

An English VPE puzzle and a derivational approach to ellipsis^{*}

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Park, Dongwoo. 2018 An English VPE puzzle and a derivational approach to ellipsis. *Linguistic Research* 35(1), 1–27. Even though a lot of researchers have tried to illuminate the exact nature of English VP ellipsis (henceforth VPE), there is no consensus on how sentences with VPE are generated. It seems that the most widely accepted approaches involve the PF deletion approach (Merchant 2001, 2008, 2013; Lasnik 2001, *inter alia*) and the LF copying approach (Chung et al. 1995; Saito 2007, *inter alia*). However, in this paper, I point out that these two analyses cannot account for the VPE puzzle presented by Tancredi (1992), which shows that the ellipsis site of VPE cannot contain an *in-situ wh*-phrase. That is, a *wh*-element staying in VP cannot be elided alongside VPE. In order to explain this puzzle, I adopt the proposal by Park (2017a, 2017b) that ellipsis is a narrow syntactic operation that occurs during the derivation, rather than a post-syntactic operation occurring at PF, and that what is elided as a result of ellipsis is phonological feature matrices of lexical items inside the ellipsis site. On the basis of this derivational approach to ellipsis, I propose a prosodic requirement that all questions have to obey. This requirement is based on Richards' (2016) Contiguity, which states that syntax can make reference to particular types of phonological information, and that syntax generates a prosodic representation during the derivation (i.e. as the derivation proceeds) alongside the syntactic representation. I argue that this prosodic constraint can also explain puzzling properties of Dutch Modal Complement Ellipsis, and British English *do* construction, where the complement of *do* located in *v* is elided. (Seoul National University)

Keywords English VPE puzzle, a derivational approach to ellipsis, deletion of phonological feature matrices, prosodic constraint, syntax-phonology interface, Dutch Modal Complement Ellipsis, British English *do* construction

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1. Introduction

In generative grammar, ellipsis has been one of the most actively discussed. However, there is no consensus on the exact nature of ellipsis. Merchant (2001) and Lasnik (2001) suggest that the sound of lexical items inside the ellipsis site is deleted at PF. Meanwhile, Chung et al. (2005) propose that ellipsis is not an operation related to deletion. Rather, it is an LF-copying operation. That is, the meaning of an antecedent is copied into the phonologically null constituent at LF. Recently, some researchers have suggested that ellipsis is a failure of vocabulary insertion at PF, which is caused by particular operations that occur in narrow syntax. For instance, Aelbrecht (2010) proposes that an E-feature on the head that selects the elided XP establishes an Agree relation with a licenser. Then, the ellipsis site is sent to PF, and vocabulary insertion of lexical items inside the ellipsis site is inhibited. Baltin (2012) proposes that ellipsis is deletion of formal/syntactic features, which occurs during the derivation in overt syntax, and thus, bleeds vocabulary insertion at PF, assuming that vocabulary insertion depends on formal/syntactic features. According to Aelbrecht's and Baltin's proposals, ellipsis is not deletion of sound. Additionally, Park (2017a, 2017b) argues that ellipsis is a narrow syntactic operation that eliminates phonological feature matrices of lexical items inside the ellipsis site. This indicates that narrow syntax can make reference to a phonological feature matrix every lexical item contains, but not to segmental content which will be inserted into phonological feature matrix at PF.

In this paper, I first present a VPE puzzle, which is first mentioned in Tancredi (1992), and point out that neither the PF deletion approach nor the LF copying approach can account for the VPE puzzle. Subsequently, I propose a prosodic requirement, adopting and modifying Richards' (2016) Contiguity, to explain the VPE puzzle. This prosodic condition is based on Park's (2017a, 2017b) proposal that ellipsis is an operation that gets rid of phonological features matrices of lexical items, and that ellipsis occurs during the derivation in the narrow syntax.

This paper is organized as follows. Section 2 provides a VPE puzzle, first introduced by Tancredi (1992), and limits of existing analyses for explaining the VPE puzzle. In section 3, I review Richards' (2016) Contiguity, which suggests particular phonological information is visible in the narrow syntax, and syntax creates the phonological representation as well as the syntactic representation. In

section 4, I propose a prosodic requirement *wh*-questions must obey, based on Richards' (2016) Contiguity, and present a novel analysis for the VPE puzzle. In section 5, I argue that the newly proposed prosodic constraint can also explain the extraction facts in Dutch Modal Complement Ellipsis and British English *do* construction. Section 6 presents concluding remarks.

2. An English VPE puzzle and existing analyses

English VPE has the following properties: First, in order for VP to be elided, the elided constituent must be syntactically or/and semantically identical to its antecedent constituent (Chung et al. 1995; Merchant 2001, 2008, 2013; Lasnik 2001, Hartman 2011; Messick and Thoms 2016, *inter alia*).

- (1) a. Abby called Chuck an idiot after Ben did ~~call Chuck an idiot~~.
- b. *Abby called Chuck an idiot after Ben did ~~insult Chuck~~. (Merchant 2001)

In (1a), the elided constituent is semantically and syntactically identical to its antecedent constituent, and thus, VPE is licensed. By contrast, in (1b), there is no antecedent which is syntactically or semantically identical to the elided constituent. As a result, VPE is not permitted.

The second property of English VPE is that extraction of a *wh*-element base-generated inside the ellipsis site is restricted, as shown in (2) and (3).¹

- (2) a. Someone left, but I don't know who_t did ~~leave~~-*t*_t.
- b. Who did John criticize, and who₂ did Mary ~~criticize~~-*t*₂?
- c. Mary saw a man who bit one of my friends, but Tom did not realized [which one of my friends]₁ ~~she saw~~ [DP a man who bit *t*₁].
- d. I don't know which puppy you should adopt, but I know which one you shouldn't ~~adopt~~. (Schuyler 2001)

¹ A reviewer points out that Lappin (1984) and Schuyler (2001) argue that *wh*-phrase extraction out of the VPE ellipsis site is allowed only when a c-commanding domain of a moved *wh*-phrase contains an (unelided) element conveying a contrast focus meaning. This can account for the asymmetry between (2d) and (3e).

