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Pied-piping domains and adjunction coincide in Finnish

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It is well-known that *wh*-pronouns may pied-pipe their containing host phrases as they move to their final scope positions. In Finnish, such pied-piping requires further that a *wh*-element is situated at the left edge of host phrases, a position in which it ends up either through base generation or through *wh*-movement. This article investigates which independent properties define such pied-piping domains. An empirical generalization will be defended according to which a phrase constitutes such pied-piping domain if and only if it is adjoinable. The hypothesis that pied-piping domains are islands is put into question. Secondary *wh*-movement, pied-piping and adjunction are thus intrinsically linked with each other.

Keywords adjoinability, adjunction, Finnish, islands, pied-piping, secondary *wh*-movement, *wh*-movement

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1. INTRODUCTION

This article examines A'-movement, such as *wh*-movement in (1).

(1) Who did Pekka see ___?

The *wh*-element *who* is extracted from the object position to the left edge. In some circumstances it is not just the *wh*-pronoun that moves, but a phrase that contains the *wh*-element, as shown in (2).

(2) Towards which city does the Seine run ___?

In this situation the *wh*-element is said to PIED-PIPE the hosting phrase. In the example above, the *wh*-element *which city* remains in situ, and the hosting phrase *towards which city* moves. Huhmarniemi (2012a) demonstrates that in Finnish, pied-piping requires an additional step: the *wh*-element must move to the left edge of the hosting phrase (3).¹

(3) [Mitä syötyään ___] Pekka nukahti ___?
what ate.TUA Pekka fall.asleep
 'After eating what did Pekka fall asleep?'

In this example, the containing host phrase is an adverb clause. The first movement operation inside the adverb phrase is called SECONDARY *wh*-MOVEMENT (Heck 2004, 2008). The containing host phrase is moved to the final scope position after secondary *wh*-movement. Both movement operations are mandatory for the formation of a normal interrogative sentence. The fact that the *wh*-element must occupy the left periphery of the pied-piped phrase is known as the EDGE GENERALIZATION (Heck 2008:88).

Huhmarniemi (2012a) shows that in Finnish, secondary *wh*-movement + pied-piping applies in an across-the-board fashion, thus applying to preposition phrases (PPs), determiner phrases (DPs), adjective phrases (APs), to several adverb phrases (AdvPs) and even to certain nonfinite constructions. This may lead to a ‘roll up’ movement. Example (4) shows a three-stage process. The interrogative DP is first moved to the left periphery of its host DP, which is in turn moved to the left periphery of the containing PP, which is then moved to the left periphery of the containing CP.

- (4) [[Kenen ___ taloa] kohti ___] Pekka käveli ___?
 whose house towards Pekka walked
 ‘Towards whose house did Pekka walk?’

Every step is mandatory for the creation of an interrogative sentence. Example (4) illustrates RECURSIVE PIED-PIPING (Heck 2008:76). Not all languages involve extensive roll up movement similar to Finnish. For example, the English equivalents of Finnish pied-piping constructions often involve *wh*-in-situ. The exact reason for this will have to await further research.

When a phrase XP allows pied-piping (A'-movement or base-generation to the left periphery plus pied-piping), I will call it a PIED-PIPING DOMAIN. Example (3) shows that the TUA-adjunct constitutes a pied-piping domain, (4) demonstrates that DPs and PPs are pied-piping domains in Finnish.

But why must *wh*-elements target the intermediate left peripheral positions on their way up to the final scope position? Why do they not move directly into the final position? A compelling hypothesis is to say that the pied-piped host phrases are islands (phrases which do not let *wh*-elements to escape). Because they are islands, a *wh*-element that wishes to move up to the final scope position must make a pit-stop at the edge and pied-pipe the rest. However, Huhmarniemi (2012a:229–232) and others have demonstrated that there is optional pied-piping: constructions where both extraction out of the phrase and secondary *wh*-movement plus pied-piping applies.² Some such constructions are exemplified in (5)–(12) (from Huhmarniemi 2012a, b), which illustrate the claim for the MA-infinitival, DPs, PPs and certain adverb clauses.³

- (5) *MA-infinitival phrase*
 a. ?[Mitä syömässä] Pekka näki Merjan ___?
 what eat.MA Pekka saw Merja?

- b. Mitä Pekka näki Merjan [syömässä ___]?
what Pekka saw Merja eat.MA
 ‘What did Pekka see Merja eating?’
- (6) *Preposition phrase*
- a. [Mitä ilman] Pekka ei pärjää ___?
what without Pekka not manage
- b. Mitä Pekka ei pärjää [ilman ___]?
what Pekka not manage without
 ‘Without what Pekka doesn’t manage?’
- (7) *Preposition phrase*
- a. [Mitä kohti ___] Pekka juoksi?
what towards Pekka ran
- b. Mitä Pekka juoksi [kohti ___]?
what Pekka ran towards
 ‘Towards what did Pekka run?’
- (8) *Determiner phrase*
- a. [Miten pitkälle aamuun nukkumisen] Pekka lopetti ___?
how far into.morning sleeping Pekka stop
- b. Miten pitkälle aamuun Pekka lopetti [nukkumisen ___]?
how far into.morning Pekka stop sleeping
 ‘Sleeping how long during the morning did Pekka stop?’
- (9) *Determiner phrase*
- a. [Missä käymistä] Asko suositteli ___?
where visiting Asko recommend
- b. Missä Asko suositteli [käymistä ___]?
where Asko recommended visiting
 ‘What did Asko recommend to visit?’
- (10) *Determiner phrase*
- a. [Ketä tapaamaan] Pekka järjesti matkan ___?
who to.meet Pekka organized trip
- b. Ketä Pekka järjesti matkan [tapaamaan ___]?
who Pekka organized trip to.meet
 ‘To meet who did Pekka organize the trip?’
- (11) *KSE-adverb phrase*
- a. [Mitä tehdäkseen] Pekka oli tarpeeksi hullu ___?
what do.KSE Pekka was enough crazy
- b. Mitä Pekka oli tarpeeksi hullu [tehdäkseen ___]?
what Pekka was enough crazy do.KSE
 ‘What was Pekka crazy enough to do?’
- (12) *E-adverb phrase*
- a. [Mitä laulua vihellellen] Pekka käveli kotiin ___?
what song whistle.E Pekka walked home

