

Crossing and stranding at edges*

Colin P Davis / MIT / colind@mit.edu

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, as well as a crossing effect which bans IS in the edge of vP when subjects A-move from that phase.

1 Introduction

Moved phrases 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 α successive-cyclically A'-moves in two steps, pied-piping β 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 α feeds IS of β .

(1) **A schema for IS**

$$[ZP \ \alpha \ [Y P_{[Phase]} \ \alpha\beta \ [X P \ \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.

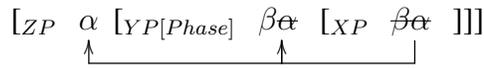
1.1 Conclusions in preview

Assuming that IS typically 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 it would require the stranded material to be crossed over within a phase edge, in a way that I'll argue is illicit.

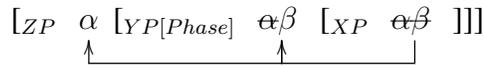
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This crossing problem is illustrated in (3a) below. Here β precedes α before movement. In order for successive-cyclic movement of α to strand β in the edge of the phase YP, α must cross over β when β is stranded there. In contrast, in (3b) α precedes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

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



b. **No crossing at the edge**

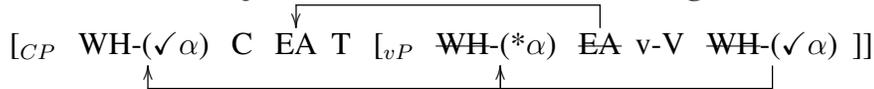


In this paper, I argue for a theory which ensures that only non-crossing IS derivations like (3b) succeed, thus deriving the ISG as a theorem of more general principles.

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. This notion of movement serves to prevent certain exceptions to the ISG that CL alone does not rule out.

I'll argue that beyond deriving the ISG, these concepts also lead to beneficial predictions about how subject movement interacts with IS at the vP edge. In particular, I'll show that crossing of the vP edge by A-movement of subjects in English uniformly rules out IS in that edge:

(4) **Movement of subject from vP bans IS in the vP edge**



We'll see that in Korean and Japanese, subjects may remain in situ, and when they do, IS in the vP edge is permitted. But if the subject does exit vP, stranding in the vP edge is banned, as predicted.

1.2 Road map of the paper

Section 2 provides more background on IS, and the evidence for the ISG. Section 3 outlines and compares the predictions of phase theory in Chomsky (2000, 2001) versus CL. Section 4 argues for the importance of Agree-driven movement, among other proposed locality constraints. Section 5 examines the interaction of IS at the vP edge with subject movement, and to a lesser extent, head movement. Section 6 contains the appendices, and section 7 briefly concludes.

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.

- b. (**Exactly**) [how many cakes]_k (**exactly**) did you say that we ate *t_k*?
- c. Who said that you ate (**exactly**) [how many cakes] (**exactly**)?

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

(9) **Exactly-stranding**

What_k did you suppose *t_k* (**exactly/precisely**) that they wanted *t_k* (**exactly/precisely**)?

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 predicate *suppose* used in this example is incompatible with an adverbial *exactly*:

- (10) 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 (11) below. Since such adjuncts are not homophonous with adverbs, as *exactly/precisely* are, examples like (11) provide even clearer cases of IS.

(11) **Quantity adjunct IS**

Tell me [_{CP} (to the nearest pound) [how much flour]_k (to the nearest pound) you said [_{CP} *t_k* (**to the nearest pound**) that the bakery wants *t_k* (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.

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.³

First, these elements can be stranded in their base position:

(12) **Stranding in base position**

- a. **Y-an_k** la Bintë waat ne nga lekk *t_k* **y-epp**?
 CL.PL-wh XPL.COP Binta swear that XPL.COP.2SG eat CL.PL-every
 “What all did Binta swear that you ate?” (Torrence 2018, ex. 44d)
- b. **F-an_k** l-a-ñu wax ne nga teg *t_k* **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:

³The 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 suggest that they don’t.

(13) **Full pied-piping**

- a. [**Ñ-an** **ñ-əpp**]_k l-a Ayda wax ne l-a-a dóór t_k?
 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**]_k l-a Ayda wax ne l-a-a dem t_k?
 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 CP edges where stranding can occur, as expected. These elements do not appear in clause edges if there is no movement to strand them.

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

- a. **F-an**_k l-a-ñu foog t_k **f-əpp** ne la-a togg-e ceeb t_k?
 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**_k l-a-ñu foog t_k **f-eeneen** ne la-a togg-e ceeb t_k?
 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 (13), 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:

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

- | | |
|--|--|
| a. O čem _k ty govoriš t _k ?
About what you talk?
“About what are you talking?” | b. * Čem _k ty govoriš o t _k ?
What you talk about?
“About what are you talking?” |
|--|--|

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

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

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

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

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

- a. (Navstreču) **komu_k** (navstreču) ty bežal *t_k* (**navstreču**)?
(Towards) whom (towards) you ran (towards)?
“Towards whom did you run?”
- b. (Nazlo) **komu_k** (nazlo) ty èto sdelal *t_k* (**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:⁴

(18) **IS of ambivalent Ps** (P.c. Tanya Bondarenko, Anton Kukhto, Mitya Privoznov)

- a. ?**Komu_k** Vasja xotel *t_k* **navstreču** čtoby Petja nobežal *t_k* ?
Who Vasya want towards that Petja run
“Toward whom did Vasya want that Petja would run?”
- b. ?**Komu_k** Lena xotela *t_k* **nazlo** čtoby Maša pobedila *t_k* ?
Who Lena wanted to.spite that Masha win
“In spite of whom did Lena want that Masha would win?”

If these facts are accurate⁵, 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:

⁴This 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 (18) 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.

⁵It 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_k** čtoby Petja nobežal Maše *t_k* ?
Vasya want towards that Petja ran Masha
“Vasya wanted that Petja would run towards Masha (not any other direction)”
- b. Lena xotela **nazlo_k** čtoby Maša pobedila Naste *t_k* ?
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 (18) shows true IS under A'-movement, whereas (ii) 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 (18) suggests that (18) does not involve independent scrambling of PP, but rather mere pied-piping of PP that is parasitic on *wh*-movement.