- (3) a. *They heard a lecture about a Balkan language, but I don't know which Balkan language₄ they did ~~hear a lecture about~~ *t*₄. (Lasnik 2001)
- b. *Abby said that a biography of one of the Marx brothers is going to be published this year, but I don't remember which₅ Ben did say ~~that a biography of~~ *t*₅ ~~is going to be published this year~~. (Lasnik and Park 2013)
- c. *John became very upset, but I don't know how upset Bill did ~~become~~.
- d. *Mary will kiss Tom. Who will Gary kiss?
- e. *I think you should adopt one of these puppies, but I don't know which one you should ~~adopt~~. (Schuyler 2001)

These two properties above have been actively discussed by researchers over the past decades. However, consider the following sentences.

- (4) A: I wish I knew who brought what to the party.
 B: Me too. I have no idea who brought what.
 B': *Me too. I have no idea who did ~~bring~~ *what*. (Tancredi 1992)

The non-elliptical sentence in (4B) is perfectly well-formed. However, when VP ellipsis occurs, the sentence is significantly degraded, as shown in (4B'). This phenomenon has been less studied, and the ungrammaticality remains as a puzzle.

Tancredi (1992) points out that the following approaches cannot account for the aforementioned puzzle. First, suppose that what is copied into the ellipsis site in the LF copying approach would be the syntactic representation (i.e., S-structure representation) of the antecedent VP. If so, then, this analysis erroneously predicts that the sentence in (4B') should be grammatical. The reason is as follows: the syntactic representation of the VP *bring what to the party* is copied into the ellipsis site at LF. Subsequently, *wh*-movement would apply to the *wh*-phrase, namely *what*, in the copied VP, just like *what* in the antecedent VP.²

² A reviewer asks if *what* in the VP whose syntactic representation has already been copied into the ellipsis site at LF could move further. Consider the following sentence.

Now, suppose that what is copied in the LF copying approach is the LF of the antecedent VP, rather than the syntactic representation. In the antecedent VP, the *in-situ* *wh*-phrase covertly moves to the C layer. Then, the VP contains the trace of the covertly moved *wh*-phrase. When the LF of the antecedent VP containing the trace is copied into the ellipsis site, the LF of the elliptical sentence is ill-formed. This is because the trace of copied VP fails to be bound in the copied VP. This of course can account for the ungrammaticality of (4B'). However, Tancredi (1992) points out this analysis could face a nontrivial problem. Consider the sentences in (5).

- (5) a. The doctor/lawyer conference was an abysmal failure. On the first day, some lawyer objected to every proposal.
 b. Then, on the second day, some doctor did.
 c. Then, on the second day, some doctor objected to every proposal.
 (Tancredi 1992: 124)

The LF copying analysis of the ungrammaticality of (4B') implies that the antecedent VP containing a quantified phrase (QP) can be copied into the elliptical phrase only when the QP has not been raised. If the LF of the VP containing the trace of a raised QP were copied into the ellipsis site, then the sentence should be ungrammatical. This is because the trace of the raised QP inside the copied VP cannot be bound, just like the trace of *wh*-element in (4B'). However, this expectation is not fulfilled in (5). Even though it is harder to get inverse scope in (5b) than in (5c), my informants all agree that it is not impossible to get inverse scope.³ If this is so, then the LF-copying approach has to account for why (4B') is ungrammatical, while the wide scope reading of the universal quantifier is available in (5b), even though the VPs in those two sentences have the same representation at LF, in that they contain unbound traces.

(i) Some will read every book, and some woman will, too.
 (some > every, every > some) (Baltin 2012)

Suppose that the syntactic representation of VP in the antecedent clause is copied into the ellipsis site at LF in (i). In order to get wide scope of the universal quantifier, it has to move over the subject at LF. Otherwise, it would be predicted that the sentence should not allow scope ambiguity.

3 In Tancredi (1992), the author mentions that the distinction between (5b) and (5c) with respect to the availability of wide scope of the raised QR is subtle.

We have discussed that the LF copying approach cannot account for the VPE puzzle in (4). Now, we can imagine that elliptical sentences are created through the deletion of sound of lexical items inside the ellipsis site, as the PF deletion theory argues. In this approach, elliptical sentences are in fact full-fledged sentences in the narrow syntax. Thus, the meaning of the elided constituent need not be recovered through any additional LF operation. This approach also predicts that the sentence in (4B') would be well-formed. The reason is as follows: according to the PF-deletion approach, the sentence in (4B') is derived from (4B). That is, the two sentences have the same structure in the narrow syntax, but the difference is that in (4B'), VP is elided at PF. Thus, the LF representation of (4B') is identical to that of (4B). Consequently, if we assume that the licensing/checking of the *in-situ wh*-phrase occurs at LF, then it is impossible to account for the asymmetry between those two sentences.

Tancredi presents two possible ways of ruling out the sentence in (4B') under the PF deletion approach. First, it can be assumed that *wh*-phrases are always focused, and thus, they cannot be deleted. Under this analysis, (4B') is ungrammatical since the *wh*-phrase within the VP is elided, even though it is focused. However, Tancredi points out that this analysis is untenable. This is because the grammaticality of the sentence in (6B) remains mysterious, where the elided VP contains two *wh*-phrases.

- (6) A: I wish I knew who brought what to the party. (= (4A))
 B: I wish I did ~~know who bought what to the party~~, too.

