WHY A-MOVEMENT DOES NOT LICENSE PARASITIC GAPS*

COPPE VAN URK
Queen Mary University of London

1 Introduction

A well-known difference between A- and Ā-movement is that only Ā-movement is capable of licensing parasitic gaps (1a–b). A-movement is not, even when crossing the same adjuncts (1c–d).

(1) *Only Ā-movement licenses parasitic gaps:*
   a. Which present did you open ___ [after buying ___]?
   b. Those books, Alex picked up ___ yesterday [only to throw away ___ later].
   c. *Every present was opened ___ [after buying ___].
   d. *That book was picked up ___ yesterday [only to throw away ___ later].

In this paper, I show that this contrast can be made to follow from Nissenbaum's (2000) theory of parasitic gaps when combined with with the idea that Ā-movement involves quantification over *choice functions* and not individuals, as suggested by Sauerland (1998) and Ruys (2000) to account for Weak Crossover effects. In particular, I propose that, because Ā-movement triggers abstraction over choice functions, it creates *different predicates* than A-movement, which involves abstraction over individuals. As a result, the predicate conjunction employed in Nissenbaum's account is only possible if the two predicates are formed by the same type of movement.

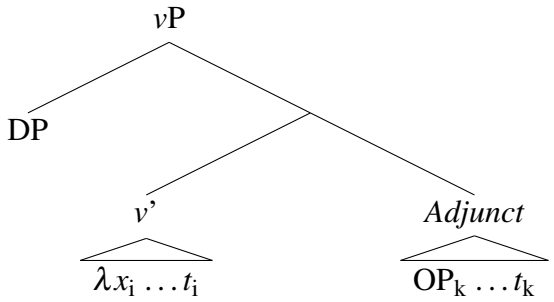
In addition, I show that this analysis makes sense of Pylkkänen's (2008) observation that depictives can be licensed in intermediate positions in a similar fashion to parasitic gaps, by means of predicate conjunction, but appear to have the opposite licensing requirements. In particular, parasitic gaps can be licensed by Ā-movement, but not by A-movement. In contrast, depictives are licensed by A-movement, but not by Ā-movement.

*As always, this paper has benefited greatly from discussions with David (and also from an old observation of his, in (14a), which turns out to be a crucial example). I would like to thank Danny Fox, Claire Halpert, Aron Hirsch, Sabine Iatridou, Luisa Martí, Chris O'Brien, Norvin Richards, Roger Schwarzschild, and Yasu Sudo for comments and discussion. I am also indebted to Benjamin Bruening and Idan Landau for their insightful commentary.

2 Nissenbaum's (2000) Theory of Parasitic Gaps

I adopt the approach to parasitic gaps developed by Nissenbaum (2000). Nissenbaum proposes that parasitic gap constructions appear because both intermediate successive-cyclic movement and null operator movement create derived predicates. Parasitic gaps occur when such predicates are conjoined. In other words, parasitic gaps involve the configuration in (2).

(2) *Parasitic gap configuration in Nissenbaum (2000):*



On the assumption that both intermediate movement and null operator movement result in λ-abstraction and so form open predicates, the *v*P and adjunct in (2) can be combined to yield a single predicate.[1] This conjoined predicate composes with the DP copy at the *v*P edge, leading to the appearance of a parasitic gap.

The advantage of this analysis is that it derives the special properties of parasitic gaps, such as the path-containment conditions described by Pesetsky (1982), Kayne (1983), and Sag (1983), without requiring mechanisms particular to the construction. Nissenbaum's account is overly permissive in several respects, however (see also Nissenbaum and Schwarz 2011). First of all, if adjuncts with operator gaps are simply predicates over individuals, it is unclear why argument-introducing heads like *v* and V cannot form a conjoined predicate with such adjuncts directly, allowing an operator gap to be licensed from the thematic position of a subject or object. That this is impossible is demonstrated by examples like (3a–b).

