Prosody Knows Where Prepositions can Strand in English: Beyond the Syntactic and the Functional Approach*

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0. Introduction

In this paper, I argue that the distribution of stranding prepositions in English falls under the theory of prosodic phonology (or sentence phonology). This view is not pervasive in the literature. The most prevailing approach to preposition stranding has been derived from the syntactic theory, especially generative grammar. Researchers embracing the syntactic approach have long stuck to claiming that preposition stranding is prohibited in adjunct positions because extraction from PP adjuncts runs afoul of a certain syntactic constraint (Riemsdijk 1978; Hornstein and Weinberg 1981; Chomsky 1981; Stowell 1982; and many others). However, this long-standing claim in the syntactic approach contradicts with discoveries made by researchers in terms of the functional approach. They uncovered the cases that preposition stranding is indeed possible in adjunct positions. Such facts led them to suggest that extraction from PP should be subject to functional constraints (Takami 1988, 1991, 1992, among others). The functional approach to preposition stranding, however, is said to lack in the explanatory adequacy (see Riemsdijk 1994).

* First and foremost, I would like to express my special gratitude to Kayono Shiobara. She kindly let me read her dissertation on syntax-phonology interface, which happened to put the basis for the approach presented in this paper into my head. So, it is not too much to say that she gave me the opportunity to start this study, although she might not have intended to do so. Without the opportunity, I would not have hit on any of the ideas in this paper.

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I demonstrate that the prosodic approach presented in this paper is empirically superior to both the syntactic and the functional approach. Another significant advantage of the prosodic approach is that under the approach we can account for the distribution of stranding prepositions in English by invoking only prosodic constraints already proposed in the literature without postulating any stipulation. In developing the approach, I employ prosodic constraints on the mapping between syntactic categories and prosodic constituents: *Align-XP,R*, *Wrap-XP*, and *Align-Foc*(*us*) (Truckenbrodt 1995, 1999; Selkirk 1995, 2000). These mapping constraints are independently motivated in English and other languages, as verified in the references cited above. For Truckenbrodt (1999), the constraints are subject to the Lexical Category Condition, which requires that they should apply only to lexical, phonologically visible categories and their projections. When a sentence contains syntactic categories that are not translated into prosodic constituents on every level of prosodic hierarchy, its phonological representation is said to fail to be exhaustively parsed. Such sentence is ruled out by the Strict Layer Hypothesis, which dictates that phonological parsing must be exhaustive on all the levels of prosodic hierarchy (Selkirk 1984, 1995). This paper shows that the prosodic constrains mentioned above, together with the Lexical Category Condition and the Strict Layer Hypothesis, govern the way stranding prepositions are distributed in English.

In section 1, I set forth data concerning the distribution of stranding prepositions in English, then bringing up problems to be solved in this paper. The data presented are pertinent solely to preposition stranding in *wh*-interrogative clauses. In section 2, I review the two previous approaches mentioned above, pointing out their empirical drawbacks. In section 3, I sketch out the theory of mapping from syntactic categories to prosodic constituents, and in section 4, based on this theory, I propose a prosodic approach to the

distribution of stranding prepositions in English, showing that this approach gives straightforward accounts to the problems raised in section 1. As a result, it will turn out that the prosodic approach in this paper overcomes the empirical faults in the syntactic and the functional approach. In section 6 I try to extend the prosodic approach in section 4 toward preposition stranding in Spanish. The result of this attempt will be shown to reinforce the present approach. Section 5 is the conclusion of this paper.

1. Data and problems

English is a language that permits preposition stranding in *wh*-interrogative clauses. This is exemplified in (1) (taken from Takami 1992).

(1) a. Whom did John write the letter [$_{PP}$ to *t*] after the party?
b. Which island did the pirates bury the treasure [$_{PP}$ on *t*] after the attack?

In (1) *wh*-movement extracts the *wh*-phrases *whom* and *which island* from the PP complements of the verbs *write* and *bury*, leaving behind the prepositions *to* and *on*. It is not the case, however, that prepositions are always allowed to strand in complement positions. (2) illustrates the point.

(2) a. *Whom did John write the letter after the party [$_{PP}$ to *t*]?
(Cf. John wrote the letter after the party to Mary.)
b. *Which island did the pirates bury the treasure after the attack [$_{PP}$ on *t*]?
(Cf. The pirates buried the treasure after the attack on the island.)

(2) differs from (1) in that the PP complements of the verbs *write* and *bury* are dislocated to the rightmost positions in the sentences, preceded by the adverbial phrases *after the party* and *after the attack*. Although the corresponding *wh*-extraction is implemented in both (1) and (2), the latter deteriorates the acceptability of preposition stranding in the complement position. The unacceptability of (2) cannot be ascribed to the patterns of word order therein, as indicated by the acceptable conferred sentences. In this context, it is worth pointing out

that rightward dislocation becomes possible only when the dislocated element (here *to Mary* or *on the island*) is associated with a sort of emphasis or a focus interpretation.

When prepositions strand in adjunct positions, their distribution is more restricted. Consider the following examples in this respect (examples from (3) to (5) are taken from Takami 1992).

(3) a. Which party did John write the letter [PP after *t*]?
b. Which attack did the pirates bury the treasure [PP after *t*]?

(4) a. *Which party did John write the letter to Mary [PP after *t*]?
b. *Which attack did the pirates bury the treasure on the island [PP after *t*]?

(5) a. ??Which party did John write the letter [PP after *t*] to Mary?
b. *Which attack did the pirates bury the treasure [PP after *t*] on the island?

In (3) the *wh*-phrases *which party* and *which attack* are extracted from the PP adjuncts, leaving the preposition *after* in situ. These sentences are acceptable. In (4) the PP adjuncts are preceded by the PP complements of the verbs *write* and *bury*. As shown, *wh*-extraction from these PP adjuncts results in the unacceptability. Examples (5) are also unacceptable, where the PP adjuncts are followed by the PP complements. Again, the unacceptability of (5) is not due to the patterns of word order therein (see the conferred sentences in (2)).

We have seen that in English, prepositions are not always permitted to strand in either complement or adjunct positions. The acceptability of preposition stranding depends on its position within the sentence. Sentential contexts also have an effect on the possibility of preposition stranding. (6) and (7) exemplify the point (these examples are taken from Takami 1992).

(6) ??/*Which party did John bury the letter [PP after *t*]?

(7) a. *Which vacation did John go to Hawaii [PP during *t*]?
b. A: They all went to Hawaii during their vacations: Peter and David went to Hawaii during the winter vacation, and Jane during the summer vacation.
B: I see. Which vacation did John go (to Hawaii) [PP during *t*], then?

(6) is a minimal pair of (3a) with the verb *write* replaced by *bury*. Although *wh*-extraction in (6) corresponds with that in (3a), the acceptability of (6) is badly degraded. (7a) is also unacceptable on a par with (4). Interestingly, however, (7a) becomes acceptable when it is used in the context which puts an emphasis on the duration of John's trip, as shown in (7b).

To summarize this section, the problems to be solved concerning the distribution of stranding prepositions in English are as follows: (i) why the acceptability of preposition stranding is contingent upon its position within the sentence?; (ii) why preposition stranding is more restricted in adjunct positions than in complement positions?; and, (iii) why sentential contexts affect the acceptability of preposition stranding? In this paper, I seek to elucidate all the three problems in terms of the prosodic approach proposed here.

2. A critical review of syntactic and functional approaches

As mentioned in introduction, the approach based on the syntactic theory has been predominant in the literature on preposition stranding in English. For elucidating when preposition stranding is possible, many researchers invoked different devices or principles in terms of syntactic theory. Riemsdijk (1978) employed Fiengo's (1974) constraint on extraction. He dubbed it the Head Constraint (HC), formulating it as in (8) below. The HC (8) states that no syntactic relation is established between H's complement and any position outside HP unless H is phonologically empty: that is, extraction is prohibited from phrases headed by phonologically visible elements. Hornstein and Weinberg (1981) postulated a sort of filter in the form (9). The filter (9) penalizes the assignment of oblique Case to empty categories like traces. Chomsky (1981) and Stowell (1982), among others, attempted to account for the issue in question in terms of the Empty Category Principle (ECP), defined as in (10). The ECP (10) requires that empty categories including traces should not be left in

the positions which are not properly governed.

