

# Crossing and stranding at edges\*

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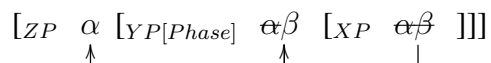
**Abstract:** This paper investigates the distribution of stranding in phase edges by A'-movement. I argue that the restrictions on such intermediate stranding (IS) provide evidence for the Cyclic Linearization theory of spellout, and a theory of movement as contingent on C-command-constrained Agree, which restricts movement in phrase edges. I show that these claims accurately predict a cross-linguistic word order generalization about IS, and provide insight into when a given edge position is viable for stranding or not.

## 1 Introduction

Moving constituents can sometimes leave material behind at intermediate points in the sentence. If the syntactic derivation is constrained by *phases*, with the result that movement paths must successive-cyclically pause in the edge of each phase passed (Chomsky 2000, 2001, a.o.), then such patterns of *intermediate stranding* (IS) are something that we expect to see—the landing sites forced by phases provide positions where, in principle, movement might leave something behind. In this paper, I examine the distribution of such stranding under A'-movement.

The schema in (1) illustrates the basic form of these derivations. Here  $\alpha$  successive-cyclically A'-moves in two steps, pied-piping  $\beta$  to the edge of the YP phase with the first step of movement, and stranding it there with the second step. Thus successive-cyclic movement of  $\alpha$  feeds IS of  $\beta$ .

(1) **A schema for IS**

$$[ZP \ \alpha \ [_{YP[Phase]} \ \alpha\beta \ [XP \ \alpha\beta \ ]]]$$


I'll show that IS by A'-movement obeys a cross-linguistic generalization about word order:

(2) **Intermediate Stranding Generalization (ISG)**

*IS is only possible when the stranded material is, or can be, to the right of the material that continues to move leftward*

I argue that this generalization is not a coincidence, but suggests a particular understanding of the nature of spellout, and the constraints on movement.

### 1.1 Conclusions in preview

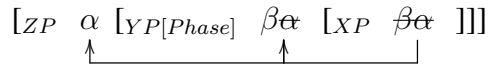
Assuming that IS occurs in phase edges for the reasons outlined above, I argue that the ISG in (2) holds because only those derivations that obey it avoid a fatal crossing problem. Namely, IS of an element that precedes the phrase that strands would require the stranded material to be crossed over within a phase edge, in a way that I'll argue is illicit.

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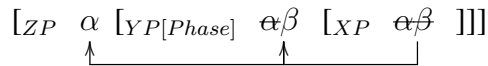
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This crossing problem is illustrated in (3a) below. Here  $\beta$  precedes  $\alpha$  before movement. In order for successive-cyclic movement of  $\alpha$  to strand  $\beta$  in the edge of the phase YP,  $\alpha$  must cross over  $\beta$  when  $\beta$  is stranded there. In contrast, in (3b)  $\alpha$  precedes  $\beta$  before movement. Thus movement of  $\alpha$  will not cross over  $\beta$  when  $\beta$  is stranded at the YP edge.

(3) a. **\*Crossing at the edge**



b. **No crossing at the edge**



In this paper, I argue for a theory which ensures that only non-crossing IS derivations like (3b) succeed, thus deriving the ISG as a theorem of more general principles.

I argue that the combination of two concepts in syntactic theory derives the ISG. The first is the *Cyclic Linearization* (CL) theory of spellout (Fox & Pesetsky (2003, 2005a,b); Podobryaev (2009); Sabbagh (2007); Ko (2007, 2011, 2014)). CL derives successive-cyclic movement (and certain exceptions to it) from the logic of non-contradiction in *linearization*, the phase-by-phase mapping of syntactic structures to pronounceable linear strings at spellout. The second concept is a theory of movement as parasitic on Agree (Chomsky (1995, 2001); Ko (2014); van Urk (2015)) and thus c-command, which predicts constraints on movement within phrase edges, preventing certain exceptions to the ISG that CL alone does not rule out.

## 1.2 Roadmap

Section 2 provides more background on IS, and the evidence for the ISG. Section 3 outlines and compares the predictions of the theory of spellout in Chomsky (2000, 2001) versus CL. Section 4 argues for the importance of Agree-driven movement, among other locality constraints on movement. Section 5 examines the predictions about when a given edge is licit for stranding or not.

## 2 Examining IS cross-linguistically

### 2.1 West Ulster English and an old puzzle

I open the examination of IS with a known puzzle in the literature, which presents a contrast directly relevant to the issues that I focus on here.

McCloskey (2000) discusses what is likely the most well-known case of IS, involving the post-nominal quantifier *all* in West Ulster English. In this dialect, A'-movement can strand *all* both in its base position and in intermediate points in the sentence:<sup>1</sup>

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<sup>1</sup>Standard English has the same *all*, but cannot strand it under A'-movement. This is an independent puzzle that I won't address in this paper, though McCloskey suggests that prosodic differences between the two English varieties can account for this difference. In general, the question of what makes something strandable in the first place is not addressed in this paper. Here I take for granted the fact that certain elements in some languages are capable of being stranded, and examine the resulting predictions for IS.

- (4) **West Ulster English *all*-stranding** (McCloskey 2000, ex. 8)  
 What<sub>k</sub> (all) did he say [<sub>CP</sub> t<sub>k</sub> (**all**) (that) he wanted t<sub>k</sub> (all)]

McCloskey argues that such facts provide evidence that A'-movement successive-cyclically passes through the CP edge. Decades earlier, Postal (1972, 1974) made the inverse argument, based in part on the fact that English prepositions cannot be stranded at clause edges:

- (5) **No IS of English prepositions**  
 (In) [whose pants]<sub>k</sub> did you say [<sub>CP</sub> (**\*in**) t<sub>k</sub> (that) I put eels (in) t<sub>k</sub>]?

Postal argues that if movement is really successive-cyclic, preposition stranding should be possible at the intermediate landing sites of such movement. The facts instantiated in (4) and (5), and the theories they suggest, are clearly in tension. If long-distance A'-movement is not successive cyclic, what allows (4), and if it is, what is the problem in (5)? I argue that the problem in (5) has to do with word order.

Notice that prepositions, which can't be intermediately stranded, precede the *wh*-phrase they attach to. However, the West Ulster English strandable *all* follows the *wh*-phrase, and can be intermediately stranded. This contrast parallels the schema in (3), and thus fits the ISG:<sup>2</sup>

- |                             |                       |
|-----------------------------|-----------------------|
| (6) a. <b>IS impossible</b> | b. <b>IS possible</b> |
| <u>In</u> which hovercraft  | What <u>all</u>       |

In this paper I maintain the successive-cyclic nature of A'-movement, and argue that the ban on IS of prepositions, and the ISG more broadly, has a linearization explanation. The rest of this subsection surveys all IS patterns I am currently aware of, which all fit the ISG.

## 2.2 English DP adjunct stranding

McCloskey (2000) discusses a stranding pattern in English involving adjuncts like *precisely/exactly*, which he credits to Urban (1999). These adjuncts can precede or follow DP, either in a moved position or in situ:

- (7) **Variable order DP adjuncts**
- a. (**Exactly**) ten people (**exactly**) went to Antarctica last year.
  - b. (**Exactly**) how many cakes (**exactly**) did you say that we ate?
  - c. Who said that you ate (**exactly**) how many cakes (**exactly**)?

These adjuncts of DP can be stranded by A'-movement in their base position, as well as at CP edges, as in (8):

- (8) **Exactly-stranding**  
 What<sub>k</sub> did you suppose t<sub>k</sub> (**exactly/precisely**) that they wanted t<sub>k</sub> **exactly/precisely**?

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<sup>2</sup>This discussion recalls the phenomenon of *swiping* ellipsis, as in English sentences like “*I know John went somewhere, but I don't know where to*”. The concepts defended in this paper will necessitate an analysis of swiping where the moved *wh*-phrase is no longer within PP, because if the *wh*-phrase is able to precede P within PP, the predictions that this paper makes for preposition stranding cease to hold.

I argue that the intermediately stranded adjunct here must have really been left behind by movement of DP, and cannot be an adverb of the matrix v/VP. This is because the matrix V *suppose* in this example is incompatible with an adverbial *exactly*, as (9) shows:

(9) I supposed (tentatively/~~#~~**exactly**) that fifty people came to the party.

The same stranding pattern is evident with other DP adjuncts of quantity/precision, like *to the nearest pound* in (10) below. Since such adjuncts are not homophonous with adverbs, as *exactly/precisely* are, examples like (10) provide even clearer cases of IS.

(10) **Quantity adjunct IS**

Tell me [<sub>CP</sub> (to the nearest pound) [how much flour]<sub>k</sub> (to the nearest pound) you said [<sub>CP</sub> *t<sub>k</sub>* (**to the nearest pound**) that the bakery wants *t<sub>k</sub>* (to the nearest pound)]]

The strandable adjuncts shown above all fit the ISG: They can precede or follow the moving DP that strands them, and they can also be subject to IS.<sup>3</sup>

## 2.3 Q-stranding in Wolof

Torrence (2018) examines a number of elements that appear in the periphery of clauses crossed by *wh*-movement in Wolof (Niger-Congo, Atlantic). Torrence reports that there are at least two morpho-syntactic classes of such elements. He argues that one of these classes, which he terms “Q-like”, has a distribution indicative of stranding under movement.<sup>4</sup> First, these elements can be stranded in their base position:

(11) **Stranding in base position**

- a. **K-an<sub>k</sub>** nga foog ne l-a-a dóór *t<sub>k</sub>* **k-eeneen?**  
 CL-wh XPL.COP.2SG think that XPL-COP-1SG hit CL-other  
 “Who else do you think that I hit?” (Torrence 2018, ex. 45a)
- b. **F-an<sub>k</sub>** l-a-ñu wax ne nga teg *t<sub>k</sub>* **f-eneen?**  
 CL-wh XPL-COP-3pl say that XPL.COP.2SG put CL-other  
 “Where else did they say that you put the book?” (Torrence 2018, ex. 45b)

Second, they can be pied-piped all the way along the path of *wh*-movement:

(12) **Full pied-piping**

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<sup>3</sup>The stranding of such adjuncts seems to not be something English-particular, since the same IS pattern is available in Hebrew. The differences between English and Hebrew syntax may make predictions about the respective distribution of IS, which may be of interest to future work.