(3) *Operator gaps cannot be licensed from thematic positions:*

a. *Kim$_i$ sold a book [before Jess had a chance to talk to ___$_i$].
b. *I opened that present$_i$ [after buying ___$_i$].

Nissenbaum suggests that adjuncts with operator gaps cannot adjoin to an intermediate projection, but must attach to a maximal projection (see also Nissenbaum and Schwarz 2011).

Another problem arises with A-movement. In Nissenbaum's account, there is no reason why parasitic gaps are necessarily licensed by Ā-movement. An intermediate A-movement step to *v*P should in principle also be able to create a predicate that can be conjoined with an operator gap adjunct. As noted previously, however, A-movement cannot license parasitic gaps (4a–b).

(4) *A-movement does not license parasitic gaps:*

a. *Every present was opened ___ [after buying ___].
b. *That book was picked up ___ yesterday [only to throw away ___ later].

[1] It is important that the adjunct can be attached in between the point of abstraction and the DP. In addition to this, more needs to be said about how such predicates can be conjoined. See Nissenbaum and Schwarz (2011).

Nissenbaum assumes that there is no intermediate A-movement to the *v*P edge, so that there are no intermediate copies where the relevant adjuncts attach.

In this paper, I first argue, drawing on Pylkkänen's (2008) work on depictives, that the distribution of parasitic gaps cannot be explained by constraints on attachment. I provide evidence that there is intermediate A-movement to the *v*P edge and that parasitic gaps can be licensed in adjuncts that must be attached just below a thematic position. Instead, I propose that what distinguishes A- and Ā-movement is only that they create *different predicates*, so that predicates created by Ā-movement cannot be conjoined with predicates formed by A-movement and vice versa. We can then maintain the idea that A- and Ā-movement both involve intermediate movement to the *v*P edge (*cf.* Legate 2003), and that there are no syntactic constraints on whether adjuncts can attach to maximal or intermediate projections.

3 Pylkkänen (2008) on Depictives

Pylkkänen (2008) points out that the licensing of depictives shows a number of similarities with the licensing of parasitic gaps in Nissenbaum's account. In particular, Pylkkänen proposes that depictives are licensed by the same mechanism of predicate conjunction, but only involving argument-introducing heads or predicates created by A-movement (see also Bruening 2015).

Depictives in the usual case can modify subjects or objects (5a), but displays some restrictions (see in particular Marušič, Marvin, and Žaucer 2008). For example, they cannot refer to the indirect object of the ditransitive in (5b) or the complement of *with* in (5c).

(5) *Depictives can refer to subjects and direct objects:*
   a. Sam_{i} hugged Ted_{k} $\text{drunk}_{\text{i/k}}$.
   b. Sam_{i} gave Ted_{k} coffee $\text{drunk}_{\text{i/*k}}$.
   c. Sam_{i} danced with Ted_{k} $\text{drunk}_{\text{i/*k}}$.

As Pylkkänen points out, however, A-movement may create novel interpretations for depictives (an observation that goes back at least to Koizumi (1994)). A-movement of an indirect object to Spec-TP or A-movement of the DP complement of a preposition in a pseudopassive allows for that nominal to be modified by a depictive (6a–b).

(6) *Depictives are licensed by A-movement:*
   a. Ted_{k} was danced with ___ drunk_{k}.
   b. Ted_{k} was given ___ coffee drunk_{k}.

In these examples, it is not obvious whether the depictive is licensed by a final movement step or by an intermediate A-movement. We can show, however, that intermediate A-movement can suffice. In the example in (7), the depictive can modify both the matrix and the embedded verb, the last reading necessarily made possible by an intermediate A-movement step.

(7) *Depictives are licensed by intermediate A-movement:*
   Ted_{k} turned out [$_{\text{TP}}$ ___ to have been told ___ all the secrets drunk_{k}].
   Matrix reading: While drunk, Ted turned out to have been told all the secrets.
   Embedded reading: It turned out that, while drunk, Ted had been told all the secrets.