(8) No rule may involve X_i/X_j and Y_i/Y_j in the structure
... X_i ... $[_{H^n}$ ... $[_{H'}$ ... Y_i ... H ... Y_j ...$]_{H'}$ ... $]_{H^n}$ ... X_j ...
where H is the phonologically specified (i.e. non-null) head and H^n is the maximal projection of H.

(9) $*[_{NP}\ \underset{\text{oblique}}{e}\ ]$

(10) $[_\alpha\ e]$ must be properly governed.[1]

(Chomsky 1981: 250)

These three analyses in terms of the syntactic theory (i.e. the accounts based on the HC, the Case filter, and the ECP, respectively) share the hypothesis that the grammar of English is able to utilize a syntactic mechanism for coalescence of prepositions with verbs. The mechanism has been referred to as reanalysis or incorporation in the literature.[2] The three syntactic analyses consent to claim that the mechanism applies only to prepositions under the selection by verbs. Namely, prepositions heading PP complements can be coalesced with verbs, while those heading PP adjuncts cannot undergo such coalescence because of not being selected by any verbs.

However, the three syntactic analyses are differentiated from each other with respect to the treatment of prepositions and the effect of preposition-verb coalescence. In the HC

[1] Government and proper government are defined in (i) and (ii), respectively.

(i) $[_\beta$ ... γ ... α ... γ ...], where
a. $\alpha = X^0$ or is coindexed with γ,
b. where β is a maximal projection, if β dominates γ then β dominates α
c. α c-commands γ
In this case, α governs γ.

(adapted from Chomsky 1981: 250)

(ii) α properly governs β if and only if α governs β and α is lexical.

(Chomsky 1981: 273)

[2] Strictly speaking, the reanalysis and the incorporation are different operations. The reanalysis is a restructuring operation, by which a string of words is transformed into one word. In, for example, *whom did John* [*write the letter to*]*?*, the reanalysis restructures the bracketed portion into the single word. The existence of such operation in the grammar is dubious, as argued by several researchers (see, for example, Baltin and Postal 1996). On the other hand, the incorporation is a sort of head movement. It may apply at the surface structure or at the covert component. In English, it applies covertly because it does not manifest any phonological effect.

analysis, no stipulation is added about the nature of prepositions, and the coalescence mechanism is simply a device to combine prepositions with verbs. As a result of the coalescence, the base positions of prepositions are rendered phonologically empty.

In the Case-filter analysis, prepositions are regarded as oblique Case assigners. Therefore, the complements of prepositions are assigned oblique Case by them. The coalescence mechanism in the analysis behaves as a technique to disable prepositions from assigning oblique Case. Once a preposition is coalesced with a verb, the resulting amalgam assigns accusative Case to the complement of the preposition.

The ECP analysis stipulates that prepositions do not belong to the class of proper governors. In the analysis, hence, the complements of prepositions are positions that are not properly governed. The effect of the coalescence mechanism in the ECP analysis is that the combination of prepositions with verbs makes it possible for the verbs to govern the positions which the prepositions governed in their base positions (cf. the Government Transparency Corollary of Baker 1988). Owing to this effect, the complements of prepositions turn to be properly governed by verbs after the application of the coalescence mechanism.

In the light of the rough sketches for the three syntactic analyses, we find that they converge to manifest the same prediction that extraction is possible from PP complements but not from PP adjuncts. The HC analysis expects extraction to be permitted from PP complements but not from PP adjuncts in conformity with the HC (8), because the heads of the former can, but those of the latter cannot, be phonologically emptied by means of preposition-verb coalescence.

The Case-filter analysis predicts that extraction from PP is disallowed as far as it leaves a trace in a position assigned an oblique Case by the preposition. This situation emerges when extraction is implemented from a PP adjunct. Such extraction creates a trace

in the position to which the preposition assigns an oblique Case. Traces in such positions are excluded as illegitimate ingredients by the Case filter (9). When extraction is executed out of a PP complement, the situation differs. When the head of a PP complement is coalesced with the selecting verb, its complement position is no longer assigned an oblique Case. Therefore, extraction from PP complements avoids violating the Case filter (9).

The prediction of the ECP analysis is that extraction from PP is prohibited unless it produces a trace in a position under proper government. Because it is stipulated that prepositions are not proper governors on their own, traces induce a violation of the ECP (10) when in the complements of prepositions. However, once prepositions are coalesced with the verbs that select them, their complement positions turn to be properly governed by the verbs combined with them. Therefore, extraction from PP complements evades violating the ECP (10). On the contrary, extraction from PP adjuncts fails to satisfy the ECP (10) since it is doomed to leave a trace in a position that is not properly governed.

The consensus prediction of the three syntactic analyses, however, is far from borne out empirically. We observed in section 1 that in English there are some cases where extraction is permitted from PP adjuncts (see (3) and (7a)). In addition, extraction from PP complements gives rise to unacceptability in a certain case (see (2)). The syntactic analyses fail to capture these facts. On top of this, they do not take into consideration any contextual effect on the acceptability of preposition stranding (see (6) and (7)). Accordingly, it is concluded that the syntactic analyses thus reviewed suffers from several empirical problems to be explained. The syntactic approach to preposition stranding, therefore, is empirically untenable.

Most of the empirical faults that we have found in the syntactic approach were originally revealed by Takami (1988, 1991, 1992). He accumulated empirical evidence

against the syntactic approach, then proposing an alternative approach in terms of functional grammar. In order to explain when extraction is possible out of PP, he propounded the functional constraint (11).

(11) An NP can be extracted out of a PP only when the NP may itself be interpreted as being more important than the rest of the sentence.
(Takami 1992: 36)

The constraint (11) punishes extraction from PP such that it extracts a noun phrase bearing less important information than other elements in the sentence.

The functional constraint (11) is in a total harmony with the acceptability of (1), (3) and (7b) and the unacceptability of (4), (5), (6) and (7a). As we will see later (section 4), the extracted *wh*-phrases in the former set of sentences carry the most important information in the sentences, but those in the latter set do not. However, the functional constraint (11) does not fare with the unacceptability of (2). In (2) the *wh*-phrases are extracted from the PP complements dislocated to the rightmost positions in the sentences. As already indicated, a dislocated element is assigned a sort of emphasis, therefore regarded as more important than the rest of the sentence. If the functional constraint (11) is correct, *wh*-extraction in (2) should result in acceptability, contrary to fact. In this respect, the functional approach based on (11) is empirically defective. The constraint (11), in the first place, is merely a descriptive generalization, giving no explanation for why noun phrases cannot undergo extraction from PP unless they are interpreted as the most important in sentence (for other criticism about the functional approach to preposition stranding, see Riemsdijk 1994).

3. Prosodic phonology: the mapping between syntactic categories and prosodic constituents

The prosodic approach I aim to develop in this paper hinges primarily on the following constraints on the mapping from syntactic categories to prosodic constituents.

(12) i. *Align-XP,R* = Align(XP, R; P, R)
"Each XP is aligned with the right edge of a phonological phrase."
ii. *Wrap-XP*
"Each XP is contained in a phonological phrase."
iii. *Align-Foc* = Align(Foc, R; P, R)
"Each focused constituent is aligned with the right edge of a phonological phrase"

Align-XP,R in (12i), which is formulated by Selkirk (1995), calls for the right-edge alignment of syntactic phrase with phonological phrases (hereafter, p-phrases). The phrasing pattern in (13) displays some instances in point

(13) $(\text{John})_{\text{P}}$ $(\text{wrote the letter})_{\text{P}}$ $(\text{to Mary})_{\text{P}}$
$[\text{John}]_{\text{NP}}$ $[[\text{wrote}]_{\text{V}}$ $[\text{the letter}]_{\text{NP}}$ $[\text{to Mary}]_{\text{PP}}]_{\text{VP}}$

In (13) the right edges of the two NPs *John* and *the letter* are aligned with the right boundaries of p-phrases. The pattern of phrasing in (13) is natural under a neutral information context and a moderate rate of speech. It should be noted here that no phonological boundary is inserted between the verb *wrote* and its complement *the letter*. This is because the right edge of the verb does not coincide with the right edge of a syntactic phrase.