- i. Ma (bidyuk) hu amar [(**bidyuk**) še- anaxnu amurim liknot (bidyuk)]?  
 what (exactly) he said [(exactly) C- we supposed.PL buy.INF (exactly)]?  
 “What exactly did he say that we should buy?” (Hebrew, p.c. Itai Bassi)

<sup>4</sup>The other class, termed “D-like”, are argued by Torrence to have a distribution more akin to complementizers, as they only appear in clause peripheries. These elements would also fit the generalization I defend in this paper if it were clear that they participate in pied-piping/stranding, though Torrence’s findings argue against this.

- a. [**Ñ-an** **ñ-epp**]<sub>k</sub> l-a Ayda wax ne l-a-a dóór *t<sub>k</sub>*?  
 CL.PL-wh CL.PL-every XPL-COP Ayda say that XPL-COP-1SG hit  
 “Who all did Ayda say that I hit?” (Torrence 2018, ex. 38a)
- b. [**F-an** **f-eeneen**]<sub>k</sub> l-a Ayda wax ne l-a-a dem *t<sub>k</sub>*?  
 CL-wh CL-other XPL-COP Ayda say that XPL-COP-1sg go  
 “Where else did Ayda say that I went?” (Torrence 2018, ex. 38b)

And third, they can be stranded in the edge of an embedded clause crossed by *wh*-movement. Sentences with multiple embedded clauses have multiple positions for potential stranding, as expected. These elements do not appear in clause edges if there is no movement available to strand them.

(13) **Stranding in intermediate clause edge**

- a. **F-an**<sub>k</sub> l-a-ñu foog *t<sub>k</sub>* **f-epp** ne la-a togg-e ceeb *t<sub>k</sub>*?  
 CL-wh XPL-COP-3pl think **CL-every** that XPL-COP-1sg cook-LOC rice  
 “Where all do they think that I cooked rice?” (Torrence 2018, ex. 29a)
- b. **F-an**<sub>k</sub> l-a-ñu foog *t<sub>k</sub>* **f-eeneen** ne la-a togg-e ceeb *t<sub>k</sub>*?  
 CL-wh XPL-COP-3pl think **CL-other** that XPL-COP-1sg cook-LOC rice  
 “Where else do they think that I cooked rice?” (Torrence 2018, ex. 29b)

Torrence shows, as we see in the full pied-piping examples in (12), that these (intermediately) strandable elements are attached to the right of what strands them. As such, they fit the ISG.

## 2.4 Russian ambivalent adpositions

Podobryaev (2009) notes that prepositions in Russian can’t be stranded by *wh*-movement:

(14) **No preposition stranding in Russian** (Podobryaev 2009, ex. 1)

- |  |  |
|--|--|
| a. <b>O</b> <b>čem</b> <sub>k</sub> ty govoriš <i>t<sub>k</sub></i> ?<br>About what you talk?<br>“About what are you talking?” | b. * <b>Čem</b> <sub>k</sub> ty govoriš <b>o</b> <i>t<sub>k</sub></i> ?<br>What you talk about?<br>“About what are you talking?” |
|--|--|

Prepositions contrast with what Podobryaev terms “ambivalent Ps”, which can either follow or precede their complement NP:

(15) **Variable word order of ambivalent Ps** (Podobryaev 2009, ex. 15-16)

- |   |                                      |
|---|--------------------------------------|
| a. <b>navstreču</b> Pete<br>towards Petya | c. <b>nazlo</b> tebe<br>to.spite you |
| b. Pete <b>navstreču</b><br>Petya towards | d. tebe <b>nazlo</b><br>you to.spite |

Podobryaev shows that these ambivalent Ps may be stranded, unlike prepositions, and argues that this contrast is expected under Cyclic Linearization:

(16) **Pied-piping and stranding of ambivalent Ps** (Podobryaev 2009, ex. 18-19)

- a. (Navstreču) **komu<sub>k</sub>** (navstreču) ty bežal *t<sub>k</sub>* (**navstreču**)?  
 (Towards) whom (towards) you ran (towards)?  
 “Towards whom did you run?”
- b. (Nazlo) **komu<sub>k</sub>** (nazlo) ty èto sdelal *t<sub>k</sub>* (**nazlo**)?  
 (To.spite) who (to.spite) you this did (to.spite)?  
 “To spite whom have you done it?”

Importantly for this paper, IS of these ambivalent Ps at clause edges is also possible:<sup>5</sup>

- (17) **IS of ambivalent Ps** (P.c. Tanya Bondarenko, Anton Kukhto, Mitya Privoznov)
- a. ?Komu<sub>k</sub> Vasja xotel *t<sub>k</sub>* **navstreču** čtoby Petja nobežal *t<sub>k</sub>* ?  
 Who Vasya want towards that Petja run  
 “Toward whom did Vasya want that Petja would run?”
- b. ?Komu<sub>k</sub> Lena xotela *t<sub>k</sub>* **nazlo** čtoby Maša pobedila *t<sub>k</sub>* ?  
 Who Lena wanted to.spite that Masha win  
 “In spite of whom did Lena want that Masha would win?”

If these facts are accurate<sup>6</sup>, in Russian we find another pattern that fits the ISG: These ambivalent adpositions are able to be to the right of what strands them in an intermediate position.

## 2.5 Korean and Japanese numeral quantifiers

Japanese and Korean numeral quantifiers, which can occur on either side of NP, can be stranded by scrambling. Ko (2011) shows for Korean that object scrambling to the edge of the clause, leaving the subject in situ, can strand a numeral quantifier in spec-vP:

- (18) **IS of numeral quantifier by object scrambling in Korean** (Ko 2011, ex. 24)

<sup>5</sup>This observation was made by Tanya Bondarenko, who with Mitya Privoznov confirmed that such sentences are possible, though subject to inter-speaker variation. The examples in (17) use a subjunctive embedded clause because these are easier to extract from in Russian (Bailyn (2012)). Speakers who permit extraction from finite clauses with overt C (*čto*) allow similar IS examples with embedded finite clauses.

<sup>6</sup>It is possible for the adposition to end up in this same inter-clausal position, even when there is no *wh*-movement to strand it there. These examples require the moved adposition to receive a focus interpretation, however:

- ii. **Non-pied-piping adposition movement** (P.c. Tanya Bondarenko, Anton Kukhto)
- a. Vasja xotel **navstreču<sub>k</sub>** čtoby Petja nobežal Maše *t<sub>k</sub>* ?  
 Vasya want towards that Petja ran Masha  
 “Vasya wanted that Petja would run towards Masha (not any other direction)”
- b. Lena xotela **nazlo<sub>k</sub>** čtoby Maša pobedila Naste *t<sub>k</sub>* ?  
 Lena wanted to.spite that Masha win Nastya.DAT  
 “Lena wanted that Masha would win in spite of Nastya (not for her benefit)”

I argue that (17) shows true IS under A'-movement, whereas (18) involves remnant scrambling of a PP that has been evacuated by NP. While such PP scrambling evidently has a concomitant result on interpretation, the fact that that this semantic effect is absent in examples like (17) suggests that (17) does not involve independent scrambling of PP, but rather mere pied-piping of PP along with *wh*-movement.

**Kong-ul**<sub>k</sub> amato [<sub>vP</sub> *t*<sub>k</sub> **sey-kay** haksayng-tul-i *t*<sub>k</sub> patassulkesita]  
 Ball-ACC probably 3-thing student-PL-NOM received

“The students probably received three balls”

The same possibility holds for Japanese, whose syntax is highly similar:<sup>7</sup>

(19) **IS of numeral quantifier by object scrambling in Japanese** (P.c. Takashi Morita)

**Neko-o**<sub>k</sub> osoraku [<sub>vP</sub> *t*<sub>k</sub> **san-biki** gakusei-ga umaku *t*<sub>k</sub> mitsuketa]  
 cat-ACC probably 3-CL student-NOM skillfully found

“The students probably skillfully found 3 cats”

This pattern fits the ISG, since these strandable numeral quantifiers are able to be attached on the right side of what strands them.

## 2.6 Polish left branch extraction

Wiland (2009, 2010) analyzes NP stranding under *wh*-movement in Polish. Polish *wh*-movement permits pied-piping of the entire nominal phrase containing a *wh*-element, as well as left branch extraction of the minimal *wh*-element, stranding NP below:

(20) **Polish pied-piping *wh*-movement** (Wiland 2010, ex. 1)

[**Jaki samochód**]<sub>k</sub> Paweł kupił swojej żonie *t*<sub>k</sub>?  
 [What car] Paweł bought his wife

“What car did Paweł buy his wife?”

(21) **Polish left branch extracting *wh*-movement** (Wiland 2010, ex. 2)

**Jaki**<sub>k</sub> Paweł kupił swojej żonie *t*<sub>k</sub> **samochód**?  
 What Paweł bought his wife car

“What car did Paweł buy his wife?”

This left branch extraction can strand NP at various intermediate points in the sentence, which Wiland claims to be spec-VP, spec-vP, and spec-CP:

(22) **IS of NP under left branch extraction in Polish**

a. **IS in spec-VP**

(Wiland 2010, ex. 3)

**Jaki**<sub>k</sub> Paweł kupił *t*<sub>k</sub> **samochód** swojej żonie *t*<sub>k</sub>?  
 What Paweł bought car his wife

“What car did Paweł buy his wife?”

<sup>7</sup>In (19) the inclusion of the adverb *umaku* is intended to rule out a derivation with VP fronting after verb movement out of VP, followed by scrambling of the object. Miyagawa (2017) shows that the adverb *umaku* adjoins to VP, and in (19) we see that *umaku* sits in its base position. The fact that *umaku* was not carried along by any of the movement operations in (19) suggests that the VP was not fronted.