Following Geuder (2000), Pylkkänen proposes that depictives are formed by combining an adjective with a functional head Dep, whose denotation is in (8a). A depictive like *drunk* is then an <e,st> predicate (8b). (See also Bruening 2015.)

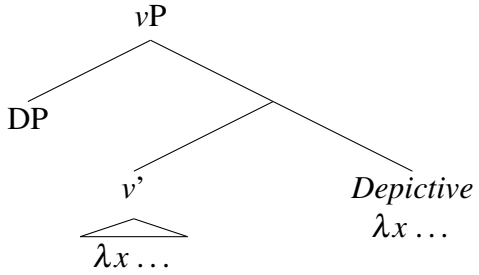
(8) *Semantics of depictive:*

a. $[\![\text{Dep}]\!] = \lambda f_{<e,st>}.\lambda x.\lambda e.\exists s.f(s,x)\ \&\ e \circ s$

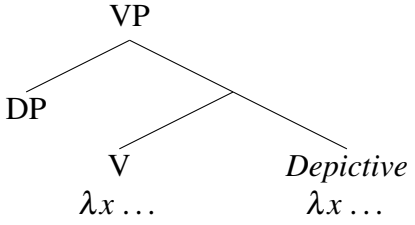
b. $[\![\text{Dep } \textit{drunk}]\!] = \lambda x.\lambda e.\exists s.\text{drunk}(s,x)\ \&\ e \circ s$
(where $\circ$ signifies overlap between two events)

In Pylkkänen's analysis, depictives are introduced by means of Predicate Modification, creating a conjoined predicate. Depictives modifying subjects and objects in their thematic positions combine with a projection of the argument-introducing head, A depictive combining with *v*' yields a subject depictive and a depictive combining with V yields an object depictive. The relevant structures are given in (9) and (10).

(9) *Subject depictive:*

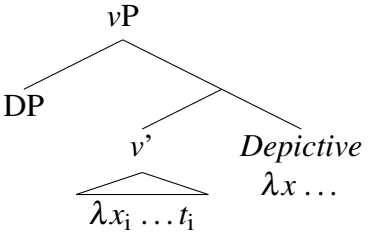


(10) *Object depictive:*



To deal with the fact that depictives can be licensed by A-movement too, Pylkkänen allows for the configuration in (9) to be created by intermediate A-movement as well. In this view, intermediate A-movement is accompanied by abstraction, just like intermediate Ā-movement for parasitic gaps, creating a predicate that may combine with the depictive (11).

(11) *Intermediate A-movement licenses depictive:*



The idea that depictives adjoin to an intermediate projection in the verb phrase (and not, for instance, to T) fits well with the notion that depictives encode a relation of overlap between the event described by the depictive and another event. A further argument for placing depictive licensing inside the verb phrase comes from expletive constructions like (12), which I analyze as A-movement to Spec-*v*P of the promoted subject licensing the depictive *drunk*.[2]

(12) *Depictive can be licensed by A-movement below Spec-TP:*
There was someone$_i$ who I hadn't invited being danced with ___ drunk$_i$.

[2]My thanks to Benjamin Bruening for pointing out such examples.

I present additional evidence that differences between parasitic gaps and depictives are not due to attachment site below.

Pylkkänen points out that, although this treatment of depictives is very similar to Nissenbaum's analysis of parasitic gaps, the distribution of depictives and parasitic gaps is different. Just as A-movement cannot license parasitic gaps, Ā-movement cannot give rise to novel interpretations of depictives (13a–b).

(13) *Ā-movement does not license depictives:*

a. Who_k did Sam_i give ___ coffee $\text{drunk}_{i/*k}$?
b. Who_k did Sam_i dance with ___ $\text{drunk}_{i/*k}$?