In English, syntactic phrases are not always right-aligned with p-phrases, however. (14) illustrates the point.

(14) $(\text{John})_{\text{P}}$ $(\text{wrote the letter to Mary})_{\text{P}}$
$[\text{John}]_{\text{NP}}$ $[[\text{wrote}]_{\text{V}}$ $[\text{the letter}]_{\text{NP}}$ $[\text{to Mary}]_{\text{PP}}]_{\text{VP}}$

The phrasing pattern of (14) is as natural as that of (13) in English. (14) diverges from (13) in that the NP complement *the letter* of the verb *wrote* is not followed by any phonological boundary: all the materials except for the subject *John* are contained in one and the same p-phrase.

In order to account for a phrasing pattern like (14), Selkirk (2000) exploits the mapping constraint *Wrap-XP* in (12ii). The constraint (12ii) was originally proposed by

Truckenbrodt (1995, 1999) for the purpose of explaining the fact that no phonological boundary is inserted within syntactic phrases in a number of languages (like Tohono O'odham and Chichewa). The demand of *Wrap-XP* is that each unit of syntactic phrases should be encompassed in a single p-phrase. Its function is cohesional in the sense that a syntactic phrase fails to observe the constraint when its ingredients are phrased in separate p-phrases. The phrasing pattern in (14) satisfies the demand of *Wrap-XP*, since the VP is entirely contained in a single p-phrase. The obedience of *Wrap-XP* in (14), however, costs a violation of *Align-XP,R* with respect to the NP complement *the letter*. In (13), on the contrary, *Wrap-XP* is violated since the VP has two distinct p-phrases.

In this manner, *Wrap-XP* (12ii) collides with *Align-XP,R* (12i) in their demands: the former favors a smaller number of phonological boundaries, while the latter wants a phonological boundary after each syntactic category. Therefore, these constraints should be viewed as violable and equally ranked (*á la* Prince and Smolensky 1993). In order to explain the phrasing alternation between (13) and (14), we need to assume that *Wrap-XP* and *Align-XP,R* constitute part of the grammar for phonological phrasing in English. However, the alternation would fail to be captured if either of the two constraints were dominated by the other in ranking hierarchy (Selkirk 2000). If *Wrap-XP* were to outrank *Align-XP,R*, the phrasing pattern (15) in esteem of *Wrap-XP* would be chosen as more "optimal" than the phrasing pattern (14) in esteem of *Align-XP,R*. The reverse would also hold if *Align-XP,R* were to outrank *Wrap-XP*. As mentioned, both (14) and (15) are equally natural patterns of phrasing in English. Needless to say, both would not be attested if neither *Aligh-XP,R* nor *Wrap-XP* tolerated being violated.

When focus is taken into account, the situation becomes more complicated. For instance, when focus is put on the verb *wrote* in *John wrote the letter to Mary*, the emerging

pattern of phrasing is (15a).

(15) a. $(\text{John})_{P}$ $(\text{wrote}_{F})_{P}$ $(\text{the letter})_{P}$ $(\text{to Mary})_{P}$
b. *$(\text{John})_{P}$ $(\text{wrote}_{F})_{P}$ $(\text{the letter to Mary})_{P}$
$[\text{John}]_{NP}$ $[[\text{wrote}_{F}]_{V}$ $[\text{the letter}]_{NP}$ $[\text{to Mary}]_{PP}]_{VP}$

It is noteworthy in (15a) that the focused constituent *wrote* is followed by a phonological boundary. Such effect of focus on phonological phrasing is couched in the prosodic constraint *Align-Foc* (12iii), which is originally proposed by Truckenbrodt (1995, 1999) (see also Selkirk 2000). *Align-Foc* demands a phonological boundary after each focused constituent.[3] The epenthesis of a phonological boundary between the focused verb *wrote* and its complement *the letter* in (15a) satisfies this demand. I would like here to assume without argument that *Align-Foc* is indifferent to whether a focused constituent is presentational or contrastive. In general, every sentence conveys presentational focus event under a out-of-blue context, while contrastive focus is exhibited only under the relevant context (for more details, see Kiss 1998, among others). Although presentational focus and contrastive focus are distinguished in this and other respects, they have the effect of right-edge alignment with p-phrases in common.[4]

The right-edge alignment of the verb *wrote* with a p-phrase in (15a), however, entails

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[3] The right-edge alignment effect by focus is also captured by the conspiracy of the two prosodic constraints *Stess-Focus* and *Head-P*, which are formalized by Samek-Lodovici (2005) based on other researchers' insights, as in (i) and (ii), respectively.

(i) *Stress-Focus*:
For any XP_f and YP in the focus domain of XP_f, XP_f is prosodically more prominent than YP.

(ii) *Head-P*:
Align the right boundary of every phonological phrase with its head.

The head of a p-phrase is identified with the prosodically most prominent position within that p-phrase. Taking (15) as an example, the focused verb *wrote* must be more prominent than the rest of the sentence, by virtue of *Stress-Focus* (i), and hence it must be right-aligned with a p-phrase by virtue of *Head-P*. The discussion in this paper proceeds with neither *Stress-Focus* nor *Head-P* employed.

[4] Contrastive focus is also followed by an intonational break. In this respect too, it is differentiated from presentational focus, after which no intonational break is required. See Selkirk (2002) for more details.

a violation of *Align-XP,R* (12i), since its right edge does not coincide with the right edge of a syntactic phrase. *Wrap-XP* is also disobeyed in (15a), because the VP is not encompassed within a single p-phrase. Therefore, *Align-Foc* (12iii) dominates the other two constraints *Align-XP,R* and *Wrap-XP*: otherwise, (15a) would not be an optimal option over (15b). The ranking hierarchy is represented in (16) (the semicolon between *Align-XP,R* and *Wrap-XP* is used to signal that the two constraints are the same ranked).

(16) *Align-Foc* > *Align-XP,R*; *Wrap-XP*

Interestingly, in (15a) the two complements *the letter* and *to Mary* of the verb *wrote* are contained in distinct p-phrases. (15b), where these complements are phrased together in a single p-phrase, is an incorrect pattern of phrasing in English under the context in question. The preference of (15a) over (15b) follows in a straightforward manner. In (15a), *Align-XP,R* is violated once with respect to the verb *wrote*, and *Wrap-XP* is violated once with respect to the VP. (15b) costs additional violations of the two constraints. Specifically, one more violation of *Align-XP* is involved because the complement *the letter* is not right-aligned with a p-phrase, and one more violation of *Wrap-XP* is also involved because the two complements of the verb *wrote* are wrapped together in a single p-phrase regardless of not forming a single unit of syntactic phrase. Therefore, the phrasing pattern of (15a) is more "optimal" than that of (15b) since the former incurs the smaller number of violations of the prosodic constraints than the latter.

In this paper, I assume, following Truckenbrodt (1995, 1999), that the prosodic constraints in (12) must obey the Lexical Category Condition (LCC) in (17).

(17) *The Lexical Category Condition*:
Mapping constraints from syntactic phrases to prosodic constituents apply to neither functional nor empty categories, but only to lexical categories.

The LCC dictates that it is only lexical, phonologically visible, syntactic categories that are susceptible to the constraints on the syntax-prosody mapping (cf. also Selkirk 1984).

To see how the LCC works, consider how *Wrap-XP* derives the correct pattern of phrasing (18a) from a finer-grained syntactic structure than before.

(18) a. $(\text{John})_{\text{P}}$ $(\text{wrote the letter})_{\text{P}}$
b. *$(\text{John wrote the letter})_{\text{P}}$
c. *$(\text{John})_{\text{P}}$ $(\text{wrote})_{\text{P}}$ $(\text{the letter})_{\text{P}}$
$[[\text{John}]_{\text{NP}}\ \text{T}\ [t_{\text{NP}}\ [\text{wrote}_{\text{V}}]_{v}\ [t_{\text{V}}\ [\text{the letter}]_{\text{NP}}]_{\text{VP}}]_{v\text{P}}]_{\text{TP}}$

In the syntactic structure depicted above, a functional category TP and a light verb phrase *v*P are projected, which have been ignored for the purpose of simplicity. In addition, the verb *wrote* moves to the light verb *v* from the lower VP, vacating its original position. TP is headed by a tense, furnished with a specifier for the landing site of subject raising from *v*P. The light *v*P is a well-established category in the current syntactic theory (especially, in the sophistication of verb phrase structure in terms of the recent theory of generative grammar), which has been argued to necessarily project in the verb phrase structure irrespectively of the verb's transitivity (i.e., whether the verb is transitive or intransitive) (see Arad 2002 and Legate 2003, for example).