- b. **IS in spec-vP** (Wiland 2010, ex. 4)  
**Jaki**<sub>k</sub> Paweł *t<sub>k</sub>* **samochód** kupił swojej żonie *t<sub>k</sub>*?  
 What Paweł car bought his wife  
 “What car did Paweł buy his wife?”
- c. **Long-distance *wh*-movement stranding in matrix spec-vP** (Wiland 2010, ex. 6)  
 %**Jaki**<sub>k</sub> Maria *t<sub>k</sub>* **samochód** myślała (\*że) Paweł kupił swojej żonie *t<sub>k</sub>*?  
 What Maria car think (\*that) Paweł bought his wife *t*?  
 ‘What car did Maria say she bought?’
- d. **IS in spec-CP** (Wiland 2010, ex. 5)  
 ?**Jaki**<sub>k</sub> *pro* myślisz *t<sub>k</sub>* **samochód** (\*że) Paweł kupił swojej żonie *t<sub>k</sub>*?  
 What (you) think car (\*that) Paweł bought his wife  
 “What car do you think that Paweł bought his wife?”

Wiland shows that scrambling in Polish is clause-bound, unlike *wh*-movement. Therefore Wiland argues that examples like (22c-d), where we see the stranded NP ending up in a higher clause, must have been derived by true stranding under *wh*-movement rather than scrambling.

Notice that the *wh*-element which is left branch extracted from the nominal phrase starts out to the left of the NP that it strands. Thus these facts also fit the ISG.

## 2.7 Spec-vP stranding in Dutch

Barbiers (2002) argues that long-distance A'-movement in Dutch can strand various adpositions and modifiers in the matrix spec-vP:

- (23) **Stranding in spec-vP in Dutch** (Barbiers 2002, ex. 6)
- a. Waar<sub>k</sub> had jij dan [<sub>vP</sub> *t<sub>k</sub>* **mee** gedacht dat je de vis *t<sub>k</sub>* zou moeten snijden]?  
 where had you then with thought that you the fish would must cut  
 “I had thought that Ed would buy only one book”
- b. Waar<sub>k</sub> had jij dan [<sub>vP</sub> *t<sub>k</sub>* **voor bal** gedacht dat Ed *t<sub>k</sub>* zou kopen]?  
 where had you then for ball thought that Ed would buy  
 “What kind of ball had you thought that Ed would buy?”
- c. [Een boek]<sub>k</sub> had ik [<sub>vP</sub> **maar** *t<sub>k</sub>* gedacht dat Ed *t<sub>k</sub>* zou kopen]  
 One book Had I only thought that Ed would buy  
 “I had thought that Ed would buy only one book”

Barbiers shows that long-distance A'-movement cannot normally be combined with long-distance scrambling in Dutch. This rules out a scrambling analysis of the stranded remnant in these examples, suggesting that they were really formed by stranding.

Most of the elements that Barbiers shows undergoing IS in spec-vP in this way were attached to the right of what stranded them, as we see in (23a-b). The exception is (23c), where we see that movement has stranded *maar* (“only”), which Barbiers shows as having been originally attached to the left of the moving element that stranded it. This looks like an exception to the ISG. However,



in other work, Barbiers (1995) shows that such configurations where *maar* has a numeral as its focus associate allow *maar* to be postnominal:

(24) ***maar* in pre- or post-nominal position** (Barbiers 1995, ex. 31)

[(**Maar**) twee jongens (**maar**)] weeten het antwoord  
 (only) two boys (only) know the answer

Consequently, these Dutch facts fit the ISG. Further Dutch facts corroborate this result.

In Dutch, inanimate pronouns within PPs take on a special form (termed *R-pronoun*), which causes inversion of prepositions to postpositions. While prepositions in Dutch cannot be stranded by A'-movement<sup>8</sup>, the postpositions used with R-pronouns can be (van Riemsdijk (1978)).

(25) **No preposition stranding in Dutch** (P.c. Coppe van Urk)

- a. Ik snij het brood **met een mes**  
 I cut the bread with a knife  
 "I cut the bread with a knife."
- b. \*[**Welk mes**]<sub>k</sub> snij je het brood [**met t<sub>k</sub>**]?  
 which knife cut you the bread with  
 "Which knife are you cutting the bread with?"

(26) **Postposition stranded by moved R-pronoun** (P.c. Coppe van Urk)

- a. Ik snij het brood **daar-mee**  
 I cut the bread there-with  
 "I am cutting the bread with that."
- b. **Waar**<sub>k</sub> snij je het brood [**t<sub>k</sub> mee**]?  
 where cut you the bread with  
 "What are you cutting the bread with?"

In the above examples, we see that the P *with* is realized as *met* when it is a preposition, and *mee* when it is a postposition. We saw in (23a) above that this postpositional form is capable of IS. As expected given the ISG, the prepositional variant of *with* cannot be stranded in this way:

(27) **No preposition stranding in spec-vP in Dutch** (P.c. Coppe van Urk)

[**Welk mes**]<sub>k</sub> had jij dan [<sub>vP</sub> [**t<sub>k</sub> mee**] / [**\*met t<sub>k</sub>**] gedacht dat je de vis zou  
 which knife had you then with with thought that you the fish would  
 moeten snijden t<sub>k</sub>?  
 must cut

"Which knife did you think then that you would have to cut the fish with?"

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<sup>8</sup>This fact is predicted if PP is a phase in such languages and Abel's (2003) anti-locality holds, though see that work for a more thorough discussion of the complications in this area.

## 2.8 Afrikaans postpositions

Du Plessis (1977) shows that, like Dutch, Afrikaans cannot strand prepositions with A'-movement:

- (28) a. **No preposition stranding in Afrikaans** (du Plessis 1977, p. 724)

**Vir** wat<sub>k</sub> werk ons nou eintlik t<sub>k</sub>?  
For what work we now actually?

“For what do we actually work?”

- b. \* **Waar**<sub>k</sub> werk ons nou eintlik **vir** t<sub>k</sub>?  
What work we now actually for?

“For what do we actually work?”

But also like Dutch, Afrikaans has postpositions that occur with R-pronouns. Du Plessis shows that these can be stranded in their base position and at clause edges:<sup>9</sup>

- (29) **Afrikaans postposition stranding** (Adapted from du Plessis 1977, ex. 5, 12-13)

- a. Waar<sub>k</sub>(voor) dink julle [<sub>CP</sub> t<sub>k</sub> (**voor**) werk ons t<sub>k</sub> (**voor**) ]?  
where(for) think you [ (for) work we (for) ]?

“For what do you think that we work?”

- b. Wat/waar<sub>k</sub> dink julle dink die bure [<sub>CP</sub> t<sub>k</sub> (**oor**) stry ons t<sub>k</sub> (**oor**) ]?  
What think you think the neighbors [ (about) argue we (about) ]?

“What do you think the neighbors think we are arguing about?”

As with every IS scenario we've seen, the elements that can undergo IS in Afrikaans are, as postpositions, attached to the right of what strands them by leftward movement.

## 2.9 Interim summary

In this section I surveyed all the cases of IS I am aware of. These all fit the ISG, repeated below:

- (30) **Intermediate Stranding Generalization (ISG)** [= (2)]

*IS is only possible when the stranded material is, or can be, to the right of the material that continues to move leftward*

I argue that this generalization arises naturally from the correct theory of spellout and constraints on movement, as we'll see next.

## 3 Two phase theories and their predictions

In this section I'll compare the predictions about IS made by phase theory in Chomsky (2000, 2001, a.o.) with those of Cyclic Linearization (CL). I'll argue that the latter theory is better equipped to account for the word order generalization about IS illustrated in the previous section.

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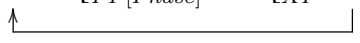
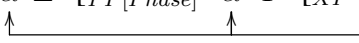
<sup>9</sup>For other restrictions on IS in Afrikaans see Rackowski & Richards (2005).

### 3.1 Phases in Chomsky (2000, 2001)

Chomsky (2000, 2001, inter alia) argues that syntactic structure is mapped to phonology (PF) and interpretation (LF) incrementally, at domains termed *phases*. Minimally, vP and CP are phases.<sup>10</sup>

When the operation *spellout* performs this mapping, the content of the spelled-out constituent by hypothesis becomes inaccessible to the rest of the syntactic derivation. Chomsky argues that spellout applies to only the complement of phase heads. Consequently, moving from a phase directly from its complement isn't possible, since the content of the phase's complement will undergo spellout before such movement can apply (31a). However, moving to the edge (specifier) of the phase before its complement spells-out allows further movement out of the phase (31b).

(31) **Must exit phase complement via the phase edge**

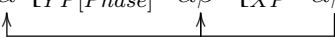
- a. \*  $[_{ZP} \alpha Z [_{YP[Phase]} Y [_{XP} \alpha ]]]$   

- b. ✓  $[_{ZP} \alpha Z [_{YP[Phase]} \alpha Y [_{XP} \alpha ]]]$   


In this way, Chomsky's proposal predicts that movement must stop in the edge of each phase crossed in order to avoid being trapped by spellout.

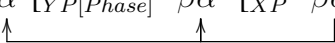
#### 3.1.1 Predictions for IS

Given the above argumentation, anything which is in (or can reach) a phase's edge should in principle be available for further movement. Word order should not be at issue here, only structure. Therefore, unless more is added to this phase theory, it predicts that the IS scenarios in (32) below should be equally licit. These two scenarios are structurally comparable, but differ in word order:

(32) a. **IS with no crossing at the edge**

- $[_{ZP} \alpha [_{YP[Phase]} \alpha\beta [_{XP} \alpha\beta ]]]$   


b. **IS with crossing at the edge**

- $[_{ZP} \alpha [_{YP[Phase]} \beta\alpha [_{XP} \beta\alpha ]]]$   


I have argued that the step of A'-movement which strands material in a phase edge does indeed have a word order restriction: The material that is stranded in an edge cannot have (obligatorily)

<sup>10</sup>DP is also often thought to be a phase, though in my opinion the evidence is murky. Zyman (under review) points out that *exactly*-stranding isn't possible in DP edges, puzzlingly if DPs are phases:

- iii. Who<sub>k</sub> did Clarence send [<sub>DP</sub> t<sub>k</sub> (\***exactly**) a picture of t<sub>k</sub> ] to the museum as a prank?