The second option Tancredi proposes is to block the deletion of *wh*-phrases within VP as follows: The relations between *in-situ wh*-expressions and the Comp they raise to at LF must not be broken. However, deletion of VP breaks this relation. In order to account for how deletion occurring within the PF component can affect the relation between *in-situ wh*-phrases and Comp, Tancredi proposes the following constraints:

- (7) a. A *wh*-expression is bound by the Comp to which it eventually raises, leaving the representation of this binding relation unspecified.⁴

- b. A VP containing a *wh*-expression which is unbound within that VP can never qualify as non-distinct from another VP, while one containing only *wh*-expressions which are bound within the VP can.
- c. The resulting definition of non-distinctness applies only to overt *wh*-expressions and not to their traces, since VP ellipsis is perfectly acceptable in sentences in which the deletion VP contain a WH trace [, as illustrated in (8)].
(Tancredi 1992: 124)

- (8) A: Who did John introduce to Mary?
B: I don't know. Who did Peter? (Tancredi 1992: 125)

A definition of non-distinctness that satisfies these requirements is as follows:

- (9) Two expressions α and β are non-distinct at PF if and only if:
- i. α and β are similar, and
 - ii if γ is a WH expression occurring in α and γ' the corresponding *wh*-expression occurring in β , must γ and γ' be bound within α and β , respectively.
- α and β are similar if and only iff
- i. α and β are lexical elements and $\alpha = \beta$, or
 - ii. $\alpha = [\gamma \ i]_j$ and $\beta = [\delta \ k]_l$ (i, j, k, l optional), and $\{i, j\} \cap \{k, l\} \neq \emptyset$, or the immediate constituent structure of α is syntactically identical to that of β and each subconstituent of α is non-distinct from the corresponding subconstituent of β . (Tancredi 1992: 125)

According to this approach, the *wh*-phrase in the elided VP in (4B') is not bound within that elided VP, and thus, the elided VP is not non-distinct from the

4 Tancredi (1991) assumes that *wh*-expressions must be directly related (no later than) at S-Structure to the Comp, and non-*in-situ wh*-expressions move to Comp at S-structure. This indicates that an overtly moved element can be bound by Comp to which it raises, since the bound relation is created either at D-structure and S-structure. This is the reason the *wh*-phrase in (8B) is bound by Comp.

antecedent VP. Consequently, VPE cannot be licensed. On the other hand, in (6B) and (8B), the *wh*-phrases are bound by the Comp to which they move overtly or covertly within the elided VP. As a result, the elided VPs are non-distinct from their antecedent VPs, and thus, VPE is licensed. Even though this analysis successfully accounts for the asymmetry between (4B') and (8B), it is not clear how the syntactic condition (i.e., boundness) interacts with the PF condition (i.e., non-distinctiveness). This in turn has a problem that the definition of non-distinctiveness is stipulatory, as Tancredi admits.

To summarize, under the LF copying approach and the PF deletion approach, it is not easy to account for the ungrammaticality of the sentence in (4B'), where the *in-situ wh*-phrase remains inside the ellipsis site. In the next section, I briefly review Richards' (2016) contiguity, which proposes that some phonological information is visible in the narrow syntactic derivation. This will be the basis for the proposal advanced in section 4.

3. Richards' (2016) Contiguity

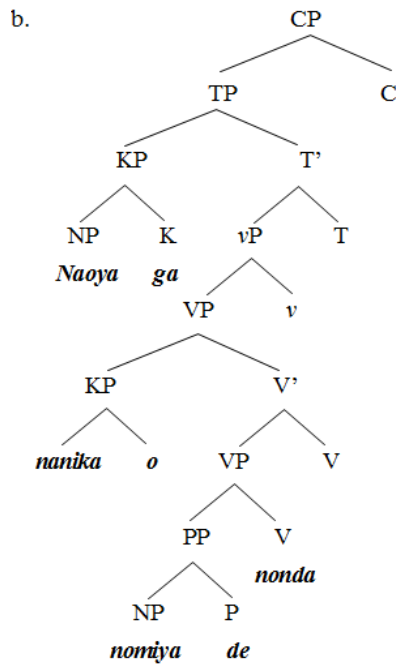
Richards (2016; see also Richards 2010) proposes that syntax can make reference to some types of phonological information. As a result, syntax generates a prosodic representation as the derivation proceeds, alongside the syntactic representation. Richards' approach to prosodic representation is based on Match Theory (Selkirk 2009, 2011; Elfner 2012; Clemens 2014, among others). Unlike end-based theories of prosody (Selkirk 1984; Selkirk and Tateishi 1988, among others), whereby languages are classified into two types depending on which edge of maximal projections is mapped onto a prosodic boundary, Match Theory proposes that all languages have prosodic boundaries both at left and at right edges of all maximal projections. However, languages differ depending on which edges of maximal projections certain prosodic phenomena are associated with. Richards refers to boundaries that have prosodic effects as *prosodically active*. A set of representative mapping principles in Match Theory is the following:

- (10) a. Every syntactic (possibly complex) head corresponds to a prosodic word ω .

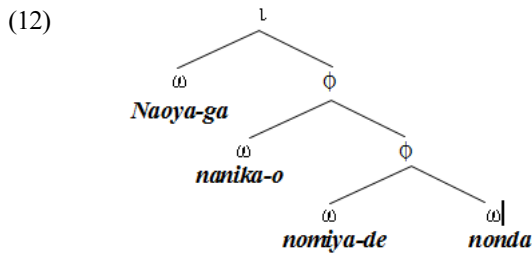
- b. Every XP corresponds to a phonological phrase ϕ .
- c. Every clause corresponds to an intonational phrase ι .

For instance, the Japanese sentence in (11a) has the syntactic tree represented in (11b).

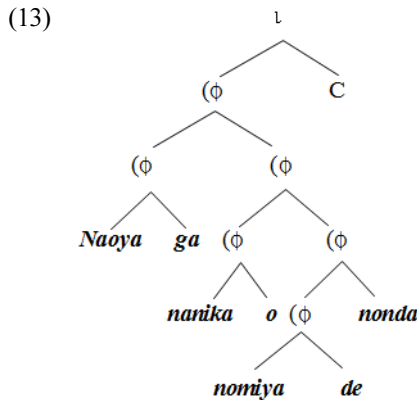
- (11) a. Naoya-ga nanika-o nomiya-de nonda.
 Naoya-NOM something-ACC bar-at drank
 ‘Naoya drank something at the bar.’



