How to detect a phase

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Abstract

      This paper investigates the question of how we determine whether a particular phrase behaves like a phasal domain crosslinguistically. I present an overview of the morphophonological, syntactic, and semantic effects that should be associated with a phrase across languages if it hosts successive-cyclic movement. For both the clause and the verb phrase, I argue that the full range of such effects is attested, providing evidence for the parallelism of these domains (Chomsky 1986 et seq.). This overview then provides a set of predictions against which any candidate for a phasal domain can be tested. I examine PPs and DPs from this perspective and identify a number of missing effects.

**keywords:** successive cyclicity – phases – movement – CP – vP – PP – DP

Introduction

      Since Chomsky (1973), much evidence has accrued for the idea that long-distance dependencies are successive-cyclic, and thus are decomposed into a series of shorter dependencies. However, different researchers have come to different conclusions about which domains evidence successive cyclicity effects. In some approaches, all phrases on the path of movement are implicated, but, in other theories, successive-cyclic dependencies are punctuated paths, because only some phrases constitute phases (e.g. CP and vP). Even in the context of a punctuated path approach, it has been questioned whether CP and vP have the same status (e.g. Rackowski and Richards 2005; Den Dikken 2009, 2010; Keine 2016), as well as whether PPs and DPs may also constitute phasal units. Finally, phase boundaries are routinely invoked in both morphological and syntactic analyses, to explain apparent domain restrictions (for instance, for heads such as n,a, or Appl).

      This paper focuses on the issue of how to detect a phase, by asking the question of what the set of reflexes of intermediate movement is that is expected to be associated with a phase edge. I then investigate whether all such effects are found in some of the most influential phasal domains across languages. Focusing first on the clause and verb phrase, I demonstrate that the full range of morphophonological, syntactic, and semantic effects that should be associated with intermediate movement is indeed attested. The resulting picture provides clear evidence for at least two phasal boundaries in the clausal domain, one associated with the clause edge and one with the verbal domain (Chomsky 1986 et seq.). These domains display symmetry, in that they show the same range of successive cyclicity effects (contra, for instance, Rackowski and Richards 2005, Den Dikken 2009, 2010, and Keine 2016). Finally, I review the question of whether similar evidence can be found for the PP/DP domain, ultimately concluding that these too are phasal domains, even though some key effects appear to be absent. I provide independent explanations for the absence of multiple spell-out and semantic effects, but point out interactions with φ-agreement and stranding that should in principle be attested.

1 Featural effects on intervening nodes

I will start this paper by examining the question of what types of successive cyclicity effects should be visible on the intermediate material itself, such as the phase head. I adopt the assumption that an intermediate node that heads a locality domain hosts a feature relevant to extraction (1), responsible for triggering movement.

(1)

```
              IntP
         ┌─────────┐
        XP         Int'
     [F_EXT]     ┌─────┐
               Int     . . .
             [F_EXT]
```
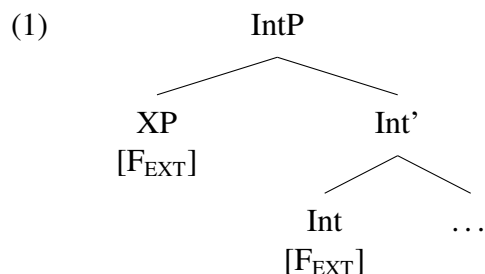
I identify three types of effects that we should expect if these features are present in a domain: extraction marking, parasitic agreement, and lexical choice phenomena. All three are evident at the edge of the clause and at the edge of the verb phrase.

1.1 Morphological form

The simplest way in which the presence of a feature can affect an intermediate head is through the morphological realization of an extraction feature, resulting in *extraction marking*. Such effects are commonly found at the CP edge, and at *v*P as well.

1.1.1 Extraction marking at the CP edge

Extraction marking at the CP edge is perhaps one of the most commonly found reflexes of successive cyclicity. Irish complementizer alternations, for example, can be analyzed as reflecting the realization of extraction features (e.g. McCloskey 1979, 2001, 2002). In Irish, the declarative complementizer *go* alternates with extraction complementizer *aL*, depending on whether Ā-movement targets the left periphery (2a–b).[1]

(2)   **Two different complementizers in Irish:**

    a.   *Creidim   [$_{CP}$ **gu**-r   inis sé bréag].*
        believe.1SG   C.DCL-PAST tell he lie
        'I believe that he told a lie.'

    b.   *an fhilíocht [$_{CP}$ **a**   chum   sí   ___]*
        the poetry   C.EXT composed she
        'the poetry that she composed'
        (McCloskey 2002:185–186)

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[1]There is also a complementizer *aN* that signals resumption. The terms *aN* and *aL* refer to the mutation effect triggered on the following verb, where N = nasalization and L = lenition. See McCloskey (2002) for detailed discussion of the distribution of these complementizers.

Importantly, all intervening complementizers on the path of long-distance movement must be *aL* (3), as expected if all intervening clauses are locality domains.

(3)   **Extraction complementizer appears in intermediate clauses:**
      *an t-ainm [₍CP₎ **a**   hinnseadh dúinn [₍CP₎ **a**   bhí ___ ar an áit]]*
      the name   C.EXT was-told   to-us   C.EXT was   on the place
      'the name that we were told was on the place'
      (McCloskey 2002:185)

Dinka also has an extraction marking pattern (Van Urk 2015). Dinka has a V2 effect at the clause edge that is found both in matrix and embedded clauses. In addition to this, the verb/auxiliary in V2 position carries a prefix with a dedicated extraction form found with Ā-movement. In long-distance dependencies, this extraction prefix must appear both at final and intermediate V2 positions (4a–b).

(4)   **Extraction prefix in Dinka:**
      a.   *Yè kɔ̂ɔc-kó_i   Ø-yùu̯kù̱   ké tàak   [₍CP₎ kè̱ Ø-cɨ̱i   Áyèn   (ké)*
           be people-which EXT.3-HAB.1P 3PL think.NF   C EXT.3-PRF.OV Ayen.GEN 3PL
           càm   kè̱nè̱ kêek_i]?
           eat.NF with 3PL
           'Which people do we think Ayen has eaten with?'
      b.   *Ye kɔ̂ɔc-kó   **é̱-kè̱**-yá   ké tàak   [₍CP₎ **é̱-kè̱**-cɨ̱i*
           be people.CS-which.PL EXT.PST-3P-HAB.2SG 3PL think.NF   EXT.PST-3P-PRF.OV
           Áyèn   ké gàam   gàlàm]]?
           Ayen.GEN 3PL give.NF pen
           'Which people did (s)he think that Ayen had given a pen to?'

In (4a), both the matrix and embedded auxiliary surface with a null prefix instead of the expected prefix in present tense declaratives, *à-*. In (4b), both auxiliaries appear with *é̱-* instead of the past tense variant *áa-*.

Other languages with extraction marking patterns include at least Asante Twi (Korsah and Murphy 2016), Chamorro (Chung 1982), Kîîtharaka (Abels and Muriungi 2008), Seereer (Baier 2014), and Wolof (Torrence 2005).

1.1.2   Extraction marking at *v*P edge

Extraction marking is found at the *v*P edge as well. Bennett et al. (2012) describe a *v*P-level extraction morpheme in Defaka (Ijoid). In Defaka, the morpheme *-kè* appears on all verbs crossed by movement (5a–b).

(5)   **Defaka *-kè* appears on all intermediate verbs:**
      a.   *Bruce ndò Bòmá jírí-**kè**   [₍CP₎ ___ á ésé-mà]*
           Bruce FOC Boma know-EXT   her see-NFUT
           'It is Bruce that Boma knows saw her.'
      b.   *áyá jíkà   ndò Bòmá ì bíè-**kè**   [₍CP₎ ì ísò ___ sónó-mà-**kè**]*
           new house FOC Boma I ask-EXT   I ISO   buy-NFUT-EXT

'It is a new house that Boma asked me if I'm going to buy.'

Bennett et al. argue that this extraction morpheme is in the verb phrase and not in the left periphery, on the basis of the fact that extraction a local subject is not accompanied by extraction marking (6a). Subjects are generated at the *v*P edge and so do not need to undergo intermediate movement to escape this domain. The -*kè* morpheme is triggered by extraction of a local object or adjunct (6b–c).

(6) **Defaka -*kè* appears with non-subject extraction:**

    a.   *ì kò   Bòmá ésé-kà-rè*
         I FOC.SBJ Boma see-FUT-NEG
         'It is me that will not see Boma.'

    b.   *tárì ndo Àmànyà ómgbìnyà sónò àmà-**kè**   ___ kⁱ́á   ᵎté?*
         who FOC Amaya shirt   buy give-EXT   market P
         'Who did Amaya buy a shirt for at the market?'

    c.   *[PP ándù kìkìà] ndò à   èbèrè rì bòi-mà-**kè***
             canoe under FOC the dog   RE hide-NFUT-EXT
         'It is under the canoe that the dog is hiding.'
         (Defaka; Bennett et al. 2012:294,296)

In addition, long-distance movement of a subject does trigger the extraction morpheme in the higher clause, since a subject must still cross the matrix *v*P edge (7). This fact tells us that there is no independent restriction on using -*kè* with subject extraction.

(7) **Defaka -*kè* appears on matrix vP with long-distance subject movement:**

    *Bruce ndò Bòmá jírí-**kè**   [CP ___ á   ésé-mà]*
    Bruce FOC Boma know-EXT   her see-NFUT
    'It is Bruce that Boma knows saw her.'
    (Defaka; Bennett et al. 2012:294,296)

A similar pattern at the *v*P edge is voice marking in Malay/Indonesian languages (e.g. Saddy 1991, 1992; Cole and Hermon 1998; Sato 2012). In these languages, extraction across a verb triggers obligatory deletion of the transitivity prefix *meN-* (8a), which is otherwise an optional morpheme (8b).