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

Kong-ul_k amato [_{vP} *t*_k **sey-kay** haksayng-tul-i *t*_k 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.⁶

- (20) **IS of numeral quantifier by object scrambling in Japanese**

a. **Neko-o**_k osoraku [_{vP} *t*_k **san-biki** gakusei-ga umaku *t*_k mitsuketa]
 cat-ACC probably 3-CL student-NOM skillfully found

“The students probably skillfully found 3 cats”

b. **Ringo-o**_k tabun [_{vP} *t*_k **san-ko** Jon-ga umaku *t*_k nusunda]
 cat-ACC probably 3-CL student-NOM skillfully found

“John probably skillfully stole 3 apples.” (P.c. Shigeru Miyagawa, Takashi Morita)

This pattern fits the ISG, since these strandable numeral quantifiers are able to be attached on the right side of what strands them. We’ll also see later in the paper that subject movement from vP blocks such IS, as I’ll show is expected under the theory defended here.

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:

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

[**Jaki samochód**]_k Paweł kupił swojej żonie *t*_k?
 [What car] Paweł bought his wife

“What car did Paweł buy his wife?”

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

Jaki_k Paweł kupił swojej żonie *t*_k **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:

⁶In (20) 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 from VP. Miyagawa (2017) shows that the adverb *umaku* adjoins to VP, and in (20) we see that *umaku* sits in its base position. The fact that *umaku* was not carried along by any of the movement operations in (20) suggests that the VP was not fronted.

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

a. **IS in spec-VP**

(Wiland 2010, ex. 3)

Jaki_k Paweł kupił *t_k* **samochód** swojej żonie *t_k*?
What Paweł bought car his wife

“What car did Paweł buy his wife?”

b. **IS in spec-vP**

(Wiland 2010, ex. 4)

Jaki_k Paweł *t_k* **samochód** kupił swojej żonie *t_k*?
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_k** Maria *t_k* **samochód** myślała (*że) Paweł kupił swojej żonie *t_k*
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_k** *pro* myślisz *t_k* **samochód** (*że) Paweł kupił swojej żonie *t_k*?
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 (23c-d), where we see the stranded NP ending up in a higher clause, must have been derived by 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 adpositions and various other elements in the matrix spec-vP:

(24) **Stranding in spec-vP in Dutch**

(Barbiers 2002, ex. 6)

a. Waar_k had jij dan [_{vP} *t_k* **mee** gedacht dat je de vis *t_k* zou moeten snijden]?
where had you then with thought that you the fish would must cut

“What had you thought to be forced to cut the fish with?”

b. Waar_k had jij dan [_{vP} *t_k* **voor bal** gedacht dat Ed *t_k* 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]_k had ik [_{vP} **maar** *t_k* gedacht dat Ed *t_k* 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 (24a-b). The exception is (24c), 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 post-nominal:

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

[(**Maar**) twee jongens (**maar**)] weten 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'-movement⁷, the postpositions used with R-pronouns can be (van Riemsdijk (1978)).

(26) **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**]_k snij je het brood [**met t_k**]?
 which knife cut you the bread with
 "Which knife are you cutting the bread with?"

(27) **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**_k snij je het brood [**t_k 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 (24a) above that this postpositional form is capable of IS. As expected given the ISG, the prepositional variant of *with* cannot be intermediately stranded:

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

*[**Welk mes**]_k had jij dan **met t_k** gedacht dat je de vis t_k zou moeten snijden?
 which knife had you then with thought that you the fish would must cut
 "Which knife did you think then that you would have to cut the fish with?"

⁷This 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:

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

Vir wat_k werk ons nou eintlik t_k ?
For what work we now actually?

“For what do we actually work?”

- b. * **Waar** $_k$ werk ons nou eintlik **vir** t_k ?
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:⁸

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

- a. $Waar_k$ (voor) dink julle [$_{CP} t_k$ (**voor**) werk ons t_k (**voor**)]?
where(for) think you [(for) work we (for)]?

“For what do you think that we work?”

- b. $Wat/waar_k$ dink julle dink die bure [$_{CP} t_k$ (**oor**) stry ons t_k (**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:

- (31) **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.

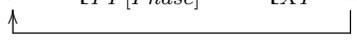
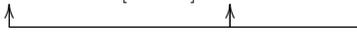
⁸For other restrictions on IS in Afrikaans see Rackowski & Richards (2005).

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.⁹

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 material in the phase's complement will undergo spellout before such movement can apply (32a). However, moving to the edge (specifier) of the phase before its complement spells-out allows further movement out of the phase (32b).

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

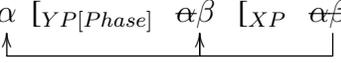
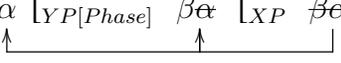
- a. * $[_{ZP} \alpha Z [_{YP[Phase]} Y [_{XP} \alpha]]]$

- 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 (33) below should be equally licit. These two scenarios are structurally comparable, but differ in word order:

(33) **Structurally comparable stranding extractions from the phase edge**

- a. **IS with no crossing at the edge**
 $[_{ZP} \alpha [_{YP[Phase]} \alpha\beta [_{XP} \alpha\beta]]]$

- b. **IS with crossing at the edge**
 $[_{ZP} \alpha [_{YP[Phase]} \beta\alpha [_{XP} \beta\alpha]]]$


⁹DP 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_k did Clarence send [_{DP} t_k (***exactly**) a picture of t_k] 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_k did she provide [t_k **exactly** a demonstration of t_k] again?
 b. ?? Who_k did he invite [t_k **exactly** participation by t_k]?

To the extent that these examples improve on (iii), I suggest that they are derived by heavy NP shift to the right of an *exactly* stranded in its base position. This creates the appearance of intermediate stranding. The phonologically lighter nominal in (iii) cannot shift so readily, and ungrammaticality is clearer.

I have shown that all attested IS patterns correspond only to the schema in (33a), where the stranded material was ordered to the right of what moves on, as the ISG describes. Since the phase theory under consideration permits both (33a) and (33b), it overgenerates.