- b. Mitä laulua Pekka käveli kotiin [vihellellen ____]?
what song Pekka walked home whistle.E
 'By whistling what song did Pekka walk home?'

Optional pied-piping shows that pied-piping domains need not be islands.⁴ Another hypothesis is that the intermediate steps instantiate some locality, minimality or economy condition, according to which movement operations must proceed in the smallest possible steps. An auxiliary assumption required is that the edges of pied-piping domains (and only those) function as targets for *wh*-movement. This hypothesis as such fails to explain why these phrases (and not all phrases, or some other imaginable set of phrases) have such an edge position. This is the question I want to discuss in this paper. I argue that the following generalization emerges from Finnish:

(13) *Pied-piping domains (Finnish)*

XP is a pied-piping domain if and only if XP may be adjoined.

When a phrase can be adjoined, I will say that the phrase is ADJOINABLE. A deep connection between adjunction, pied-piping and A'-movement is therefore implied.

We clarify the two notions which occur in (13), PIED-PIPING DOMAIN and ADJUNCTION. The following definitions will be used in this article:

(14) *Pied-piping domain*

XP is a pied-piping domain (by definition) if and only if a *wh*-interrogative can stop, or can be base-generated, at its left edge and pied-pipe the phrase upstream, all else being equal.

(15) *Adjunction*

A phrase XP is adjoinable if and only if it can occur in an adjunct position.

The definition of 'pied-piping domain' is not standard. It requires that such phrases satisfy the edge generalization for *wh*-movement and pied-piping. Pied-piping alone or pied-piping together with *wh*-in situ are not sufficient. I believe that the results presented here might generalize to such cases as well, but this will not be shown here; hence the more narrow definition.

We provide empirical diagnostic tests to distinguish adjuncts and other phrases. The following standard tests will be used here (see Carnie 2008:121–129):

(16) *Adjunct tests*

a. Iteration Test

Adjuncts can be iterated inside a given projection.

b. Optionality Test

Adjuncts are optional and cannot be selected by another head.

c. Free Ordering Test

Adjuncts can be ordered freely and do not need to be adjacent to any head.

d. Coordination Test

Adjuncts can be coordinated with other adjuncts, and not with complements or specifiers.

e. Thematic Roles Test

Adjuncts do not bear thematic roles.

f. Projectional Inertness Test

Adjuncts do not change the syntactic properties (e.g., its category or type) of the constituent they are daughters of.

Not all tests apply to every possible situation, and not every adjunct has these properties while some complements and specifiers may in fact have some of them, but it is not controversial that the notion of ‘adjunct’ captures an important linguistic property and that the properties listed in (16) more or less converge into the same set of constituents.

It is important to realize that (13) does not claim that only phrases which are adjuncts constitute pied-piping domains. That would be too strong since, for instance, argument DPs constitute pied-piping domains even if they occur in argument positions. The claim is rather that DP constitutes a pied-piping domain (in whatever context it occurs) because it can be adjoined. For instance, while DPs generally occur in argument positions, as is illustrated in (17a), they may also appear in adjunct positions, as in example (17b), where the DP constitutes a temporal adjunct.

- (17) a. Pekka varasi [koko päivän].
Pekka reserved whole day.ACC
 ‘Pekka reserved the whole day.’
- b. Pekka odotti [koko päivän].
Pekka waited whole day.ACC
 ‘Pekka waited the whole day.’

The claim that the two tokens of the same DP in (17) differ in their syntactic status means that the diagnostic adjunct tests apply to the latter but not to the former.

The definition (14) requires that the *wh*-interrogative is able to stop at its left edge and pied-pipe the phrase upwards. The condition ‘all else being equal’ abstracts away from conditions which may prevent these operations applying. For instance, it is well-known that agreement may block extraction that would be possible otherwise (Boeckx 2008, Huhmarniemi 2009). The definition in (14) is meant to be read so that the agreement factor, among other irrelevant factors considered in this article, is ignored. What is required is that the two key operations are at least possible – hence possible ‘all else being equal’.

The notion of an adjunct, and adjunction more generally, has been subject to several controversies, especially since the emergence of minimalism. Perhaps a few words concerning this debate are in order. There is in my mind no doubt that certain phrases behave like adjuncts in terms of the diagnostic tests listed above, while other

phrases fail to satisfy the same tests. Thus, adjuncts and adjunction were defined axiomatically in X-bar theory. Minimalism dispenses with X-bar theory in a way that leaves the distinction between specifiers and adjuncts difficult to capture. The present work does not rely on any analysis concerning the relation between specifiers and adjuncts: I have nothing to say about specifiers. A fully formal theory of adjunction is likewise irrelevant. I will only show that pied-piping domains and adjoinability coincide; if the generalization holds, then any theory of pied-piping, *wh*-movement and adjunction must explain why the correlation holds.