I am aware of no clear case of IS in DP edges. David Pesetsky (p.c.) suggests that examples like (iii) improve with deverbal nouns, though my personal judgments are less permissive:

- iv. a. ? What<sub>k</sub> did she provide [t<sub>k</sub> **exactly** a demonstration of t<sub>k</sub>] again?  
 b. ? Who<sub>k</sub> did he invite [t<sub>k</sub> **exactly** participation by t<sub>k</sub>]?

To the extent that these examples show any improvement over (iii), I suggest that the possibility of heavy NP shift applying to the relatively phonologically large nominals here may be creating the appearance of IS at the DP edge. The phonologically lighter nominal in (iii) cannot shift so readily, and ungrammaticality is clearer.

preceded what strands it, hence the attested IS derivations all correspond to (32a), which fits the ISG. I argue that this connection between word order and the availability of IS is precisely what the Cyclic Linearization (CL) view of spellout predicts, as we’ll see next.<sup>11</sup>

### 3.2 Cyclic Linearization (Fox & Pesetsky 2005)

CL proposes that successive-cyclic movement is a consequence of the information-preserving nature of spellout, termed *Order Preservation*. As we’ll see, Order Preservation constrains the syntactic derivation by permitting only those derivations that do not generate contradictory ordering information. Evidence for such an approach has come from object shift and quantifier movement in Scandinavian (Fox & Pesetsky 2005 a,b), constraints on rightward movement (Sabbagh 2007), P-stranding in Russian (Podobryaev 2007) and asymmetries in scrambling (Ko 2007, 2011, 2014). The present paper constitutes another contribution in support of such a theory.

In CL, entire phasal constituents spell-out all at once, edge included. A phase spells-out as soon as it is done being constructed by successive applications of (internal and external) Merge. Since phase-level spellout targets everything within the phase, not even elements in the phase edge escape spellout. Therefore in order to avoid predicting the absence of movement out of phases, CL hypothesizes that spelled-out material does remain accessible for the rest of the syntactic derivation. Since this hypothesis is incompatible with the explanation for successive-cyclic movement in Chomsky (2000, 2001), CL proposes a different one: CL argues that successive-cyclic movement is necessary to ensure that the ordering information spellout generates for a given phase is consistent with that of all other phases in the derivation.

To understand the logic of CL, first consider a derivation like (33) below, where the moving phrase *what* non-successive-cyclically moves to spec-CP without passing through the edge of vP:

(33) **Hypothetical non-successive-cyclic movement from vP**

[<sub>CP</sub> What did Mary [<sub>vP</sub> give the cat *what* ]]]?

In this derivation, *what* had not moved to the edge of vP at the time when vP spelled-out. Therefore spellout of this vP generates the following ordering information:

(34) **Ordering at vP (without successive-cyclic movement)**

*give < the cat < what* ( $\alpha < \beta$  means “ $\alpha$  linearly precedes  $\beta$ ”)

<sup>11</sup>The phase theory initiated by Chomsky might predict something like the generalization under examination if combined with the claim that only phases move (Chomsky (2005); Fowlie (2010); Harwood (2015); Bošković (2018), a.o.). If all moving constituents are phases, then IS always requires movement through the edge of the constituent being stranded. Given this, we might regard the badness of stranding scenarios like (32b) which violate the ISG to be attributable to  $\alpha$  not moving to the edge of the pied-piped constituent headed by  $\beta$  prior to stranding  $\beta$ .

This explanation only holds if the stranded  $\beta$  really involves a phasal projection (and if it is always impossible for  $\alpha$  to be at the structural edge of  $\beta$  when it is linearized to the right of  $\beta$ ). While phases may be generally mobile, it is not clear that all mobile constituents must be phases. A case in point is the English PP. If English PP were a phase, base-position P stranding would have to involve movement of DP through spec-PP. If this movement through the PP edge is available, we predict such movement to open up the possibility of stranding PP in intermediate positions, contrary to fact. Thus it is not obvious that the English PP should be regarded as a phase, but the English PP is indeed movable.

Further, it is not clear that the material being stranded always heads an additional projection over what strands it, to which we might attribute phasehood. For instance, I see no evidence that the adjuncts of DP described in 2.2 should be associated with an additional projection over DP. These elements appear to be adjuncts in the projection of D (Zyman (under review)), which as such don’t head anything.


Later, *what* moves in one step to spec-CP. Spellout of CP produces the linearization in (35):

- (35) **Ordering at CP**  
*what* < *did* < *Mary* < [content of vP]

Notice that in (34), *what* follows everything in vP. However, in (35) *what* precedes everything in CP, and so ultimately precedes everything in vP. Thus we have a contradiction: In this derivation the moving phrase *what* has been determined to simultaneously follow and precede the content of vP. CL posits that such contradictory results yield a derivation that is deviant at PF. Due to Order Preservation, offending linearization statements cannot be deleted in order to avoid such problems.

In contrast, successive-cyclic movement through the linear edge of vP, as in (36), prevents the derivation from yielding a contradictory linearization.

- (36) **Successive-cyclic movement through the linear edge of vP**  

$$[{}_{CP} \text{ What did Mary } [{}_{vP} \text{ what give the cat what } ]]]?$$


Spellout of the vP in (36) generates the ordering information in (37):

- (37) **Ordering at vP with successive-cyclic movement**  
*what* < *give* < *the cat*

The ordering of this vP doesn't contradict the linearization later produced at CP (35), because the linear orders generated at both of these phases encode that *what* precedes their contents:

- (38) a. **Ordering in vP with successive-cyclic movement**  
*what* < *give* < *the cat*  
 b. **Ordering at CP**  
*what* < *did* < *Mary* < [content of vP]

This result is consistent with *what* being pronounced at the left edge of the sentence, preceding the content of both phases in this derivation.<sup>12</sup>

Fox & Pesetsky argue that in this way, successive-cyclic movement through the linear edge of phases maintains a coherent linearization. When material does not exit from the linear edge, incoherent linearizations are generated, unless additional order-restoring movements take place later on to avoid a contradiction. More on this in section 5.

### 3.2.1 Cyclic Linearization's predictions for IS

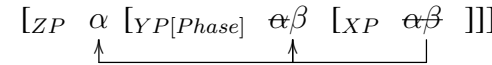
Recall the generalization about IS that was illustrated earlier:

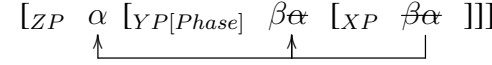
- (39) **Intermediate Stranding Generalization (ISG)** [(=2)]  
*IS is only possible when the stranded material is, or can be, to the right of the material that continues to move leftward*

<sup>12</sup>The notation "<" encodes the relative order of two elements, not strict adjacency. So an ordering [ $\alpha$  <  $\beta$ ] generated at an intermediate phase of the derivation is compatible with  $\alpha$  moving later on, with the result that other material intervenes between  $\alpha$  and  $\beta$ , as in [ $\alpha$   $\gamma$   $\beta$ ]. This result remains faithful to the relative ordering [ $\alpha$  <  $\beta$ ].

Notice once more that if the material being stranded at a phase edge precedes the phrase that moves on into the next phase, that phrase must cross over the material it strands (40b). But if the material being stranded in the edge follows the phrase that moves on (40a), such crossing doesn't occur:

- (40) a. **No crossing at the edge**  

$$[_{ZP} \alpha [_{YP[Phase]} \alpha\beta [_{XP} \alpha\beta ]]]$$

- b. **Crossing at the edge**  

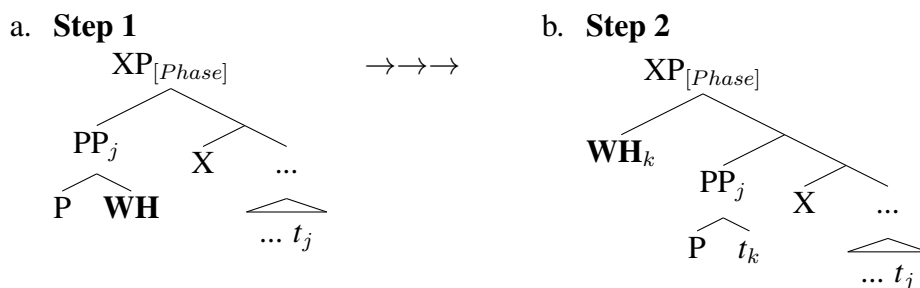
$$[_{ZP} \alpha [_{YP[Phase]} \beta\alpha [_{XP} \beta\alpha ]]]$$


We've just seen that phase-exiting movement steps which cross material within the phase on the way out are precisely what CL bans. Thus CL accurately permits only IS derivations like (40a), which fit the ISG. The crossing problem that derives this generalization applies only at phase edges. Thus base position preposition stranding in English, for instance, is correctly permitted.

## 4 Agree and other constraints on movement

The explanation for the ISG argued for above encounters a problem, when we take notice of another possible sort of IS derivation. If IS is illicit when the moving phrase crosses what is being stranded at the phase edge, then IS should be permitted if it is possible for that phrase to move within the phase edge, to a position above the pied-piped material that precedes it, before exiting the phase. For instance, IS of prepositions in English or Dutch might hypothetically be fed by moving the complement of a pied-piped PP across P, to a higher specifier of the same phase:

- (41) **Hypothetical phrase-bound spec-to-spec movement (to be ruled out)**



If such specifier to specifier movement within the same phrase is possible, it undesirably permits IS of prepositions, and violations of the ISG in general. Such movement must be ruled out.

