edge condition.¹⁷

6. Consequences

6.1. Partial Labeling

In Section 4.3, I have assumed following Chomsky (2001) that the infinitival T has only an unvalued person feature, [u-person]. Under this assumption, a problem emerges regarding how the set consisting of the subject DP and the infinitival TP is labeled. In this subsection, I assume that part of the full set of φ-features enters into an Agree relation. Specifically, because of the presence of the [person] feature of the infinitival T, this feature works as a prominent feature for the purpose of labeling. Therefore, infinitival clauses have the label of <person, person> due to the sharing of the [person] with the subject DPs, as shown in (32).

(32) It is important for [_{<person, person>} [DP the students] [TP to learn English]].

In (32), the infinitival T only has [person], and the labeling algorithm cannot find a full set of φ-features, but only a part of the full set, that is, [person] features on both the DP *the students* and the infinitival T. Therefore, [person] becomes the label. I assume that this labeling applies in infinitival clauses, and I name the labeling algorithm partial labeling.^{18, 19}

A similar labeling mechanism is observed in clausal gerunds. In the dis-

cussion of (17) and (18), we have seen the lack of a full agreement relation between clausal gerunds and T. More specifically, these sentences show that clausal gerunds do not have a [number] feature. Owing to the lack of [number], even when clausal gerunds are coordinated, the *be*-verbs do not bear plural inflection. I assume that what is responsible for labeling is the [person] feature shared by both clausal gerunds and T. The [person] features Agree with each other and [person] becomes the label. Therefore, when a clausal gerund is merged with TP, the label of the resulting structure becomes $\langle \text{person}, \text{person} \rangle$.

Finally, note that under the recent Minimalist framework, many previous studies have already shown that the [person] feature and [number] feature each separately search for their own goals, and the mechanisms are called split Agree, split probe, or split checking (see Anagnostopoulou 2003 among others). Therefore, it is natural to assume that these features each induce Agree and also enter into a labeling algorithm. To put it simply, each feature becomes a prominent feature for a labeling purpose.

6.2. Variation among Speakers

It has been claimed that speakers' judgments regarding the sub-extraction out of subject phrases vary considerably from person to person. For example, Bianchi and Chesi (2015) offer (15a) as a grammatical sentence, but the grammatical judgment of this sentence is subject to gradation among speakers. Specifically, some speakers will find it to be only marginally grammatical and other speakers will judge it to be simply ungrammatical. To account for the variation among speakers, consider (16b) repeated here as (33):

- (33) ... (of) [which x] [x a masterpiece] is
 $[\langle \phi, \phi \rangle \text{DP one reproduction of } [x]] \text{ T}_{be} [\text{AP [one reproduction of } [x]] \text{ available}]$

(33) has two copies generated by the movement of the subject DP phrase. I assume that these two copies do not have an equally accessible status at Transfer. Specifically, in establishing a necessary operator-variable relation, some speak-

ers have difficulty accessing the lower subject phrase across the higher copy. For those who cannot cross the higher copy, (15a) is ungrammatical (as well as (15b)). On the other hand, those who consider (15a) to be marginal can access the lower copy across the higher one, but they do so at the cost of slight degradation in dealing with the non-local lower copy. This accounts for the (slight) degradation observed by these speakers.

In short, for the grammatical judgment of (15a), there are three groups of speakers: (i) those who consider (15a) grammatical have no difficulty in accessing the lower copy, taking the higher copy to be “invisible” in the sense that it does not work as a blocker in accessing the lower one; (ii) those who consider (15a) to be ungrammatical take the higher copy to be “visible;” and (iii) those who find it to be marginal judge the higher copy to be visible but this copy does not totally block the access to the lower copy, which induces the slight degradation of the sentence.²⁰

Notably, the (in)visibility/(in)accessibility in A-movement is not exclusive to the sub-extraction phenomena. A similar observation is reported in Icelandic where verbs usually show agreement relations with nominative arguments. However, there is variation in agreement patterns in quirky subject constructions in Icelandic. This is first reported in Holmberg and Hróarsdóttir (2003, 2004), and, later, Sigurðsson and Holmberg (2008) categorize Icelandic into three varieties (Icelandic A, B, and C), depending on the agreement patterns.

For the purpose of the current discussion, I focus on Icelandic B and C; these two varieties are sensitive to defective intervention effects, as exemplified in (34).²¹

- (34) Það líkaði/*líkuðu einum málfræðingi þessar hugmyndir.
 Expl liked.3Sg/*liked.3Pl one linguist.Dat these ideas.Nom
 ‘One linguist likes these ideas.’ (Icelandic B and Icelandic C)
 (Sigurðsson and Holmberg 2008: 256)

As (34) shows, Icelandic B and Icelandic C show no agreement relation between the verb *líkuðu* ‘like’ and *hugmyndir* ‘ideas,’ due to the presence of the

dative argument *einum málfræðingi* ‘one linguist.’ In other words, the dative argument works as the intervener of the agreement relation between them. As a result, the verb must bear the default (that is, third person singular) inflection. This inflectional pattern is shared by both varieties of Icelandic.