The ISG does not sit naturally in a theory of extraction cast purely in structural terms. If creating the right structures for extraction at some point in the derivation is all that matters, it is not obvious why the independent surface word order properties of a given construction should be relevant to IS. The present paper will argue that this connection between word order and the availability of IS emerges naturally under CL, and independently motivated constraints on movement.

A concept that potentially helps Chomsky (2000, 2001) explain the ISG is the claim that only phases move (Chomsky (2005); Fowlie (2010); Harwood (2015); Bošković (2018), a.o.). In appendix A, I describe how such an approach would work, and the reasons why it is insufficient. In the meantime, I will go on to explain the CL-based account that is the focus of this paper.

3.2 Cyclic Linearization (CL)

Here I'll overview the aspects of CL, and then explain its predictions for IS. In short, CL proposes that successive-cyclic movement is a consequence of the information-preserving nature of spellout, termed *Order Preservation*. 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 remains accessible for the entire 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 that 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 (34) below, where the moving phrase *what* non-successive-cyclically moves to spec-CP without passing through the edge of vP:

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

[_{CP} What did Mary [_{vP} 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:

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

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

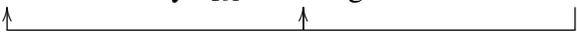
Later, *what* moves in one step to spec-CP. Spellout of CP produces the linearization in (36):

(36) **Ordering at CP**

what < did < Mary < [content of vP]

Notice that in (35), *what* follows everything in vP. However, in (36) *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 (37), prevents the derivation from yielding a contradictory linearization.

- (37) **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 (37) generates the ordering information in (38):

- (38) **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 (36), because the linear orders generated at both of these phases encode that *what* precedes their contents:

- (39) 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.¹⁰

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:

- (40) **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

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 (41a). But if the material being stranded in the edge follows the phrase that moves on (41b), such crossing doesn't occur:

¹⁰The 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 α moving later on, with the result that other material intervenes between α and β , as in $[\alpha \gamma \beta]$.

(41) a. ***Crossing at the edge**

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

b. **No crossing at the edge**

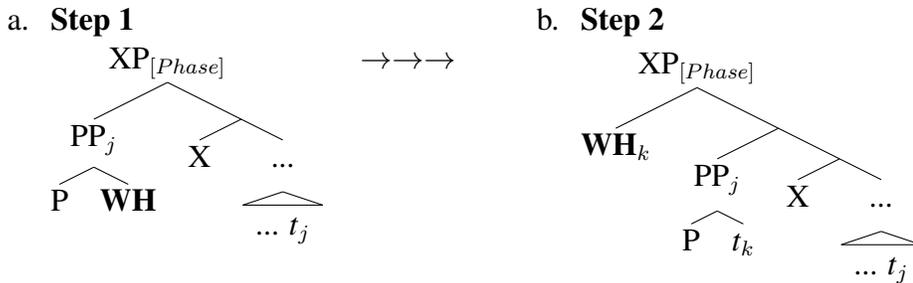
$$[_{ZP} \alpha [_{YP[Phase]} \alpha\beta [_{XP} \alpha\beta]]]$$

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 (41b), which fits 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 a moving phrase crosses what it strands at the phase edge, then IS should be permitted if that phrase can move within the phase edge, to a position above the pied-piped material that precedes it. If this occurs, later movement out of the phase won't cross over the material that was previously pied-piped into the phase edge. For instance, IS of prepositions in English or Dutch might hypothetically be fed by first moving the complement of a pied-piped PP across P, to a higher specifier of the same phase, as in (42).

(42) **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.

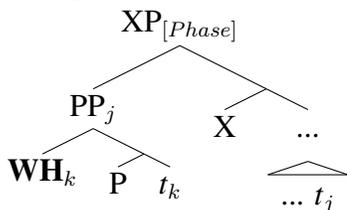
Many works argue that movement is triggered by an Agree relation with a probing feature on a head (Chomsky 1995, 2001, Ko 2007, 2014, van Urk 2015). Ko points out that this theory automatically predicts the desired constraint on movement: If moving an element to the specifier of a head requires a probe 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 (42) above, the movement of the *wh*-phrase to a higher spec-XP in (42b) 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.¹¹

¹¹Richards (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.

4.1 Anti-locality and movement within the pied-piped constituent

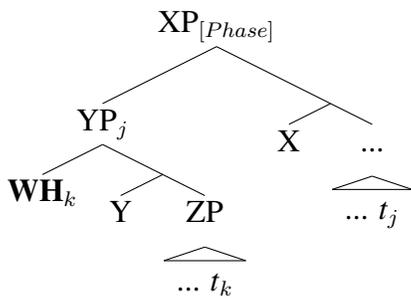
While movement within the phase edge has just been ruled out, nothing has been said that prevents movement within the pied-piped constituent. For instance, returning to the P stranding scenario in (42) above, it is also necessary to ensure that WH cannot come to precede P by moving to spec-PP, as in (43) 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).¹²

(43) ***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 (44) 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:

(44) **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 linear edge.¹³ 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 adpositions, and *maar* (“only”) in Dutch. If the structure associated with such elements allows movement within it, the resulting word order freedom ensures that IS is possible.

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.¹⁴

¹²It would also suffice to claim that Agree requires a probe to asymmetrically c-command its goal.

¹³While 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.

¹⁴If 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.

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. Since there are gaps in most IS paradigms, this is likely to be a necessary conclusion.

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

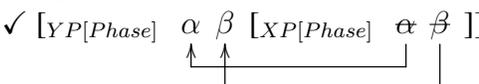
As described in section 3, CL derives successive-cyclic movement through phase edges from the logic of Order Preservation—movement through the linear edge of each phase crossed ensures the coherency of the orderings that phase-by-phase spellout generates. As briefly noted in section 3, the same logic 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 (45) below, we see a schema for non-successive-cyclic movement and its repair. In (45a), the element α precedes β within the phase XP before movement. Here β moves out of XP without stopping in its edge, thus crossing α on the way out. As discussed, such scenarios are predicted to result in a linearization problem. This is because the crossing of α by movement of β creates an ordering which requires pronouncing beta β both before and after α . CL predicts that this problem is avoided, however, if α also moves into the next phase, to a position above β , as in (45b). The result of this movement is that α precedes β within the second phase just as it did within the first.