If the functional category TP were subject to *Wrap-XP*, it would be entirely translated into a single p-phrase as in (18b). This pattern of phrasing is ungrammatical in English, however. If *Wrap-XP* were able to apply to the VP whose head is emptied by V-to-v raising, the NP *the letter* would be contained in a single p-phrase since it is only the phonological material that the VP includes in itself. As a result, it would be phrased separately from the verb *wrote* as in (18c). This phrasing pattern is unnatural with no focus on the verb. These facts suggest that neither functional nor empty categories are susceptible to *Wrap-XP*. This is exactly as expected under the LCC (17). The phrasing pattern of (18a) is only the

candidate which is derivable from the syntactic structure under the LCC (17). The wrapping of the subject NP *John* and the light *v*P in distinct p-phrases observes the LCC, since both are lexical, phonologically visible categories.

A question which immediately arises, then, is how functional but phonologically visible categories go through phonological parsing on the level of p-phrases. Under the LCC (17), such a category is not right-aligned with a p-phrase nor is contained in a single p-phrase. If all syntactic categories in a sentence are not parsed on every level of prosodic hierarchy (intonational phrases, p-phrases, prosodic words, feet, and syllables), it constitutes a violation of the Strict Layer Hypothesis (SLH) (or the exhaustivity requirement) formulated as in (19) (Selkirk 1984, 1995).

(19) *The Strict Layer Hypothesis*:
Each prosodic constituent of layer *j* is dominated by another constituent of layer *j+1*.

Under the definition of (19), sentences are ruled out whose phonological representations contain, for instance, p-phrases (layer *j*+1) that immediately dominate feet (layer *j*-1) that are not dominated by prosodic words (layer *j*). I would like here to contend that the SLH do not participate in ranking hierarchy (contra Selkirk 1995 and Truckenbrodt 1999). In this paper, the SLH acts as a legibility condition on the phonological interface, surveiling the phonological legibility of linguistic sentence on that interface. If a sentence contains prosodic materials that remain unparsed on any level of prosodic hierarchy, its phonological representation is filtered out as illegible by the SLH. The sentence is thus regarded as unacceptable.

In order to circumvent a violation of the SLH, functional categories avail themselves of two possible means. One way is to exercise cliticization: functional categories can escape from violating the SLH by cliticising to prosodic elements on their recursive sides (cf. Nespor

and Vogel 1986). Such cases are already shown in (15a) above. The determiner *the* in *the letter* and the preposition *to* in *to Mary* are both functional, but they are included in the p-phrases around the nouns *letter* and *Mary*, respectively. The inclusion of *the* and *to* within the respective p-phrases is owing to their cliticization to the prosodic elements *letter* and *Mary* on their recursive side.

Secondly, functional categories can avoid violating the SLH when staying within lexical, phonologically visible syntactic phrases. In this case, they are taken in p-phrases around such syntactic phrases, as schematized in (19).

(19) $(X_L\ Y_F)_P$
$[X_L\ [Y_F]_{YP}]_{XP}$ (where X and Y are lexical and functional, respectively, and both are phonologically visible)

In (19) the functional category Y is parsed together with the lexical category X in one and the same p-phrase around the lexical phrase XP. The containment of both X and Y in a single p-phrase does not conflict with the demand of *Wrap-XP* under the LCC (17).

A syntactic configuration like (19) is exactly analogous to a construction under which a preposition strands within a verb phrase, which we are concerned with in this paper. As prepositions are functional, they have to cliticize to prosodic elements on their recursive side or reside inside lexical, phonologically visible syntactic phrases: otherwise, they would not undergo the parsing on the level of p-phrases, inducing a violation of the SLH. Prepositions, when stranding, must press the second means into service, because they are deprived of their complements on their recursive sides by means of extraction. Therefore, stranding prepositions are obliged to stay within lexical syntactic phrases like verb phrases, for the purpose of accomplishing the exhaustive parsing of phonological representation. This expectation is empirically correct, as I will demonstrate in the following section.

4. A prosodic approach to the distribution of stranding prepositions in English

Having outlined the prosodic theory I adopt in this paper, I begin to explain how stranding prepositions are distributed in English. First of all, I have to identify focus positions in the sentences surveyed in section 1, since, as already noted, focus plays an important role on phonological phrasing. In this paper, I am assuming that both presentational and contrastive foci are susceptible to the prosodic constraint *Align-Foc*. As all the examples except for (7b) in section 1 are sentences under out-of-blue contexts, they are naturally expected to exhibit at least presentational foci. Contrastive focus is relevant only in (7b), where the duration of John's trip is contrasted with that of others' trips. In the ensuing discussion, I refer to either presentational or contrastive focus merely as focus.

Among several diagnostics for detecting foci in sentences, I put the negation test into use: the domain of negation is in general said to be identical with the position of focus. The sentences given in section 1 are reformulated into the following negative sentences (the domain of negation is marked with small capitals).

(21) a. John didn't write the letter after THE PARTY.
b. The pirates didn't bury the treasure after THE ATTACK.

(22) a. John didn't write the letter to MARY after the party.
b. The pirates didn't bury the treasure on THE ISLAND after the attack.

(23) a. John didn't write the letter after the party to MARY.
b. The pirates didn't bury the treasure after the attack on THE ISLAND.

(24) John didn't BURY the letter after the party.

(25) John didn't go to HAWAII during the summer vacation.

(21) are the negative counterparts of (3). In (21), with a neutral information structure, the domain of negation falls on the noun phrases *the party* and *the attack* in the PPs. This fact is compatible with the general observation that speakers tend to put on sentence-final positions what they think to be the most important. However, the domain of

negation does not correspond with the sentence-final positions in (22), the negative counterparts of (1) and (4). This is indeed guaranteed by the fact that (22a), for instance, can be felicitously followed by a sentence like *he wrote it to Mary*. If (22a) were to precede a sentence like *he wrote it to her after the meeting*, the discourse flow would become infelicitous.

Similarly, in (23), which are the negative counterparts of (1) and (5), the domain of negation is identified with the noun phrases *Mary* and *the island* in the dislocated PPs. As mentioned in section 1, dislocated elements are associated with a sort of emphasis. In fact, (23a), for example, can be felicitously followed by a sentence like *he wrote it to Jane*, but not by *he wrote it to her after the meeting*. This pinpoints the domain of negation in the noun phrase *Mary*.

(24) and (25) are the negative counterpart of (6) and (7a), respectively. In (24) the domain of negation falls on the verb *buried*. This fact is verified by the felicity test as follows: (24a) naturally precedes a sentence like *he burned it* (*after the party*), but when it is followed by a sentence like *he buried it after the meeting*, the resulting discourse will be unnatural. In (25) the domain of negation is identified with the noun phrase *Hawaii* under an out-of-blue context. However, the domain of negation can be shifted to the noun phrase *the summer vacation* under the context in which the duration of John's trip is (contrastively) focused.

In light of the results of the negation test, the focus positions in the sentences given in section 1 are identified as follows (focused constituents are marked with the subscript $_F$).[5, 6]

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[5] *Wh*-constituents are inherently focus-marked. In the discussion, however, I ignore this fact, let alone its influence on phonological phrasing.

[6] Takami (1992) obtains the same results about all the examples (1′) to (7′) except for (2'), by using the negation test and others. In light of the results, he concludes that the extracted *wh*-phrases in (1), (3) and (7b) are interpreted as carrying the most important information but those in the rest of the examples are not.

(1′) a. Whom$_F$ did John write the letter [$_{PP}$ to *t*] after the party?
b. Which island$_F$ did the pirates bury the treasure [$_{PP}$ on *t*] after the attack?