2. ADJOINABILITY AND PIED-PIPING DOMAINS COINCIDE

Next we argue that any phrase is a pied-piping domain if it can be adjoined, i.e. if it is adjoinable. The argument will be constructed by showing that all adjunct phrases possess the two characteristics. Specifically, in every example below, the (a) example demonstrates that the phrase in question can function as an adjunct or that it occurs in an adjunct position, and the (b) example shows that the phrase in question constitutes a pied-piping domain.

(18) *Determiner phrase*

- a. Pekka nukkui [koko päivän].
Pekka slept whole day
 'Pekka slept the whole day.'
- b. [Kenen ___ auton] Pekka varasti ___?
whose car Pekka stole
 'Whose car Pekka stole?'

(19) *Preposition phrase*

- a. Pekka pääsi kotiin [ilman autoa].
Pekka got home without car
 'Pekka got home without the car.'
- b. [Mitä ilman ___] Pekka pääsi kotiin ___?
what without Pekka got home
 'Without what did Pekka get home?'

(20) *TUA-adverb phrase*

- a. Pekka nukahti [tehtyään työt].
Pekka slept did.TUA work
 'Pekka fell asleep after doing the work.'
- b. [Mitkä tehtyään ___] Pekka nukahti ___?
what did.TUA Pekka slept
 'After doing what did Pekka fall asleep?'

(21) *ESSA-adverb phrase*

- a. Pekka nukahti [lukiessaan kirjaa].
Pekka fall.asleep read.ESSA book
 'Pekka fall asleep while reading a book.'

- b. [Mitä lukiessaan] Pekka nukahti?
what.PRT read.ESSA Pekka fall.asleep
 ‘While reading what did Pekka fall asleep?’
- (22) *KSE-adverb phrases*
- a. Pekka meni kauppaan [ostaakseen voita].
Pekka went shop buy.KSE butter
 ‘Pekka went to shop in order to buy butter.’
- b. [Mitä ostaakseen ____] Pekka meni kauppaan ____?
what buy.KSE Pekka went shop
 ‘To buy what did Pekka go to the shop?’
- (23) *MA-adverb phrase (two types)*
- a. MALLA-adjunct
 Pekka pääsi kauppaan [lainaamalla auton].
Pekka went shop borrow.MALLA car
 ‘Pekka got into the shop by borrowing a car.’
- b. [Minkä lainaamalla ____] Pekka pääsi kauppaan ____?
what borrow.MALLA Pekka went shop
 ‘By borrowing what did Pekka get into the shop?’
- (24) *MATTA-adjunct phrase*
 [Mitä lukematta ____] Pekka läpäisi tentin ____?
what read.MATTA Pekka passed examination
 ‘Without reading what did Pekka pass the examination?’
- (25) *Adjective phrase*
- a. Pekka näki [[luuta syövän] koiran].
Pekka saw bone eat.A dog
 ‘Pekka saw a dog who was eating a bone.’
- b. [[Mitä ____ syövän] ____ koiran] Pekka näki ____?
what eat.A dog Pekka saw
- (26) *Complementizer phrase*
- a. Pekka tilaa pizzan [keneltä tahtoo].
Pekka orders pizza who wants
 ‘Pekka orders the pizza from whoever he wants.’
- b. Pekka pohti [keneltä hän tilaa pizzan ____].
Pekka wonder who he order pizza
 ‘Pekka wondered from who can he order the pizza.’
- c. ?[Keneltä hän tilaa pizzan ____] Pekka pohti?
who he order pizza Pekka wonder

The CP behaves differently with respect to the other pied-piping domains. CPs appear to be in some way ‘too heavy’ to allow smooth pied-piping. They can be moved if embedded inside of a DP (e.g., *Sitä että keneltä hän tilaa pizzan Pekka pohti* ‘that.D that.C who he order pizza Pekka wondered’). The second, more important, difference is that the CP-internal quantifier does not ‘scope out’ of its clause (Huhmarniemi

2012a:95). When a non-CP *wh*-phrase moves, the *wh*-element can take scope over the material it moves over. This is not true of CP-movement, which must reconstruct obligatorily. Thus, an interrogative such as (27) is ungrammatical:

- (27) *Keneltä hän tilaa pizzaa Pekka tiesi ___?
who he orders pizza Pekka knew
 Intended: 'From who Pekka knew he will order the pizza?'

It is arguable, therefore, that example (26c) involves topicalization of the complement clause and not pied-piping. If so, then CPs constitute an exception to the proposed generalization: they can be adjoined, but do not constitute pied-piping domains. An independent factor may be in play (see Brattico 2012).

From this data it can be concluded that there is a strong tendency for a phrase that allows adjunction to constitute a pied-piping domain. However, some details need to be clarified before we proceed. I take it as self-evident that PPs, APs and AdvPs satisfy the diagnostic tests (16) for adjuncts. Specifically, they can all be iterated, they are optional, they can be ordered freely, they can be coordinated only with other constituents of the same type, they do not have thematic roles and they are inert inside their projection. Perhaps the claim that the temporal DPs in example (17), repeated here as (28), also constitute adjuncts may require a clarifying remark.

- (28) Pekka nukkui [koko päivän].
Pekka slept whole day
 'Pekka slept the whole day.'

This DP fulfills the adjunct diagnostics, as shown in (29).