According to Match Theory, the syntactic tree in (11b) is mapped onto the prosodic tree in (12), which is the result of applying pruning to the syntactic tree. That is, only phonologically contentful elements in the syntactic representation are preserved in the prosodic one. Meanwhile, the declarative complementizer, which is phonologically null in Japanese, is absent in the tree. Additionally, the Japanese case morphemes are not treated as independent prosodic words.



Richards, however, proposes that the prosodic tree created in the narrow syntax is more isomorphic to the syntactic tree than Match Theory suggests, as illustrated in (13).



The prosodic tree in (13) differs from that in (12) in three respects. First, as for the complementizer, it is present in the prosodic tree, even though it ends up without phonological content. The reason is as follows: In Japanese, unlike the complementizer in (11b), interrogative complementizers are overtly pronounced. This means that whether or not a particular complementizer is pronounced is due to lexically idiosyncratic properties, and thus, the fact that a particular complementizer is phonologically null is represented neither in the narrow syntax nor in the accompanying prosodic structure. Consequently, within the narrow syntax, complementizers are not treated as phonologically null elements, but considered as an eligible object in creating prosodic trees generated by the narrow syntax. In other words, syntactic objects whose phonological realization is determined by lexically

idiosyncratic properties are visible in prosodic trees within the narrow syntax. Consequently, the prosodic tree generated by the narrow syntax contains null complementizers. Second, even though the case morphemes are dependent on their associated nouns, they are represented as independent words within the narrow syntax. Finally, in the case of Japanese, certain prosodic phenomena such as Initial Lowering are associated with the left edges of prosodic phrases. Due to this, in this language, the left edges of phonological phrases are phonologically active. In (13), prosodically active edges are represented as parentheses to the left of every ϕ .

Next, let us consider the interrogative sentence in (14), corresponding to the declarative sentence in (11a).

- (14) Naoya-ga nani-o nomiya-de nonda no?
 Naoya-NOM what-ACC bar-at drank Q
 ‘What did Naoya drink at the bar?’

Richards proposes that *wh*-questions universally obey the following prosodic condition, called *Contiguity*.

(15) **Contiguity**

Given a *wh*-phrase α and a complementizer C where α takes scope, α and C must be dominated by a single ϕ , within which α is *Contiguity-prominent*.⁵

(16) **Contiguity-prominent**

α is Contiguity-prominent within ϕ if α is adjacent to a prosodically active edge of ϕ .

5 A reviewer asks what happens if only phonologically contentful Cs were visible at the phonological representation. If phonologically null C were not present in the phonological representation, as the Match theory assumes, there is no way to explain what triggers overt *wh*-movement without positing a strong feature in C. Similarly, we have to use weak features of C to explain *wh-in-situ*. Richards’ (2016) Contiguity tries to uniformly account for why *wh-in-situ* is allowed in some languages, but not in the other languages, regardless of whether C containing Q is overtly pronounced or not. Contiguity, based on the syntax-phonology interface, can get rid of the distinction between weak and strong feature, and account for seemingly unrelated syntactic operations in a uniform way, such as selection and head movement (For more information, see Richards 2016).

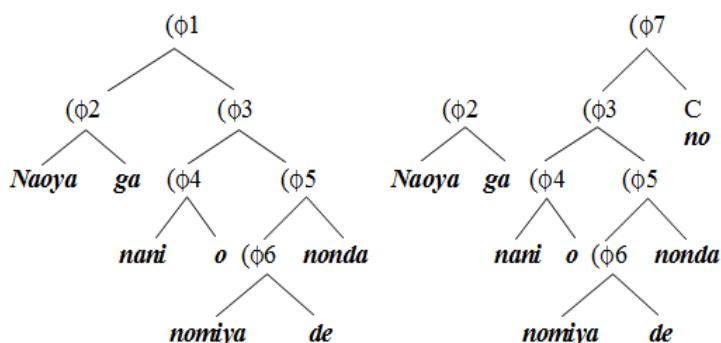
One of the ways of satisfying Contiguity between an interrogative C and a *wh*-phrase, which is relevant to the current discussion, is Grouping. This is an operation that alters prosodic structure.

(17) **Grouping**

Given a *wh*-phrase α and a C with which α is in a Probe-Goal relation, created a ϕ which dominates C and has α at one of its edges.

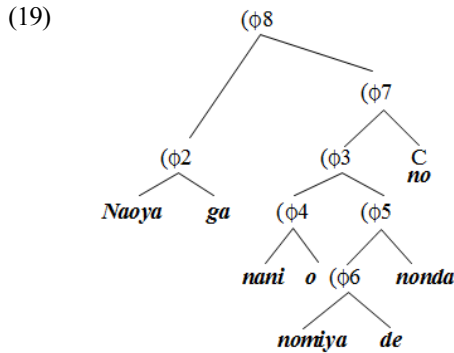
Recall that prosodic structures are generated as the derivation proceeds. Before C merges with TP, the prosodic structure of TP can be illustrated as in (18a). For the expository purpose, the ϕ nodes are numbered, following Richards (2016). When C merges with TP, Grouping applies to C, generating (18b).