(2′) a. *Whom$_F$ did John write the letter after the party [$_{PP}$ to *t*]?
b. *Which island$_F$ did the pirates bury the treasure after the attack [$_{PP}$ on *t*]?

(3′) a. Which party$_F$ did John write the letter [$_{PP}$ after *t*]?
b. Which attack$_F$ did the pirates bury the treasure [$_{PP}$ after *t*]?

(4′) a. *Which party did John write the letter to Mary$_F$ [$_{PP}$ after *t*]?
b. *Which attack did the pirates bury the treasure on the island$_F$ [$_{PP}$ after *t*]?

(5′) a. ??Which party did John write the letter [$_{PP}$ after *t*] to Mary$_F$?
b. *Which attack did the pirates bury the treasure [$_{PP}$ after *t*] on the island$_F$?

(6′) ??/*Which party did John bury$_F$ the letter [$_{PP}$ after *t*]?

(7′) a. *Which vacation did John go to Hawaii$_F$ [$_{PP}$ during *t*]?
b. A: They all went to Hawaii during their vacations: Peter and David went to Hawaii during the winter vacation, and Jane during the summer vacation.
B: I see. Which vacation$_F$ did John go (to Hawaii) [$_{PP}$ during *t*], then?

Now that the focus positions in the sentences above have been detected, I am in a position to explain the distribution of stranding prepositions in those sentences in terms of the prosodic theory outlined in section 3. In the following discussion, the light *v*P projection is taken into account but with the functional projection TP put aside.

Let us first consider (1′) with their phonological representations in (26) below.

(26) a. (Whom$_F$)$_P$ (did John)$_P$ (write the letter to *e* after the party)$_P$
[whom$_F$]$_{NP}$ [did] [John]$_{NP}$ [[write$_V$]$_v$ [[*t*$_V$ [the letter]$_{NP}$ [to *t*]$_{PP}$]$_{VP}$ [after the party]$_{PP}$]$_{VP}$]$_{vP}$
b. (Which island$_F$)$_P$ (did the pirates)$_P$ (bury the treasure on *e* after the attack)$_P$
[which island$_F$]$_{NP}$ [did] [the pirates]$_{NP}$ [[bury$_V$]$_v$ [[*t*$_V$ [the treasure]$_{NP}$ [to *t*]$_{PP}$]$_{VP}$ [after the attack]$_{PP}$]$_{VP}$]$_{vP}$

In (26) the emerging patterns of phrasing satisfy the demand of *Align-Foc* since the focused constituents *whom* and *which island* are followed by phonological boundaries. In addition, they respect *Wrap-XP* other than *Align-XP,R*, since the light *v*Ps are entirely encompassed in single p-phrases. Although the phrasing patterns in (26) do not satisfy the demand of

Align-XP,R with respect to the NP *the letter*, they are permissible since *Wrap-XP* and *Aling-XP,R* are both violable and the same ranked. Accordingly, the prepositions *to* and *on* are allowed to strand within the p-phrases around the light *v*Ps. In consequence, the phonological representations of (26) are exhaustively parsed, hence sentences (1′) are acceptable.

Let us next consider (2′), whose phonological representations are given in (27).

(27) a. *$(\text{Whom}_F)_P$ (did John)$_P$ (write the letter)$_P$ (after the party)$_P$ to *e*
$[\text{whom}_F]_{NP}$ [did] [John]$_{NP}$ [[[write$_V$]$_v$ [[t_V [the letter]$_{NP}$]$_{VP}$ [after the party]$_{PP}$]$_{VP}$]$_{vP}$ [to *t*]$_{PP}$]$_{vP}$
b. *$(\text{Which island}_F)_P$ (did the pirates)$_P$ (bury the treasure)$_P$ (after the attack)$_P$ on *e*
$[\text{which island}_F]_{NP}$ [did] [the pirates]$_{NP}$ [[[bury$_V$]$_v$ [[t_V [the treasure]$_{NP}$]$_{VP}$ [after the attack]$_{PP}$]$_{VP}$]$_{vP}$ [on *t*]$_{PP}$]$_{vP}$

As already mentioned, sentences (2′) involve the rightward dislocation of the PP complements. Assuming that the dislocated PPs are adjoined to the light *v*Ps, the *v*Ps is segmented into the upper *v*P and the lower *v*P. For Truckenbrodt (1995, 1999), the mapping constrains refer to syntactic *categories*, not to syntactic *segments*, and when a syntactic category is segmented, they count only its lowest segment. Therefore, syntactic segments other than the lowest one are irrelevant to the mapping constraints (for more detail, see Truckenbrodt 1995, 1999). If this is correct, the lower *v*P segments in (27) are encompassed within single p-phrases by virtue of *Wrap-XP*, excluding any material within the upper *v*P segments. As the dislocated PPs are included in the upper *v*P segments but not in the lower ones, their heads *to* and *on* strand without being contained in the p-phrases around the lower *v*Ps. In consequence, these stranding prepositions are not parsed in any p-phrase. The phonological representations of (27) hence fatally violate the SLH. In this way, the unacceptability of (2′) is accounted for. (I will later mention why the PP adjuncts in (26) are phrased in single p-phrases.)

Let us turn to (3′) and (4′). (28) and (29) below show the phonological

representations of (3′) and (4′), respectively.

(28) a. (Which party$_F$)$_P$ (did John)$_P$ (write the letter after *e*)$_P$
[which party$_F$]$_{NP}$ [did] [John]$_{NP}$ [[write$_V$]$_v$ [[*t*$_V$ [the letter]$_{NP}$]$_{VP}$ [after *t*]$_{PP}$]$_{VP}$]$_{vP}$
b. (Which attack$_F$)$_P$ (did the pirates)$_P$ (bury the treasure after *e*)$_P$
[which attack$_F$]$_{NP}$ [did] [the pirates]$_{NP}$ [[bury$_V$]$_v$ [[*t*$_V$ [the treasure]$_{NP}$]$_{VP}$ [after *t*]$_{PP}$]$_{VP}$]$_{vP}$

(29) a. *(Which party)$_P$ (did John)$_P$ (write the letter to Mary$_F$)$_P$ after *e*
[which party]$_{NP}$ [did] [John]$_{NP}$ [[write$_V$]$_v$ [[*t*$_V$ [the letter]$_{NP}$ [to Mary$_F$]$_{PP}$]$_{VP}$ [after *t*]$_{PP}$]$_{VP}$]$_{vP}$
b. *(Which attack)$_P$ (did the pirates)$_P$ (bury the treasure on the island$_F$)$_P$ after *e*
[which attack]$_{NP}$ [did] [the pirates]$_{NP}$ [[bury$_V$]$_v$ [[*t*$_V$ [the treasure]$_{NP}$ [on the island$_F$]$_{PP}$]$_{VP}$ [after *t*]$_{PP}$]$_{VP}$]$_{vP}$

In (28) the phrasing patterns satisfy the demand of *Align-Foc* since the focused constituents *which party* and *which attack* are right-aligned with p-phrases, and they also esteem *Wrap-XP* but not *Align-XP,R* since the light *v*Ps are phrased in single p-phrases. The patterns of phrasing in (28) are allowed to emerge though at the cost of violating *Align-XP,R* with respect to the NPs *the letter* and *the treasure*. This is because *Wrap-XP* and *Align* are violable constraints at the same ranking. Accordingly, the preposition *after* is permitted to strand within the p-phrases around the light *v*Ps. The phonological representations of (28) are thus exhaustively parsed. Hence, (3′) are acceptable although the preposition *after* strands in adjunct positions.

In (29) *Align-Foc* calls for phonological boundaries after the focused constituents *Mary* and *the island*. These boundaries prevent the stranding preposition *after* from being integrated into the preceding p-phrases. The preposition, hence, remains unparsed on the level of p-phrases. This result would be evaded if the light *v*Ps were entirely wrapped in single p-phrases with no boundary after the focused constituents: the resulting pattern of phrasing would allow the preposition to be parsed in the p-phrase that it produces. Although this phrasing pattern satisfies the demand of *Wrap-XP*, it conflicts the demand of *Align-Foc*.