(8) **_MeN-_ cannot appear on intermediate verbs:**

    a.   *siapa Bill **(*mem)**-beritahu ibunya   [CP yang ___ **(men)**-yintai Fatimah]?*
         who Bill (*meN)-tell   mother.his   that   (meN)-love Fatimah
         'Who does Bill tell his mother that loves Fatimah?'

    b.   *Ali **(mem)**-beri Fatimah hadiah untuk hari lahirnya*
         Ali **(meng)**-give Fatimah present for   day birth
         'Ali gave Fatimah a present for her birthday.'
         (Malay; Cole and Hermon 1998:231–232)

This prefix is usually analyzed as a *v*P-level voice or transitivity morpheme (Cole et al. 2008; Sato 2012; *cf.* Rackowski and Richards 2005). As in Defaka, extraction of a local subject does not trigger *meN*-deletion (9a), in contrast to an embedded subject (8), providing additional evidence that this

effect is at the *v*P edge. In contrast, local object movement also requires *meN*-deletion.

(9)   **No *MeN*- deletion with movement of subjects:**

    a.   *siapa (**mem**)-beli   buku itu?*
         who   (meN)-bought book that
         'Who bought that book?'

    b.   *apa Ali (***mem**)-beri pada Fatimah?*
         what Ali (*meN)-gave to   Fatimah
         'What did Ali give to Fatimah?'
         (Malay; Cole and Hermon 1998:231)

      Similar *v*P-level effects may be found at least in Tagalog (Rackowski and Richards 2005) and Asante Twi (Korsah and Murphy 2016).

1.2   Satisfaction of other features: φ-agreement and V2

      Another way in which successive-cyclic movement might affect intermediate heads is through the satisfaction of independent features on the intermediate head. suppose an intermediate head Int carries other features in addition to the extraction feature, such as F_2 and F_3 in (10).

(10)
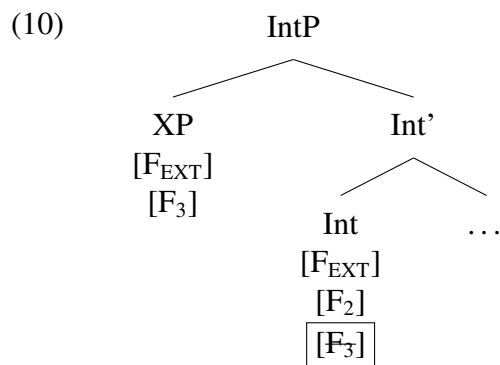
Since the moving XP ends up in a local relation with Int by virtue of the extraction feature, we might expect it to be capable of satisfying some of these unrelated features, if the XP happens to carry them as well, like F_3 in (10).

      In fact, much work on probe-goal relations has argued that features can be satisfied parasitically in this fashion (e.g. Chomsky 2001; Bruening 2001; Kotek 2014; Deal 2014; Režać 2015; Van Urk 2015). Generalizing over this work, I will refer to this idea as Parasitic Agree (11).

(11)   **Parasitic Agree:**
      If a Probe on a certain head H has found a goal G, other probes on H can also enter into Agree/Attract relations with G.

If Agree relations can be parasitic on other Agree relations in this fashion, we expect extraction features to be detectable by the ability of intermediate dependencies to satisfy unrelated features, like φ-features. As I will show in this section, such effects are found in both the CP and *v*P domain.

1.2.1 φ-agreement at the CP edge

In a number of languages, long-distance movement may result in φ-agreement with the moving phrase at intermediate clause edges. Dinka provides one example. In Dinka, movement of a plural DP is reflected at intervening clause boundaries by the presence of a plural agreement prefix (12a–b).[2]

(12) **Intermediate movement triggers φ-agreement:**

    a. *Yè **kɔ̀ɔc-kó***   *[CP Op ɛ́-**kè**-yá*   *ké tàak*   *[CP ɛ̀ ___*
         be people.CS1-which   EXT.PST-PL-HAB.2SG 3PL think.NF   C
         *ɛ́-**kè**-cíi*   *Áyèn*   *ké gâam gàlàm]]?*
         EXT.PST-PL-PRF.OV Ayen.GEN 3PL give.NF pen
         'Which people did (s)he think that Ayen had given a pen to?'

    b. ***Wɔ̀ɔk*** *yíi*   *Bôl*   *ké luêeel [CP ɛ̀ ___ ɛ́-**kè**-lɛ́ɛt*   *Áyèn*
         we   HAB.OV Bol.GEN 3PL say.NF   C   EXT.PST-PL-insult.OV Ayen.GEN
         ké].
         3PL
         'Us, Bol says Ayen was insulting.'

Van Urk (2015) provides an analysis of these φ-agreement patterns in terms of the notion of parasitic agreement. If the moving phrase already satisfies an extraction feature at the clause edge, this same relation may allow the intervening head to access φ-features.

Wolof also appears to have a pattern of φ-agreement at C (Torrence 2005, 2012). In particular, Torrence argues that Wolof has a complementizer that agrees in noun class with a moved *wh*-phrase. This agreeing complementizer may appear in intervening clauses (13a–b).[3]

(13) **Agreeing complementizers in Wolof:**

    a. ***K-u*** *Isaa foog [CP **k-u**   a bëgg]?*
         AGR-C Isaa think   AGR-C 2SG love
         'Who does Isaa think you love?'

    b. ***F-u*** *Isaa wax ne [CP **f-u**-ma*   *jàng-e taalif y-a]?*
         AGR-C Isaa say FRC   AGR-C-1SG read-LOC poem DEF
         'Where did Isaa say that I read the poems?'
         (Torrence 2012:22)

1.2.2 φ-agreement at the *v*P edge

Similar interactions between successive-cyclic movement and agreement have been documented at the *v*P edge. Bruening (2001) observes that Ā-movement in Passamaquoddy can be accompanied by φ-agreement on intervening heads. Specifically, verbs on the path of movement

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[2]The morpheme found with singulars is always null. As discussed in Van Urk (2015), this can be attributed to the neutralization of person features as a result of anti-agreement. In non-movement contexts, the default singular morpheme is null.

[3]Torrence argues that such extractions involve silent *wh*-phrases, essentially null operators, obligatory in this construction as the result of a Doubly-Filled Comp Effect. See Torrence (2012) for detailed argumentation.

may surface with agreeing participial endings (14a–b).[4]

(14) **Passamaquoddy verbs may agree with Ā-moving phrases:**

    a.   ***Wen-ik***   *kisitahatom-on-**ik***   *[$_{CP}$ keti-naci-wikuwamkom-oc-**ik**]?*
        who-3PL decide.IO-2CONJ-PART.3PL   IC.FUT-go.do-visit.AO-2CONJ-PART.3PL
        'Who all did you decide to go visit?'

    b.   *Wot **nit** **pahtoliyas** [$_{CP}$ Mali elitahasi-c-**il**   [$_{CP}$ eli wen*
        this that priest   Mary IC.think-3CONJ-PART.OBV   C someone
        *kisi-komutonom-ac-**il**]*
        PERF-rob.AO-3CONJ-PART.OBV
        'This is the priest that Mary thinks someone robbed.'
        (Passamaquoddy; Bruening 2006:34)

Just as suggested here, Bruening (p. 209) analyzes this as parasitic agreement as a result of movement to *v*P, since the morphology is participial in nature. See also Den Dikken 2010 for discussion of the interaction of object agreement and movement in Hungarian.

    As with extraction marking, the distribution of φ-agreement as a reflex of successive-cyclic movement is symmetrical: we can find examples of this effect both at the CP and *v*P edge.

1.3 Lexical choice

    Another way in which intermediate movement can affect the intermediate head is by having an effect on lexical choice. If intermediate movement is feature-driven, we may expect that flavors of the intermediate head can vary in whether they carry a featural trigger, as schematized in (15) and (16).

(15)   IntP   (16)   IntP

        XP   Int'   Int$_2$ . . .

             Int$_1$ . . .   . . .   XP
             [F$_{EXT}$]
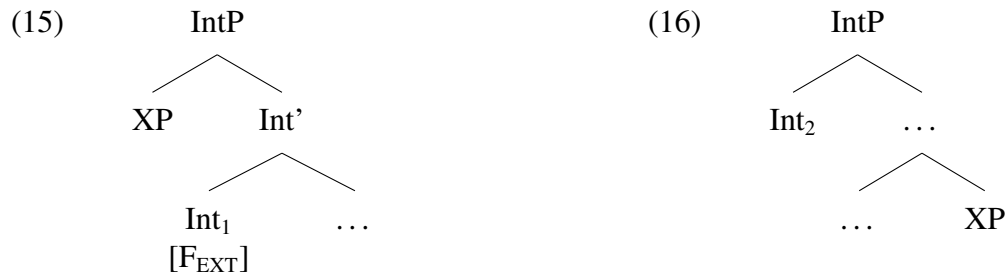
Such effects are distinct from extraction marking, because neither head necessarily realizes extraction morphology. In this section, I show that such effects are attested both at the CP and *v*P edge.