One possibility that we might entertain is that the landing sites of intermediate A- and Ā-movement are different. However, as Pylkkänen notes, we can find specific evidence that a depictives can be adjoined in positions in which parasitic gaps can be licensed. Parasitic gaps can in fact be licensed inside of depictives, as example (14a) demonstrates (an observation Pylkkänen credits David Pesetsky and Norvin Richards with). As with other parasitic gaps, such depictives must adjoin on the path of movement (14b–c).

(14) *Parasitic gap in a depictive:*

a. Which country did he die for ___ [still loyal to ___]?
(Pylkkänen 2008:40)
b. Which country ___ sent him to war [still loyal to the cause]?
c. *Which country ___ sent him to war [still loyal to ___]?

What these examples show is that adjuncts with operator gaps can be attached in the same position as depictives. These facts suggest that intermediate A- and Ā-movement target the same landing site. I propose that what distinguishes A- and Ā-movement is only that they create different predicates, providing an indepedent restriction on predicate conjunction. Specifically, I posit that Ā-movement always triggers abstraction over *choice functions*, following Sauerland (1998) and Ruys (2000), while A-movement abstracts over individuals.

4 Choice Functions and Ā-Movement

Sauerland (1998) and Ruys (2000) propose that Ā-movement is always accompanied by abstraction over choice functions, and not by abstraction over individuals. In this theory, all quantifiers quantify over choice functions. As a result, both Ā-movement and QR, since they establish quantification, trigger abstraction over choice functions. *Wh*-phrases, for instance, are treated as existential quantifiers over choice functions, following Reinhart's (1998) analysis of *wh*-in situ.

For this approach to work, two operations have to apply to the copies that make up an Ā-movement chain: 1) (distributed) deletion of the NP restrictor in the higher copy,[3] and 2) replacement of the quantifier in the lower copy with a choice function variable. The copies created by *wh*-movement are in (15a), creating the LF in (15b).

[3] Sauerland (1998:Ch. 5) provides an alternative that allows for the NP restrictor to be interpreted in the higher copy as well as the lower copy. He also outlines a treatment of relative clauses with abstraction over choice functions.

(15) *Wh-movement in Sauerland (1998) and Ruys (2000):*

a. [which ~~book~~] λf. do you like [f book]

b. **LF:** $\lambda p.\exists f.(p = \lambda w.$you like f(book) in $w)$

Importantly, instances of intermediate Ā-movement involve the same operations (16a). Abstraction over choice functions creates a derived predicate over choice functions at the *v*P level. The NP restrictor of the intermediate copy is deleted and the quantifier is replaced by choice function variable, allowing it to be bound by the copy in Spec-CP. The same LF results (16b).

(16) *Representation of intermediate copies:*

a. [which ~~book~~] λf. do you [$_{v\text{P}}$ [f ~~book~~] λf. t_{you} like [f book]]

b. **LF:** $\lambda p.\exists f.(p = \lambda w.$you like f(book) in $w)$

Such an account has advantages in dealing with split scope and conservativity (see Abels and Martí 2010 in particular). In addition, as Sauerland (1998) and Ruys (2000) argue, a choice function approach to Ā-movement provides an explanation of Weak Crossover effects. If pronouns are individuals, then Ā-movement cannot bind pronouns: it involves abstraction of the *wrong type*. In contrast, A-movement involves abstraction over individuals, and so can bind pronouns. An important assumption here is that bound pronouns never contain choice functions, so that variable binding cannot arise through abstraction over such a choice function.

In this system, a *wh*-phrase can only bind a pronoun if it undergoes A-movement prior to Ā-movement. For instance, in a sentence like *Which boy*$_{\text{i}}$ *likes his*$_{\text{i}}$ *sister?*, A-movement of the subject to Spec-TP, accompanied by abstraction over individuals and Fox's (1999) Trace Conversion in the lower copy, can bind the pronoun (17). Subsequent Ā-movement converts the copy in Spec-TP into an individual (f(boy)).