As *Align-Foc* dominates *Wrap-XP*, the wrapping of the light *v*Ps in single p-phrases is not an optimal option. Thus, the stranding preposition *after* fails to be parsed in p-phrases. For this, the phonological representations of (29) induce violations of the SLH. This is why (4′) are unacceptable.

Let us consider (6′) and (7′), skipping (5′). The phonological representations of (6′) and (7′) are given in (29) and (30), respectively.

(30) *(Which party)$_{P}$ (did John) (bury$_{F}$)$_{P}$ (the letter)$_{P}$ after *e*
[which party]$_{NP}$ [did] [John]$_{NP}$ [[bury$_{FV}$]$_{v}$ [[*t*$_{V}$ [the letter]$_{NP}$]$_{VP}$ [after *t*]$_{PP}$]$_{VP}$]$_{vP}$

(31) a. *(Which vacation)$_{P}$ (did John)$_{P}$ (go to Hawaii$_{F}$)$_{P}$ during *e*
[which vacation]$_{NP}$ [did] [John]$_{NP}$ [[go$_{V}$]$_{v}$ [*t*$_{V}$ [to Hawaii$_{F}$]$_{PP}$]$_{VP}$ [during *t*]$_{PP}$]$_{VP}$]$_{vP}$
b. (Which vacation$_{F}$)$_{P}$ (did John)$_{P}$ (go to Hawaii during *e*)$_{P}$
[which vacation$_{F}$]$_{NP}$ [did] [John]$_{NP}$ [[go$_{V}$]$_{v}$ [*t*$_{V}$ [to Hawaii]$_{PP}$]$_{VP}$ [during *t*]$_{PP}$]$_{VP}$]$_{vP}$

In (30) the verb *bury* is a focused constituent, followed by a phonological boundary in terms of *Align-Foc*. Delineating a phonological boundary after the focused verb requires each of the syntactic phrases following the verb to be phrased separately from the other. If those syntactic phrases (i.e. the NP *the letter* and the PP *after* t) were phrased together in a single p-phrase, it would cause additional violations of *Wrap-XP* and *Align-XP,R* (cf. (15)). Recall that the right-edge alignment of the verb with a p-phrase entails violations of these two constraints. However, the stranding preposition *after* itself cannot be contained in a p-phrase under the LCC, since it is a functional category. Therefore, it remains unparsed on the level of p-phrases. The phonological representation of (30) thus fail to satisfy the SLH, hence (6′) is unacceptable.

In (31a) *Align-Foc* demands a phonological boundary after the focused constituent *Hawaii*. The preposition *during* strands just behind this phonological boundary, hence it is not included in the preceding p-phrase. If it were integrated into the p-phrase, the resulting pattern of phrasing would conform to *Wrap-XP*. However, this phrasing is not licensed to

emerge under the context with focus on the NP *Hawaii*, since it disobeys the more dominant constraint *Align-Foc*. The stranding preposition *after* thus fails to be parsed in a p-phrase. Hence, the phonological representation of (31a) does not satisfy the SLH. In this way, the unacceptability of (7a′) is accounted for.

In (31b), on the other hand, focus is shifted to *which vacation*. This focus shift is due to the discourse or contextual force. The disappearance of focus from the NP *Hawaii* means that the NP is not necessarily followed by a phonological boundary. It follows, then, that the preposition during is allowed to strand within the p-phrase around the light *v*P. This is ensured by the effect of *Wrap-XP*, since the preposition resides inside the light *v*P. Thus, the focus shift from *Hawaii* permits the preposition *during* to be parsed in a p-phrase. As a result, the phonological representation of (31b) successfully fulfills the SLH. This is why (7b′) is acceptable unlike (7a′).

Finally, consider (5′) with its phonological representation in (32).

(32) a. ??(Which party)$_{P}$ (did John)$_{P}$ (write the letter)$_{P}$ after *e* (to Mary$_{F}$)$_{P}$
[which party]$_{NP}$ [did] [John]$_{NP}$ [[[write$_{V}$]$_{v}$ [[*t*$_{V}$ [the letter]$_{NP}$]$_{VP}$ [after *t*]$_{PP}$]$_{VP}$]$_{vP}$ [to Mary$_{F}$]$_{PP}$]$_{vP}$

b. *(Which attack)$_{P}$ (did the pirates)$_{P}$ (bury the treasure)$_{P}$ after *e* (on the island$_{F}$)$_{P}$
[which attack]$_{NP}$ [did] [the pirates]$_{NP}$ [[[bury$_{V}$]$_{v}$ [[*t*$_{V}$ [the treasure]$_{NP}$]$_{VP}$ [after *t*]$_{PP}$]$_{VP}$]$_{vP}$ [on the island$_{F}$]$_{PP}$]$_{vP}$

In (32) the demand of *Align-Foc* is trivially satisfied because the right edges of the focused constituents *Mary* and *the island* coincide with the end edges of the sentences. However, the sentences are unacceptable. In order to account for the unacceptability, I assume, following Wagner (2005), that adverbial phrases must be contained in single p-phrases unless they follow their modifiee.[7] This is tentatively formulated as in (33).

[7] Wagner argues that this is evidenced by several prosodic facts. For instance, he borrows examples like (i) from Maienborn (2001), stating that the prosodic contrast between (ia) and (ib) suggests that frame-setting modifiers are phrased separately from their modifiee when the former precede the latter.

(33) *Wrap-Ad*(*verb*)
"Each non-final adverb is contained in a p-phrase."

In addition, I assume that *Wrap-Ad* (33) outranks the two prosodic constraints *Align-XP,R* and *Wrap-XP*.[8]

If *Wrap-Ad* (33) and its ranking are correct, the unacceptability of (5′) is explained in the following way. In (32) *Wrap-Ad* comes into effect with respect to the PP adjuncts headed by the preposition *after*, because they do not follow their modifiee. Note in passing that these PP modifiers scope over the PP complements to *Mary* and *on the island*. *Wrap-Ad* then demands the PP adjuncts to be phrased in single p-phrases. However, the preposition *after* itself is not subject to the prosodic constraint under the LCC, since it is a functional category. Hence, it fails to be parsed in p-phrases. This situation could be avoided if all the ingredients inside the light *v*Ps were crammed into single p-phrases: as a result, the preposition *after* would strand within the p-phrases around *v*Ps. Although the resulting pattern of phrasing satisfies the demand of *Wrap-XP*, it costs the more dominant constraint *Wrap-Ad*. Under the ranking hierarchy assumed here, therefore, the phrasing of the PP adjuncts in single p-phrases takes priority over their inclusion into p-phrases around the light *v*Ps. The stranding preposition *after* thus remains unparsed on the level of p-phrases. In consequence, the phonological representations of (32) end up with incurring violations of the

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(i) a. In Néw York, John became very famous all over the world.
b. John became very famous all over the world in New York.

Either (ia) or (ib) can be interpreted to mean that at the time John was living in New York, he achieved a world-wide fame. However, the frame-setting in (ia) receives a phrasal stress but the one in (ib) does not.

If the locative adverb in (ib) were contained in a single p-phrase as the one in (ia) is, it would violate the prosodic constraint *Stress-XP*, which dictates that each p-phrase must contain a phrasal stress (Truckenbrodt 1995; see also Samek-Lodovici 2005 and references cited therein). The absence of a phrasal stress on the locative adverb in (ib), therefore, suggests that the adverb is phrased together with the preceding modifee in one and the same p-phrase. (Wagner's analysis of the prosodic contrast in (i) is not based on *Stress-XP*.) In this paper, I put aside *Stess-XP* from the discussion.

[8] I am agnostic about whether *Wrap-Ad* outranks *Align-Foc* or not. I have no evidence at hand to determine which option is empirically correct.

SLH. Accordingly, the unacceptability of (5′) is accounted for in terms of *Wrap-Ad* in (33) and its ranking.

In this section, I have developed a prosodic approach to the distribution of stranding prepositions in English. To summarize this section, let me answer the three questions in section 2, based on the results obtained in the course of discussion.

Q1: Why is the acceptability of preposition stranding contingent upon its position within the sentence?