(18) a. STEP 1. Completion of TP b. STEP 2. Merger of C + Grouping



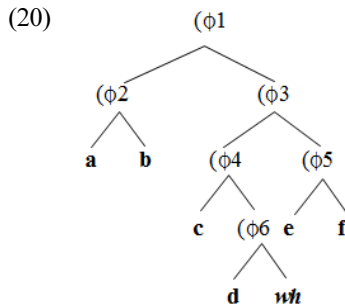
As a result of Grouping, the phonological phrase $\phi7$ containing C and the *wh*-phrase that Agrees with it is created. In addition, the *wh*-phrase is contiguity-prominent, in that the *wh*-phrase is adjacent to the prosodically active edge $\phi7$ (i.e. any prosodic effect associated with the prosodically active edge $\phi7$ is realized on the *wh*-phrase). Consequently, this derivation satisfies the phonological constraint in (15). When CP is completed, the CP node is mapped onto a new ϕ to obey the general condition in Match theory, namely (10b). This is illustrated in (19).⁶

⁶ The highest phonological phrase in (19) can form an intonational phrase, according to the Match



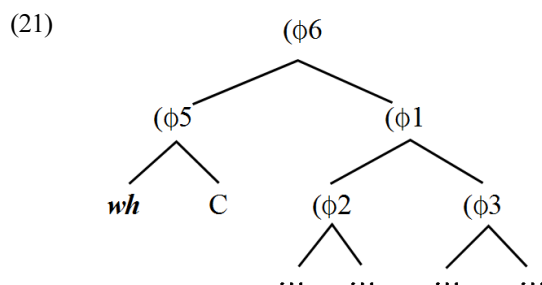
As shown above, through Grouping, Japanese *wh*-questions come to obey the prosodic condition in (15) without movement. Thus, this language allows *wh-in-situ*.

Now, imagine languages where prosodically active edges are left edges of maximal projections and the CP projection is head-initial. Tagalog is such a language. The representation of TP in such a language, prior to merger of C, is illustrated in (20) (individual letters in terminal nodes represent lexical items).



When C merges with TP in the narrow syntax, Grouping cannot occur with the *wh*-phrase remaining in its base-position. That is, there is no way to create a phonological phrase ϕ which dominates C and has the *wh*-phrase at its active edge. In this case, in order to comply with (15), the *wh*-phrase moves to C. As a result, *wh*-movement alters the prosodic structure as illustrated in (21).

Theory. However, it is represented as a phonological phrase for the sake of simplicity of discussion.



In this prosodic tree, the *wh*-phrase and the complementizer are dominated by $\phi 5$, and the *wh*-phrase is adjacent to a prosodically active edge of $\phi 5$. This is because the *wh*-phrase is located in the left edge of $\phi 5$. Thus, this derivation satisfies the prosodic condition in (15).

Richards argues that Tagalog is an instance of languages using this strategy for the satisfaction of the prosodic condition in (15). In English, a complementizer is head-initial. I assume in this paper that the left edges of phonological phrases are phonologically active, similar to Tagalog. Consequently, English *wh*-phrases have to overtly move to satisfy the prosodic condition in (15). According to Richards' logic, if the right edges of phonological phrases were phonologically active in English, and thus, English were the mirror image of Japanese, then *wh-in-situ* would be possible, contrary to fact.

To summarize, syntax can make reference to some types of phonological information. Additionally, the phonological requirement that must be satisfied in the narrow syntax can interact with syntactic operations.

4. Proposal

Richards' (2016) Contiguity theory indicates that a certain type of prosodic/phonological constraint must be satisfied in the narrow syntax. In this section, I adopt this point, and propose a prosodic condition *wh*-questions must obey.

In order to account for the ungrammaticality of (4B') (repeated here in (22B')), we can make a constraint, as represented in (23).

- (22) A: I wish I knew who brought what to the party.
 B: Me too. I have no idea who brought what.
 B': *Me too. I have no idea who did **bring what**. (Tancredi 1992)

(23) **The *wh*-question constraint**

Wh-elements which establish an appropriate dependency with C containing Q must be overtly pronounced.⁷

The generalization in (23) shows that *wh*-phrases must retain their sound, in order to participate in a syntactic operation related to C containing Q. This is possible only when relevant phonological information is visible in the narrow syntax.

In formalizing the constraint in (23), I assume the following points: first, every lexical item (including null complementizers and null operators) contains a formal feature matrix (FFM), in which formal features are contained, and a phonological feature matrix (PFM), where segmental content (i.e., phonological features) is located. In case of null complementizers, they contain a PFM, which is empty. That is, every lexical item contains two feature boxes, one of which is a FFM and the other of which is a PFM. The former box contains formal features of the lexical items, while the latter bears phonological features. The difference of them is that the FFM box is unlocked, so that syntax can make reference to the formal features, while the PFM box is locked, and thus, syntax does not know what is inside the PFM box.

Second, adopting Richards (2016), I assume that even though complementizers are phonologically null, they are relevant to the construction of prosodic structure. In my terms, every complementizer contains a PFM in the narrow syntax, regardless of whether phonological features (i.e. segmental content) are contained in the PFM or not. Based on this, we can say that there are two types of complementizers –

7 A reviewer points out that this constraint needs to be compared to Cable's (2010) theory of *wh*-movement. In Cable (2010), every *wh*-phrase externally merges with a Q(uestion)-particle, which projects a QP. He proposes that it is not *wh*-phrases themselves but Q(uestion)Ps containing a *wh*-phrase that move to their surface position. That is, since the QP containing the *wh*-phrase moves, the *wh*-phrase undergoes movement as a result of pied-piping. If this were true, then what establishes an appropriate dependency with C must be a QP containing a *wh*-phrase. However, in this paper, I entertain the assumption that the (overt) fronting of *wh*-phrases in *wh*-questions directly results from a property of the *wh*-phrase (see also Chomsky 2000).

complementizers whose PFMs are filled with segmental material, and complementizers whose PFMs are empty. The former are pronounced at PF, while the latter are not. Given this, I propose that lexical items (including null operators and null complementizers) can participate in prosodic structuring as long as they contain PFMs. That is, whether lexical items can take part in prosodic structuring in the narrow syntax is not determined by the presence/absence of the segmental content inside their PFMs, but by presence/absence of the PFM itself. This is the reason phonologically null complementizer can be present in prosodic trees. This essentially recapitulates Richards' approach to complementizers in Japanese using the terms of the present proposal.