1.3.1 Lexical choice effects at the CP edge

    It is well-known that the choice of complementizer may affect the availability of long-distance movement. In the simplest case, clauses headed by certain complementizers may block movement. For example, in Russian, movement is banned out of indicative clauses, but possible out

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    [4]The suffix *-il* realizes agreement with a 3rd person obviative.

of subjunctives (17a–b).[5]

(17)   **Long-distance movement in Russian depends on complementizer:**

    a. *Kakuju knigu ty   dumaeš' [$_{CP}$ **čto**   Petr pročital ___]?*
       which book you believe   that.IND Petr read
       'Which book do you believe that Petr read?'

    b. *Kakuju knigu ty   dumaeš' [$_{CP}$ **čtoby**   Petr pročital ___]?*
       which book you believe   that.SUBJ Petr read
       'Which book do you believe that Petr read?'
       (Müller and Sternefeld 1993)

This is a lexical choice effect, and not extraction marking, because neither complementizer realizes extraction morphology and there are other syntactic and semantic differences between the heads involved.

      Another effect that can be analyzed as lexical choice is inversion. In a number of languages, the subject and auxiliary must invert if intermediate movement targets the CP edge (e.g. Kayne and Pollock 1978; Torrego 1984; Henry 1995). I illustrate with Belfast English (Henry 1995).

(18)   **Inversion in Belfast English:**

    a. *Who did John hope [$_{CP}$ **would** he see ___]?*
    b. *What did Mary claim [$_{CP}$ **did** they steal ___]?*
      (Belfast English; Henry 1995:109)

A standard analysis of this pattern is to say the null C that hosts a featural trigger also happens to attract T.[6] This type of approach is essentially a lexical choice analysis, since inversion will only be obligatory if all other instances of C do not have a feature triggering movement and so would be blocked in the context of long-distance dependencies.

1.3.2   Lexical choice effects at the *v*P edge

      There are again analogous effects in the *v*P domain. In Nupe, the choice of verb phrase correlates with extraction, as documented by Kandybowicz (2008). Specifically, extraction is blocked from verb phrases headed by perfect aspect (19a–b).

(19)   **Movement out of perfect *v*Ps impossible in Nupe:**

    a. *Ke Musa pa   ___ o?*
       what Musa pound   O
       'What did Musa pound?'

    b. *Ke Musa **à**   pa   ___ o?*
       what Musa FUT pound   O
       'What will Musa pound?'

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[5]On this analysis, the islandhood of finite CPs in some languages reflects the lack of an extraction feature on C. Another possibility is that some additional factors cause CPs to be islands in these languages, as is likely the case for other islands.

[6]It is worth noting that, in Romance languages, the auxiliary and verb invert together, so that inversion in these languages is not obviously the result of T-to-C movement. I set aside this issue here.

c.   *_Ke Musa **á** pa   ___ o?_
    what Musa PRF pound   O
    'What has Musa pounded?'
    (Nupe; Kandybowicz 2008:288)

Evidence that this is a *v*P-level restriction comes from the fact that local subjects may freely extract, as well as high adverbs (20a–b). In contrast, like objects, low adverbs may not be extracted out a perfect verb phrase.

(20)   **Subjects, high adverbs, not low adverbs may move in perfect:**

a. ***Bagi** na   ___ á   nakàn ba na*
    man REL   PRF meat cut REL
    'the man that had cut the meat'

b. ***Panyi lèé** ___ Musa á   nakàn ba o.*
    before past   Musa PRF meat cut O
    'A LONG TIME AGO, Musa had cut the meat.'

c. **Karayín** _Musa á   nakàn ba ___ o._
    carefully Musa PRF meat cut   O
    'Musa had cut the meat CAREFULLY.'
    (Nupe; Kandybowicz 2008:291)

As predicted, such structural asymmetries disappear in long-distance extraction. If a higher *v*P is perfect, long-distance subject and object extraction are equally degraded (21a–b).

(21)   **Long-distance movement across perfect *v*P banned:**

a. ***Nana** Musa á   gan [_CP gànán ___ pa   eci o._
    Nana Musa PRF say   COMP   pound yam O
    'Musa has said that NANA pounded the yam.'

b. ***Eci** Musa á   gan [_CP gànán Nana pa   ___ o._
    yam Musa PRF say   COMP Nana pound   O
    'Musa has said that Nana pounded THE YAM.'
    (Nupe; Kandybowicz 2008:295)

We can also find inversion effects at the *v*P edge, as pointed out by Cognola (2013) in work on the Germanic dialect Mòcheno, spoken in northern Italy. Mòcheno allows both OV and VO orders in the verb phrase:

(22)   **Mòcheno allows VO and OV order:**

a. *Gester   hone   [vP a puach **kaft**].*
    yesterday have-1SG   a book bought
    'Yesterday, I bought a book.'

b. *Gester   hone   [vP **kaft**   a puach].*
    yesterday have-1SG   bought a book
    'Yesterday, I bought a book.'
    (Mòcheno; Cognola 2008:81)

However, in the context of extraction, only VO syntax is possible (23a–b).[7]

(23)   **Inversion in the *v*P with *wh*-movement in Mòcheno:**

    a. *En bem   hòt-se [*$_{vP}$ **kaft**   de zaitung]*
        to whom has-she   bought the newspaper
        'Who has she bought a newspaper?'

    b. **En bem   hòt-se [*$_{vP}$ *de zaitung   **kaft**]*
        to whom has-she   the newspaper bought
        'Who has she bought a newspaper?'
        (Mòcheno; Cognola 2013:7)

This effect then is analogous to inversion in the CP domain and we can analyze it as a lexical choice effect. Suppose Mòcheno has two variants of *v*, one for OV and one for VO. If only the head that triggers VO is endowed with a featural trigger, we expect that OV verb phrases are islands, as shown in (23b).

    In this section, I demonstrated that we can find at least three different types of reflexes of successive cyclicity that can be linked to the presence of features associated with extraction on intermediate heads: extraction marking, parasitic agreement, and lexical choice effects. These effects are equally distributed across the CP/*v*P domain, providing evidence that these are both phasal domains (e.g. Chomsky 1986 et seq.).

2   On the presence of intermediate copies

    I now turn to evidence for the presence of intermediate copies, which should be detectable both at PF and LF. I start by examining the question of which PF effects should be attested and identify at least four types: intermediate copy realization, multiple spell-out, stranding and V2 satisfaction. As with featural effects, we can find instances of most reflexes at both the CP and *v*P edge.

2.1   Intermediate copy realization

    The first way in which we expect the presence of intermediate copies of a moving phrase to be recoverable is if an intermediate copy can be realized. For example, if there are independent constraints blocking the pronunciation of the highest copy, we might see a dislocated phrase surface in an intermediate position instead (24).
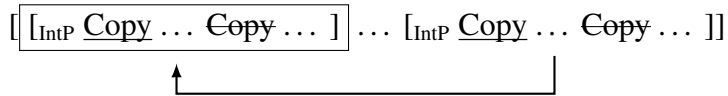
(24)   **Intermediate copy realization:**
    [~~Copy~~ ... [$_{IntP}$ $\boxed{\text{Copy}}$ ... ~~Copy~~ ...]]

The first type of construction that seems to instantiate this is partial *wh*-movement, in which a *wh*-phrase surfaces in an intermediate position, although it behaves as if it has undergo movement to the scopal position. Fanselow (2006) and Abels (2012a:sec. 3.3–3.4) point out that intermediate copy realization could also arise as the result of the interaction of intermediate movement with pied-piping. If a locality domain can be pied-piped by the final step of movement, the moving phrase

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[7]The inversion effect is also found with subject extraction. See Cognola (2008, 2013) for discussion.

should be realized in an intermediate position, since it can still undergo intermediate movement inside the locality domain a phasal domain. This situation is schematized in (25).

(25)   ***Wh*-trapping:**

[[$_{IntP}$ Copy … ~~Copy~~ …] … [$_{IntP}$ Copy … ~~Copy~~ …]]

I refer to such constructions as *wh-trapping*, and there are instances of this effect at the CP and *v*P edge.

2.1.1   Intermediate copy realization at the CP edge

Partial movement has been documented in a few languages, particularly for *wh*-phrases. Cole and Hermon (2000) describe a pattern along these lines for Malay. In Malay, *wh*-dependencies can be expressed with full *wh*-movement, partial movement, and *wh*- in situ (26a–c).

(26)   ***Wh*-in situ and full and partial *wh*-movement in Malay:**

   a.   ***Siapa*** *Bill harap [$_{CP}$ ___ akan membeli baju   untuknya]?*
        who   Bill hopes   will   buy   clothes for.him
        'Who does Bill hope will buy clothes for him?'
   b.   *Ali memberitahu kamu tadi   [$_{CP}$ **apa**   Fatimah baca ___]?*
        Ali told   you   just.now   what Fatimah read
        'What did Ali tell you just now that Fatimah was reading?'
   c.   *Ali memberitahu kamu tadi   [$_{CP}$ Fatimah baca **apa**]?*
        Ali told   you   just.now   Fatimah read what
        'What did Ali tell you just now that Fatimah was reading?'
        (Cole and Hermon 1998:224–225)

It is important to establish that such partial movement configurations reflect intermediate copy realization and not independent focus movement of an in situ *wh*-phrase inside the embedded clause (see, for instance, Zentz 2016). As Cole and Hermon point out, evidence for the intermediate copy analysis comes from the fact that this construction is sensitive both to islands above and below the pronunciation site, as evident in (27a–b).

(27)   **Partial *wh*-movement is sensitive to higher and lower islands:**

   a.   **Ali memberitahu kamu [$_{CP}$ **apa**   Mary fikir   [$_{CP}$ dia suka [$_{DP}$ perempuan yang beli*
        Ali told   you   what Mary think   he   likes   woman   that buy
        ___]]]?
        'What did Ali tell you that Mary thinks that he likes a woman who bought?'
   b.   **Kamu sayang [$_{DP}$ perempuan yang Ali fikir   [$_{CP}$ **apa** telah   makan ___]]?*
        you   love   woman   that Ali thinks   what already eat
        'Who do you love the woman who Ali thinks ate what?'
        (Cole and Hermon 2000:91–92)

These island effects follow from a full movement analysis, with intermediate spell-out. If this analysis is correct, partial *wh*-movement reveals intermediate movement in the embedded CP. See

Fanselow (2006) for an overview of other languages that may allow similar partial *wh*-movement constructions.