- (45) a. **Illicit crossing at the edge...**

$$* [Y P[Phase] \beta [X P[Phase] \alpha \beta]]$$

- b. **...repaired by restoring original order**

$$\checkmark [Y P[Phase] \alpha \beta [X P[Phase] \alpha \beta]]$$


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

Returning to the topic of IS, the prediction shown in (45) leads 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 (45b). 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 in the vP edge, where subject movement and head movement can interact with the distribution of IS under A'-movement. I'll primarily be concerned with the influence of subject movement.

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, Japanese, and Korean. I'll examine the predictions and results for the former, before contrasting with the latter two.

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:

(46) **Adjunct stranding at clause edge**

- a. **What_k** did you suppose *t_k* (**exactly/precisely**) that they wanted *t_k*?
- b. **How much saffron_k** did the chef say *t_k* (**to the closest gram**) that we need *t_k*?

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 (46b), which unlike *exactly/precisely*, can't be parsed as adverbs, thus avoiding a potential confound.¹⁵

Example (47) below attempts IS in spec-vP in transitive clauses, which is ungrammatical:

(47) **No DP adjunct stranding in spec-vP: Transitive clause**

- a. How much flour (to the nearest pound) did you [_{vP} (***to the nearest pound**) tell me [_{CP} (to the nearest pound) that the bakery [_{vP} (***to the nearest pound**) asked you for (to the nearest pound)]]]]?
- b. Tell me [_{CP} how many grams of tranquilizer (to the third decimal place) the researchers [_{vP} (***to the third decimal place**) reported [_{CP} (to the third decimal place) that they [_{vP} (***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 θ -position:

¹⁵Zyman (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?

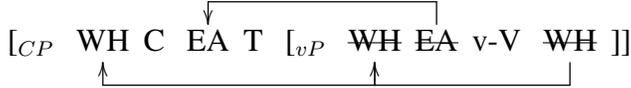
I argue that the possible adverbial parse for these stranded adjuncts makes their derivation ambiguous. As we'll see, when we avoid testing spec-vP IS with these ambiguous elements, we find that spec-vP IS in English is uniformly bad.

(48) **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. When this occurs, the relative order of the moving phrases established in vP and CP is the same, yielding a coherent linearization:

(49) **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 (50), where we see that while there is no problem if the moving *wh*-phrase pied-pipes the element α to spec-CP, there is a problem if α is stranded in vP and thus crossed by A-movement of EA:

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



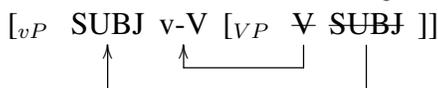
As expected, the same holds for unergatives, which also involve an A-moving EA:

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

- a. How much money (to the nearest million) did the governor [${}_{vP}$ (***to the nearest million**) resign for (to the nearest million)]?
- b. How many bad jokes (to the nearest dozen) did the audience [${}_{vP}$ (***to the nearest dozen**) laugh in spite of (to the nearest dozen)]?

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

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



Any A'-movement in such contexts will form a higher spec-vP above the moved theme subject, just as occurs with EAs, which originate in vP rather than moving there. 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've seen with EAs. Given this, IS in the edge of vP should not be possible in passive and unaccusative derivations. This prediction is accurate:¹⁶

¹⁶The same effect emerges in expletive constructions. This is consistent with a theory in which expletives are externally merged in spec-vP (Deal (2009); Biberaur & Richards (2005)). Subsequent A-movement of the expletive out of vP will block IS in spec-vP, as we've seen with movement of typical subjects.

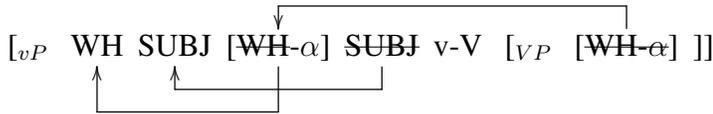
vi. **No spec-vP stranding in expletive constructions**

- a. *[How many demonstrators]_k have there [${}_{vP}$ t_k (to the nearest hundred) been arrested t_k by the police]?
- b. *[How many patients]_k have there [${}_{vP}$ t_k (to the nearest dozen) been t_k in this office today]?

- (53) a. ***DP adjunct stranding in spec-vP: Unaccusative**
 [How many firefighters]_k (to the nearest dozen) did the house [_{vP} *t_k* (***to the nearest dozen**) burn down despite the efforts of *t_k* (to the nearest dozen)]?
 b. ***DP adjunct stranding in spec-vP: Passive**
 [How much flour]_k (to the nearest pound) was the bakery [_{vP} *t_k* (***to the nearest pound**) sent *t_k* (to the nearest pound)]?

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 (54). Here successive-cyclic movement of WH pied-pipes α to the vP edge, above the subject. Subsequently the subject moves over WH and α , and then WH moves over the subject, stranding α below it:

- (54) **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 α after these rearrangements have occurred. However, given Agree-triggered movement and the resulting ban on phrase-bound spec-to-spec movement discussed in section 4, such a derivation is not available.¹⁷

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 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 scrambling and numeral quantifier stranding in Korean and Japanese. As mentioned in section 2, these languages can strand certain numeral quantifiers under scrambling, shown for Korean below:

- (55) **Numeral quantifier stranding by object scrambling in Korean**

Maykcwu-lul_k John-i [*t_k* **sey-pyeng**] masiessta
 Beer-ACC John-NOM [3-bottle] drank

“John drank three bottles of beer”

(Ko 2014, pg. 31, ex. 1b)

¹⁷This 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 [_{CP} (**exactly**) that [extremely fortunately] [_{TP} (***exactly**) escaped the fire]]?