On the basis of this, the constraint in (23) can be formalized as follows:

- (24) Every pair $\langle C, \text{wh-phrased} \rangle$ that stand in an Agree relation must be associated with PFMs $\langle \text{PFM}[C], \text{PFM}[\text{wh-phrased}] \rangle$, such that there is at least one ϕ that contains both of these PFMs.⁸

I propose that the prosodic requirement in (24) is calculated at each interrogative CP level, and that a derivation that does not obey the prosodic requirement is ill-formed.⁹

In order to account for the ungrammaticality of (22B'), I assume the following aspects: First, I adopt Chomsky's (2001) weak Phase Impenetrability Condition (PIC), whereby the complement of the phase head H is spelled-out when the next higher phase head Z is introduced into the derivation. Second, I adopt the proposal in Park (2017b) that ellipsis follows the constraint in (25), and that ellipsis is a syntactic operation that removes PFMs of lexical items inside the ellipsis site only,

8 The original Contiguity in (15) cannot account for the ungrammaticality of the sentence in (22B'). The reason is that when the *wh*-phrase is not present in any ϕ containing the complementizer, the prosodic requirement in (15) is vacuously satisfied.

9 A reviewer asks if this constraint is also applied to other types of ellipsis. The following sentences indicate that sluicing is also subject to the prosodic constraint in (24).

- (i) Someone was talking to someone, but I don't know who ~~was talking to who~~.
 $\neq$ Someone was talking to someone, but I don't know who (was talking) to who.

The first sentence in (i) cannot convey the same meaning the second sentence does. This is because the ellipsis site contains a *wh*-element, and thus, it violates the constraint in (24), similar to VPE.

which occurs during the derivation. This implies that even though the narrow syntax cannot make reference to the phonological features of lexical items, it can to the PFMs of them containing the phonological features. One consequence of this proposal is that elements that have been deprived of their PFMs can participate in further formal operations occurring after ellipsis, since they retain FFM.s.¹⁰

(25) **The timing of ellipsis**

XP ellipsis occurs as soon as all the featural requirements of the licenser of XP ellipsis are satisfied. (Park 2017b)

Now, we are ready to explain why (22B') is ungrammatical. The sentence is derived as follows: The verb merges with the object *wh*-phrase, forming VP, and subsequently *v* merges with VP. The phase head Voice merges with *v*P. The subject *wh*-phrase is base-generated in Spec,VoiceP, and the object *wh*-phrase remains inside VP. VoiceP merges with T, which functions as the licenser of VPE (Lobeck 1995, among others). T contains two featural requirements – Agree in phi-features with the subject and the EPP (namely, [*uD**]). Due to (strong) cyclicity, these two requirements are satisfied when T is introduced into the derivation, attracting the subject to Spec,TP. Just after this, the elision of *v*P occurs.¹¹ At this point, the *wh*-phrase object is inside the ellipsis site, and thus, its PFM is eliminated. When C

10 Park (2017b) proposes the constraint in (25) can account for the following asymmetry.

- (i) a. ?*I know what John should be proud of, but I have no idea about what he shouldn't be proud-of.
b. What should John be proud of, and what shouldn't he be proud-of?

When ellipsis occurs in the embedded clause, object *wh*-phrase extraction out of the ellipsis site is not allowed. On the other hand, such extraction is permitted when ellipsis occurs in the matrix clause.

Additionally, Park argues that the contrast between (iia) and (iib) shows that elements whose PFMs have already been eliminated can participate in further formal operations occurring after ellipsis.

- (ii) a. *John will be fond of all the books last year which Mary will be fond-of.
b. John will be fond of all the books last year that Mary will be fond-of.

I will not discuss in detail how Park (2017b) accounts for these asymmetries, due to space limit. I refer readers to Park (2017b) for the relevant analysis.

11 I assume here that the ellipsis site of VPE is *v*P, which is the complement of Voice, following Merchant (2008, 2013) and Aelbrecht (2010).

merges with T, *vP* is spelled-out, given that VoiceP is a phase. The [*uwh*]-feature of C Agrees with the [*iwh*]-feature of the subject in Spec,TP. However, C cannot enter into an Agree relation with the object, since this derivation violates the prosodic requirement in (24).¹² This is represented in (26). The elimination of the PFMs of lexical items is represented with grey letters.

- (26) a. [_{VP} bought what]
 b. *v* [_{VP} bought what]
 c. [_{VoiceP} who [_{VP} [_{VP} bought what]]]
 d. [_{TP} who [_{VoiceP} [_{VP} [_{VP} ~~bought what~~]]]]
 e. C [_{TP} who [_{VoiceP} (_{VP} [_{VP} ~~bought what~~]]]] → violation of (24)
-

This can also explain the well-formedness of the sentence in (6B), repeated here in (27B).

- (27) A: I wish I knew who brought what to the party.
 B: I wish I did ~~know who brought what to the party~~, too.

When the embedded C merges with TP, C enters an Agree relation with the two *wh*-phrases. At this point, they contain their PFMs since VPE occurs in the matrix clause. Thus, it can be said that the ellipsis site can contain the *wh*-phrases in (27B), since the prosodic requirement in (24) has already been satisfied before VPE in the matrix clause occurs.

5. Cross-linguistic evidence

In this section, I argue that the prosodic requirement in (24) is not restricted to English, but applied to Dutch Modal Complement Ellipsis (MCE) construction and British English *do* construction.

12 If VP is not elided, C can enter an Agree relation with the *in-situ wh*-object. This is because the *wh*-object retains its FFM. An assumption I entertain now is that two elements α and β , which c-command α , can enter an Agree relation even when α has already been spelled-out. For specific arguments, see Bobaljik and Wurmbrand (2005), and Bošković (2007), among others.

Dutch MCE can be exemplified in (28).