(17) *Binding by A-movement before Ā-movement:*
[which ~~boy~~] λf. C [$_{\text{TP}}$ [f(boy)] λx. T [$_{v\text{P}}$ [THE boy $\lambda y.y = x$] likes x's sister]]

One possible challenge to the idea that all Ā-movement involves abstraction over choice functions comes from Lasnik and Stowell's (1991) observation that not all Ā-movements appear to display Weak Crossover effects. Topicalization, non-restrictive relative clauses, parasitic gap constructions, and *tough*-movement do not appear to the trigger the Weak Crossover effect (18a–d).[4]

(18) *No Weak Crossover with topicalization, tough-movement, or parasitic gaps:*

a. This book$_{\text{i}}$, I expect its$_{\text{i}}$ author to buy ___.

b. Gerald, who his$_{\text{i}}$ mother loves ___, is a nice guy.

c. Who$_{\text{i}}$ will be easy [for us to get his$_{\text{i}}$ mother to talk to ___]?

d. Who$_{\text{i}}$ did you stay with ___ [before his$_{\text{i}}$ wife had spoken to ___]?
(Lasnik and Stowell 1991:691,698)

Ruys (2004) observes that the absence of Weak Crossover with *tough*-movement is not surprising. *Tough*-movement involves a step of A-movement in the higher clause, which allows a pronoun to

[4]Variable binding differs in this regard from anaphor binding, which is why it is important to distinguish Weak Crossover effects with Ā-movement from the inability to license anaphors.

be bound. Ruys also notes that the amelioration with parasitic gaps is unrelated to the presence of the operator gap. No Weak Crossover effects arise in this configuration when the parasitic gap is absent (19a–b), suggesting that variable binding is possible in this configuration to begin with.

(19) *Weakest Crossover does not depend on parasitic gap:*

a. Who$_i$ did you stay with ___ [before his$_i$ wife had spoken to ___]?

b. Who$_i$ did you stay with ___ [without ever talking to him$_i$]?
(Ruys 2004:127)

What these patterns show instead is that linear order also plays a role in binding relations (Barker 2012; Bruening 2014).

I also follow Ruys (2004) in taking the admissible cases of coindexation with topicalization and non-restrictive relative clauses to be cases of coreference and not binding. As support for this, note that Weak Crossover amelioration is only found with referential phrases.[5] Topicalization does not permit quantifiers to establish binding relations (20a–b), a fact first noted by Postal (1993:542).

(20) *Topicalization of quantificational DP is subject to WCO:*

a. Every other girl$_i$, Alex claims ___ likes her$_i$ mother.

b. *Every other girl$_i$, Alex claims her$_i$ mother likes ___.

Ruys also points to differences in the admissibility of a bound reading in pairs like (21a–b), where (21b) only permits a coreferential interpretation (it does not have the reading corresponding to *Even Winnie is liked by his own mother*).[6]

(21) *Only coreferential reading with crossover in topicalization:*

a. Even Winnie$_i$ thinks he$_i$ is smart.

b. Even Winnie$_i$, his$_i$ mother likes.
(Ruys 2004:136)

On this basis, I propose that the apparent divide between referential and quantificational DPs noted by Lasnik and Stowell (1991) and Postal (1993) reflects the fact that referential phrases can enter into coreference relations when variable binding is not possible. In this view, we can take all instances of Ā-movement to involve abstraction over choice functions.

5 Choice Functions and Parasitic Gaps

An important consequence of the choice function approach is that it provides a way of formalizing the idea that A- and Ā-movement trigger different types of abstraction and create different

[5] We might wonder, however, how Ā-movement of a referential phrase can be interpreted with choice functions. If such definite DPs denote individuals (e.g. Elbourne 2005), then such Ā-movement involves semantic reconstruction of the definite (since it is of same the type as a choice function), along the lines of (i).