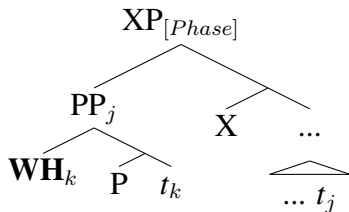
Many works argue that movement is triggered by an Agree relation with a probing feature on a head (Chomsky 1995, 2001, Ko 2007, 2014, van Urk 2015). Ko points out that this view predicts the desired ban on phrase-bound spec-to-spec movement: If moving an element to the specifier of a head requires a probe on that head to find that element in its c-command domain via Agree, the fact that heads don't c-command their specifiers removes the possibility of a head moving anything from one of its specifiers to another. Thus in (41) above, the movement of the *wh*-phrase to a higher spec-XP in (41b) cannot occur, since X did not c-command the *wh*-phrase at the time when this

movement applied. The same constraint bans any potential scenario of phrase-bound spec-to-spec movement, preventing such movement from yielding ISG violations.<sup>13</sup>

#### 4.1 The role of anti-locality

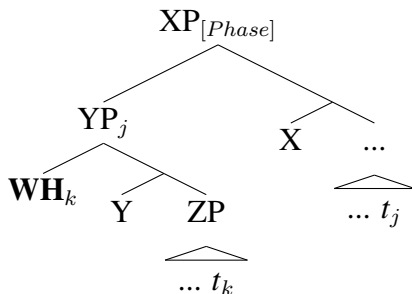
While movement within the phase edge has just been ruled out, nothing has been said that prevents movement within the pied-piped constituent. For instance, returning to the P stranding scenario discussed in (41) above, it is also necessary to ensure that WH cannot come to precede P by moving to spec-PP, as in (42) below. This movement within the pied-piped constituent is derivable by Agree-triggered movement, because P c-commanded WH at the time when this movement applied. However, such movement from complement to specifier of the same phrase is prevented by the principle of anti-locality in Abels (2003).<sup>14</sup>

(42) **\*Illegally short movement within pied-piped constituent**



Notice that if the pied-piped constituent is structurally larger, rather than being a single phrase like the PP above, movement within it should be permitted. For example, in (43) below movement of WH pied-pipes YP and ZP to spec-XP. Subsequent movement of WH from within ZP to the edge of YP is not ruled out by anti-locality:

(43) **Legal movement within larger pied-piped constituent**



Thus we expect IS of YP here to be possible, since the *wh*-phrase that will strand it was able to pass through its edge.<sup>15</sup> I suggest that scenarios like this are at work in circumstances where we find material that can be ordered on either side of what it attaches to, as mentioned in section 2 for certain adjuncts of DP in English, Japanese/Korean numeral quantifiers, Russian ambivalent

<sup>13</sup>Richards (2004) argues that in Bulgarian we see movement of a first *wh*-phrase to spec-CP, followed by extraction of a second *wh*-phrase out of the first, and into a second (higher or lower) specifier of the same CP. Since this sort of spec-to-spec movement is banned under the approach argued for here, this remains to be understood.

<sup>14</sup>It would also suffice to claim that Agree requires a probe to asymmetrically c-command its goal.

<sup>15</sup>While I've spoken in terms of Abels' anti-locality, other versions such as the spec-to-spec anti-locality of Erlewine (2015) will make similar predictions, though further collection of IS patterns may reveal scenarios that adjudicate in favor of one of these approaches.

adpositions, and *maar* (“only”) in Dutch. If the structure associated with such elements allows movement within them, the resulting word order freedom ensures that they can be subject to IS.

The possibility of such scenarios is the reason for the statement “is, or can be, to the right of the material that moves leftward” in the ISG. As long as the possibility of being linearized to the right of what moves leftward exists, the possibility of IS remains, in principle.<sup>16</sup>

## 4.2 Interim summary: What this theory does and does not predict

This paper has argued that CL and the constrained nature of Agree-driven movement predict a cross-linguistic generalization about IS and word order. What has been said so far predicts that, in principle, IS of appropriate elements should be possible at any phase edge passed through.

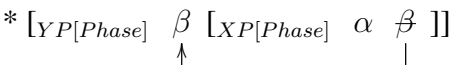
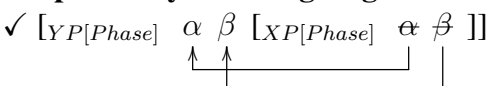
However, note that this account does not predict that IS must necessarily be possible in every such edge. There is no contradiction in allowing the distribution of IS predicted by the general principles argued for so far to be further constrained by additional factors. As there are gaps in most IS paradigms, this seems likely to be an accurate view.

The remainder of this paper examines some additional ways that IS might be restricted. In the next section, I’ll show that CL plus Agree-driven movement predicts a set of circumstances in which an edge is not available for IS, even if the material to be stranded there satisfies the conditions that this paper has discussed so far.

## 5 When an edge must be empty

As described in section 3, CL derives successive-cyclic movement through phase edges from the logic of Order Preservation—movement through the linear edge of each phase crossed ensures the coherency of the orderings that phase-by-phase spellout generates. As briefly noted in section 3, the same logic also predicts that certain exceptions to successive-cyclic movement are possible, as long as additional movements occur that keep linearization coherent. This theory leads to predictions about a certain class of scenarios where a given edge will not be available for stranding.

In (44) below, we see a schema for non-successive-cyclic movement and its repair. In (44a), the element  $\alpha$  precedes  $\beta$  within the phase XP before movement. Here  $\beta$  moves out of XP without stopping in its edge, thus crossing  $\alpha$  on the way out. As discussed, such scenarios are predicted to result in a linearization problem. This is because the crossing of  $\alpha$  by the movement of  $\beta$  creates ordering information that tells PF that  $\beta$  both follows and precedes  $\alpha$ . CL predicts that this problem is avoided, however, if  $\alpha$  also moves into the next phase, to a position above  $\beta$ , as in (44b). The result of this movement is that  $\alpha$  precedes  $\beta$  within the next phase just as it did within the first.

- (44) a. **Illicit crossing at the edge...**  
 $* [Y P[Phase] \beta [X P[Phase] \alpha \cancel{\beta} ]]$   

- b. **...repaired by restoring original order**  
 $\checkmark [Y P[Phase] \alpha \beta [X P[Phase] \alpha \cancel{\beta} ]]$   


<sup>16</sup>If such word order variability is simply a result of free choice ordering between two elements, the same result holds. Whether or not word order variability in a given scenario is due to optionality at PF, or is derived by movement, is not important here. Either situation should provide the conditions for legal IS.



In this way, CL predicts a class of exceptions to successive-cyclic movement. A non-successive-cyclic phase exit does not crash a derivation, as long as additional order-restoring movements occur. This is the essence of Fox & Pesetsky’s account of the Scandinavian phenomenon of Holmberg’s Generalization, in which anything in VP crossed by movement of an object must also move.

Returning to the topic of IS, the predictions shown in (44) lead us to expect that any phase edges crossed over by such a non-successive-cyclic movement should not be viable positions for stranding. Rather, such positions must be vacated in the way shown in (44b). Consequently, any material that was pied-piped into such an illicit edge must be pied-piped further.

In the rest of this section, I’ll examine how these predictions play out in several case studies of IS at clause-internal positions, where head movement and A-movement can interact with the distribution of IS under A’-movement. I’ll primarily be concerned with IS in the vP edge.

## 5.1 A straightforward case: English vs. Korean and Japanese

Here we’ll see that the possibility of IS in spec-vP is predictable from the independent syntactic properties of standard English, as opposed to Japanese and Korean. I’ll examine the predictions and results for the former, before contrasting with the latter pair. I speak in terms of “standard” English here because, as we’ll see later in this section, other dialects have different IS possibilities.

### 5.1.1 DP adjunct stranding in standard English

In section 2 I discussed how *exactly* and other adjuncts of DP are capable of IS at clause edges, shown again below:

- (45) a. **What**<sub>k</sub> did you suppose *t*<sub>k</sub> (**exactly/precisely**) that they wanted *t*<sub>k</sub>?  
 b. **How much saffron**<sub>k</sub> did the chef say *t*<sub>k</sub> (**to the closest gram**) that we need *t*<sub>k</sub>?

Testing the possibility of IS in spec-vP requires attempting to strand such adjuncts at the edge of the verbal domain. This position is also a normal location for adverbs, however. For this reason I focus on strandable adjuncts like that in (45b), which unlike *exactly/precisely*, can’t be parsed as adverbs, thus avoiding a potential confound.<sup>17</sup>

Example (46) below attempts IS in spec-vP in transitive clauses, which is ungrammatical:

- (46) **No DP adjunct stranding in spec-vP: Transitive clause**  
 a. How much flour (to the nearest pound) did you [<sub>vP</sub> (**\*to the nearest pound**) tell me [<sub>CP</sub> (to the nearest pound) that the bakery [<sub>vP</sub> (**\*to the nearest pound**) asked you for (to the nearest pound)]]]?

<sup>17</sup>Zyman (under review) argues that *exactly*-stranding is possible in spec-vP, but notes some inter-speaker variation regarding the acceptability of such sentences.

- v. *exactly*-stranding in spec-vP (Zyman, under review)  
 a. What was he **exactly/precisely** doing there?  
 b. What did she **exactly/precisely** send?

I argue that the possible adverbial parse for these stranded adjuncts makes their derivation ambiguous. As we’ll see, when we avoid testing spec-vP IS with these ambiguous elements, we find that spec-vP IS in English is uniformly bad.

- b. Tell me [<sub>CP</sub> how many grams of tranquilizer (to the third decimal place) the researchers [<sub>vP</sub> (**\*to the third decimal place**) reported [<sub>CP</sub> (to the third decimal place) that they [<sub>vP</sub> (**\*to the third decimal place**) used to sedate the tiger? ]]]]?