- (28) Jeroen wou Sarah wel een cadeautje geven, maar hij
 Jeroen wanted Sarah PRT a present give but he
 mocht niet.
 was.allowed not
 ‘Jeroen wanted to give Sarah a present, but he wasn’t allowed to.’
 (Aelbrecht 2010)

According to Aelbrecht (2010), modals base-generated in Mod selecting TP are the licensors of Dutch MCE.¹³ The ellipsis site of this construction is the complement of T, namely AspP. Briefly speaking, in this approach, when the licensor modal merges with AspP, AspP is spelled-out, and it is elided at PF.¹⁴ In this case, since AspP is sent to the interfaces, everything inside the ellipsis site cannot be visible at the further syntactic operations.

An interesting property of Dutch MCE is that *wh*-elements undergoing $\bar{A}$ -movement cannot be extracted out of the ellipsis site, as illustrated in (29).

- (29) *Ik weet niet aan wie Thomas die bloem WOU geven
 I know not to whom Thomas that flower want give
 maar ik weet wel aan wie hij MOEST
 but I know PRT to whom he must.PAST
 ‘I don’t know who Thomas wanted to give that flower to, but I do
 know who he had to.’ (Aelbrecht 2010)

13 In this analysis, the subject base-generated inside AspP, which is elided in MCE, moves to the specifier position of TP selected by Mod, where the modal is base-generated. However, in order to get the right word order, the subject moves further above the modal.

14 Aelbrecht (2010) proposes a derivational approach to ellipsis by adopting and modifying Merchant’s (2001) E-feature. In Aelbrecht’s analysis, a sister head of the phrase that deletes bears an E-feature. However, a head containing an E-feature is not necessarily an ellipsis licensor, unlike in Merchant’s proposal. That is, the licensor of XP ellipsis is distinct from a head containing an E-feature in some cases, while it is identical to a head bearing an E-feature in other cases. Based on this, Aelbrecht suggests that, as soon as the categorial feature [F] on the licensor head establishes an Agree relation with the uninterpretable inflectional feature [μ F] of the head bearing the E-feature, the ellipsis site is spelled-out. At PF, due to the phonological requirement of the E-feature, vocabulary insertion does not apply to any terminal node inside the ellipsis site, based on Halle and Marantz (1993). Thus, strictly speaking, in this approach, ellipsis is not deletion of sound.

Aelbrecht accounts for the ungrammaticality of (29) as follows: when the modal (i.e., the licenser of MCE) merges with TP, AspP, selected by T, is spelled-out. At this point, the object *wh*-phrase in (29) fails to be located outside AspP. This is because neither the phrase headed by the modal nor the phrase between the modal and AspP, namely TP, can provide a landing site for -moving elements. Thus, the *wh*-phrase must also be sent to PF, and is elided alongside AspP. The sentence in (29) is ungrammatical, since the *wh*-phrase sent to PF with AspP after spell-out cannot enter an Agree relation with C, and thus, the [*uwh*]-feature on C can never be deleted.

However, this analysis faces a non-trivial problem. Abels (2012) points out that, unlike the *wh*-element, null elements seem to be able to be extracted out of the ellipsis site in this construction.

- (30) Hij moet meer boeken lezen dan hij kan.
 he must more books read than he can
 ‘He has to read more books than he can.’ (Abels 2012: 35)

In comparative constructions, it is widely assumed that a null comparative operator must move to the highest position of the comparative clause (See Kennedy 1997). If so, the null comparative operator base-generated inside the ellipsis site in (30) can move out of the ellipsis site. Otherwise, the comparative operator fails to move to the highest position of the comparative CP, and thus, the sentence would be ill-formed, contrary to fact. Aelbrecht’s analysis predicts that the sentence in (30) would crash. The reason is as follows: since the null operator is located inside AspP at the point of ellipsis, it must be sent to the interfaces alongside AspP. Then, the null operator cannot take part in any further syntactic operation. This means that the null operator fails to move to the highest position of the comparative clause.

The asymmetry between (29) and (30) can be accounted for with the proposal by Park (2017a, 2017b) in a uniform way as follows: When the *wh*-phrase in (29) is introduced into the derivation, it contains a FFM, containing formal features, and a PFM, bearing phonological features. The elision of AspP occurs as soon as all the featural requirements of the licenser, namely the modal, are satisfied. Since the modal does not have any featural requirement, MCE occurs just after the modal merges with TP. At the point of ellipsis, the *wh*-phrase is located inside the ellipsis site (since neither ModP nor

TP above AspP can provide an intermediate landing site for the *wh*-phrase undergoing -movement), and thus, the PFM of the *wh*-phrase is eliminated. Since the *wh*-phrase retains its FFM, the [*iwh*]-feature in the *wh*-phrase can Agree with the [*uwh*]-feature of C, and the *wh*-phrase can be moved to Spec,CP. However, since its PFM has been eliminated, it must not be pronounced outside the ellipsis site. Thus, (29) is ill-formed, since the *wh*-phrase, which lacks its PFM, is pronounced.

When the null operator in (30) is introduced into the derivation, it contains a PFM, which is empty, since it is never pronounced. Even after the null operator is deprived of its PFM inside AspP, it can move further to the highest position of the comparative clause. This is because the null operator retains its FFM.¹⁵ The null operator which lacks the PFM is not pronounced, and thus, it is well-formed.

Now, consider the following sentence.

- (31) *Ik weet niet aan wie Thomas die bloem WOU geven
 I know not to whom Thomas that flower want give
 maar ik weet wel hij MOEST
 but I know PRT he must.PAST
 (lit.)‘I don’t know who Thomas wanted to give that flower to, but
 I do know he had to.’

In (31), the pied-piped *wh*-phrase (i.e., *to whom*) in the second conjunct is not pronounced. Recall that the reason (29) is ill-formed is that the *wh*-phrase which is deprived of its PFM as a result of ellipsis is pronounced outside the ellipsis site. If this is true, it is predicted that the sentence in (31) would be grammatical. This is because this derivation not only satisfies all the syntactic requirements (i.e., since the *wh*-phrase whose PFM has been eliminated can participate in further formal operations after ellipsis, the [*uwh*]-feature of C can enter an Agree relation with an [*iwh*]-feature of the *wh*-phrase, and the *wh*-phrase can be moved to Spec,CP), but also it is not pronounced.