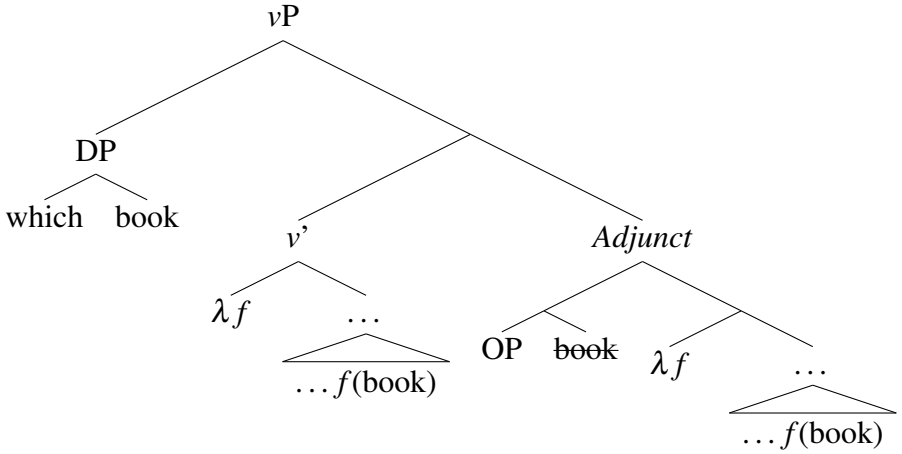
(i) *Ā-movement of referential phrases:*
[the ~~book~~], λf. I don't like [f book]

[6] See Ruys (2004:sec. 4) for more extensive discussion.

predicates. Since conjunction requires predicates of the same type, we then expect Predicate Modification to be possible with either A- or Ā-movement in any configuration, but never both.

In the approach outlined above, null operator movement, like other instances of Ā-movement, creates a predicate over choice functions. The resulting predicate can be conjoined with a predicate created by intermediate Ā-movement (22), just as in Nissenbaum (2000).

(22) *Parasitic gaps with abstraction over choice functions:*



I posit an NP restrictor that moves along with the null operator OP and is deleted under identity. It is important that the real gap and the operator gap have the same restrictor to ensure that the choice function will pick out the same individual. A similar matching operation has been invoked in the treatment of relative clauses (e.g. Carlson 1977; Sauerland 1998). In this view, the left periphery of a parasitic gap adjunct ends up looking essentially identical to the left periphery of a matching relative clause. For evidence that the parasitic gap site may indeed contain such NP material, see in particular Bruening and Al-Khalaf's (2016) recent discussion of reconstruction in parasitic gap constructions, although I must omit a full discussion of reconstruction effects for reasons of space. Another worry is whether parasitic gap constructions and ATB movement have similar derivations. The approach outlined here must follow work that assumes parasitic gap constructions and ATB movement have different derivations (e.g. Nissenbaum 2000), since ATB movement can be A-movement. One piece of support for this comes from the observation that ATB may require case matching in languages in which parasitic gaps do not, as in Polish (23a–b).

(23) *Polish ATB constructions require case matching, but parasitic gaps do not:*

a. *Czego/co Jan nienawidzi ___GEN a Maria lubi ___ACC?
what.GEN/ACC Jan hates and Maria likes
'What does Jan hate and Maria like?'

b. Którą książkę obejrzal ___ACC [nie zabierając ___GEN]?
which book.ACC looked.through not taking
'Which book did he look through without taking?'
(Polish; Bondaruk 2003:230, Citko 2005:487)