Intermediate copy realization is also evident in languages that allow clausal pied-piping, which give rise to the *wh*-trapping configuration identified above. Imbabura Quechua and Basque are examples of languages with clausal pied-piping (e.g. Hermon 1985; Ortiz de Urbina 1989; Arregi 2003). In both (28a–b), the *wh*-phrase that triggers pied-piping must reside in a left-peripheral position inside the moved CP.

(28)   **Clausal pied-piping in Quechua and Basque:**

a.   *[*CP* **Ima-ta**   wawa   ___ miku-chun-taj] Maria muna-n?*
        what-ACC child.NOM   eat-SUBJ-Q   Maria want-PR.3
        'What does Maria want that the child eat?'
        (Imbabura Quechua; Hermon 1985:151)

b.   *[*CP* **Se**   idatzi   rabela Jonek]   pentzate su?*
        what written has   Jon.ERG you-think
        'What do you think Jon wrote?'
        (Basque; Arregi 2003:118)

Such facts seem to demonstrate that the *wh*-phrase undergoes intermediate movement inside the CP. See also Heck (2008: sec. 2.3) for arguments that movement of infinitives in German relatives involves a similar configuration of clausal pied-piping.[8]

2.1.2   Intermediate copy realization at the *v*P edge

Let us now turn to the question of whether there are intermediate copy realization constructions at the *v*P edge. Manetta (2010) presents an analysis of Kashmiri and Hindi *wh*-dependencies which makes use of partial *wh*-movement to the edge of the verb phrase, analogous to the account of Malay discussed above. However, Dayal (2014) provides some critical discussion of this pattern. For *wh*-trapping, we can find counterparts at the *v*P edge. This may be surprising, because a crosslinguistic generalization that seems to govern pied-piping is that *v*Ps cannot be pied-piped (Cable 2007, 2010; Heck 2008, 2009). However, *wh*-trapping effects do seem to emerge when *wh*-movement co-occurs with an independent instance of VP-fronting, as shown by Cozier (2006) and Buell (2012). In such environments, we find evidence for intermediate movement to the *v*P edge.

Cozier (2006) describes an interaction between intermediate movement and predicate clefting in Trinidadian English that operates along these lines. Trinidadian English does not allow pied-piping of verbs in isolation. However, Trinidadian English possesses an independent operation of long-distance predicate clefting, as in the examples in (29a–b).

(29)   **Predicate clefting in Trinidadian English:**

a.   *Is **walk** [that Tim did **walk**].*
        'Tim really walked.'

---

[8]An interesting observation is that clausal pied-piping is typically restricted to nominalized or infinitival clauses, which may suggest that neither full CPs or *v*Ps can be pied-piped in isolation. This does not diminish the point, however, that we can see the effects of intermediate movement when pied-piping of a clause is possible.

b. *Is **talk** [he tell me [that she **talk** about Ricky]].*
(Trinidadian English; Cozier 2006:660,663)

Cozier argues that predicate clefting is phrasal movement, based on the observation that *v*P-internal adverbs to the left of the verb can be moved along (30a–b).[9]

(30) **Predicate cleft pied-pipes material to the left:**

    a. *Is **briefly touch** [he did **touch** upon that matter].*
'He briefly touched upon that matter (as opposed to doing something else with that matter).'

    b. *Is **cleverly avoid** [he **avoid** the question].*
'He cleverly AVOIDED the question (as opposed to cleverly doing something else with the question, like answering it).'
(Trinidadian English; Cozier 2006:666)

On this basis, Cozier proposes an analysis of predicate clefting as remnant *v*P-movement, with all other VP-internal material undergoing evacuating movements of the VP. As a result, only material at the *v*P edge, like a left-adjoined adverb, will surface in the fronted phrase.[10]

Importantly, *wh*-words that have undergone intermediate movement to the edge of the verb phrase can be pied-piped as well, as in (31a–c).

(31) **Predicate cleft may pied-pipe *wh*-words:**

    a. *Is **what fix** [he did **fix** ___ yesterday]?*

    b. **Is **who talk** [___ **talking** about she]?*
(Trinidadian English; Cozier 2006:670,679)

Strikingly, this is possible even when the *wh*-phrase is undergoing long-distance movement from a lower clause and does not directly modify the clefted verb (32).

(32) **Predicate cleft can pied-pipe *wh*-word from lower clause:**
*Is **who tell** [Tim **tell** you [that he give the car to ___]]?*
(Trinidadian English; Cozier 2006:681)

This is the same effect as the clausal pied-piping example discussed above. The *wh*-phrase undergoes intermediate movement to a position at the *v*P edge and pied-pipes the *v*P from this position. In this way, predicate clefting in Trinidadian English reveals the presence of a copy in an intermediate *v*P position.

A similar interaction of *v*P-fronting and pied-piping is found in Ewe (Buell 2012). Buell observes that a focus-fronted *v*P may be in a pied-piping configuration, as long as the *wh*-phrase is generated inside the *v*P.

(33) **Objects but not subjects and high adjuncts can be pied-piped:**

    a. *[_{vP} **Núkà** dù-ḿ]*   *nè-lè?*
         what   eat-PROG 2SG-be.at

---

[9]Note that these adverbs must originate in the lower verb phrase, because a reading in which they modify the cleft clause is semantically implausible.

[10]An alternative might be to adopt a distributed deletion analysis, but nothing hinges on the choice for our purposes.

'What are you eating?'
b. *[*vP* ***Àmékà*** *dzó*] *gé* *lè?*
    who   leave PROSP be.at
    'Who is about to leave?'
c. *[*vP* ***Núkàtà*** *dzó-ḿ*] *nè-lè?*
    why   leave-PROG 2SG-be.at
    'Why are you leaving?'
    (Ewe; Buell 2012:4,7)

As in Trinidadian English, even *wh*-phrases that have undergone long-distance movement from within an embedded clause can pied-pipe the *v*P.[11] In (34), it is the matrix verb that undergoes *v*P-fronting, but the *wh*-phrase originates in a lower clause.

(34)   **Movement of intermediate *v*P can pied-pipe *wh*-phrase:**

    [*vP* ***Núkà*** *dí-ḿ*]   *nè-lè*   [*CP* *bé* *má-* *dà*   ___]?
      what want-PROG 2SG-be.at   that 1SG.FUT-prepare
    'What do you want me to make?'
    (Ewe; Buell 2012:19)

Note that, as in Trinidadian English, this pattern of *v*P fronting involves at least one step of extraposition as well, in this case of the complement clause.

    In this way, the Trinidadian English and Ewe patterns seem to provide evidence for the presence of intermediate copies at the verb phrase edge.

2.2 Multiple copy spell-out

    Another effect that reveals the presence of a copy is multiple copy spell-out, or constructions in which intermediate copies are overtly realized alongside the highest copy. One example of this is *wh*-copying. In a number of languages, *wh*-movement can be accompanied by *wh*-copying, so that a copy of the *wh*-phrase appears in all Spec-CP positions on the path of movement. Such constructions are found in German, Frisian, and Passamaquoddy, for example (35a–c).

(35)   **Examples of *wh*-copying:**

    a. ***Wen*** *glaubst du* [*CP* ***wen*** *sie getroffen hat*]?
       who believe you   who she met   has
       'Who do you believe she has met?'
       (German; Felser 2004)

    b. ***Wêr*** *tinke jo* [*CP* ***wêr****'t* *Jan wennet*]?
       where think you   where-C Jan lives
       'Where do you think that Jan lives?'
       (Frisian; Hiemstra 1986:99)

    c. ***Tayuwe*** *kt-itom-ups* [*CP* ***tayuwe*** *apc* *k-tol-i* *malsanikuwam-ok*]?
       when   2-say-DUB   when   again 2-there-go store-LOC
       'When did you say you're going to go to the store?'
       (Passamaquoddy; Bruening 2006:26)

---

[11]Low adverbs do not seem to be included in the fronted *v*P in Ewe.

See Felser (2004) and Bruening (2006) for arguments that such constructions arise from movement.

Wh-copying is usually limited to *wh*-movement and relative clauses (see, for example, Pankau 2013), but not always. Baier (2014) describes a pattern of multiple copy spell-out with all Ā-dependencies in Seereer. As evident in (36a–b), intermediate copies at the clause edge in Seereer are spelled out as pronouns.

(36)   **Pronoun copying in Seereer:**

    a.   ***Xar** foog-o   [CP yee **ten** Yande a-lay-u   [CP yee **ten** Jegaan a-ga'-u]]?*
        what think-2SG.EXT   C   3SG Yande 3-say-EXT   C   3SG Jegaan 3-see-EXT
        'What do you think Yande said Jegaan saw?'

    b.   ***Aniin** foog-o   [CP yee **den** Yande a-lay-u   [CP yee **den** Jegaan*
        who.PL think-2SG.EXT   C   3PL Yande 3-say-EXT   C   3PL Jegaan
        a-ga'-u]]?
        3-see-EXT
        'Who all do you think Yande said Jegaan saw?'
        (Seereer; Baier 2014)

A similar effect happens at the *v*P in Dinka. In Dinka, copies left at the *v*P edge by Ā-movement are spelled out as pronouns, in the same position as the V2 effect (37a–b).[12]

(37)   **Movement in Dinka triggers pronoun copying at *v*P edge:**

    a.   *Bòl à-cɛ́   **rɔ̀ọor** [CP cɛ̀   [vP **kêek** lâat]]   tɪ̂ɪŋ.*
        Bol 3S-PRF men   PRF.3SG   3PL insult.NF see.NF
        'Bol has seen the men he has insulted.'

    b.   *Yè **kɔ̂ɔc-kó**   [CP yɪ́i   Bôl   [vP **ké** luêeel [CP ɛ̀ cɪ́i   Áyèn*
        be people.CS1-which   HAB.OV Bol.GEN   3PL say.NF   C PRF.OV Ayen.GEN
        *[vP **ké**   tɪ̂ɪŋ]]]?*
          3PL see.NF
        'Which people does Bol say Ayen has seen?'