- (29) a. Iteration Test
 Pekka nukkui eilen/ tänä päivänä koko aamun.
Pekka slept yesterday this day whole morning
 'Pekka slept the whole morning yesterday/today.'
- b. Optionality test
 Pekka nukkui (koko aamun).
Pekka slept whole morning
 'Pekka slept (the whole morning).'
- c. Free Ordering Test
 Pekka nukkui koko aamun eilen/ tänään.
Pekka slept whole morning yesterday today
 'Pekka slept four hours yesterday/today.'
- d. Coordination Test
 ??Pekka söi leipää ja koko aamun.
Pekka ate bread and whole morning
 'Pekka ate the bread and (he ate it) for the whole morning.'
- e. Thematic Role Test
 Pekka katsoi *(televisiota) koko aamun.
Pekka watched television whole morning

The Iteration Test, Optionality Test and Coordination Test give different results with complement DPs (30), showing that the adjunct DP contrasts with a complement DP.

- (30) a. Iteration Test
 *Pekka katsoi televisiota ikkunaa.
Pekka watched television window
- b. Optionality Test
 *Pekka katsoi.
Pekka watched
- c. Coordination Test
 Pekka katsoi televisiota ja ikkunaa.
Pekka watched television and window
 ‘Pekka watched the television and the window.’

Furthermore, the complement in (30) bears the thematic role of Patient (Thematic Role Test) and it changes the syntactic nature of its projection $V \rightarrow v$ (Projectional Inertness Test). The Free Word Order Test cannot be applied to a finite clause due to the fact that Finnish word order is relatively free. It can, however, be applied to adjective phrases. In Finnish, an adjective phrase must obey the head-final word ordering, as shown in (31). Thus, all the head–complement dependencies must occur in the head-final order, in contrast to finite clauses where the natural word order is head-initial.

- (31) a. talon myymistä valmistellut perhe
house.ACC selling prepared family
 ‘a family that prepared the selling of a house’

Adjunct phrases such as *koko päivän* ‘whole day’ may, however, occur at several positions (32a, b). This behavior contrasts with heads and complements (or arguments), which cannot scramble into any other position (32a, b).

- (32) a. koko päivän talon myymistä valmistellut perhe
whole day house.ACC selling prepared family
 ‘a family that prepared the selling of a house the whole day’
- b. talon myymistä koko päivän valmistellut perhe
house.ACC selling whole day prepared family
 ‘a family that prepared the selling of a house the whole day’
- (33) a. koko päivän varaamista valmistellut perhe
whole day reserving prepared family
 ‘a family who prepared to reserve the whole day’
- b. *varaamista koko päivän valmistellut perhe
reserving whole day prepared family
 ‘a family who prepared to reserve the whole day’

Temporal DPs are therefore adjuncts. If a phrase is adjoinable, it constitutes a pied-piping domain. Some authors maintain that bare-DP temporal adverbs are actually

PPs headed by empty prepositions (see Demirdache & Uribe-Etxebarria 2004 and references therein), while others hold that they are DPs (Larson 1985). If it is true that temporal adverb DPs are PPs, then one could maintain that there are no adjoinable DPs. The hypothesis that pied-piping domains are adjoinable predicts that DPs should be adjoinable. There is strong evidence, however, that bare-DP adverbs are not concealed PPs. Note first that when a DP occurs in the complement position of a preposition, its Case in Finnish is determined by the preposition and never by a nonlocal Case assigner. Therefore, if it is true that bare-DP adverbs are concealed PPs, their Case should never change as a function of the matrix clause properties. This prediction is not borne out. First, in Finnish, the matrix negation requires all direct objects to occur in the partitive, but the same is true of the bare-DP adverb as well, see (34a, b). Secondly, the modal verb *täytyy* ‘must’ requires direct objects to occur in the nominative Case; it will license nominative Case for the bare-DP adverbs as well, see (34c). In sum, bare-DP temporal modifiers behave like bare DPs. They are transparent to Case assignment.

- (34) a. Minä nukuin *koko päivä/ koko päivän/ *koko päivää.
I slept whole day.NOM whole day.ACC whole day.PRT
 ‘I slept the whole day.’
- b. Minä en nukkunut *koko päivä/ *koko päivän/ koko päivää.
I not slept whole day.NOM whole day.ACC whole day.PRT
 ‘I didn’t sleep the whole day.’
- c. Minun täytyy nukkua koko päivä/ ?koko päivän/ *koko päivää.
I must sleep whole day.NOM whole day.ACC whole day.PRT
 ‘I must sleep the whole day.’

I will therefore maintain that DPs are adjoinable. An anonymous reviewer objects to the present generalization by pointing out that (for example) *because*-clauses are adjoinable but they are not pied-piping domains. This argument might be problematic because the relevant clauses are defined by requiring a specific non-*wh*-element to occur at their left edge. It is possible to argue against the present generalization by saying that DPs with overt demonstratives are adjoinable but they are not pied-piping domains. However, the reason why such DPs do not involve *wh*-movement to their left edge is because the overt demonstrative fills the edge position and blocks movement. The same is true of clauses headed by *because*: there is no space for the *wh*-interrogative, and therefore such clauses do not pied-pipe.

Next we tackle the ‘only if’ part of our empirical generalization in (13). To show that an XP is a pied-piping domain only if it can be adjoined we must show that the phrases listed in the previous section are all and the only pied-piping domains there are in Finnish. That this holds is argued by Huhmarniemi (2012a:208–210). An additional argument can be crafted by going through phrases which cannot be adjoined and showing for each that they do not constitute pied-piping domains. I will go through this demonstration here.