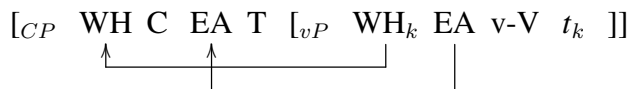
The concepts defended in this paper predict this gap in the stranding paradigm, when we consider the interaction of successive-cyclic A'-movement with A-movement of the subject. CL requires an A'-moving phrase on its way to spec-CP to stop in the most peripheral position of the vP phase. This will be a specifier above the external argument (EA) in situ in its  $\theta$ -position:

(47) **A'-movement to outer spec-vP**



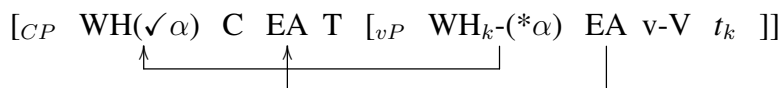
There is no problem with the subject later A-moving to spec-TP across that outer spec-vP formed by successive-cyclic A'-movement, as long as the content of the outer A'-specifier moves along to spec-CP as well. In this scenario, the relative order of the moving phrases is the same in vP as in CP, yielding a coherent linearization for the derivation:

(48) **A'-movement to spec-CP, A-movement to spec-TP**



However, if *wh*-movement strands something in that outer spec-vP, movement of the subject across the stranded material yields a crossing problem. This is shown in (49), where we see that while there is no problem if the moving *wh*-phrase pied-pipes the element  $\alpha$  to spec-CP, there is a problem if  $\alpha$  is stranded in vP and thus crossed by A-movement of EA:

(49) **Conflict between EA movement and stranding in the vP edge**



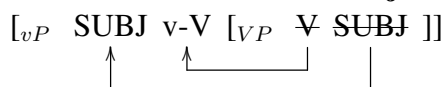
As expected, the same holds for unergatives, which also involve an A-moving EA:

(50) **No DP adjunct stranding in spec-vP: Unergative clauses**

- a. How much money (to the nearest million) did the governor [<sub>vP</sub> (**\*to the nearest million**) resign for (to the nearest million)]?
- b. How many bad jokes (to the nearest dozen) did the audience laugh [<sub>vP</sub> (**\*to the nearest dozen**) in spite of (to the nearest dozen)]?

Under CL, theme subjects are expected to pass through the edge of vP in order to precede V, given that V moves to v in English (Larson 1988, Chomsky 1995, Kratzer 1996, and others). Such movement is necessary to ensure that the theme subject precedes V within vP, as it will later after movement to spec-TP:

(51) **V movement and theme subject movement within vP**

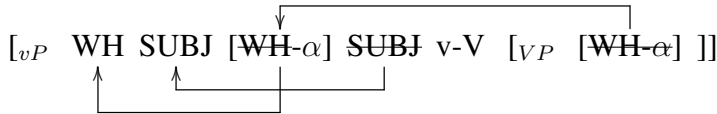


A'-movement will form a higher spec-vP above the moved theme subject, just as was the case for an EA that was externally merged in vP. This being the case, later movement of a theme subject to spec-TP must cross over anything stranded in the vP edge by A'-movement, just as we saw with EAs. Given this, IS in the edge of vP should not be possible in passive and unaccusative derivations. This prediction is accurate:<sup>18</sup>

- (52) a. **\*DP adjunct stranding in spec-vP: Passive subject**  
 [How much flour]<sub>k</sub> (to the nearest pound) was the bakery [<sub>vP</sub> *t<sub>k</sub>* (\*to the nearest pound) sent *t<sub>k</sub>* (to the nearest pound)]?  
 b. **\*DP adjunct stranding in spec-vP: Unaccusative subject**  
 [How many firefighters]<sub>k</sub> (to the nearest dozen) did the house [<sub>vP</sub> *t<sub>k</sub>* (\*to the nearest dozen) burn down despite the efforts of *t<sub>k</sub>* (to the nearest dozen)]?

These circumstances where A-movement of the subject blocks IS in the vP edge would be avoided if it were possible to rearrange the content of the phase edge, as in (53). Here successive-cyclic movement of WH pied-pipes  $\alpha$  to the vP edge, above the subject. Subsequently the subject moves over WH and  $\alpha$ , and then WH moves over the subject, stranding  $\alpha$  below:

(53) **Successive-cyclic movement followed by rearranging in the vP edge**



Such a derivation produces a vP that is consistent with the final ordering that will be produced in CP, and importantly, movement of the subject to spec-TP will not cross the stranded  $\alpha$  after these rearrangements have occurred. However, given Agree-triggered movement and resulting the ban on phrase-bound spec-to-spec movement discussed in section 4, such a derivation is not available.<sup>19</sup>

### 5.1.2 Spec-vP IS in Japanese and Korean

In section 2, I showed that spec-vP IS in Japanese and Korean is possible. Here I'll overview Ko's evidence that vP is indeed a phase in such languages, and then show why, given the syntactic

<sup>18</sup>The same effect emerges in expletive constructions. This is consistent with a theory in which expletives are externally merged in spec-vP (REFERENCES). Subsequent A-movement of the expletive out of vP will block IS in spec-vP, as we've seen with movement of typical subjects.

- vi. **No spec-vP stranding in expletive constructions**  
 a. \*[How many demonstrators]<sub>k</sub> have there [<sub>vP</sub> *t<sub>k</sub>* (to the nearest hundred) been arrested *t<sub>k</sub>* by the police?]  
 b. \*[How many patients]<sub>k</sub> have there [<sub>vP</sub> *t<sub>k</sub>* (to the nearest dozen) been *t<sub>k</sub>* in this office today?]

<sup>19</sup>This discussion has focused on stranding in the vP edge by successive-cyclic A'-movement of internal arguments. A'-movement of a *wh*-subject out of TP should also in principle be able to strand an adjunct there. While A'-extraction of subjects typically invokes the *that*-trace effect, an adverb placed between CP and TP can ameliorate this effect (Bresnan (1977), a.o.), allowing for clearer testing of stranding in spec-TP. As far as I can tell, this test shows that stranding under A'-movement of subjects is possible in CP, but not TP:

- vii. Who did you say [<sub>CP</sub> (**exactly**) that [extremely fortunately] [<sub>TP</sub> (**\*exactly**) escaped the fire]]?

This finding is consistent with the claim that subjects which undergo A'-movement in English do not pass through spec-TP (McCloskey (2000); Bošković (2004)).

properties of these languages, spec-vP IS is expected to be a possibility.

Ko (2007, 2011, 2014) analyzes some properties of syntactic edges using the same concepts argued for in the current paper, focusing on the interaction of movement and numeral quantifier stranding in Korean and Japanese. As mentioned in section 2, these languages can strand certain numeral quantifiers under scrambling:

(54) **Numeral quantifier stranding by object scrambling in Korean**

**Maykcwu-lul<sub>k</sub>** John-i [ *t<sub>k</sub>* **sey-pyeng** ] masiessta  
 Beer-ACC John-NOM [ 3-bottle ] drank

“John drank three bottles of beer” (Ko 2014, pg. 31, ex. 1b)

In (54), the subject intervenes between the scrambled object and the stranded numeral quantifier. In contrast, in these languages it is not possible to create configurations where the subject and an associated numeral quantifier are separated by the object:

(55) **\*Object between subject and its numeral quantifier in Korean**

\*Haksayng-tul-i<sub>k</sub> **maykcwu-lul** [*t<sub>k</sub>* sey-myeng] masi-ess-ta  
 Students-PL-NOM beer-ACC 3-people drink-PAST-DECL

“Three students drank beer” (Ko 2014, pg. 32, ex. 7)

Such ungrammatical examples could plausibly have been derived by scrambling the object over the subject, as we learned is possible from (54), followed by scrambling the subject over the object, resulting in stranding of the subject’s numeral quantifier:

(56) **Scrambling of object and subject** (Ko 2014, pg. 31, ex. 2b)

[ S O [*t<sub>SUBJ</sub>* NQ<sub>SUBJ</sub>] *t<sub>OBJ</sub>* V ]

Ko points out that subject scrambling is attested in these languages (contra Saito (1985)), so the absence of derivations like (56) remains puzzling. Ko’s solution makes use of the same concepts argued for in the present paper—CL and Agree-driven movement. If vP is a phase in Korean and Japanese, Order Preservation requires (56) to play out within vP. This derivation will require moving the subject from its  $\theta$ -position in the vP edge, to a higher spec-vP, above the previously scrambled object. Given the ban on phrase-bound spec-to-spec movement that Agree-driven movement derives, such subject movement is impossible, and derivations like (55/56) fail.

This solution requires that vP is a phase in Korean and Japanese, just as has been claimed of languages like English with a more rigid word order. If vP is a phase in a given language, we expect IS in spec-vP to be possible, as long as other factors don’t interfere. We’ve seen that A-movement of subjects in English interferes with stranding in the vP edge. This result leads to the prediction that if a language allows subjects to remain in situ, IS in spec-vP should be permitted. Korean and Japanese verify this prediction. These languages allow subjects to remain low, resulting in the possibility of IS in the vP edge, as shown in section 2 and repeated below:

(57) **IS of numeral quantifier by object scrambling in Korean** [= (18)]

**Kong-ul**<sub>k</sub> amato [<sub>vP</sub> *t*<sub>k</sub> **sey-kay** haksayng-tul-i *t*<sub>k</sub> patassulkesita]  
 Ball-ACC probably 3-thing student-PL-NOM received

“The students probably received three balls”

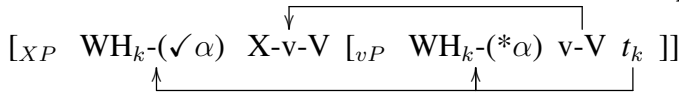
(58) **IS of numeral quantifier by object scrambling in Japanese** [= (19)]

**Neko-o**<sub>k</sub> osoraku [<sub>vP</sub> *t*<sub>k</sub> **san-biki** gakusei-ga umaku *t*<sub>k</sub> mitsuketa]  
 cat-ACC probably 3-CL student-NOM skillfully found

“The students probably skillfully found 3 cats”

Another factor that could block IS in the vP edge is head movement out of this phase. Given the constraint that heads only move to other heads (Travis (1984)), there is no position within vP that V can move to which precedes the specifiers of vP. Thus eventual movement of V out of vP necessarily crosses anything stranded in the vP edge, preventing stranding in that position:

(59) **Leftward head movement out of vP blocks IS in spec-vP**



This interference will only be caused by leftward head movement, however. If a language is head-final, as Korean and Japanese are, head movement goes linearly to the right, and so will never linearly cross any specifiers of vP. Therefore we fully expect IS in spec-vP to be possible in Korean and Japanese, as in reality. Neither A-movement nor head movement need interfere.