See Baier (2014) and Van Urk (2018) for extensive arguments that this reflects multiple copy spell-out.

Although perhaps less widely attested in the verb phrase, multiple copy spell-out is then found at both domain edges. Again, there is no reason then to suppose a qualitative difference between CP and *v*P in how they interact with successive-cyclic movement.[13]

2.3 Stranding

A third reflex of successive-cyclic movement that reveals the presence of a copy in an intermediate position is stranding (e.g. McCloskey 2000; Barbiers 2002; Henry 2012), found in

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[12]Note that copying is limited to plurals, as extensively discussed in Van Urk (2018).

[13]I do not know of languages in which there is a multiple spell-out effect at the CP and *v*P edge at the same time. A common approach to multiple spell-out is to assume that there are special constraints on the edges that require realization, which prevent copy deletion (see Landau 2006, Van Urk 2018). In such a theory, it is not in principle surprising that the CP and *v*P edge might behave differently in the same language. See also Van Urk (2018) for discussion of this question in Dinka.

Spec-CP and Spec-*v*P.

Perhaps the most well-known case of stranding is *all*-stranding in West Ulster English, as first described by McCloskey (2000). McCloskey observes that complex *wh*-phrases such as *what all* may strand *all* at Spec-CP in West Ulster English (38a–c).

(38)   ***All*-stranding in West Ulster English:**

    a.   ***What all*** *did he say [CP he wanted ___]?*

    b.   ***What*** *did he say [CP he wanted **all**]?*

    c.   ***What*** *did he say [CP **all** he wanted ___]?* (West Ulster English; McCloskey 2000:61)

McCloskey argues that intermediate stranding in (38c) occurs in the intermediate Spec-CP, because the stranded *all* must follow material in the matrix verb phrase. This is demonstrated by the examples in (39a–c).[14]

(39)   **Stranded *all* must follow matrix *v*P-material:**

    a.   ***What all*** *did he say to him that he wanted to buy ___]?*

    b.   ?***What*** *did he say to him [CP **all** that he wanted to buy ___]?*

    c.   ****What*** *did he say **all** to him [CP that he wanted to buy ___]?*
        (West Ulster English; McCloskey 2000:63)

As McCloskey points out, these facts offer an argument for successive-cyclic movement through Spec-CP, under the assumption that *what all* moves as a unit to an intermediate position, followed by subextraction of *what*.

Similar stranding effects are found at the *v*P edge. Even in West Ulster varieties, Henry (2012) shows that there are grammars that allow stranding at the edge of *v*P as well. In South Derry English in fact, only *v*P-stranding is tolerated (40a–c).[15]

(40)   ***All*-stranding only at *v*P in South Derry English:**

    a.   ***What*** *did he [vP **all** do ___ on holiday]?*

    b.   ***What*** *did he [vP **all** say [CP that he did ___ on holiday]]?*

    c.   ****What*** *did he [vP say [CP **all** that he did ___ on holiday]]?*
        (Henry 2012:28)

Speakers of East Derry English allow stranding everywhere, both at the *v*P and CP edge (41a–c).

(41)   ***All*-stranding at *v*P and CP in East Derry English:**

    a.   ***What*** *did he [vP **all** do ___ in Derry]?*

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[14]That *all* is not stranded in a position in the verb phrase is evident in the contrast between *all*-stranding in the base position, which may precede a PP object (ia), and intermediate stranding, which cannot (ib). This contrast is unexpected if *all*-stranding takes place in an intermediate verb phrase position, but expected if intermediate *all* forms a constituent with the embedded CP.

(i)   a.   ?*Who was talking **all** to the kids last night?*

    b.   **What did he say **all** to his friends [CP that he wanted to buy]?*
       (West Ulster English; McCloskey 2000:63,74)

[15]Henry (2012) describes the different stranding varieties in geographical terms. Henry (2017) qualifies this and suggests that the different grammars described here may simply reflect variation within the same population.

b. *What* did he say [CP **all** that he did ___ in Derry]?

c. *What* did he [vP **all** say [CP that he did ___ in Derry]]?
   (Henry 2012:31)

There are also instances of *all*-stranding at the *v*P edge in other languages.[16] As pointed out by Barbiers (2002) and Koopman (2010), a similar pattern is found in Dutch, with stranding of the quantifier *allemaal* (42a). In Dutch, this stranding must target an intermediate *v*P, as evident by the relative positioning of a higher verb and the complementizer (42b–c).

(42) **Stranded *allemaal* in Dutch occurs at intermediate *v*P:**

a. *Wat heeft hij gezegd [CP dat hij **allemaal** wil hebben]?*
   what has he said   that he all   wants have.NF
   'What all has he said that he wants to have?'

b. *Wat heeft hij [vP **allemaal** gezegd [CP dat hij ___ wil hebben]]?*
   what has he all   said   that he   wants have.NF
   'What all has he said that he wants to have?'

c. **Wat heeft hij gezegd [CP **allemaal** dat hij ___ wil hebben]?*
   what has he said   all   that he   wants have.NF
   'What all has he said that he wants to have?'
   (Dutch; adapted from Koopman 2010:268)

In fact, Dutch allows stranding of other material in the same position, as Barbiers (2002) demonstrates. R-pronouns can strand a preposition at the *v*P edge as well, in any intermediate *v*P on the path of movement (43a–c).

(43) **Preposition stranding at intermediate *v*P in Dutch:**

a. ***Waarmee** had jij dan gedacht [CP dat je de vis ___ zou moeten*
   where.with had you then thought   that you the fish   would have.to.NF
   snijden]?
   cut.NF
   'With what had you then thought that you would have to cut the fish?'

b. ***Waar** had jij dan gedacht [CP dat je de vis **mee** zou moeten snijden]?*
   where had you then thought   that you the fish with would have.to.NF cut.NF
   'With what had you then thought that you would have to cut the fish?'

c. ***Waar** had jij dan [vP **mee** gedacht [CP dat je de vis ___ zou moeten*
   where had you then   with thought   that you the fish   would have.to.NF
   snijden]]?
   cut.NF
   'With what had you then thought that you would have to cut the fish?'
   (Dutch; adapted from Barbiers 2002:49)

The same facts obtain in the *wat-voor* split. The remnant DP can be pied-piped (44a), stranded in the base position (44b), or stranded at an intermediate *v*P edge (44c).

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[16]As with multiple spell-out, the question arises why all stranding languages do not behave like East Derry English, with stranding at both the CP and *v*P edge. An open question here is what mechanism could restrict stranding to specific edges.

(44)   **Stranding in *wat-voor* split:**

    a.   ***Wat voor bal*** *had jij dan gedacht [*$_{CP}$* dat Ed* ___ *zou   kopen]?*
        what for   ball had you then thought   that Ed   would buy.NF
        'What kind of ball had you then thought that Ed would buy?'

    b.   ***Wat*** *had jij dan gedacht [*$_{CP}$* dat Ed **voor bal*** *zou   kopen]?*
        what had you then thought   that Ed for   ball would buy.NF
        'What kind of ball had you then thought that Ed would buy?'

    c.   ?***Wat*** *had jij dan [*$_{vP}$* **voor bal*** *gedacht [*$_{CP}$* dat Ed* ___ *zou   kopen]]?*
        what had you then   for   ball thought   that Ed   would buy.NF
        'What kind of ball had you then thought that Ed would buy?'
        (Dutch; adapted from Barbiers 2002:49)

A third pattern of stranding that shows symmetry between the CP and *v*P edge comes from Left Branch Extraction in Polish. Wiland (2010) points out that Left-Branch Extraction in Polish allows for the NP out of which extraction takes place to be stranded in intermediate positions, including the edge of *v*P and the edge of CP (45a–c).

(45)   **Polish LBE may strand NP in intermediate positions:**

    a.   ***Jaki*** *Pawel [*$_{vP}$* **samochód*** *kupil   swojej żonie* ___ *]?*
        what Pawel   car   bought his   wife
        'What car did Pawel buy his wife?'

    b.   ?***Jaki*** *myślisz   [*$_{CP}$* **samochód*** *Pawel kupil   swojej żonie* ___ *]?*
        what thought.2SG   car   Pawel bought his   wife
        'What car did you think Pawel bought his wife?'

    c.   %***Jaki*** *Maria [*$_{vP}$* **samochód*** *myślala [*$_{CP}$* że   Pawel kupil   swojej żonie* ___ *]]?*
        what Maria   car   thought   that Pawel bought his   wife
        'What car did Mary think Pawel bought his wife?'
        (Polish; Wiland 2010)

The distribution of stranding phenomena then provides additional support for the notion of successive-cyclic movement and shows that there is symmetry between CP and *v*P in the possibility of stranding under intermediate movement.

2.4   V2 satisfaction

The final effect that I attribute to the presence of intermediate copies is V2 satisfaction in intermediate positions. If V2 effects are interpreted as requirement that an XP overtly occupies the specifier of a functional head, then an intermediate movement account predicts that the presence of an intermediate copy, despite undergoing deletion, may be diagnosable through its effect on V2. In an approach to V2 in which V2 is only about featural requirements, these facts may instead be attributed to the roles of features in intermediate movement. In any case, such effects should be attested.