Phrases which cannot be adjoined in Finnish include tense phrases (TPs), small verb phrases (vPs), quantifier phrases (QPs), numeral phrases (NumPs) and the three verbal complement infinitivals (VA, MA, A). The claim is easy to show for the two infinitivals, VA and A. In each (a) example below a *wh*-interrogative is formed by extracting the *wh*-pronoun from the embedded infinitival; these are all grammatical. In each (b) example, the *wh*-pronoun and the whole infinitival phrase remains in situ; these are all ungrammatical. Finally, each (c) example shows whether pied-piping is possible. It is possible for the MA-infinitival, contrary to the generalization (13), but not for the VA- and A-infinitival. I will return to the MA-infinitival further below.

(35) *VA-infinitival*

- a. Kenen Pekka pohti ___ syövän leipää?
who Pekka wondered eat.VA bread
 ‘Who did Pekka wonder was eating the bread?’
- b. *Pekka pohti kenen syövän leipää?
Pekka wonder who eat.VA bread
- c. *[Kenen syövän leipää] Pekka näki ___?
who eat bread Pekka saw

(36) *MA-infinitival*

- a. Kenet Pekka näki ___ syömässä leipää?
who Pekka saw eat.MA bread
 ‘Who did Pekka saw eating bread?’
- b. *Pekka pohti kenet syömässä leipää?
Pekka wonder who eat.MA bread
- c. *[Kenet syömässä leipää] Pekka näki ___?
who eat.MA bread Pekka saw
 ‘Who Pekka saw eating the bread?’

(37) *A-infinitival*

- a. Kenen Pekka käski ___ lähteä kotiin?
who Pekka asked go.A home
 ‘Who did Pekka ask to go home?’
- b. *Pekka käski kenen lähteä kotiin?
Pekka ask who leave.A home
- c. *[Kenen lähteä kotiin] Pekka käski ___?
who leave.A home Pekka ask?

The VA- and A-infinitivals do not satisfy the adjunct tests. I will show this for the A-infinitival: they cannot be iterated (38a); they are selected by the governing verb and are often not optional (38b-c); their ordering is not free (38d-e); it is not possible coordinate them with adjuncts (38f) and they bear thematic roles assigned by the governing verb.

- (38) a. *Pekka käski Merjan katsoa Jukan lähteä.
Pekka asked Merja look.A Jukka leave.A

- b. Pekka käski/ *näki Merjan nukkua.
Pekka asked saw Merja sleep.A
 ‘Pekka asked Merja to sleep.’
- c. Pekka käski *(Merjan nukkua).
Pekka asked Merja sleep.A
- d. Pekka käski Merjan katsoa TV:tä hänen lukiessaan.
Pekka asked Merja watch.A TV s/he.GEN reading
 ‘Pekka asked Merja to watch TV while s/he was reading.’
- e. *Pekka käski hänen lukiessaan Merjan katsoa TV:tä.
Pekka asked s/he.GEN reading Merja watch.A TV
- f. *Pekka käski Jukan lähteä ja koko päivän.
Pekka asked Jukka leave.A and whole day

The QP and NumP are projections internal to a noun phrase. They are neither islands (39b) nor projections that can pied-pipe out of the DP, see (39c, d). Rather, as shown by Huhmarniemi (2012a:149–151), a *wh*-element moves to the edge of the DP and pied-pipes the whole DP, as shown in (39b).

- (39) a. Pekka näki ne kaikki kolme isänsä polkupyörää.
Pekka saw those all three father's bicycles
 ‘Pekka saw all those three bicycles of his father.’
- b. [Kenen kaikki kolme ___ polkupyörää] Pekka näki ___?
whose all three bicycles Pekka saw
 ‘Whose all three bicycles did Pekka see?’
- c. *[Kenen kaikki kolme ___ polkupyörää] Pekka näki [ne ___]?
whose all three bicycles Pekka saw those
- d. *[kenen polkupyörää] Pekka näki ne kolme ___?
whose bicycles Pekka saw those three

Is it possible to form an interrogative by pied-piping the *vP*? The matter is difficult to assess, given that both the main verb and the subject may have escaped from the *vP* before operations apply. It is well-known that a phase whose head has escaped cannot move (Takano 2000). But is it possible to find an example where both the subject and the verb remain inside the *vP*? It is possible to keep the subject inside with two auxiliary assumptions. The first assumption will be that if the clause is headed by an expletive, then the subject remains at (Spec,*vP*) (Holmberg & Nikanne 2002). The second assumption is that the subject will get nominative Case and trigger phi-agreement at this position and thus will not require movement to (Spec,TP) (Chomsky 2000, 2008). Then we can show that if the external subject is a *wh*-pronoun, *vP* cannot be pied-piped to the front of the clause, see (40a, b). On the other hand, it is possible to form an interrogative by moving the *wh*-pronoun out of the *vP*, as shown in (40c).

- (40) a. Sitä syö [isä taas leipää].
EXPL eat father again bread
 ‘Father is again eating bread.’

- b. *[Kuka taas leipää] sitä syö ____?
who again bread EXPL eats
- c. Kuka sitä ____ syö taas leipää?
who EXPL eat again bread
 'Who's eating bread again?'