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

In (55), the subject intervenes between the scrambled object and the object's 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:

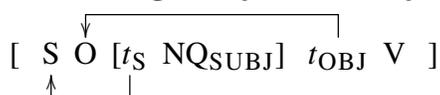
(56) ***Object between subject and its numeral quantifier in Korean**

*Haksayng-tul-*i_k* **maykcwu-lul** [*t_k* 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 (55), followed by scrambling the subject over the object:

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



Ko points out that subjects can scramble in these languages (contra Saito (1985)), so the absence of derivations like (57) is puzzling. Ko's solution uses 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 (57) to play out within vP. This derivation requires moving the subject from its θ -position in the vP edge, to a higher spec-vP, above the previously scrambled object. Given Agree-driven movement, such subject movement is impossible, and derivations like (56/57) 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:

(58) **Spec-vP IS**

a. **Korean** [= (19)]

Kong-ul_k amato [_{vP} *t_k* **sey-kay** haksayng-tul-i *t_k* patassulkesita]
 Ball-ACC probably 3-thing student-PL-NOM received

“The students probably received three balls”

b. **Japanese** [= (20b)]

Ringo-o_k tabun [_{vP} *t_k* **san-ko** Jon-ga umaku *t_k* nusunda]
 cat-ACC probably 3-CL student-NOM skillfully found

“John probably skillfully stole 3 apples.”

As expected, moving the subject out of vP in such examples results in ungrammaticality. This is shown in (59), where the subject scrambles from vP to a position below the scrambled object:¹⁸

¹⁸Order Preservation with regard to the subject and object in these examples is satisfied, since the object precedes the subject both within vP, and after scrambling of both out of vP. Therefore the ungrammaticality here should indeed

(59) **Subject movement out of vP blocks IS**

a. **Korean**

(P.c. Heejeong Ko)

* Kong-ul_k haksayng-tul-i_j amato [vP t_k **sey-kay** t_j [cayppalli] t_k
 ball-ACC student-PL-NOM3 probably 3-CL quickly
 swumkiessulkesita]
 hide.past(was.likely)

“The students probably quickly hid the ball.”

b. **Japanese**

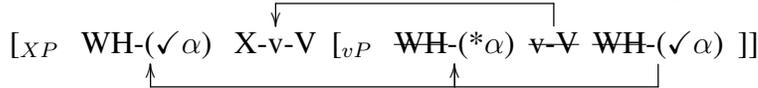
(P.c. Masatoshi Koizumi)

* Neko-o_k gakusei-ga_j osoraku [vP t_k **san-biki** t_j umaku t_k mitsuketa]
 cat-ACC student-NOM probably 3-CL 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 any leftward movement of V out of vP necessarily crosses anything stranded in the vP edge, preventing stranding there. This interference will only occur when head movement is leftward, as in head-initial languages:

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



If a language is head-final, as Korean and Japanese are, any head movement goes linearly to the right, and so will never linearly cross any specifiers of vP:

(61) **Rightward head movement does not linearly cross vP edge**



Therefore we fully expect IS in spec-vP to be possible in Korean and Japanese, as in reality, provided that the subject doesn't move from vP.

5.2 Cross-linguistic variance in IS and phase size

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. While these predictions have worked well for standard English, Korean, and Japanese, recall that earlier in this paper we saw examples from

be attributed to crossing of the stranded material in the vP edge, and not to some other effect of subject scrambling.

Further evidence for this conclusion is provided by Heejeong Ko (p.c.) who notes that the Korean (59a) is grammatical if the stranded numeral quantifier is case-marked. As Ko (2007, 2014) shows, case-marked numeral quantifiers are not subject to the constraints on ordering characteristic of numeral quantifiers without case marking, which she argues is because case-marked numeral quantifiers do not originate within the nominal phrase. The fact that a case-marked numeral quantifier makes (59a) grammatical suggests that there is nothing semantically wrong with this configuration, but rather that we really have a syntactic problem, as I claim.

Polish¹⁹ 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:

(62) **Spec-vP IS**

a. **Dutch**

Waar_j had **jij**_k dan [_{vP} t_j **voor bal** t_k gedacht dat Ed t_j 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)]

b. **Polish**

Jaki_j **Paweł**_k [_{vP} t_j **samochód** t_k kupił swojej żonie t_j]?
 What Paweł car bought his wife

“What car did Paweł buy his wife?” [= (22b)]

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

(63) **West Ulster *all*-stranding in spec-CP** (McCloskey 2000, ex. 8)

What_k (all) did he say [_{CP} t_k (**all**) (that) he wanted t_k (all)]

McCloskey reports 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:

(64) **No *all*-stranding in spec-vP** (McCloskey 2000, ex. 14e)

What_k did he **tell**_j [_{vP} t_k (***all**) t_j his friends [_{CP} t_k (all) that he wanted t_k?]]

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 (65-66). 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. While she observes that the variety studied by McCloskey indeed does not permit such IS, evidently, some dialects do:²⁰

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

a. What_k did he t_k **all** do t_k on holiday? (Henry 2010, ex. 25)

b. Where_k does she t_k **all** see her students t_k? (Ex. 29)

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

a. What_k did he t_k **all** do t_k in Derry? (Ex. 52)

¹⁹In (23a) 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 (23a) are not actually IS. Indeed, Wiland (2009) shows that the position of supposed spec-VP stranding in (23a) is also a position available for A-scrambling of direct objects. Given the availability of movement into this position, examples like (23a) can be analyzed as A-scrambling into a low position followed by A'-sub-extraction.

²⁰Tilleson (2017) claims that Upper Midwestern American English also has *all*-stranding in spec-vP.

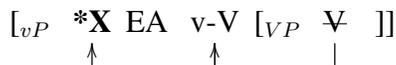
b. Who t_k did he t_k **all** say was elected t_k in the council elections? (Ex. 56)

The existence of the dialects that do permit spec-vP IS, as well as languages like Dutch and Polish, presents a challenge for the predictions at issue in this section. If vP is a phase in all languages, spec-vP IS should never occur when the subject exits vP, but this is precisely what we've seen that these languages/dialects allow.

I hypothesize that we can accommodate such facts if we allow phase size to vary cross-linguistically. This same route is taken in Fox & Pesetsky (2005a), in order to account for differences in the ordering of subjects across languages/dialects. While we saw earlier that positing vP as the relevant phase in (standard) English, Japanese, and Korean makes good predictions, it turns out that there is independent evidence that vP cannot be the spellout domain in languages like Dutch and Polish. This evidence comes from the possible orderings of EA and V.