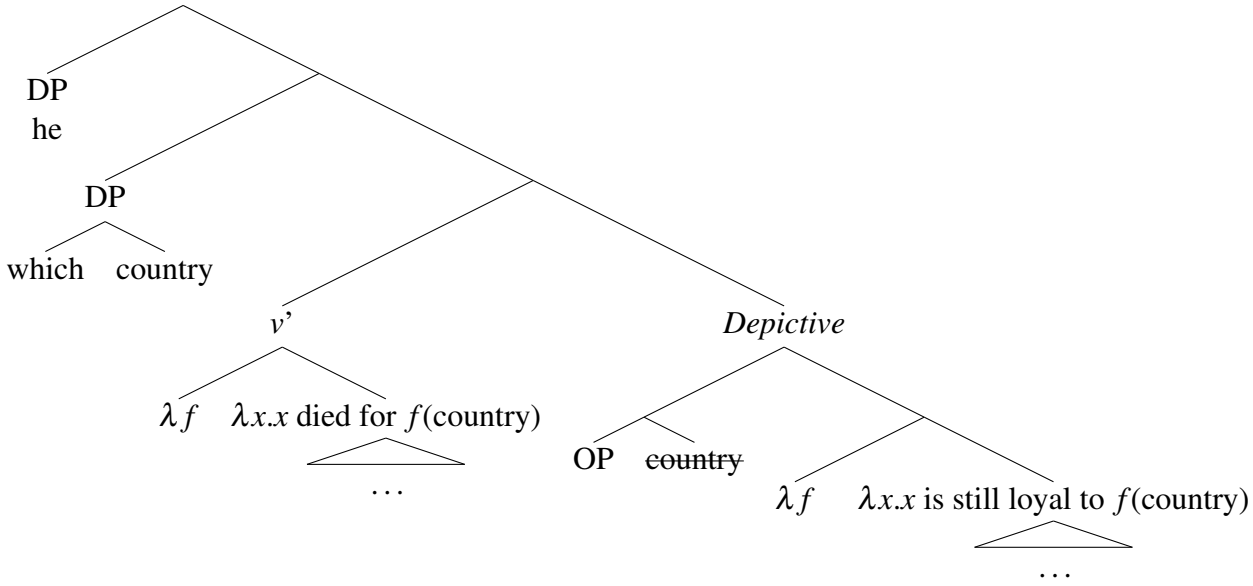
This approach explains why A-movement cannot create a parasitic gap, simply because a predicate over individuals cannot be conjoined with a predicate over choice functions. In addition, we can allow for depictives and parasitic gaps to attach in the same positions. There is no need

to posit constraints on attachment to intermediate projections. Finally, the possibility of having a parasitic gap inside of a depictive follows from the account outlined here. Assuming null operator movement in the depictive and that the DP copy left by intermediate Ā-movement can Merge below the copy left by intermediate A-movement of the unaccusative subject, I propose the structure in (24b) for (24a) (I omit event arguments for ease of exposition).

(24) *Representation of parasitic gap in depictive:*

a. Which country did he die for ___ [still loyal to ___]?

b. *v*P



Null operator movement inside the depictive adds an open choice function argument in addition to the open individual argument. The verb phrase has an open individual argument, created by movement of *he*. Intermediate Ā-movement triggers abstraction over choice functions in addition to this. The resulting verb phrase can form a conjoined predicate with the depictive, because the two phrases share both open arguments. The Ā-moved DP and thematic subject fill these argument positions in turn. Note that, in order to allow for representations like (24b), we do have to allow all abstraction to take place below the Merge site of both intermediate copies and some constraints would need to be put in place to ensure the right copy associates with the right predicate.

Examples like (24a) and the associated LF then demonstrate that A- and Ā-movement form distinct predicates. It is hard to see how we can account for such examples if null operator movement creates predicates of the same type as depictives.