A1: Because stranding prepositions must be placed in where they can be parsed in p-phrases around lexical, phonologically visible syntactic phrases. Prepositions themselves cannot be wrapped in p-phrases under the LCC because of being functional categories. In order to be parsed in p-phrases, they must lean on lexical, phonologically visible syntactic phrases for phonological support, by cliticizing to such phrases on their recursive side or by including themselves in such phrases. When stranding, prepositions are forced to select the second means, since they no longer have syntactic phrases to cliticize to on their recursive side. If they fail to be included in p-phrases around lexical, phonologically visible syntactic phrases, they will not be parsed in p-phrases. This causes a violation of the SLH. For other details, please see A2 and A3 below.

Q2: Why is preposition stranding more restricted in adjunct positions than in complement positions?

A2: Because stranding prepositions in adjunct positions are less likely to be parsed in p-phrases than those in complement positions. As observed in this section, focus tends to fall on PP complements rather than on PP adjuncts (unless sentential contexts demand focus on PP adjuncts). In fact, many researchers have revealed the fact that PP complements behave differently from PP adjuncts in that the former receives main stress more frequently than the latter (Gussenhoven 1983; Jacobs 1993; Zubizarreta 1998, among others). This fact dovetails with our observation in this section.

When a PP adjunct is followed by a focused constituent, a phonological boundary is delineated between the two constituents by virtue of *Align-Foc*. In this case, then, the PP adjunct does not enter into a p-phrase formed before it. When extraction from such a PP adjunct takes place, the preposition will be left behind in a position that prevents it from being parsed in a p-phrase. This results in violating the SLH.

When extraction takes place from PP complements, the prepositions left behind will be parsed in p-phrases as far as they are included in lexical, phonologically visible syntactic phrases. One exception is when a PP complement is dislocated to a rightward position in the sentence. The dislocated PP is adjoined to the light *v*P, the latter segmented into the upper *v*P and the lower *v*P. As the lower *v*P segment but not the upper one is subject to the prosodic constraints, the former can be wrapped in a single p-phrase, excluding any material within the latter. Therefore, the dislocated PP is phrased separately from a p-phrase around the lower *v*P segment, since it is included within the upper *v*P segment. If extraction is implemented from the dislocated PP, the

preposition left behind will fail to be parsed in the p-phrase around the (lower) *v*P. This gives rise to a violation of the SLH.

Q3: Why do sentential contexts affect the acceptability of preposition stranding?
A3: The reason for this runs as follows: Sentential contexts have an effect to determine focus positions in sentence. Focus in turn gives an impact on phonological phrasing. Phonological phrasing affects the acceptability of preposition stranding, as explained throughout this section.

Before closing this section, I want to briefly mention in what ways the present approach is superior to the previous approaches discussed in section 2. The syntactic approach to preposition stranding, though the most prevailing in the literature, is quite unlikely to solve all the questions above, as revealed in section 2. All the versions of the syntactic analysis evince the same prediction that extraction is disallowed from PP adjuncts but not from PP complements. This prediction hardly proves empirically correct, since extraction from PP adjuncts is indeed possible and extraction from PP complements degrades acceptability in a certain case. What is worse, no syntactic analysis is competent to account for why sentential contexts vary the acceptability of preposition stranding. The prosodic approach proposed in this paper does not suffer from these empirical problems.

The functional approach to preposition stranding, which is instituted mainly by Takami (1988, et preq), is built upon the functional constraint that extraction from PP is permitted only when the extracted noun phrase carries the most important information in the sentence. The functional approach excels the syntactic one in the following respects: it accounts for the fact that extraction is possible even from PP adjuncts, and it assimilates contextual effects on the acceptability of preposition stranding. However, the functional approach fails to give an account of why extraction is prohibited from dislocated PPs. As dislocated PPs contain focused NPs in the complement positions, the NPs should be allowed to undergo extraction in conformity with the functional constraint mentioned above. This is contrary to fact, however. The prosodic approach in this paper provides a solution to this

problem. Consequently, it is concluded from an empirical point of view that the present approach surpasses both the syntactic and the functional approach.

5. Preposition stranding in Spanish

In this section, I make an attempt to extend the present approach toward preposition stranding in Spanish. If this attempt is successful, the prosodic approach to preposition stranding is reinforced from a cross-linguistic perspective.

Spanish allows for preposition stranding but in limited cases. In the language, the prepositions that are able to strand are restricted to the group of "substantive" prepositions, which includes prepositions like *cerca* 'near' and *encima* 'on top of' (Campos 1991).[9] (34) below illustrates that the substantive preposition *cerca* strands by means of *wh*-extraction of its complement *de que edificio*.

(34) De que edificio esta [$_{PP}$ cerca *t*] la facultad?
what building is near the school
'What building is the school near?'

(Campos 1991: 741)

When strand, substantive prepositions must be adjacent to the verbs that select them. This is evidenced by the grammatical contrast in (35).

(35) a. De qué estante puso [$_{PP}$ encima *t*] los libros?
of which shelf did he put on top the books
b. *De qué estante puso los libros [$_{PP}$ encima *t*]?
of which shelf did he put the books on top

(Campos 1991: 745)

In (35a) the substantive preposition *encima* strands immediately behind the selecting verb *puso*, while in (35b) the adjacency of *encima* to *puso* is blocked by the intervention of the noun phrase *los libros*. (35a) is acceptable because *encima* is adjacent to *puso*, but (35b) is

[9] Campos borrows the term "substantive preposition" from Plann (1985, 1988).

unacceptable because it is not.

The fact in (35) is in a sharp contrast with the English examples (1), repeated in (36).

(36) a. Whom did John write the letter [$_{PP}$ to *t*] after the party?
b. Which island did the pirates bury the treasure [$_{PP}$ on *t*] after the attack?

As shown, the stranding prepositions *to* and *on* are not adjacent to the selecting verbs *write* and *bury*. The English sentences (36) are acceptable unlike the Spanish ones (35). The problem to be embarked on, thus, is why Spanish, unlike English, requires stranding prepositions to keep adjacent to selecting verbs.

In order to account for the contrast in (35), I modify the constraint ranking thus far assumed, so that it suits to properties of Spanish phonological phrasing. The idea behind this modification originates from the main stream of the prosodic theory started from Prince and Smolensky (1993). Prince and Smolensky offered the guiding hypothesis that all languages have the same set of prosodic constraints and the differences between them are reflections of the different rankings of the same prosodic constraints. A large number of studies on prosody were conducted in the spirit of this hypothesis, uncovering many insightful facts leading to development of the prosodic theory.

According to this line of approach, I assume that the Spanish grammar of phonological phrasing is equipped with the same prosodic constraints as the English one but the prosodic constraints of Spanish are ordered in a different ranking from those of English. (The LCC and the SLH are effective in Spanish as well.) I will show that this assumption enables us to not only account for the contrast in (35) but also cope with the question of why preposition stranding in Spanish is different from that in English in the way that we saw in (35) and (36).

My assumption about the ranking relation of prosodic constraints in Spanish is based

on Prieto's (2005, 2007) experimental observation on Spanish phonological phrasing. On the basis of experimental data on Spanish patterns of phonological phrasing, she reveals that *Align-XP,R* outranks *Wrap-XP* in the language.[10] The ranking hierarchy is shown in (37).

(37) *Aling-XP,R* > *Wrap-XP*

It is worth here to recall that in English, *Align-XP,R* is the same ranked as *Wrap-XP*.

To see the adequacy of the ranking relation in (37), let us consider the phonological phrasing in the following Spanish sentences that Prieto presents in her paper (2007) (the syntactic structures represented below are mine).

(38) (Compraba mapas)$_{P}$
[*pro* [[compraba$_{V}$]$_{v}$]$_{T}$ [t_{v} [t_{V} [mapas]$_{NP}$]$_{VP}$]$_{vP}$]$_{TP}$[11]
'I/(s)he used to buy maps.'