If vP is a spellout domain in a given language, we expect ordering V before EA to be impossible. This is because, as mentioned in the previous subsection, there is no position in vP where V can precede the specifiers of vP. Therefore any final order where V precedes EA will contradict the order necessarily established in vP:

(67) **Absence of head position above EA within vP forces EA to precede V**

$[_{vP} \ *X \ EA \ v-V \ [_{VP} \ V \]]$


Importantly, both Dutch and Polish permit V < EA orders:

(68) **V preceding EA**

a. **Dutch**

(Barbiers 2002, ex. 14)

Een boek **denk ik** dat Jan leest
 A book think I that Jan reads

“A book, I think that John is reading”

b. **Polish**

(Wiland 2009, ex. 173b)

Jaki $_k$ samochód **kupił Paweł** swojej żonie t_k ?
 What car bought Paweł his wife

“What car did Paweł buy his wife?”

This fact means that the clause-internal phase in these languages must not be vP, but a constituent of a size that permits V to not be strictly ordered after EA.

In principle, a phase either larger or smaller than vP can get the right results. Various works argue that phase size correlates with the height of head movement (Den Dikken (2007); Gallego (2010); Alexiadou et al. (2014)), and following such findings, I take the possibility of V occupying a position above the subject in Dutch and Polish to be indicative of a phase that is larger than vP in these languages. As the exact identity of the phasal projection is not important, I'll simply speak in terms of a phasal XP which dominates vP. The possibility of V movement to X allows V to precede EA within the local phase, as desired:

(69) **Larger phase allows ordering V before EA**

$[_{XP[Phase]} \ X-v-V \ [_{vP} \ EA \ v-V \ [_{VP} \ V \ \dots \]]]$


I argue that a larger phase provides a means of accomplishing spec-vP IS in Dutch and Polish. A supporting fact is that these languages allow scrambling into a low position in the clause. When V does not move, we can identify this position as pre-verbal, as we see in (70):

(70) **Scrambling into clause-medial position**

a. **Dutch** (Barbiers 2002, ex. 23a)

I hat [ⁿ boek over zichzelf]_k gedacht dat Ed t_k zou schrijven
 I had a book about himself thought that Ed would write
 “I had thought that Ed would write a book about himself”

b. **Polish** (Wiland 2010, ex. 25)

Maria powiedziała [_{CP} że Piotr pieniądze_k oddał bratu t_k]
 Maria said that Piotr money-ACC returned brother-DAT ?
 ‘Maria said that Piotr had returned the money to his brother’

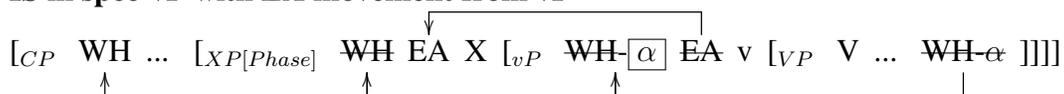
Barbiers and Wiland both claim, for the respective languages they are concerned with, that this position is spec-vP. While it is in principle possible for this position to be a specifier tucked-in below EA, even if it is above EA, there is no problem. Since vP is not a phase in such languages, scrambling to the edge of vP can be followed by movement of EA to the edge of XP. This is compatible with a final ordering where EA precedes the scrambled DP, which we saw in (70).

(71) **Scrambling to vP edge followed by movement of subject into XP**



In (70) movement stops in the vP edge, but if movement passes through it instead, nothing prevents that movement from stranding something there. Since vP is not a phase in such languages, the subject’s crossing of material stranded in the vP edge incurs no violation, as (72) shows:²¹

(72) **IS in spec-vP with EA movement from vP**



Importantly, if vP is a phase in a given language, derivations like (72) are unavailable. While the movements of WH and EA that we see in (72) are permitted within the XP phase, the ban on phrase-bound spec-to-spec movement prevents the necessary rearrangements from occurring within a phasal vP, as we saw in the discussion of (54) above. Thus this account accurately rules out deriving spec-vP IS via derivations like (72) in vP phase languages like standard English,

²¹Since for Dutch and Polish I have posited that the relevant phase is not vP, but something bigger, spec-vP IS is in these cases no longer IS in a phase edge. If successive-cyclic movement can target and strand material in non phase edges, we are at risk of predicting exceptions to the ISG. Only when movement through a non-phase-edge is possible should ISG-violating IS ever occur, however. Such IS would also have to occur at an early point in the derivation, before the moving phrase has been ordered before the material to be stranded.

Korean, and Japanese. Thus this account captures the differing IS patterns in English, Korean, and Japanese, versus Polish and Dutch.²²

I have not yet addressed the Irish English dialects mentioned earlier. What has been said so far suggests that those dialects that permit spec-vP IS should also permit V < S word orders, and there is some evidence of this. Henry (1996) shows that Belfast English dialects sometimes allow V < S order in imperatives, and she (p.c.) informs me that *all*-stranding dialects do so as well. Since some *all*-stranding dialects do not permit spec-vP IS, as we saw earlier, perhaps having a larger phase (which permits V < S orders) is a necessary condition for spec-vP IS, but not a sufficient one. Recall that McCloskey's original analysis of West Ulster English independently concluded that V raises from vP in this dialect, though the variety he studied doesn't permit spec-vP IS. It is possible that there is generally a larger phase in Irish English, correlated with a higher V position, conceivably due to the influence of V-initial word order in Irish. This property may in part be responsible for permitting spec-vP IS, which further factors block in some dialects.^{23 24}

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 (typically²⁵) 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 (73):

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

a. ***Combien* split in French**

(P.c. Vincent Rouillard)

Combien_k (de livres) crois-tu t_k (*de livres) que je devrais lire t_k (de livres)?
 How.many of books believe-you of books that I should read of books

²²An alternative to the approach presented here in terms of phase size might be found by further decomposing the verbal domain. Legate (2014) argues that EAs are introduced by voiceP, a phase distinct from vP. Recent work in Distributed Morphology (Halle & Marantz (1993); Harley & Noyer (1999), a.o.) posits that v is a head responsible for determining the verbal category of V, and that such categorizing heads (v⁰, n⁰, a⁰, etc.) are phases (Marvin (2003); Marantz (2007); Newell (2008); Embick & Marantz (2008)). Taking these ideas all together, we arrive at the result that the verbal domain has two phases, vP and voiceP. In principle, successive-cyclic movement might strand material in the edge of either of these. Perhaps in languages like Dutch, Polish, and certain Irish Englishes, spec-vP IS in fact involves stranding in the lower of the two, whose edge is not crossed by movement of EA. Head movement of V to voice might be responsible for blocking IS in that position for some languages/dialects.