Thiersch (1978) observes that extraction from embedded V2 clauses in German must satisfy the V2 requirement, resulting in overt V1 order (46a–b).

(46)   **Extraction satisfies V2 in German:**

a. ***Wen*** *sagt Johan [CP* ⬚ *sehe er* ___*]?*
   who.ACC says Johan see.SBJ he
   'Who does Johan say that he is seeing?'

b. ****Wen*** *sagt Johan [CP* [er] *sehe* ___*]?*
   who.ACC says Johan he see.SBJ
   'Who does Johan say that he is seeing?'
   (German; Thiersch 1978:135)

We can show that this is linked to intermediate movement, because movement in the matrix clause still requires V2 in the complement. The pairs in (47a–b) and (47c–d) demonstrate. In (47a–b), movement of a PP from an embedded clause requires V1. The pattern of grammaticality reverses with movement of the same PP within the matrix clause: embedded V2 is now required and embedded V1 is impossible (47c–d).

(47) **V1 order due to extraction:**

a. *In welche Schule sagte Leo [CP* ___ *sei er gegangen]?*
   to which school said Leo is.SBJ he went
   'To which school did Leo say he went?'

b. **In welche Schule sagte Leo [CP **er** sei gegangen]?*
   to which school said Leo he is.SBJ went
   'To which school did Leo say he went?'

c. **In welcher Sprache sagte Leo [CP* ___ *sei er gegangen]?*
   in which language said Leo is.SBJ he went
   'In which language did say he went?'

d. *In welcher Sprache sagte Leo [CP **er** sei gegangen]?*
   in which language said Leo he is.SBJ went
   'In which language did say he went?'
   (German; Susi Wurmbrand, p.c.)

These facts provides evidence for a step of intermediate movement, with the copy satisfying V2.

Van Urk and Richards (2015) describe a similar pattern in the Nilotic language Dinka. Dinka requires V2 in embedded clauses. Intermediate movement must satisfy the V2 property of any clause it passes through, resulting in overt V1 order (48a–d).[17]

(48) **Long-distance movement and V2:**

a. *Yè **ŋà** yùuukù̱ luêeel [CP* ___ *cé̱ cuî̱in câam]?*
   be who HAB.1PL say.NF PRF food eat.NF
   'Who do we say [CP ___ has eaten food]?'

b. **Yè **ŋà** yùuukù̱ luêeel [CP **cuî̱in** à-cí̱i câam]?*
   be who HAB.1PL say.NF food 3SG-PRF.OV eat.NF
   'Who do we say [CP has eaten food]?'

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[17]In Dinka, we can also tell that an intermediate copy satisfies V2 in the embedded clause, because the moving phrase can trigger agreement on the highest verb/auxiliary in any clause it passes through, as discussed in section 2.2.1. This extraction marking effect is also evident in the alternation between *cé̱*, the unmarked form of the auxiliary, and *cí̱i*, which surfaces in the context of non-subject extraction.

c. *Yè **ŋó** yùùkù̱ luêeel [$_{CP}$ ___ cí̱i Bôl câam]?*
   be what HAB.1PL say.NF   PRF.OV Bol.GEN eat.NF
   'What do we say [$_{CP}$ Bol has eaten ___]?'

d. **Yè **ŋó** yùùkù̱ luêeel [$_{CP}$ **Bòl** à-cé̱ câam]?*
   be what HAB.1PL say.NF   Bol 3SG-PRF eat.NF
   'What do we say [$_{CP}$ Bol has eaten ___]?'

Van Urk and Richards (2015; see also Van Urk 2015) show that an analogous V2 effect is found in the Dinka verb phrase. The Dinka verb phrase also has a V2 effect, so that the highest object must always appear initially, preceding the base position of the main verb, as with the ditransitive in (49a–d):

(49)   **Dinka *v*P has V2 effect:**

  a. *Yî̱in cé̱   [$_{vP}$ **Àyén** gàam cáa].*
     you PRF.SV   Ayen give.NF milk
     'You have given Ayen milk.'

  b. *Yî̱in cé̱   [$_{vP}$ **cáa** gàam Àyén].*
     you PRF.SV   milk give.NF Ayen
     'You have given milk to Ayen.'

  c. **Yî̱in cé̱   [$_{vP}$ ___ gàam cáa Àyén].*
     you PRF.SV   give.NF milk Ayen
     'You have given Ayen milk.'

When an object is extracted from inside the verb phrase, however, the same effect as at the CP edge is observed. Intermediate movement satisfies *v*P V2, as demonstrated in (50a–d).

(50)   **Object extraction satisfies V2:**

  a. *Yè **ŋó̱** [$_{CP}$ cí̱i môc   [$_{vP}$ ___ yi̱ɛ̱ɛn Bòl]]?*
     be what   PRF.OV man.GEN   give.NF Bol
     'What has the man given Bol?'

  b. **Yè **ŋó̱** [$_{CP}$ cí̱i môc   [$_{vP}$ **Bòl** yi̱ɛ̱ɛn]]?*
     be what   PRF.OV man.GEN   Bol give.NF
     'What has the man given Ayen?'

  c. *Yè **ŋà** [$_{CP}$ cí̱i môc   [$_{vP}$ ___ yi̱ɛ̱ɛn kítàap]]?*
     be who   PRF.OV man.GEN   give.NF book
     'Who has the man given the book to?'

  d. **Yè **ŋà** [$_{CP}$ cí̱i môc   [$_{vP}$ **kítàap** yi̱ɛ̱ɛn]]?*
     be who   PRF.OV man.GEN   book give.NF
     'Who has the man given the book to?'

V2 effects are then also equally distributed across the CP and *v*P edge, offering additional evidence that these domains are parallel.

3   On the LF presence of intermediate copies

A movement approach to successive cyclicity also predicts that intermediate copies should influence LF representations. In this section, I show that the presence of intermediate copies can be detected in the consequences for the binding of pronouns and anaphors (Fox 1999), the availability of intermediate scope (e.g. Rullmann 1993; Fox 1999), and licensing of parasitic gaps (Nissenbaum 2000). As above, I demonstrate that these effects are symmetrically distributed across CP and *v*P edges.

3.1   Binding of pronouns and anaphors

One LF effect that intermediate copies should have is that they should make available additional positions for binding relations. For example, long-distance movement allows an anaphor contained in the moving phrase to be bound by an antecedent on the path of movement (51a–b), even though this antecedent would not be able to bind the anaphor in its base position.

(51)   **Anaphors can be bound in intermediate positions:**

　　a.   *Which picture of herself$_{i/j}$ did Sam$_i$ say [Kim$_j$ likes ___]?*
　　b.   *Which picture of herself$_{i/j}$ did you tell Sam$_i$ [Kim$_j$ likes ___]?*

An example like (51a) can be accommodated both by assuming an intermediate copy in Spec-CP or Spec-*v*P, but (51b) provides evidence specifically for a CP edge position, since the intermediate position must at least be below the indirect object.

Fox (1999) constructs examples that specifically require an intermediate *v*P position through the interaction of anaphor binding and Condition C. As observed by Lebeaux (1998), not all material in a moved phrase needs to be interpreted in the base position. In an example like (52), the relative clause does not need to be interpreted in the lowest copy, as evidenced by the lack of a Condition C violation.

(52)   **Relative clause does not need to be interpreted in base position:**
　　[$_{DP}$ Which argument that John$_i$ made] did he$_i$ believe?

Fox demonstrates that we can use this property of relative clauses to provide evidence for intermediate copies, by constructing examples in which the requirements of Condition C compete with the requirements of variable binding (53a–b) .

(53)   **Relative clause must be interpreted in intermediate position:**

　　a.   **[$_{DP}$ Which of the papers that he$_i$ gave to Ms. Brown$_k$] did she$_k$ hope that every student$_i$ will revise ___?*
　　b.   *[$_{DP}$ Which of the papers that he$_i$ gave to Ms. Brown$_k$] did every student$_i$ hope that she$_k$ will revise ___?*
　　　　(Fox 1999:173)

The grammaticality of (53b) demonstrates that there is an intermediate copy of the moved phrase in which the relative clause can be interpreted, because both the overt position of the *wh*-phrase and the base position should yield a binding violation. The quantifier *every student* binds a pronoun

in the relative clause, so that there must be a copy of the moved phrase below the quantifier. At the same time, the relative clause cannot be interpreted in the scope of the pronoun *she*, because a Condition C violation should result. Such cases then indicate that there must be an intermediate copy that can be interpreted, in between the position of the quantifier and the pronoun.

Fox (1999) uses such effects to argue for an intermediate landing site at the *v*P edge. He points out to contrasts such as (54a–b).

(54)   **Relative clause interpreted at *v*P edge:**

    a. *[$_{DP}$ Which of the papers that he$_i$ asked Ms. Brown$_k$ for] did every student$_i$ [$_{vP}$ get her$_k$ to grade ___]?*

    b. **[$_{DP}$ Which of the papers that he$_i$ asked Ms. Brown$_k$ for] did she$_k$ [$_{vP}$ get every student$_i$ to grade ___]?*
    (Fox 1999:174)

In the grammatical (54a), the only intermediate position that can satisfy both variable binding and Principle C is in between the subject quantifier and the object, thus providing evidence for a landing site for long-distance movement at the *v*P edge.

We can manipulate these examples to argue for an intermediate Spec-CP position. Consider the pair in (55a–b), where the only difference is in the matrix indirect object and the embedded subject.