## 5.2 Cross-linguistic variance in IS in an articulated verbal domain

What has just been discussed leads to the prediction that IS in spec-vP should be unavailable in a language where subjects move to a vP-external position. Earlier in this paper we saw examples from Polish<sup>20</sup> and Dutch that violate this expectation, repeated below. In these sentences the external argument appears to occupy a vP-external position, but IS in spec-vP has succeeded:

(60) **Polish spec-vP IS**

a. **Jaki**<sub>k</sub> Paweł *t*<sub>k</sub> **samochód** kupił swojej żonie *t*<sub>k</sub>?

What Paweł car bought his wife

“What car did Paweł buy his wife?”

[= (22b)]

b. %**Jaki**<sub>k</sub> Maria *t*<sub>k</sub> **samochód** myślała (\*że) Paweł kupił swojej żonie *t*<sub>k</sub>

What Maria car think (\*that) Paweł bought his wife *t*?

“What car did Maria say she bought?”

[= (22c)]

<sup>20</sup>In (22a) above, we saw examples that Wiland (2009, 2010) claims instantiate stranding in spec-VP. If Wiland is correct in attributing phasehood to VP, this fact presents a challenge, given another of Wiland’s assumptions. Namely, that Polish V moves to v. As just mentioned, head movement across a given phase edge should prevent IS in that edge. If this is so, movement of V out of VP should block IS in spec-VP. This leads to the expectation that examples like (22a) are not actually IS. Indeed, Wiland (2009) shows that the position of supposed spec-VP stranding in (22a) is also a position available for A-scrambling of direct objects. Given the availability movement into this position, examples like (22a) can be analyzed as A-scrambling followed by A’-extraction. In contrast, Wiland’s evidence for IS in spec-vP and spec-CP is more convincing, and I will assume he is correct in these claims.

(61) **Dutch spec-vP IS**

- a. Waar<sub>k</sub> had jij dan [<sub>vP</sub> t<sub>k</sub> **mee** gedacht dat je de vis t<sub>k</sub> zou moeten snijden]?  
where had you then with thought that you the fish would must cut  
“I had thought that Ed would buy only one book” [= (23a)]
- b. Waar<sub>k</sub> had jij dan [<sub>vP</sub> t<sub>k</sub> **voor bal** gedacht dat Ed t<sub>k</sub> zou kopen]?  
where had you then for ball thought that Ed would buy  
“What kind of ball had you thought that Ed would buy?” [= (23b)]

Analogous stranding in the edge of the verbal domain is possible in some Irish Englishes. Recall that West Ulster English as reported by McCloskey (2000) can strand the postnominal quantifier *all* in spec-CP:

- (62) **West Ulster *all*-stranding** (McCloskey 2000, ex. 8)  
What<sub>k</sub> (all) did he say [<sub>CP</sub> t<sub>k</sub> (**all**) (that) he wanted t<sub>k</sub> (all)]

McCloskey points out that *all*-stranding in spec-vP isn't possible, presenting a gap in the paradigm. McCloskey's analysis of West Ulster English suggests that V moves to a head above vP, thus his examples showing this gap attempt *all*-stranding after V:

- (63) **No *all*-stranding in spec-vP** (McCloskey 2000, ex. 14e)  
What<sub>k</sub> did he tell<sub>j</sub> [<sub>vP</sub> t<sub>k</sub> (**\*all**) t<sub>j</sub> his friends [<sub>CP</sub> t<sub>k</sub> (all) that he wanted t<sub>k</sub>?]]

Henry (2010) shows that West Ulster English has several sub-varieties, some of which in fact do permit IS in spec-vP, as shown in (64-65). Henry shows that the actual position of such IS in those dialects is pre-verbal, suggesting that this position is the actual landing site of clause-internal successive-cyclic A'-movement in West Ulster English:

(64) **Spec-vP IS in South Derry English**

- a. What<sub>k</sub> did he t<sub>k</sub> **all** do t<sub>k</sub> on holiday? (Henry 2010, ex. 25)  
b. Where<sub>k</sub> does she t<sub>k</sub> **all** see her students t<sub>k</sub>? (Ex. 29)

(65) **Spec-vP IS in East Derry English**

- a. What<sub>k</sub> did he t<sub>k</sub> **all** do t<sub>k</sub> in Derry? (Ex. 52)  
b. Who<sub>k</sub> did he t<sub>k</sub> **all** say was elected t<sub>k</sub> in the council elections? (Ex. 56)

Henry's study finds that the dialect examined by McCloskey corresponds to a variety he terms West Derry City English, and observes that this dialect, along with the Strabane dialect, indeed does not permit IS of the form in (64-65).<sup>21 22</sup>

These instances of IS in the edge of vP that coexist with an *ex situ* external argument in are puzzling in light of the predictions made earlier in this section. I hypothesize that the presence of

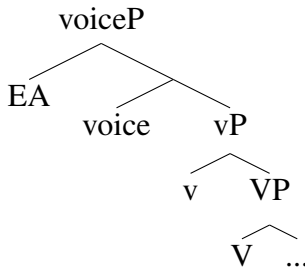
<sup>21</sup>Tillessen (2017) claims that Upper Midwestern American English also has *all*-stranding in spec-vP.

<sup>22</sup>The fact that only some dialects of Irish English allow spec-vP stranding is evocative of Zyman (under review)'s claim that spec-vP *exactly*-stranding is possible for some speakers. I argued in section 5.1.1 that Zyman is incorrect, but if some speakers prove to allow such stranding in spec-vP, the explanation offered here for the difference between Irish dialects will also apply.

such IS in some languages/dialects, and its absence in others, can be accommodated by appealing to fine variances in head movement, within the context of a decomposed verbal domain.

Throughout this paper, I have taken with previous literature the standard claim that vP is a phase, and the origination position of EAs. Legate (2014) maintains that the projection responsible for introducing EAs is a phase, but argues that this projection is voiceP, which dominates vP:

(66) **An articulated verbal domain: voiceP and vP**



I will also follow recent work in Distributed Morphology (Halle & Marantz (1993); Harley & Noyer (1999), a.o.) in positing that v is a head responsible for determining the verbal category of V (which under this theory originates as an uncategorized lexical root), and that such categorizing heads (v<sup>0</sup>, n<sup>0</sup>, a<sup>0</sup>, etc.) are phases (Marvin (2003); Marantz (2007); Newell (2008); Embick & Marantz (2008); Embick (2010)).

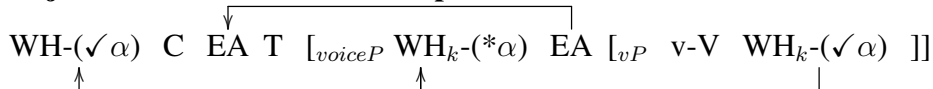
If the verbal domain is decomposed into voice and v, and both are phases, then movement out of this domain will successive-cyclically pass through the edge of both these phrases. These phase edges thus provide two positions where, in principle, IS might occur:

(67) **Hypothetical IS in spec-vP or spec-voiceP**



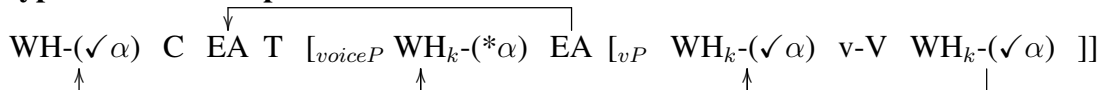
I propose that A-movement of the subject out of voiceP uniformly removes the possibility of IS in spec-voiceP, in languages where such movement must occur. The logic required is the same as that used in section 5.1.1, though at that point in the paper the relevant projection was being identified as vP rather than voiceP. Example (68) below uses a linear representation to illustrate the blocking of such stranding:

(68) **Subject movement blocks IS in spec-voiceP**



Notice that nothing here blocks stranding in spec-vP, however, because this position is not crossed by A-movement of the subject:

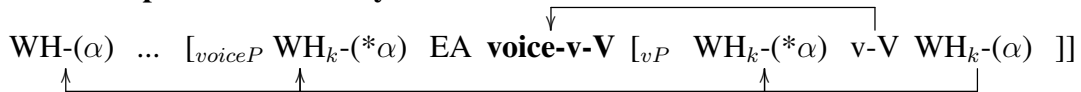
(69) **Hypothetical IS in spec-vP**



I suggest that the examples I've taken to instantiate IS at the edge of the verbal domain in languages like Dutch, Polish, and some Irish Englishes, are in fact formed by stranding in spec-vP as in (69).

We've seen that some languages, like standard English, cannot strand in this spec-vP. How can this be accounted for? Stranding here won't be ruled out by movement of the subject, which doesn't cross this position.<sup>23</sup> But this position may be crossed by head movement. Earlier in this section, I discussed how the constraints on head movement (Travis (1984)) lead to the prediction that head movement out of a given phase should ban stranding in the edge of that phase. In the context of the verbal domain under consideration, we predict an absence of IS in spec-vP if V moves to v, which then moves to voice:

(70) **IS of  $\alpha$  in spec-vP blocked by head movement**



In sum, in this section so far I've hypothesized that differences in subject movement and head movement can accommodate the cross-linguistic variance in IS at the edge of the verbal domain. Next, we'll consider a circumstance where an expected form of IS is absent, but cannot be explained by appealing to the interference of such movements.