However, Icelandic B and Icelandic C differ in the visibility of the copy left behind by A-movement of the dative argument. (35a) indicates the agreement patterns found in Icelandic B while (35b) shows the ones observed in Icelandic C.

- (35) a. *einum málfræðingi líkaði/líkuðu þessar hugmyndir.*
 one linguist.Dat liked.3Sg/liked.3Pl these ideas.Nom
 ‘One linguist likes these ideas.’ (Icelandic B)
- b. *einum málfræðingi líkaði/*líkuðu þessar hugmyndir.*
 one linguist.Dat liked.3Sg/*liked.3Pl these ideas.Nom
 ‘One linguist likes these ideas.’ (Icelandic C)
- (based on Sigurðsson and Holmberg 2008: 251)

In the both sentences in (35), the dative arguments move to the clause-initial position across the verbs, making the verbs and the nominative arguments linearly adjacent to each other. As (35a) shows, in Icelandic B, the agreement relation is possible between the verb and the nominative. This indicates that the speakers of this variety of Icelandic consider the lower copy left behind by the moved dative argument to be invisible. Owing to the invisibility, the agreement between the verb and the nominative argument is possible. On the other hand, as (35b) shows, in Icelandic C, the agreement relation is still impossible, which indicates that the lower copy is visible to the speakers of Icelandic C. That is, the phonetically null copy of the dative argument left behind by the movement is “visible,” and the copy still works as the intervener of the agreement relation between the verb and the nominative.

Thus, the discussion of Icelandic quirky subject constructions shows that the differences in (in)visibility of copies among speakers are found not only in the extraction out of subject phrases, but also in some other constructions, such

as quirky subject constructions. The difference in turn accounts for the variation among speakers in these constructions.²²

7. Conclusion

In this paper, I have discussed sub-extraction phenomena in a labeling theory. The key concept of the current proposal is that the *wh*-operator can make a legitimate relation with its variable when the variable is within the copy that does not enter into a ϕ -shared position. The current paper calls this condition the ϕ -island constraint. In section 4, I have offered three types of examples that constitute evidence against Chomsky's (2008) inactivity condition, and I have shown that these examples are accounted for by the current proposal. In section 5, I have shown that the current proposal correctly accounts for the grammaticality of the data discussed in Chomsky (2008).²³

Finally, I have discussed two consequences of the current proposal. The first consequence is partial labeling: each feature consisting of ϕ -features can be a prominent feature for the purpose of labeling. Second, the accessibility to the lower copy left behind by A-movement differs according to speakers.

Notes

1. In this paper, I sometimes appeal to trace-convention (along with indexes attached to traces), instead of spelling out of full copies, due to ease of exposition.
2. Extraction out of subject phrases is first discussed in Chomsky (1955/75: 437) under the generative framework.
3. In examining sub-extraction phenomena, I will be careful throughout the paper to avoid using psychological predicates as core data because these predicates show irregular properties in terms of sub-extraction phenomena (see Belletti and Rizzi 1988). Many syntactic and semantic factors involved with these psychological predicates are beyond the scope of the current paper.
4. I use the term, the semantic interface, rather than the C-I interface, which is a more popular terminology in the Minimalist literature. The reason is that it is under debate whether the C-I interface is internal or external to the Faculty of Language/FL (see Freidin 2016 for an excellent summary related to the debate). Without getting involved in the debate, I use the term semantic interface, assum-

ing it to be internal to FL.

5. Labeling takes place at the point of Transfer. Also see Bode (2020) for the simultaneous application of labeling and Transfer. I thank an anonymous reviewer for clarifying this point.
6. At this point, note the usage of the term “deletion.” Of course, the deletion operation here is only relevant to deal with the interpretive properties of DP. It does not mean that the DP goes totally invisible to every semantic mechanism. If it were, the DP would not receive its θ -role (see Tsai 1999 and Ott 2012 for a detailed discussion).
7. A question raised by an anonymous reviewer is how operator-variable relationships are successfully established when a CP phase intervenes between operators and variables, like the one shown below:

(i) Who_i do you think that they took pictures of t_i?

(ii) [Wh x]_i[x a person] ... [_{embedded CP} C ... [x]]

In (ii), the variable appears in the embedded clause while its operator resides in the matrix CP. This indicates that the operator and the variable undergo Transfer at different points of the derivation. However, this does not imply that the matrix and the embedded structures are totally disconnected at the semantic interface. Rather, I assume that information about the variable must be stored at the interface until its corresponding operator comes in the semantic interface, making the relation properly established between the variable and the operator. Therefore, the presence of phases such as CP does not intervene in the relation of operators and variables.