(55)   **Relative clause interpreted at CP edge:**

    a. *[$_{DP}$ Which of the papers that he$_i$ asked Ms. Brown$_k$ for] did you tell every student$_i$ [$_{CP}$ she$_k$ liked ___]?*

    b. **[$_{DP}$ Which of the papers that he$_i$ asked Ms. Brown$_k$ for] did you tell her$_k$ [$_{CP}$ every student$_i$ liked ___]?*

The admissibility of (55a) suggests that there is an intermediate position between indirect objects and embedded subjects also, which I propose is Spec-CP.

The same picture as above then emerges from an examination of binding effects: Spec-CP and Spec-*v*P are implicated to the same degree as intermediate landing sites.[18]

3.2   Intermediate scope

Another semantic effect that should be associated with the presence of a copy is the availability of additional scope positions. Intermediate positions should create the possibility of intermediate scope relations.

How many-phrases have been shown to give rise to scope ambiguities (Kroch 1989; Rullmann 1993; Cresti 1995). For example, the *how many*-phrase in (56) can be interpreted above and below *want*, as indicated by the paraphrases in (56a–b).

(56)   **Scope ambiguities with *how many*-phrases:**
    How many books does Chris want to buy ___?

---

[18]One question is whether we can find configurations similar to the grammatical examples in ((54)a) and ((55)a) which are inadmissible because of the absence of an intermediate position in between the relevant DPs. This is what we expect if long-distance movement follows a punctuated path, as Abels (2012a) points out.

a. What is the number *n* such that there are *n* books that Chris wants to buy?
b. What is the number *n* such that Chris wants to buy *n* books?
(Rullmann 1993:1)

Rullmann (1993) argues that *how many*-phrases may also take scope in an intermediate position, as demonstrated by the example in (57). In addition to wide and narrow scope, the intermediate reading paraphrased in (57c) is available as well (see also Fox 1999).

(57)   **Intermediate reading of *how many*-phrase:**
        How many books did Mary say [John needs ____]?
        a. What is the number *n* such that there are *n* books which Mary says John needs?
        b. What is the number *n* such that Mary says John needs *n* books?
        c. What is the number *n* such that Mary says that there are *n* books which John needs?
        (Rullmann 1993:11)

Following Rullmann, I propose that this intermediate reading is the result of interpreting the *how many*-phrase in the intermediate Spec-CP position.

   We can construct similar examples that appear to demonstrate intermediate scope positions at a verb phrase edge. Consider an example like (58), with a modal above *require*. In addition to the wide and narrow scope readings, the intermediate reading in (58c) is available, in which the *how many*-phrase is interpreted in between the modal and *require*.

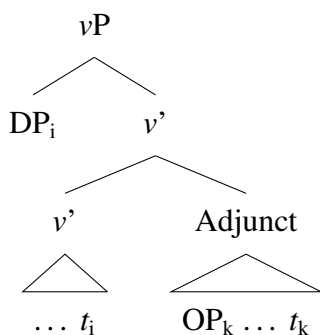(58)   **Intermediate reading of *how many*-phrase at *v*P edge:**
        How many students could Kim be required to pass?
        a. What is the number *n* such that there are *n* students that it is possible Kim is required to pass?
        b. What is the number *n* such that it is possible that Kim is required to pass *n* students?
        c. What is the number *n* such that it is possible that there are *n* students Kim is required to pass?

3.3 Parasitic gaps

   Another LF effect is the distribution of parasitic gaps, a phenomenon that has been used to argue for intermediate copies at the *v*P edge, building on Nissenbaum (2000). Nissenbaum presents a theory of parasitic gap licensing that requires intermediate movement to the *v*P edge. Both intermediate successive-cyclic movement to *v*P and operator movement in a *v*P adjunct may create derived predicates, which can be conjoined:

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

```
              vP
             /  \
          DP_i    v'
                 /  \
               v'    Adjunct
              / \     /  \
          ... t_i   OP_k ... t_k
```

On the assumption that both intermediate movement and null operator movement result in λ-abstraction and so form open predicates, the vP and adjunct in (59) can be combined to yield a conjoined predicate.[19] This conjoined predicate composes with the DP copy at the vP edge, leading to the appearance of a parasitic gap. If correct, parasitic gaps like (60) provide evidence for intermediate movement to the vP edge, assuming that the rationale clause is a vP adjunct.

(60) **Parasitic gap at vP edge:**
What did he buy ___ [in order to read through ___]?

There are also CP adjuncts that license parasitic gaps. As Engdahl (1983) notes, *if*-clauses permit parasitic gaps for some speakers (61a). These are possible even with extraction of the subject, providing evidence that these parasitic gaps are licensed outside the vP.

(61) **Parasitic gaps in *if*-clauses:**
   a. *This is the professor that Kim says that you must not say hello to ___ if you run into ___.*
   b. *This is the professor that Kim says that, if you run into ___, ___ won't say hello to you.*
   (modified from Engdahl 1983:11)

The semantic effects of copies can then be detected at the CP and vP edge. These facts provide evidence that the full range of effects that we expect to be associated with successive-cyclic movement are attested. In addition, a key conclusion that emerges from this discussion is that there are no empirical reasons to posit a qualitative asymmetry between CP and vP, since all the effects discussed can be detected in both domains (contra Rackowski and Richards 2005; Den Dikken 2009, 2010; Keine 2016).

4 Successive cyclicity in other domains

In this section, I examine how this taxonomy of successive cyclicity effects extends to other proposed phasal domains. I will look in particular at PP and DP. A key lesson that emerges from the overview given above is that, to a remarkable degree, the morphophonological, syntactic, and

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[19]It is important that the adjunct can be inserted in between the point of abstraction and the DP. In addition to this, more needs to be said about how such predicates can be conjoined. See Nissenbaum (2000) for details.

semantic effects that we expect to be associated with successive cyclicity are attested. As a result, positing additional phase boundaries should be undertaken with care, because the full suite of these effects should in principle be associated with this boundary across languages.

In this section, I use this reasoning to scrutinize the phasal status of PP and DP domain. We will see that a more nuanced picture emerges. Some familiar effects in DPs and PPs are attested, such as extraction marking and lexical choice effects. In addition, there is some evidence for intermediate copy realization, in the interaction of PPs and DPs with pied-piping. However, a number of the other effects described are missing or difficult to detect. I provide independent explanations for the absence of LF effects as well as multiple spell-out, but identify at least interactions with φ-agreement and stranding as phenomena that should in principle be found.

4.1 Extraction marking and lexical choice effects in DPs and PPs

There appear to be extraction marking effects in the PP domain. In Jamaican Creole (Durrleman 2008), for example, the preposition *fi/fa* is sensitive to extraction. When the preposition is followed by an in-situ complement, it is realized as *fi* (62a). But when the complement has been extracted, the preposition must be realized as *fa* (62b).

(62)   **Extraction marking on preposition in Jamaican Creole:**

    a. *Im bring aki   [PP **fi/*fa**   piknidem]*
        3SG bring ackee   for/for.EXT children
        '(S)he brought the ackee for the children.'

    b. *A huu im bring dat [PP ***fi/fa**   ___]?*
        A who 3SG bring that   for/for.EXT
        'Who did (s)he bring that for?'
        (Jamaican Creole; Durrleman 2008)

A similar alternation is found with the preposition *nú/ná* in Fongbe (Da Cruz 1997).

(63)   **Extraction marking on preposition in Fongbe:**

    a. *Kɔkú sà mŏtò ɔ́   [PP **nú/*ná**   Àsíbá].*
        Koku sell car   DET   to/to.EXT Asiba
        'Koku sold the car to Asiba.'

    b. *Àsíbá wɛ̀ Kɔkú sà mŏtò ɔ́   [PP ***nú/ná**   ___].*
        Asiba FOC Koku sell car   DET   to/to.EXT
        'Asiba, Koku sold the car to.'
        (Fongbe; Da Cruz 1997)

A worry about these facts is that it is possible to analyze this alternations as allomorphy (sensitive to whether an overt DP follows), since the gap site is necessarily immediately adjacent to the preposition. In addition, we could treat this pattern as lexical choice effect, in which these prepositions are instantiations of non-phasal and phasal variants of the same head (see also Abels 2003).

I do not know of extraction marking effects in the DP domain, such a determiner that only appears in the context of extraction. There are a number of lexical choice phenomena, however. Jeoung (2018) describes a pattern along these lines in Indonesian-type languages. In Indonesian, the

noun is optionally marked with the determiner suffix *-nya* before possessors (64a–b). In contexts of extraction, however, the determiner suffix is obligatory (64c).

(64)   **Optional determiner suffix with possessors in Indonesian:**

    a.   *Buku(-**nya**) dia   biru, kalau buku(-**nya**) Desy kuning.*
       book-DEF   3SG blue but   book-DEF Desy yellow
       'His book is blue, but Desy's book is yellow.'

    b.   *Uang(-**nya**) orang kaya cepat di-keluar-kan.*
       money-DEF person rich   quick PASS-exit-APPL
       'Rich people's money is quickly spent.'

    c.   *Siapa yang adik   baca buku-**nya**?*
       who   REL younger.sibling read book-DET
       'Who is it that little brother is reading (her/his) book?'
       (Jeoung 2018:1,16)

Similarly, Uriagereka (1996) points out that Galician determiners have a clitic alternant that must be used in instances of extraction (65a–b).