However, here the verb has climbed out of the *vP*. To force the verb to remain inside, we need an example where it does not show tense alteration. A relevant example can be constructed by using a tensed modal verb which takes a non-finite verbal complement. The combination of the modal and the nonfinite verb constitutes a monoclausal structure, suggesting that the relevant structure is *T + vP*. The experiment shows that pied-piping is impossible, see (41a, b).⁵

- (41) a. Sitä täytyy [isän taas syödä leipää].
EXPL must.T father.GEN again eat.A bread.PRT
 'It must again the father to eat some bread.'
- b. *[Kenen taas syödä leipää] sitä täytyy ____.
who.GEN again eat.A bread.PRT EXPL must.T

Another argument against the assumption that *vP* constitutes a pied-piping domain can be constructed on the basis of *vP* adverbs. The hypothesis that *vPs* constitute pied-piping domains predicts that after the object argument inside a *vP* has been interrogativized and moved to the left edge of the *vP*, pied-piping of the *vP* should bring the *vP* adverbs along. This prediction is not borne out, as is shown by (42b).

- (42) a. Pekka söi [leivän nopeasti].
Pekka ate bread fast
 'Pekka ate the bread fast.'
- b. ?*[Minkä nopeasti] Pekka söi ____?
what fast Pekka ate
- c. Minkä Pekka söi ____ nopeasti?
what Pekka ate fast
 'What did Pekka eat fast?'

One direct argument for the conclusion that *TP* is not a pied-piping domain can be drawn from the fact that the *VA*-infinitival is not a pied-piping domain. The *VA*-infinitival inflects for tense and contains, therefore, the *TP* projection (and arguably nothing else). Another argument is based on the fact that if the *TP* were a pied-piping domain, complementizers could appear at the end of the finite clause after the whole *TP* has moved. The resulting construction is ungrammatical in Finnish (43).

- (43) *Pekka pohti [ketä Merja rakastaa] että ____.
Pekka wonder who Merja loves that

Thus, complementizers cannot be stranded in Finnish. To conclude the argument it must be shown that neither the *TP* nor *vP* satisfy the adjunct tests. Neither of them can

be iterated; both are selected by the governing head such as C, T or V; they change the category of their projection and their order is not free. I know of no situation where a bare TP or bare *v*P would behave otherwise.

The only counterexample known to me at present to the generalization that a phrase constitutes a pied-piping domain only if it can be adjoined is the MA-infinitival, which functions as a complement but constitutes a pied-piping domain. This violates generalization (12). The evidence, presented in (36c) above, is repeated here as (44).

- (44) ?[Kenet syömässä leipää] Pekka näki ___?
who eating bread Pekka saw
 ‘Who Pekka saw eating the bread?’

Why is this so? The MA-infinitival differs from the A-infinitival and VA-infinitival in that it constitutes an ECM (Exceptional Case Marking) construction. By being an ECM construction we mean that the case of its thematic subject is assigned by an element in the matrix clause, not by an element within its own clause. A well-known experiment to show this is to use the negation test. In Finnish, the negative word *e-* forces all direct objects it c-commands to be in the partitive. The matrix negation affects the thematic subject of the MA-infinitival, (45c), but not the subjects of the VA-infinitival, (45b), or the A-infinitival, (45a):

- (45) a. Pekka ei käsenyt Merjan syödä leipää.
Pekka not ask Merja.GEN to.eat bread
 ‘Pekka did not order Merja to eat the bread.’
 b. Pekka ei nähnyt Merjan syövän leipää.
Pekka not see Merja.GEN eat.VA bread
 ‘Pekka did not see Merja eating the bread.’
 c. Pekka ei nähnyt Merjaa/ *Merjan syömässä leipää.
Pekka not see Merja.PRT Merja.ACC eat.MA bread
 ‘Pekka did not see Merja eating the bread.’

The thematic subject of the MA-infinitival is therefore in a direct object position. Suppose, therefore, that the structure of the MA-infinitival is such that the thematic subject is not contained in the MA-phrase and is therefore directly case-marked by the matrix clause elements:

- (46) Pekka näki [Merjan] [syömässä leipää].
Pekka saw Merja.ACC eat.MA bread
 ‘Pekka saw Merja eating the bread.’

The thematic subject *Merjan* cannot pied-pipe the MA-infinitival: it is not part of it. An element that is not contained in a phrase XP cannot pied-pipe that XP. There is an alternative derivation which yields (44). According to this derivation, the MA-infinitival *syömässä leipää* ‘eat.MA bread’ is first fronted by a focus-topicalization

rule, after which the *wh*-pronoun follows, see (47). They can move independently if they are independent constituents.

- (47) ?Kenet_j [syömässä leipää]_i Pekka näki ____j ____i.
who.ACC eat.MA bread Pekka saw

This analysis is supported by the fact that the MA-constituent can move as a constituent while stranding the thematic subject:

- (48) [Syömässä leipää] Pekka näki Merjan.
eat.MA bread Pekka saw Merja.ACC
 'It was eating the bread that Pekka saw Merja doing.'

This operation triggers a focus/topic interpretation for the MA-infinitival. This in effect replicates the first movement operation assumed to underlie (47). It is then easy to see that if the object *Merja* is interrogativized, it, too, must climb to the left edge. This produces the apparent 'pied-piping' construction. The second supporting fact comes from the observation that native speakers prefer the construction (49), where the *wh*-element is fronted and the MA-infinitival remains in situ.

- (49) Kenet Pekka näki ___ syömässä leipää?
who Pekka saw eating bread

If the 'pied-piping' alternative is derived by two movement operations, one which is related to topic/focus structure and another which is related to the interrogativization, then the intuition that the 'pied-piping' alternative is more marked is explained.