²³An alternative analysis for these dialects is to claim that their spec-vP *all*-stranding is in fact adverbial. As adverbs rather than stranded constituents of DP, the linearization concerns examined in this paper will not apply. While an adverbial analysis is not intuitively reasonable for a stranded NP in Polish, for instance, this analysis is potentially valid for a stranded *all*. See Fitzpatrick (2006) for more on the semantics of floating quantification. See footnote 22 for the sketch of yet another alternative analysis that could accommodate the Irish English facts.

Future work should examine the sort of adjunct stranding I analyzed for standard English earlier in this section, in the context of these Irish English dialects. If a dialect permits spec-vP *all*-stranding, we expect it to permit spec-vP adjunct stranding too. If this prediction is not verified, a more nuanced view of these constructions may be necessitated.

²⁴This discussion recalls the fact that even in standard English, V < S order is possible, but only in questions formed from copular constructions. Given that the subjects of copular predications are not external arguments, but plausibly originate lower in a small clause structure, the possibility of V < S order is not surprising here.

²⁵We predict a lack of IS in spec-CP for clauses that hyper-raising has exited, for instance.

“How many books do you believe that I should read?”

b. **ago-stranding**

How long (ago) did you say (??/***ago**) that you went to France (ago)?

c. **How much ... of split**

How much (of the chocolate cake) did you say (***of the chocolate cake**) that I ate (of the chocolate cake)?

d. **Possessor extraction in Greek**

(P.c. Sabine Iatridou)

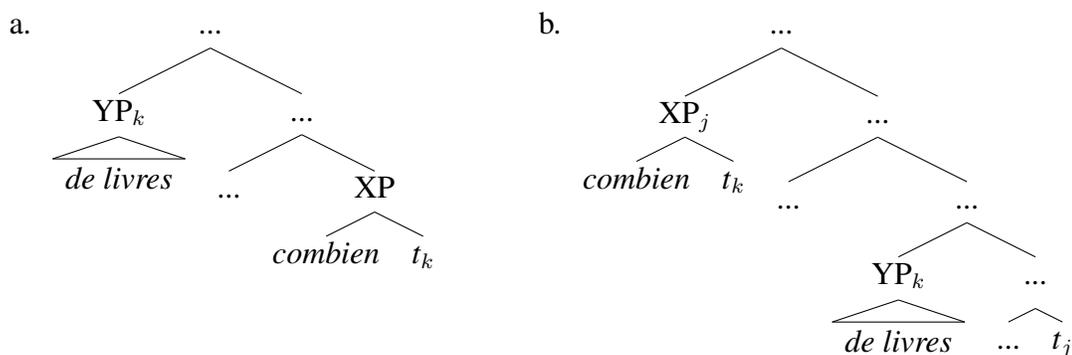
Pianou_k (to vivlio) ipe o Yanis t_k (***to vivlio**) oti i Maria diavase / diavase i
 Whose (the book) said the Yanis (**the book**) that the Maria read / read the
 Maria t_k (to vivlio)
 Maria (the book)?

“Whose book did Yanis say that Maria read?”

Stranding gaps in this position thus present an additional puzzle.

Kayne (2002) suggests that French examples like (73a) 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, apparent base position stranding of *de livres* (“of books”) in (73a) actually is derived by 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:

(74) **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 (73). We may in fact expect such derivations to be required here, as the supposedly extracting elements in this set are all plausibly non-constituents, or alternatively, might be banned from extraction by the Left Branch Condition (Ross (1967)). The appearance of their extraction would therefore necessarily be produced by a remnant movement derivation like (74).

If such a derivation is the right analysis of the (apparent) extractions in (73), 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 (73) in fact were not. Rather, they evacuated the moving phrase at an earlier point in the derivation. Since these elements don't participate in pied-piping/stranding in the first place, there is no way for them to be pied-piped, and later stranded. Such material either exits the A'-moving phrase early on, or remains inside.

This concludes the second half of the paper, where I examined what the concepts being defended here predict about when a given edge is a licit position for IS. In the next section I discuss a couple residual concerns, before briefly concluding.

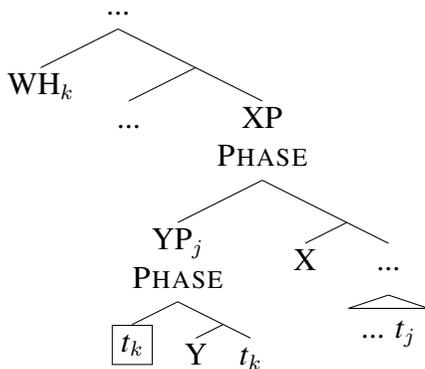
6 Appendices

6.1 Appendix A: IS in Chomsky (2000, 2001) if only phases move

In section 3, I argued that phase theory in Chomsky (2000, 2001, a.o.) is not suited to capture the ISG, unless more is added to that theory. An additional concept that lets that phase theory approach an account of the ISG is the claim that only phases move (Chomsky (2005); Fowlie (2010); Harwood (2015); Bošković (2018), a.o.). Here I'll describe how this approach would function, and some reasons that it is insufficient.

If only phases move, then presumably only phases can be pied-piped. If this is accurate, then IS always involves sub-extraction from a previously pied-piped phase. As a phase, IS of this pied-piped constituent would require extraction via its edge, as we see in (75). Here IS of the YP phase in the edge of XP involves movement of WH via the edge of YP:

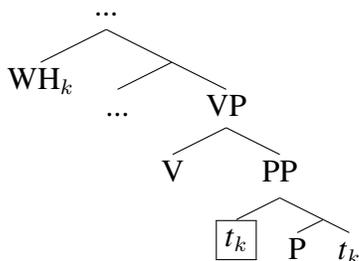
(75) **IS by movement through edge of pied-piped phase**



Perhaps the ISG holds because of this need to move through the left edge of the pied-piped phase—in other words, IS of β by movement of α is only possible in $\alpha\beta$ configurations, since $\beta\alpha$ configurations don't involve appropriate extraction of α via the edge of β .