¹⁵ One might claim that the asymmetry between (29) and (30) can be explained as follows: Originally overtly pronounced elements cannot participate in further syntactic operations after ellipsis, while null elements can. However, Park (2017b) argues that other types of originally overtly pronounced elements, such as internal heads of relative clauses and overtly pronounced comparative operators, can move further after they are deprived of their PFMs as a result of ellipsis.

I propose that the sentence (31) is ungrammatical, since the prosodic requirement in (24) is not satisfied. Since the PFM of the *wh*-phrase is removed, there is no phonological phrase ϕ that contains both the PFM of C and the PFM of the *wh*-phrase that Agrees with C.¹⁶

Another piece of evidence supporting the prosodic constraint in (24) comes from British English *do* construction, which can be exemplified in (31). In this construction, the ellipsis site is preceded by *do*.

(32) John will visit Sally, and Fred will do ___, too. (Baltin 2012)

According to Baltin (2007, 2012), the ellipsis site of this construction is VP, and the licenser is *do*, which is base-generated as a head of *v*P selected by a phase head Voice (see also Park 2013).

Similar to Dutch MCE, *wh*-phrases cannot be extracted outside the ellipsis site, as illustrated in (33).

(33) *Although we don't know what John might read, we do know what
Fred might do. (Baltin 2012)

Since *do* in *v* does not have any featural requirement (such as an EPP-feature and Agree in phi-feature), the elision of VP occurs as soon as *do* merges with VP.¹⁷ At

¹⁶ A reviewer points out that the assumption that every lexical item bears a FFM and a PFM is stipulatory and makes a theory unnecessarily complex. I partly agree with the reviewer's comments. However, I can say that this is the only way to explain how operations occurring in the narrow syntax interacts with ellipsis and extraction out of the ellipsis site, maintaining the widely accepted assumption that syntax cannot make reference to the phonological content. The proposal advanced in this paper can account for the (un)grammaticality of the sentences in (4), (29), and (30) in a uniform way, while any other analysis including Tancredi's (1992) approach cannot. For instance, Tancredi's proposal, which can account for the grammaticality of (4), cannot explain why the null operator in (30) can be extracted out of the ellipsis site, while the *wh*-element in (29) cannot. This is because he assumes that ellipsis is a post-syntactic operation. If this is so, it is expected that both the *wh*-phrase in (29) and the null operator in (30) could be extracted out of the ellipsis site – no constraint seems to be able to rule out the possibility where overt movement of *wh*-phrase and the null operator in the narrow syntax is followed by VPE occurring at a post-syntactic component.

¹⁷ One might claim that *v* has one featural requirement – Agree in phi-features with the object. However, this does not affect the timing of ellipsis. This is because that putative requirement is satisfied as soon as *do* merges with VP.

the point of ellipsis, the *wh*-phrase is located inside VP.¹⁸ As a result, the PFM of the *wh*-phrase is eliminated. The reason (33) is ill-formed is that the *wh*-phrase is pronounced, even though its PFM is eliminated within VP.

However, consider the following sentence.

- (34) Rab won't finish more than two thirds of the exam. Morag won't do, either.
(more than two thirds > not) (Thoms 2011)

Note that I assume in this paper that covert movement at LF is also triggered by some formal/syntactic features (Baltin 2012). Based on this, in (34), in order to get wide scope of the quantifier, the quantifier has to move above negation at LF. This is possible, since the scope bearing element undergoing QR retains its FFM even after the PFM of the quantifier is eliminated. If ellipsis is an operation that eliminates both PFMs and FFMs of lexical items inside the ellipsis site, it would erroneously predict that narrow scope of negation in (34) should not be permitted.

The analysis that elements whose PFMs have been removed can participate in further formal operation predicts that the following sentence would be well-formed:

- (35) *Although we don't know what John might read, we do know Fred might do.

I suggest that this sentence is also ruled out by the prosodic condition in (24) – since the PFM of the *wh*-phrase is eliminated before C is introduced into the derivation, there is no phonological phrase ϕ that contains both the PFM of C and the PFM of the *wh*-phrase that Agrees with C.

Cross-linguistic data show that the size of the ellipsis site of seemingly identical verbal domain ellipsis differs from language to language. Nonetheless, I have argued in this section that extraction out of the ellipsis site in English, Dutch MCE and British English *do* construction can be explained in a uniform way through Park's (2017a, 2017b) derivational approach to ellipsis. One consequence of this analysis is

¹⁸ According to Aelbrecht (2010) and Legate (2014), VoiceP is a phase, but vP is not. Since *v* is not a phase head, it cannot have an EPP-feature, which attracts *-moving* elements. Thus, when ellipsis occurs (i.e., when *v* merges with VP), the *wh*-phrase object is located inside the ellipsis site.

that elements whose PFMs have been eliminated as a result of ellipsis can participate in further formal operations. However, the ungrammaticality of (31) and (35) seems to indicate that Park's analysis is problematic, since *wh*-phrases which have been deprived of their PFMs do not appear to be able to take part in Agree or movement occurring after ellipsis. I have suggested that (31) and (35) are ill-formed, since they do not obey the prosodic requirement in (24), which is proposed to explain English VPE puzzle mentioned in section 2.

6. Conclusion

Even though English VPE has been actively discussed, aforementioned English VPE puzzle has been less studied. In order to resolve the puzzle, I adopted Park's (2017a, 2017b) derivational approach to ellipsis. In this approach, ellipsis is an operation that occurs during the derivation in the narrow syntax. Additionally, what is elided as a result of ellipsis is PFMs of lexical items. Since the elements whose PFMs have been eliminated retain their FFMs, they can participate in further formal operations. Based on this, I propose a prosodic constraint that requires that every *wh*-questions have to obey. This prosodic requirement can account for English VPE puzzle and the complex extraction facts in Dutch MCE and British English *do* construction in a uniform way.

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