The third argument derives from the following prediction of the present analysis. Suppose, contrary to the analysis argued here, that the object *wh*-pronoun pied-pipes the MA-infinitival to the left edge of the matrix clause. This hypothesis predicts that if the MA-infinitival contains a subject, a construction containing the *wh*-object, subject and the MA-infinitival should be dislocated. This prediction is falsified: such construction is totally ungrammatical, as shown in (50).

- (50) *[Mitä Merjan syömässä ___] Pekka näki ___?
what Merja.ACC eat.MA Pekka saw

In effect, the presence of the thematic subject prevents pied-piping: only the extraction alternative is licit. On the other hand, this data is explained by the ECM analysis, which says that the thematic subject is not part of the MA-clause. If so, the derivation of (50) performs an impossible operation: it puts an element outside phrase XP, the subject, inside that phrase when they both land at the left periphery.

A fourth argument concerns the fact that an analysis which puts the subject of the MA-infinitival and the residuum into different constituents predicts that it should be possible to move one of them further, stranding the other.⁶ This prediction is confirmed, see (51).

- (51) a. Merjan Jukka ajatteli että Pekka näki syömässä leipää.
Merja.ACC Jukka thought that Pekka saw eat.MA bread
 ‘It was Merja who Jukka thought that Pekka saw eating the bread.’
- b. ?Merjan Jukka ajatteli että syömässä leipää Pekka näki.
Merja.ACC Jukka thought that eat.MA bread Pekka saw
 ‘It was Merja who Jukka thought that Pekka saw eating the bread.’
- c. Syömässä leipää Jukka ajatteli että Merjan Pekka näki.
eat.MA bread Jukka thought that Merja.ACC Pekka saw
 ‘It was eating bread that Jukka thought that Pekka saw Merja doing.’

The fifth argument concerns the slight ungrammaticality of the ‘pied-piping alternative’, shown in (47) above, repeated here as (52).

- (52) ?Kenet_j [syömässä leipää]_i Pekka näki ____j ____i?
who.ACC eat.MA bread Pekka saw

I judge the sentence to be slightly off, while some speakers judge the sentence to be close to ungrammatical. Why? The derivation in (52) moves two constituents to the left peripheral A'-position: the residuum MA-infinitive and the *wh*-interrogative. It is well-known, however, that Finnish sentences have only one left peripheral A'-position (Vainikka 1989, Vilkuna 1995, Huhmarniemi 2012a). This is shown by (53), where a PP *autossa* ‘inside a car’ is topicalized and *wh*-pronoun is fronted. I judge the sentence to be quite ill-formed.

- (53) ??Mitä_j autossa_i Pekka teki ____i ____j?
what in-car Pekka did
 ‘What Pekka did in a car?’

Thus, the question why the pied-piping alternative is ungrammatical can be answered if we assume that it involves two movement operations, both of which target one position.

All in all, it is reasonable to assume that the MA-infinitival contains two parts: the thematic subject, which lies outside the constituent, and the residuum, containing the infinitival and its object. If the thematic subject is outside the MA-adjunct, then we focus on the behavior of the constituent containing the infinitival and its object. Let’s call it the ‘residuum MA-infinitival’. Can the residuum MA-infinitival be pied-piped and adjoined? It turns out that both questions are difficult to answer. Example (54) provides a pied-piping construction.

- (54) ?[Mitä syömässä ___] Pekka näki Merjan ___?
what eat.MA Pekka saw Merja

The bracketed phrase in (54) constitutes the residuum MA-infinitival. To me, it pied-pipes marginally, while the extraction construction is more natural. Is it adjoinable? An example such as (55) suggests that it is.⁷

- (55) Pekka näki Merjan kaupassa [ostamassa leipää].
Pekka saw Merja.ACC in.shop buy.MA bread
 'Pekka saw Merja in the shop buying bread.'

The MA-infinitival is optional and, since we have seen that its thematic subject occurs in the matrix clause, it could be argued that it does constitute an adjunct in (55). If so, then the residuum MA-infinitival would be adjoinable, which then explains at once why (54) is possible. This verifies the generalization that adjoinability and pied-piping domains coincide.

However, as much as I think that this would be a desirable result, the validity of the claim that the MA-infinitival is adjoinable is not trivial to establish and this deserves a comment. For one, the MA-infinitival is strongly licensed by certain kinds of verbs, suggesting that it would be subject to s-selection or theta-marking. Adjuncts tend to be immune to selection.

- (56) a. *?Pekka lumosi Merjan kaupassa [ostamassa leipää].
Pekka seduced Merja in-shop buy.MA bread
 b. *Pekka haki Merjan kaupasta [ostamassa leipää].
Pekka got Merja from.shop buy.MA bread
 c. *Pekka voitti Merjan [ostamassa leipää].
Pekka won Merja buy.MA bread

Second, as noted earlier, the MA-infinitive is not an extraction island. Third, only one or two MA-infinitivals can occur per verb; the construction cannot be iterated. Fourth, the 'pied-piped' version seems awkward and more marginal to me than the extraction alternative. This and other reasons have prompted some scholars to regard the MA-infinitive as a complement (Vainikka 1989, Toivonen 1995, Manninen 1999) and not as an adjunct. Due to the fact that the residuum MA-infinitival bears some properties of adjuncts and some properties of arguments, it is not possible to evaluate its standing in relation to the present generalization without further exploring the theory of adjunction. My guess is that residuum MA-infinitivals are indeed a mixed case.

This concludes the argument that a phrase is a pied-piping domain if and only if it is adjoinable. *Wh*-movement, pied-piping and adjoinability are connected with each other at some deeper level of grammatical analysis.