First, this explanation only holds if the material we are considering stranding is really a phase. However, there are elements that participate in pied-piping and stranding, but are not obviously phases. Prepositions in English are a case in point. If the English PP really is a phase, as a phase, base position P stranding in English would require movement through the PP edge, as in (76):

(76) **Base position P stranding by hypothetical movement through PP edge**

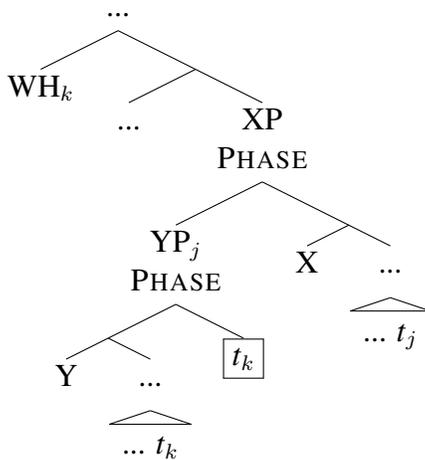


But if movement through the PP edge is available, it should permit IS of PP, via a derivation like (75) above. In reality, such IS is not possible. Thus positing phasehood to the English PP, as is necessary in a theory where only phases can move, yields contradictory predictions.²⁶

In contrast, the CL-based account that was presented in this paper captured the facts, without taking PP in English to be a phase. For this paper, the movement that strands P in its base position doesn't utilize spec-PP, in contrast to (76). Since PP is not a phase, this is not a problem. Once PP is pied-piped into a phase edge, other constraints serve to prevent IS of PP, as we've seen.

Second, for the approach under evaluation to capture the ISG, it must be impossible to escape a phase via a rightward position. Otherwise, it is unclear why extraction of α should be unable to intermediately strand β in $\beta\alpha$ configurations. Escape from a rightward specifier of a phase is in principle possible for phase theory in Chomsky (2000, 2001, a.o.) since this theory only predicts that extraction will be impossible for material contained in a phase's complement at spellout. If rightward phase escape is indeed possible, it is not clear what bans hypothetical ISG-violating derivations like (77), which shows IS in a $\beta\alpha$ configuration—here movement of WH intermediately strands Y, despite WH never passing through the left edge of YP:

(77) **IS by movement through right-side edge of YP (to be ruled out)**



Some evidence for rightward phase escape comes from heavy NP shift. Nissenbaum (2000) and Overfelt (2015, 2016) argue that heavy NP shift is genuine rightward successive-cyclic movement, which can escape CPs. This is revealed by parasitic gap configurations like (78). Here heavy NP shift from an embedded clause licenses a parasitic gap in an adjunct of the matrix clause. Since parasitic gap licensing requires movement across the phrase containing the gap, such examples are evidence for heavy NP shift through the embedded vP and CP, which are both presumably phases:

(78) **Parasitic gaps reveal long-distance heavy NP shift** (Nissenbaum 2000, p. 52)

- a. Mary [_{CP2} claimed [_{CP1} that she liked t_k] [**in order to get me to see PG_k**] [that movie with Fred Astaire and Audrey Hepburn]_k
- b. They [_{CP2} said [_{CP1} they'll hire t_k [if I criticize PG_k publicly]] [**in order to get me to praise PG_k**]] [the man who rejected my proposal]_k

²⁶Also notice that for Chomsky (2000, 2001, a.o.), if PP is not a phase, the ban on IS of PP is not predicted—we should be able to extract from it at any point. So whether PP is a phase or not, this theory runs into challenges.

The possibility of rightward movement from phases is a problem for the theory under evaluation in this section, since it shows that it is not strictly necessary to escape phases from their left edge. In contrast, this is no problem for the CL-based account that the present paper defended. This is because, as we've seen, CL does not require the notion that movement from phases must make use of a dedicated leftward position. The information-preserving nature of spellout permits extraction in any direction, as long as linearization is respected.

A third point that distinguishes the two theories being compared here arises when we consider how IS interacts with other movements across edges. We saw in section 5 that the CL-based theory accurately predicts that subject movement from vP prevents IS in the vP edge, for languages where vP is the relevant phase. I showed that this effect stems from a linearization problem presented by moving from a lower specifier, when a higher one of the same phase contains overt material. These predictions do not hold for phase theory in Chomsky (2000, 2001, a.o.), unless more is stipulated about the relative locality of multiple specifiers.

6.2 Appendix B: IS and 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”:

(79) Pied-piping in QP theory

- a. [_{QP} Who Q] did you make cookies with *t* exactly?

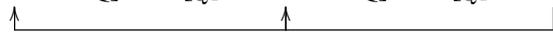
- b. [_{QP} Who exactly Q] did you make cookies with *t*?

- c. [_{QP} 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.

(80) IS as distributed deletion

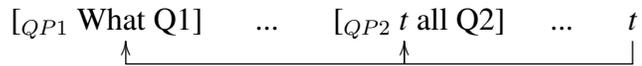
- [_{QP} **What** all-Q] ... [_{QP} **What** **all** Q] ... [_{QP} **What** all-Q]


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.²⁷

²⁷This hypothesis about IS predicts that a scope bearing element that has apparently undergone IS should take

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:

(81) **IS by embedded QP extraction**



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.

7 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 stands as exceptionless:

- (82) **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 describes what sorts of elements can undergo IS, and an account of the ISG was the purpose of the first half of the paper. The second half examined when a given edge is licit for stranding. I investigated this topic chiefly in terms of stranding in the vP edge. I showed that the concepts that derive the ISG extend to accurately predict that subject movement from vP results in a crossing problem, which prevents stranding in the vP edge in languages where vP is a phase. Languages with a different phase size, as evidenced by independent word order facts, are appropriately predicted to allow spec-vP IS even when subjects move from vP.

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scope as high as the landing site of the element that appeared to strand it. Some evidence for this may come from the fact that *wh*-adjoined *exactly* seems to take scope over the whole question, even when stranded. 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.

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