8. (14) holds only when φ -features are φ -complete. I discuss this in section 6.1.
9. Some speakers observe no contrast in (15) in grammaticality. I discuss variation among speakers in section 6.2.
10. An anonymous reviewer asks if the current analysis predicts that the sentence in (15b) turns ungrammatical when the variable becomes embedded in a complement *that*-clause. The presence of CP does not block the operator-variable relationship. See also note 7.
11. A problem arises regarding how a labeling mechanism works. Specifically, the question is how the set consisting of a clausal *gerund* and TP is labeled. To solve this problem, in Section 6.1, I argue that part of a full set of φ -features (that is, [person] in this case) works as a prominent feature for a labeling purpose.
12. An anonymous reviewer asks the grammatical status when the sub-extraction operation applies to infinitival *to*-clauses standing in a subject position of sentences. I leave this problem for further research.

13. Note that previous literature (Kuno 1973 among others) reports sub-extraction to be impossible out of clausal gerunds in the subject position without pied-piping of a preposition. See (ii), which is derived from (i).
- (i) Learning the spellings of some words is difficult. (Kuno 1973: 379)
(ii) *Which words is learning the spellings of difficult? (Kuno 1973: 379)
cf. (iii) ?Of which words is learning the spellings difficult? (Kuno 1973: 379)
- A noticeable point is the difference in grammaticality between (19) and (ii). (19) is judged to be grammatical while (ii) is considered to be ungrammatical despite the fact that in both sentences, *wh*-phrases move without pied-piping a preposition. Kluender (2004), who offers the grammatical sentence in (19), claims that when *wh*-movement takes place without pied-piping of a preposition, *wh*-phrases and the corresponding traces should not be too close. He offers an analysis based on a processing mechanism, claiming that positional proximity between a *wh*-phrase and its gap makes the sentence difficult to process. I believe that Kluender is correct in pointing out that a *wh*-phrase should not be too close to its gap. However, I leave open the question of whether the generalization is attributable to a syntactic, pragmatic or some other factors. In short, I assume that the extraction out of clausal gerunds should be possible in principle, as in (19)/(20) (and as in (iii)), but that some factors concerning closeness (whatever these turn out to be) make the sentence in (ii) ungrammatical (or unacceptable).
14. Some researchers have raised similar extraction phenomena found in infinitival clauses:
- (i) ?Of which aspiring actress did they intend for [compromising photos] to be sold to a national newspaper? (Haegeman et al. 2013: 7)
(ii) Which football team do you want [the manager of *t*] to pay a large fine? (Abels (2007: 75))
15. See Section 6.1 for the label of the set of the subject DP and the infinitival TP.
16. In (24), CP intervenes between the operator and the variable. The presence of CP does not work as hindrance of the operator-variable relationship. See note 7 and 10.
17. Some researchers argue for the base-generation analysis of the clause-initial PPs containing a *wh*-phrase, claiming that these PPs are independent adverbial topic phrases attached to the remaining host clauses (see Broekhuis 2005 among others). Under this analysis, no movement is involved, and the topic PPs are base-generated at the clause-initial position. However, the current paper rejects this analysis (or analyses similar to it) claiming that movement actually occurs (at least in English). In support of this rejection, see the following sentences with

successful binding relations ((i) is based on Kobayashi 2011: 44):

- (i) [Of which apology to each other]_i do you expect [the two parties]_j' refusal t_i to complicate the problem?
- (ii) John wonders [with which essays about themselves]_i [making the students laugh t_i] is the most effective way for relaxation.

The successful binding relation in (i) and (ii) indicates that the clause-initial PPs undergo movement out of the subject phrases.

18. The discussion here indicates that (14) holds only if both XP and YP are ϕ -complete in Agreeing XP with YP.
19. See Kanno (2020) for the definition of partial labeling and its application to a variety of constructions.
20. I have shown in the text that speakers are divided into the three groups in the accessibility of lower copies. This does not mean that these three groups have different interpretations of the subject phrases. I thank an anonymous reviewer for clarifying this point.
21. Icelandic A is reported to show the agreement pattern where a verb can agree with a nominative phrase across an overt dative phrase (see Sigurðsson and Holmberg 2008).
22. A question raised by an anonymous reviewer is whether or not we can attribute both the variation of grammatical judgment concerning sub-extraction and the one concerning A-movement to the same intervention principle as the current paper assumes. The point of the current discussion is that both agreement and extraction share the same search algorithm. The current paper assumes that the intervention effects relevant to the search algorithm is at work in both extraction and agreement.

Another question raised by a different reviewer is whether individual differences (or idiolect in his or her term) can be reduced to parameter. I leave this profound question for further research.

23. An anonymous reviewer asks how the current analysis account for adjunct island effects. I assume that different factors are involved in adjunct islands from ϕ -island. I refer interested readers to Bode (2020) and Boeckx (2012), among others.

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