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the first part of a larger work concerning *wh*-movement, adjunction and pied-piping. The second part can be found from Brattico (2012).

NOTES

1. The following abbreviations will be used in this article: A = A-infinitival or adjective; ACC = accusative Case; E = E-infinitive (roughly ‘by doing something’); EXPL = expletive; ESSA = ESSA-adverb phrase (roughly ‘while doing something’); GEN = genitive Case; KSE = KSE-adverb phrase (roughly ‘in order to do something’); MA = MA-infinitival; MALLA = MALLA-adverb phrase (roughly ‘by doing something’); MATTA = MATTA-adverb phrase (roughly ‘without doing something’); NOM = nominative Case; PRT = partitive Case; T = tense; TUA = TUA-infinitival (roughly ‘after doing something’); VA = VA-infinitival. I follow a convention according to which the E-infinitive, KSE-adverb, MA-infinitival, MALLA-adverb, MATTA-adverb, TUA-infinitival and VA-infinitival are labeled according to the overt morphological form of the identifying suffix. More detailed properties of the various infinitivals are explored and explained as we encounter them in the text.
2. Heck (2009) discusses several cases of optional pied-piping, among others the possessor pied-piping in Slavic languages pointed out by Ross (1986:145) and Corver (1990:330). He proposes that the optionality of pied-piping is only apparent and the pied-piping and extraction alternatives derive from different syntactic configurations.
3. There are several types of MA-infinitivals in Finnish. They all show optional pied-piping and seem to have close to identical properties. To avoid repetition, I will examine only one MA-infinitival in this paper.
4. An alternative hypothesis is to maintain the link between islands and pied-piping domains and explain the counterexamples by relying on an independent factor. I do not follow this line of thought here for several reasons. First, I believe there is a generalization that subsumes both the island pied-piping domains and non-island domains: the adjunction hypothesis defended here. Another reason is that the list of counterexamples is quite substantial (see examples (5)–(12) in the text). The third reason is that so far I have not been able to find an independent syntactic property distinguishing pied-piping constructions from the extraction alternatives. Without such property, optional pied-piping must be deemed as exhibiting genuine optionality.
5. It only takes one external and internal argument and does not allow stacking of mutually inconsistent adverbs.
6. This test was proposed by an anonymous reviewer.
7. This point was brought to my attention by an anonymous reviewer.

REFERENCES

- Boeckx, Cedric. 2008. *Bare Syntax*. Oxford: Oxford University Press.
- Brattico, Pauli. 2012. Pied-piping, *wh*-movement and adjunction. Ms., University of Helsinki. [To appear in *Biolinguistica Fennica Working Papers* 3.]
- Carnie, Andrew. 2008. *Constituent Structure*. Oxford: Oxford University Press.
- Chomsky, Noam. 2000. Minimalist inquiries: The framework. In Roger Martin, David Michaels & Juan Uriagereka (eds.), *Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik*, 89–156. Cambridge, MA: MIT Press.

- Chomsky, Noam. 2008. On phases. In Robert Freidin, Carlos Otero & Maria-Luisa Zubizarreta (eds.), *Foundational Issues in Linguistic Theory: Essays in Honor of Jean-Roger Vergnaud*, 133–166. Cambridge, MA: MIT Press.
- Corver, Norbert. 1990. *The Syntax of Left Branch Extractions*. Ph.D. thesis, Tilburg University.
- Demirdache, Hamida & Myriam Uribe-Etxebarria. 2004. The syntax of time adverbial. In Jacqueline Guéron & Jacqueline Lecarme (eds.), *The Syntax of Time*, 143–179. Cambridge, MA: MIT Press.
- Heck, Fabian. 2004. *A Theory of Pied-piping*. Ph.D. thesis, Universität Tübingen.
- Heck, Fabian. 2008. *On Pied-piping: Wh-movement and Beyond*. Berlin: Mouton de Gruyter.
- Holmberg, Anders & Urpo Nikanne. 2002. Expletives, subjects and topics in Finnish. In Peter Svenonius (ed.), *Subjects, Expletives, and the EPP*, 71–106. Oxford: Oxford University Press.
- Huhmarniemi, Saara. 2009. Extraction islands in Finnish. *Biolinguistica Fennica Working Papers* 1, 21–78.
- Huhmarniemi, Saara. 2012a. *Finnish A'-movement: Edges and Islands* (Institute of Behavioural Sciences, Studies in Cognitive Science 2). Helsinki: University of Helsinki.
- Huhmarniemi, Saara. 2012b. Optional pied-piping: Evidence from Finnish. Ms., University of Helsinki.
- Larson, Richard K. 1985. Bare-NP Adverbs. *Linguistic Inquiry* 16(4), 595–621.
- Manninen, Satu. 1999. *Manner Adverbials and the Structure of Finnish Sentences: A Minimalist Approach*. Ph.D. thesis, University of Edinburgh.
- Ross, John Robert. 1986. *Infinite Syntax!* Norwood, NJ: Ablex.
- Takano, Yuji. 2000. Illicit remnant movement: An argument for feature-driven movement. *Linguistic Inquiry* 31, 141–156.
- Toivonen, Ida. 1995. A study of Finnish infinitives. Bachelor thesis, Brandeis University.
- Vainikka, Anne. 1989. *Deriving Syntactic Representations in Finnish*. Ph.D. dissertation, University of Massachusetts Amherst.
- Vilkuna, Maria. 1995. Discourse configurationality in Finnish. In Katalin É. Kiss (ed.), *Discourse Configurational Languages*, 244–244. Oxford: Oxford University Press.