(Prieto 2007: 44)

(39) a. (Compraba mapas de Barcelona)$_{P}$ (para Ana)$_{P}$
b. *(Compraba mapas de Barcelona para Ana)$_{P}$
[*pro* [[compraba$_{V}$]$_{v}$]$_{T}$ [t_{v} [t_{V} [[mapas]$_{N}$ [de Barcelona]$_{PP}$]$_{NP}$ [para Ana]$_{PP}$]$_{VP}$]$_{vP}$]$_{TP}$
'He/she used to buy maps of Barcelona for Ana.'

(Prieto 2007: 50)

The Spanish sentence in (38) consists only of the transitive verb *compraba* and its complement *mapas*. These two materials are phrased together in the one and the same p-phrase. The phonological phrasing in this short sentence suggests that *Wrap-XP* is at work in Spanish as well. A caution about the phrasing of TP in a single p-phrase is in order here. As the LCC dictates that only lexical, phonologically visible categories are subject to prosodic constraints, the functional category TP in (38) should not be contained in a single p-phrase.

[10] Prieto does not take into account the effect on phonological phrasing by focus in Spanish. After Prieto, I abstract away such effect from the discussion in this section. I guess the abstraction would not affect the argument, because in Spanish focus always falls on the end of sentence (Zubizarreta 1998, among others), hence trivially observing the demand of *Align-Foc*. However, I do not know whether or not *Align-Foc* outranks other prosodic constraints in Spanish.

[11] Spanish is a pro-drop language, where sentences are allowed to have subjects that do not manifest themselves overtly. In (38) and the following, *pro* stands for the covert subject.

In (38), however, the TP is headed by the lexical verb *compraba*, which raises to the TP's head T. Spanish has verb raising to T unlike English. Therefore, the TP in (38) is regarded as a lexical category. This ensures that the TP in (38) is wrapped in a single p-phrase by the effect of *Wrap-XP*.

Let us turn to (39). The Spanish sentence in (39) is more complex than the one in (38). It comprises the verb *compraba* and its two complements *mapas de Barcelona* and *para Ana*. In this sentence, a phonological boundary is obligatorily inserted between the two complements as in (39a). If, as in (39b), the sentence has only one p-phrase containing all the materials with no intervening phonological boundary in much the same way as (38), it results in the unacceptability. This fact strongly suggests that the effect of *Wrap-XP* is overridden by the effect of *Align-XP,R*. This means, in turn, that *Align-XP,R* outranks *Wrap-XP* in Spanish.

In (39), *Align-XP,R* requires the NP *mapas de Barcelona* to be right-aligned with a p-phrase. This alignment will be unalterable, if *Align-XP* dominates *Wrap-XP* in Spanish. If *Wrap-XP* were to outrank *Align-XP,R* in Spanish, (39b) would take priority over (39a), contrary to fact. Moreover, if the two prosodic constraints were to be the same ranked in the language, both patterns of phrasing in (39) would be equally acceptable as in English. This is not the case, either. In light of the Spanish phrasing patterns in (38) and (39), Prieto reaches to the conclusion that Spanish has the ranking relation in (37) (for more details on Spanish phonological phrasing, see Prieto 2005, 2007 and references cited therein).

In terms of the Spanish ranking hierarchy in (37), I account at first for the grammatical contrast in (35), repeated in (40). The phonological representations of (40) are given in (41).

(40) a. De qué estante puso [$_{PP}$ encima *t*] los libros?
of which shelf did he put on top the books
b. *De qué estante puso los libros [$_{PP}$ encima *t*]?
of which shelf did he put the books on top

(41) a. (de qué estante)$_{P}$ (puso encima *e* los libros)$_{P}$
[de qué estante]$_{NP}$ [*pro* [[puso$_{V}$]$_{v}$]$_{T}$ [t_{v} [t_{V} [encima *t*]$_{PP}$ [los libros]$_{NP}$]$_{VP}$]$_{vP}$]$_{TP}$
b. *(de qué estante)$_{P}$ (puso los libros)$_{P}$ encima *e*
[de qué estante]$_{NP}$ [*pro* [[puso$_{V}$]$_{v}$]$_{T}$ [t_{v} [t_{V} [los libros]$_{NP}$ [encima *t*]$_{PP}$]$_{VP}$]$_{vP}$]$_{TP}$

In (41a), the sentence has only two p-phrases. The first one contains the wh-phrase *de qué estante*, and the second one ranges from the verb *puso* and the NP l*os libros*. The latter is a product of the effect by *Wrap-XP*, where the TP is entirely contained in a single p-phrase. Although *Align-XP,R* dominates *Wrap-XP* in Spanish, it does not have any effect within the second p-phrase, because no right-edge of lexical, phonologically visible syntactic phrases exists in that p-phrase except for the right edge of the NP *los libros*. The preposition *encima* strands within the second p-phrase. As *encima* is parsed in that p-phrase, the phonological representation of (41a) fulfills the SLH. (40a) is hence acceptable.

In (41b), the sentence has two p-phrases, too. The first one contains the wh-phrase as in (41a), while the second one comprises only the verb *puso* and its NP complement *los libros*. The right-edge of the second p-phrase coincides with the one of the NP *los libros*. This alignment is due to the effect of *Align-XP,R*, and irrevocable since *Align-XP,R* dominates *Wrap-XP* in Spanish. The second p-phrase does not take in the stranding preposition *encima* because of the presence of a phonological boundary between them. Therefore, the preposition fails to be parsed in a p-phrase. In consequence, the phonological representation of (41b) violates the SLH. This is why (40b) is unacceptable. In the way thus, the contrast in (40) (= (35)) is accounted for.

Let us turn to the English examples (36). Their phonological representations are repeated in (42).

(42) a. $(\text{Whom}_F)_P$ (did John)$_P$ (write the letter to *e* after the party)$_P$
$[\text{whom}_F]_{NP}$ [did] $[\text{John}]_{NP}$ $[[\text{write}_V]_v$ $[[t_V$ [the letter]$_{NP}$ [to *t*]$_{PP}]_{VP}$ [after the party]$_{PP}]_{VP}]_{vP}$

b. $(\text{Which island}_F)_P$ (did the pirates)$_P$ (bury the treasure on *e* after the attack)$_P$
$[\text{which island}_F]_{NP}$ [did] [the pirates]$_{NP}$ $[[\text{bury}_V]_v$ $[[t_V$ [the treasure]$_{NP}$ [to *t*]$_{PP}]_{VP}$ [after the attack]$_{PP}]_{VP}]_{vP}$

As already explained in section 4, the stranding prepositions *to* and *on* in (42) are parsed in the p-phrases around the light *v*Ps, conforming to the SLH. This is ensured by the effect of *Wrap-XP*. In English, *Wrap-XP* is as effective as *Align-XP,R* since the two constraints are the same ranked. In the language, therefore, stranding prepositions are parsed in p-phrases owing to the effect of *Wrap-XP*, as long as they are included in light *v*Ps. The parsing of stranding prepositions in p-phrases around *v*Ps is maintained even though they are not adjacent to selecting verbs.

In this respect, preposition stranding in English differs from that in Spanish. In Spanish, stranding prepositions must keep adjacent to selecting verbs, as evidence in (35). When their adjacency to verbs is intervened by other materials, phonological boundaries are necessarily delineated after the materials by virtue of *Align-XP,R*. This is because in Spanish *Align-XP,R* outranks *Wrap-XP* in terms of the ranking hierarchy of (37). The boundaries after the intervening materials obstruct the inclusion of the stranding prepositions into p-phrases before them. This means that the stranding prepositions cannot be parsed in p-phrases around *v*Ps. In Spanish, thus, stranding prepositions fail to be parsed in p-phrases when they are not adjacent to selecting verbs. Accordingly, in terms of the prosodic approach presented here, the question is explained why Spanish, unlike English, requires stranding prepositions to be adjacent to selecting verbs, as well as the grammatical contrast in (40) (= (35)).

6. Conclusion

In this paper, I have proven it empirically robust that prosody knows where prepositions can strand in English. It was argued that the prosodic approach in this paper surpasses both the syntactic and the functional approach on the empirical level. The latter two approaches are ruined by several empirical drawbacks, which the present approach overcomes successfully. In addition, the present approach was shown to receive further support from a cross-linguistic viewpoint. I dare wish to conclude that this paper advances a new step in the right direction for elucidation of preposition stranding in English (and hopefully, other languages).

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