(65)   **Determiner clitic in Galician is used with extraction:**

    a.   *(?)De quén   liche-**los**   [_DP_ mellores poemas de amigo ___]?*
       of   whom read.2SG-the   best   poems of friend
       'Who did you read the best poems of friendship by?'

    b.   **De quén   liches   [_DP_ **os** mellores poemas de amigo ___]?*
       of whom read.2SG   the best   poems of friend
       'Who did you read the best poems of friendship by?'
       (Uriagereka 1996:270–271)

In addition, there is a well-known correlation between the permissibility of Left-Branch Extraction and the presence of a D layer (Uriagereka 1988; Bošković 2005).[20]

(66)   **LBE permitted in languages without overt determiners:**

    a.   *Krasnuju ja kupil   [_NP_ ___ mašinu].*
       red   I bought   car
       'It is a red car that I bought.'

    b.   **Red, I bought [_DP_ a ___ car].*

4.2   Leftness effects

There is a class of effects that emerges with extraction out of PPs and DPs, leftness effects, that is reminiscent of V2 satisfaction. Specifically, in some languages, only items that may appear

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[20]The Specificity Effect might also be seen as a lexical choice effect (ia–b) (Fiengo and Higginbotham 1981).

(i)   **Specific DPs are more resistant to extraction:**

    a.   *Who did you see [_DP_ a picture of ___]?*

    b.   ??*Who did you see [_DP_ that picture of ___]?*

leftmost in PP/DP can undergo movement.

Van Riemsdijk (1978) points out, for example, that only elements that appear to the left of prepositions can extract out of PPs in Dutch. In Dutch, R-pronouns, a series of locative pronouns used to refer to inanimates, appear to the left of a preposition (67a), but not other DPs (67b).

(67) **R-pronouns appear on the left:**

a. *Je   kan [$_{PP}$ **daar**-op] rekenen.*
you can   there-on count
'You can count on it.'

b. *Je   kan [$_{PP}$ op **hem**] rekenen.*
you can   on him   count
'You can count on him.'

In addition, only R-pronouns can undergo movement out of a PP (68a–b):

(68) **Only R-pronouns can move out of PPs:**

a. ****Wie** *kan je   [$_{PP}$ op ___] rekenen.*
who can you   on   count
'Who can you count on?'

b. ***Waar** *kan je   [$_{PP}$ ___ op] rekenen.*
where can you   on count
'What can you count on?'

Bošković (2016) notes a similar effect in Left Branch Extraction in Serbo-Croatian. Although Left Branch Extraction of adjectives is generally permitted, it is blocked when a demonstrative is present, as in (69).

(69) **LBE of adjectives is blocked with demonstrative:**

a. *Ponosnog sam vidio [$_{NP}$ ___   oca].*
proud   am seen   father
'It is a proud father I saw.'

b. **Ponosnog sam vidio [$_{NP}$ tog ___ oca].*
proud   am seen   this   father
'It is this proud father that I saw.'
(Serbo-Croatian; Bošković 2016:3)

Bošković analyzes the ungrammaticality of (69) as a leftness effect. Demonstratives are different from other DP-internal elements, like possessors, in that they must precede adjectives:

(70) **Demonstratives precede adjectives:**

a. *ova skupa   slika*
this expensive picture
'this expensive picture'

b. ?**skupa   ova slika*
expensive this picture
'this expensive picture'
(Serbo-Croatian; Bošković 2016)

We can then explain why (69) is bad. Adjectives can only undergo LBE when they are leftmost in the DP.

These facts provide evidence that PPs and DPs are phasal domains, in which only the edge is accessible. Leftness effects are reminiscent of V2 satisfaction in Dinka and German, in which the moving phrase also must be leftmost in the intermediate domain. A puzzle about leftness effects, however, is why elements that are not leftmost initially cannot undergo intermediate movement, as in CP and *v*P. One type of explanation that has often been pursued for this difference is to make use of a notion of anti-locality (e.g. Abels 2003).

4.3 Evidence for intermediate copies in DPs and PPs

Let me turn now to effects that imply the presence of intermediate copies, starting with overt evidence at DP and PP edges. There are no stranding or multiple spell-out effects in the DP or PP that I know of. However, when Ā-movement pied-pipes a DP or a PP, some languages show evidence of intermediate movement internal to the pied-piped phrase.

In Ch'ol, as demonstrated by Coon (2009), *wh*-possessors move internal to the DP. In ordinary DPs, possessors are strictly postnominal (71). A similar effect is found in a number of other Mayan languages.

(71)   **Ch'ol has postnominal possessors:**
       *Tyi yajl-i   [$_{DP}$ i-plato   **aj-Maria**]*
       PRF fall-INTR   3S-plate CL-Maria
       'Maria's plate fell.'
       (Ch'ol; Coon 2009:166)

But when a possessor pied-pipes a DP, the *wh*-possessor must appear prenominally (72a–b).

(72)   ***Wh*-possessor moves inside pied-piped DP:**
       a.   *[$_{DP}$ **Maxki** i-plato] tyi   yajl-i?*
                 who   3S-plate PRF fall-INTR
               'Whose plate fell?'
       b.   **[$_{DP}$ I-plato   **maxki**] tyi   yajl-i?*
                 3S-plate who   PRF fall-INTR
               'Whose plate fell?'
               (Ch'ol; Coon 2009:166)

These facts provide evidence for DP-internal intermediate movement.

We can find similar effects in the PP. In her work on Finnish, Huhmarniemi (2012) provides evidence for intermediate movement in a range of pied-piping configurations, including PPs. Finnish allows DPs to appear before and after prepositions (73a). However, a *wh*-phrase must appear leftmost when it pied-pipes a PP, as in (73b–c).

(73)   ***Wh*-phrase moves inside pied-piped PP:**
       a.   *Pekka käveli [$_{PP}$ kohti   **puistoa**].*
            Pekka walked   towards park.PAR
            'Pekka walked towards the park.'

b.   *[_PP **Mitä** kohti]   Pekka käveli?*
      what towards Pekka walked
      'What did Pekka walk towards?'

c.   *[_PP **Mitä** yli]   Pekka käveli?*
      what over Pekka walked
      'What did Pekka walk over?'
      (Huhmarniemi 2012:105,115)

These phenomena seem to offer evidence for intermediate movement within the DP and PP.

As for semantic effects associated with intermediate copies at the DP and PP edge, it is difficult to construct examples that test for the LF presence of copies in the DP and PP domain for independent reasons. Testing for the interaction of competing binding effects is difficult, because DPs and PPs out of which extraction takes place usually cannot contain other referential DPs. In addition, it is not clear that there are adjuncts that host parasitic gaps that attach directly to DP and PP. Similarly, scope reconstruction requires a node of the appropriate type for scope reconstruction and DP and PP may simply not provide such an attachment site.

We are left with the absence of parasitic agreement, multiple spell-out, and stranding. The absence of multiple spell-out is probably not surprising. Multiple spell-out has been linked to the presence of an EPP position or V2 effect (e.g. Landau 2006; Van Urk 2018), and it is not clear that such effects are found in the DP and PP domain.[21] In the *v*P domain, the only pattern of multiple spell-out, in Dinka, involves V2.

Parasitic agreement and stranding effects should in principle be attested, however. Although rare, some languages do allow agreement on prepositions, and so we might expect systems in which prepositional agreement is obligatory only in the context of extraction. In the DP domain, the same pattern could obtain with possessor agreement.[22] There should also be instances of stranding at DP and PP edges. Given the variation described for *all*-stranding in section 2.3, we would hope to find patterns of stranding at the PP edge at least.[23]

I leave the question of whether there are ultimately convincing explanations for the effects missing from DPs and PPs for future research. What I hope to have established, however, is that there is a suite of effects reliably associated with phasal domains, which should be investigated before positing an additional phase boundary. Invoking a novel phase boundary in a syntactic analysis is by no means a harmless move and makes predictions about the crosslinguistic profile of successive cyclicity that can and should be tested.

Conclusion

This paper has investigated the question of how to detect a phase. The full range of effects that I have argued should at a minimum be associated with a phasal domain is summarized in Table 1.

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[21]I am not aware of V2-like patterns in DPs and PPs in any case. The question of whether there are EPP positions in DPs and PPs is harder to answer, because it is certainly possible to analyze some movements for basic word order as motivated by an EPP-like effect. But, as far as I know, such movements do not interact with extraction.

[22]It is possible that the Indonesian pattern described by Jeong (2018) could be analyzed in these terms.

[23]Stranding a DP-modifier at the DP edge may give rise to problems of ambiguity.

Table 1. Reflexes of successive cyclicity at CP and *v*P.

		CP	*v*P
	Effect on intermediate head		
1.	Extraction marking	Irish, Dinka, …	Defaka, Malay, …
2.	φ-agreement	Dinka, Wolof	Passamaquoddy
3.	Lexical choice/inversion	Russian, Belfast English, Spanish, …	Nupe, Mòcheno
	PF presence of copy		
4.	Intermediate copy realization	Malay, Basque, Quechua	Trinidadian English, Ewe
5.	Multiple copy spell-out	German, Frisian, Seereer, …	Dinka
6.	Stranding	West Ulster English, Polish	West Ulster English, Dutch, Polish
7.	V2	German, Dinka	Dinka
	LF presence of copy		
8.	Binding	English, …	English, …
9.	Scope	English, …	English, …
10.	Parasitic gaps	English, …	English, …

As I have demonstrated, the set of attested reflexes of successive cyclicity appears to match well crosslinguistically with the effects that should be associated with intermediate successive-cyclic movement. In addition to this, I have demonstrated that there is symmetry between the CP and *v*P in phasehood (contra, for instance, Rackowski and Richards 2005, Den Dikken 2009, 2010, and Keine 2016). A more complicated picture emerges when this same taxonomy is investigated in the DP/PP domain. The larger lesson that emerges from this work is that positing a new phase boundary is not an innocuous exercise and should ideally be evaluated against the crosslinguistic expectations that come out of the overview in Table 1.

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