### 5.3 Remnant movement and bans on IS in spec-CP

The concepts examined so far predict that any strandable material that is (or can be) adjoined to the right of what strands it should be available for IS. Various factors can impede IS, however, as just discussed in terms of A-movement and head movement. But stranding in spec-CP should be readily available, since this position is not (typically) crossed by A-movement or head movement. However, I am aware of a variety of scenarios with appropriately right-attached strandable elements that nevertheless fail to undergo IS in the CP edge, as in (71):

(71) **Base position stranding but no IS at clause edge**

a. **ago-stranding**

How long (ago) did you say (<sup>??</sup>/<sub>\*</sub>ago) that you went to France (ago)?

b. **How much ... of split**

How much (of the chocolate cake) did you say (<sub>\*</sub>of the chocolate cake) that I ate (of the chocolate cake)?

c. **Combien split in French**

(P.c. Vincent Rouillard)

Combien<sub>k</sub> (de livres) crois-tu t<sub>k</sub> (<sub>\*</sub>de livres) que je devrais lire t<sub>k</sub> (de livres)?  
 How.many of books believe-you of books that I should read of books  
 "How many books do you believe that I should read?"

d. **Possessor extraction in Greek**

(P.c. Sabine Iatridou)

Pianou<sub>k</sub> (to vivlio) ipe o Yanis t<sub>k</sub> (<sub>\*</sub>to vivlio) oti i Maria diavase / diavase i  
 Whose (the book) said the Yanis (the book) that the Maria read / read the  
 Maria t<sub>k</sub> (to vivlio)  
 Maria (the book)?

<sup>23</sup>More specifically, movement of external arguments cannot block stranding here, as external arguments originate in a higher position (spec-voiceP). But if theme subjects originate in a lower position, we may well expect their movement from within vP to block stranding in its edge. Since all the current examples that I have of spec-vP IS with ex situ subjects involve external arguments, I will leave this for later work.

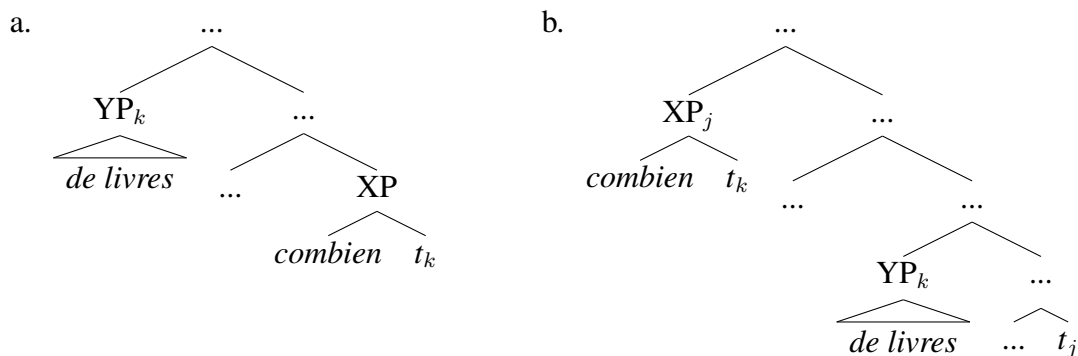


“Whose book did Yanis say that Maria read?”

Stranding gaps in this position thus present an additional puzzle.

Kayne (2002) suggests that French examples (71c) do not in fact involve extraction of *combien* (“how many”), but rather movement of a constituent that has been evacuated by everything except for *combien*. (See Corver (2007) for more on such remnant movement derivations.) Under this analysis, base position stranding of *de livres* (“of books”) in (71c) involves movement of *de livres* to a low position in the clause. Subsequent A'-movement of the phrase that *de livres* once occupied creates the appearance of *combien* having extracted:

(72) **Movement of *de livres* (a) followed by *wh*-movement of remnant (b)**



In principle, the same sort of derivation is possible for all the examples in (71). We may in fact expect such derivations to be required here, as the supposedly extracting elements in this set are all arguably non-constituents, or alternatively, should be banned from extraction by the Left Branch Condition (Ross (1967)).

If such remnant movement derivations are the right analysis of the (apparent) extractions in (71), the lack of IS in spec-CP in these examples is expected. Under the remnant movement analysis, the elements that appear to have been stranded in their base position in (71) in fact were not—they independently moved at an earlier point in the derivation. If the appearance of base position stranding of such material was formed by evacuation of that material before A'-movement applied, we don't expect that remnant constituent undergoing A'-movement to be able to strand that material at some later point in the derivation.

## 6 Conclusion

This paper has argued that the cross-linguistic distribution of IS stands as evidence for CL and movement operations as Agree-triggered. I showed that these principles accurately predict a certain word order generalization about IS, which as far as I know, stands as exceptionless:

- (73) **Intermediate Stranding Generalization (ISG)** [= (2)]  
*IS is only possible when the stranded material is, or can be, to the right of the material that continues to move leftward*

The ISG addresses what sorts of elements can undergo IS, and this was the emphasis of the first half of the paper. The second half examined the other side of the IS equation, namely, what sorts of

edges are licit for stranding. I examined this question chiefly in terms of clause-internal IS, which I argued can be disrupted by various properties of movement in a given language.

## 7 Appendices

### 7.1 Appendix A: Phonological constraints on IS

This paper has discussed constraints on IS chiefly in terms of CL, and independent syntactic constraints. We can also imagine that some instances of IS might be ruled out at PF, due to morpho-phonological requirements. If the presence of a stranded element disrupts some condition on the environment being stranded in, we expect that instance of IS to be ungrammatical.

A scenario of this type is argued for in McCloskey's (2000) analysis of West Ulster English *all*-stranding. To explain judgment patterns like that in (74), McCloskey hypothesizes that the stranded *all* has a (violable) requirement to incorporate into some preceding head, preferably a verb. In (74), we see 3 cases where *all* is stranded in the edge of the embedded CP. The only difference between these examples is whether or not material intervenes between the stranded *all* and the local V, and if so, how much. The more intervening material, the less acceptable the configuration:

(74) **Prosodic condition on *all*-stranding**

- a. What did he **say all** that he wanted to buy *t*? (McCloskey (2000), ex. 11b)
- b. What did he **say <sup>?</sup>to him all** that he wanted to buy *t*? (Ex. 15b)
- c. What did he **say <sup>?</sup>\*to his friends all** that he wanted to buy *t*? (Ex. 15c)

A similar requirement may explain a gap in the distribution of *exactly*-stranding that McCloskey noted. *Exactly*-stranding in the edge of an embedded CP is degraded when a righthand matrix adverb intervenes between the matrix V and the stranded adjunct:

(75) **Prosodic interference with IS in English**

- a. What did he say (<sup>?</sup>\*yesterday) [<sub>CP</sub> *t* exactly that we wanted *t*]?
- b. How many pies did you say (<sup>?</sup>\*yesterday) [<sub>CP</sub> *t* [to the nearest dozen] that the bakers delivered *t*]?

In my judgment, such examples improve when the intervening material is phonologically lighter. For example, an intervening pronoun or preposition incurs little to no violation:

(76) **Phonologically light interveners in *exactly*-stranding**

- a. What did you tell **me/him/her** exactly that we want?
- b. Who did you speak **to/with** exactly at the party?
- c. [How much acid] did you report **to us** [to the nearest kilogram] that the reaction required?


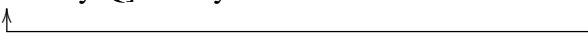

The configurations involved in the above examples are all structurally comparable. What differs is the phonological weight of the intervening material, when present. Such facts suggest that a PF condition is restricting the possibility of IS in this inter-clausal position.<sup>24</sup>

<sup>24</sup>The *Contiguity Theory* of Richards (2016) argues that prosodic well-formedness requirements constrain syntactic

## 7.2 Appendix B: The QP theory of A'-movement

Cable (2010) proposes that *wh*-movement is actually movement of QP, which dominates what we typically think of as the A'-moving phrase. QP can dominate more than just the minimal *wh*-constituent. When QP dominates additional material, that material is moved along with the *wh*-phrase, resulting in apparent “pied-piping”:


### (77) Pied-piping in QP theory

- a. [<sub>QP</sub> Who Q] did you make cookies with *t* exactly?  

- b. [<sub>QP</sub> Who exactly Q] did you make cookies with *t*?  

- c. [<sub>QP</sub> With who exactly Q] did you make cookies *t*?  


If this theory is correct for A'-movement generally, as Cable suggests, then the status of IS is called into question. If pied-piping occurs when QP dominates more than the minimal A'-feature bearing element, intermediate stranding would have to involve QP somehow dropping off one of its sub-constituents partway along the movement chain. I know of no coherent way to implement such an analysis. However, there are a few reinterpretations of IS that can avoid this issue.

First, we can imagine that what I have called IS is in fact derived by distributed deletion (Faneslow & Ćavar (2002)). Under such a view, the moving phrase does not drop off any of its sub-constituents in an intermediate position. Rather, part of the moving phrase is pronounced at the head of the chain, and another is pronounced in the position of an intermediate copy.

### (78) IS as distributed deletion

[<sub>QP</sub> What all Q] ... [<sub>QP</sub> What all Q] ... [<sub>QP</sub> What all Q]  


Such deletion will be constrained by the same principles of linearization argued for in this paper, as an operation that affect the distribution of overt syntactic nodes.<sup>25</sup>

Second, IS is derivable in QP theory if it is possible to have a recursive QP structure. Under such an analysis, IS would be derived by sub-extraction of an embedded QP after movement of the QP that contains it.

### (79) IS by embedded QP extraction

[<sub>QP1</sub> What Q1] ... [<sub>QP2</sub> *t* all Q2] ... *t*  


Such a derivation may be questionable from the perspective of locality/superiority, as well as on semantic grounds. Nevertheless such a derivation is technically a syntactic possibility.

derivations in a number of ways. For instance, Richards suggests that such requirements motivate movement as a result of Probe-Goal Agree relations, and restrict material that intervenes between two elements in a selection relationship. If Richards is right, and such prosodic concerns are operative in constraining the syntactic derivation generally, we should not be surprised to find such factors restricting IS.

<sup>25</sup>This hypothesis about IS predicts that a scope bearing element that has apparently undergone IS should take scope as high as the element that appeared to strand it has moved. While I haven't tested this prediction, Sabine Iatridou points out to me that stranded *exactly* seems to take scope over the whole question even when stranded in a lower position. So, "What did you say exactly that they want" means "Give me an exact answer to the question of what you said they want". This may follow if *exactly* is actually fully pied-piped with *what*, but is pronounced lower due to a PF effect.

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