Conclusion

In this paper, I demonstrated that Nissenbaum's (2000) account of parasitic gaps, if combined with the idea that Ā-movement triggers abstraction over choice functions (Sauerland 1998; Ruys 2000), provides an explanation of the inability of A-movement to license parasitic gaps. A-movement does not license parasitic gaps because it triggers abstraction over individuals, and so creates a different predicate than operator movement. Instead, predicates formed by A-movement can conjoin only with predicates that are not the result of Ā-movement, such as depictives (and possibly

controlled adjuncts). In addition, we predict that adjuncts that can conjoin with predicates formed by intermediate A-movement should always be able to conjoin also with argument-introducing heads, just as observed. We then have a principled explanation of why the positions created by A-movement should pattern with thematic position, and why both differ from Ā-positions.

References

Abels, Klaus, and Luisa Martí. 2010. A unified approach to split scope. *Natural Language Semantics* 18:435–470.

Barker, Chris. 2012. Quantificational binding does not require c-command. *Linguistic Inquiry* 43:614–633.

Bondaruk, Anna. 2003. Parasitic gaps and ATB in Polish. *Journal of Slavic Linguistics* 11:221–249.

Bruening, Benjamin. 2014. Precede-and-command revisited. *Language* 90:342–388.

Bruening, Benjamin. 2015. Depictive secondary predicates, light verb *give*, and theories of Double Object Constructions. Ms., University of Delaware.

Bruening, Benjamin, and Eman Al-Khalaf. 2016. Reconstruction and linear order in ATB movement and parasitic gap constructions. Ms., University of Delaware.

Carlson, Gregory. 1977. *Reference to kinds in English*. Doctoral dissertation, UMass Amherst.

Citko, Barbara. 2005. On the nature of Merge: External Merge, Internal Merge, and Parallel Merge. *Linguistic Inquiry* 36:475–496.

Elbourne, Paul. 2005. *Situations and individuals*. Cambridge, MA: MIT Press.

Fox, Danny. 1999. Reconstruction, binding theory, and the interpretation of chains. *Linguistic Inquiry* 30:157–196.

Geuder, Wilhelm. 2000. *Oriented adverbs: Issues in the lexical semantics of event adverbs*. Doctoral dissertation, University of Tübingen.

Kayne, Richard. 1983. Connectedness. *Linguistic Inquiry* 14:223–249.

Koizumi, Masatoshi. 1994. Secondary predicates. *Journal of East Asian Linguistics* 3:25–79.

Lasnik, Howard, and Tim Stowell. 1991. Weakest Crossover. *Linguistic Inquiry* 22:687–720.

Legate, Julie Anne. 2003. Some interface properties of the phase. *Linguistic Inquiry* 34:506–515.

Marušič, Frank, Tatjana Marvin, and Žaucer, Rok. 2008. Depictive secondary predication with no PRO. In *Formal description of Slavic languages*, ed. by Gerhild Zybatow, Luka Szucsich, Uwe Junghanns and Roland Meyer, 423–434. Frankfurt: Peter Lang.

Nissenbaum, Jon. 2000. *Investigations of covert phrase movement*. Doctoral dissertation, MIT.

Nissenbaum, Jon, and Bernhard Schwarz. 2011. Parasitic degree phrases. *Natural Language Semantics* 19:1–38.

Pesetsky, David. 1982. *Paths and categories*. Doctoral dissertation, MIT.

Postal, Paul. 1993. Remarks on Weak Crossover effects. *Linguistic Inquiry* 24:539–556.

Pylkkänen, Liina. 2008. *Introducing arguments*. Cambridge, MA: MIT Press.

Reinhart, Tanya. 1998. *Wh*-in-situ in the framework of the Minimalist Program. *Natural Language Semantics* 6:29–56.

Ruys, Eddy. 2000. Weak Crossover as a scope phenomenon. *Linguistic Inquiry* 31:513–539.

Ruys, Eddy. 2004. A note on Weakest Crossover. *Linguistic Inquiry* 35:124–140.

Sag, Ivan. 1983. On parasitic gaps. *Linguistics and Philosophy* 6:35–45.

Sauerland, Uli. 1998. *The meaning of chains*. Doctoral dissertation, MIT.