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Some Interface Properties of the Phase

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This squib has two goals: to identify evidence for *(strong) phases* (Chomsky 2000, 2001a,b), and to use this evidence to investigate the extensional definition of a phase. Chomsky (2000) states that CP is a phase, whereas TP is not, and (transitive) vP is a phase, whereas passive and unaccusative verb phrases (VPs) are not.[1] I argue here that unaccusative and passive VPs are phases as well.

Before turning to the arguments for phases, let us consider how they are used in Chomsky's system.[2] A phase is a self-contained subsection of the derivation, beginning with a numeration and ending with Spell-Out. At the point of Spell-Out, the complement of the phase-defining head is sent to each of the PF and LF components for interpretation. Thus, after construction of the vP phase, VP undergoes Spell-Out. This results in the *Phase Impenetrability Condition,* defined in Chomsky 2000:108 as follows: ''In phase α with head H, the domain of H is not accessible to operations outside α, only H and its edge are accessible to such operations,'' where the *edge* includes any specifiers of H and any adjuncts to H. This condition has the effect that any elements in the complement of v that need to move outside the phase (e.g., an object *wh*-phrase) must move to the phase edge before Spell-Out.

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[1] I use *VP* as a traditional term, remaining agnostic about the phrasal category of passive and unaccusative verb phrases, notably whether they involve a (defective) v head. The question of the phasehood of these phrases is independent from the question of their categorical label.

[2] For simplicity of presentation, I will ignore differences among Chomsky 2000, 2001a, and 2001b, as well as any details that are not directly relevant to the argument.

Support for this notion of a phase may thus be obtained through evidence for intermediate traces of moved elements at the phase edge. In section 1, I consider three diagnostics for such traces and demonstrate that they equally support the view that passive and unaccusative VPs are phases. Section 2 is more speculative; there, I identify a possible test for phases at PF and demonstrate that this diagnostic also supports the phasehood of passive and unaccusative VPs.

1 Evidence for Movement to the Phase Edge

1.1 Reconstruction Effects

In this section, I use reconstruction effects as a diagnostic for intermediate traces of *wh*-movement at the phase edge. The logic of this test is that in order for a *wh*-word to be visible to movement operations during a subsequent phase, it must move to the edge of its phase, in accordance with the Phase Impenetrability Condition. Thus, successive-cyclic *wh*-movement must leave copies at every intermediate CP and vP. Lebeaux (1988) devises a diagnostic for intermediate copies in CP of successive-cyclic *wh*-movement based on the interaction between binding and reconstruction, a diagnostic that Fox (1998) extends to copies adjoined to vP. Consider (1). Relevant potential reconstruction sites are indicated by underlined asterisks/check marks.

(1) a. [Which of the papers that he_i gave $Mary_j$] did every $student_i$ $\underline{\surd}$ ask her_j to read $\underline{*}$ carefully?
b. *[Which of the papers that he_i gave $Mary_j$] did she_j $\underline{*}$ ask every $student_i$ to revise $\underline{*}$? (Fox 1998: 157)

These examples are interesting in that the *wh*-phrase contains both a pronoun, *he,* to be bound by *every student,* and an R-expression, *Mary,* which must not be c-commanded by the coreferential pronoun *her*/*she.* Thus, the *wh*-phrase must reconstruct to a position below *every student* and above *her*/*she.* In (1a), such a position is available, if we assume that the *wh*-phrase leaves an intermediate copy adjoined to the vP [*ask her to read*], and indeed, the sentence is grammatical. In contrast, (1b) has no such position available. In order for *he* to be bound by *every student,* the *wh*-phrase must reconstruct to its merged position, and yet in this position *she* c-commands *Mary,* violating Condition C of the binding theory. Thus, the sentence is ungrammatical.

This test can be carried over straightforwardly to passives. In (2a) and (2b), Mary keeps being introduced to her own date at parties; (2c) and (2d) involve a charity auction at which dates with bachelors are sold.

(2) a. [At which of the parties that he_i invited $Mary_j$ to] was every man_i $\underline{\surd}$ introduced to her_j $\underline{*}$?
b. *[At which of the parties that he_i invited $Mary_j$ to] was she_j $\underline{*}$ introduced to every man_i $\underline{*}$?

c. [At which charity event that he_i brought $Mary_j$ to] was every man_i __√__ sold to her_j __*__?
d. *[At which charity event that she_j brought $John_i$ to] was he_i __*__ sold to every $woman_j$ __*__?

Identically to the sentences in (1), the sentences in (2) contain a *wh*-phrase that must reconstruct below *every man*/*woman* in order for *he*/*she* to be bound, and above *Mary*/*John* for the construction to obey Condition C. Again, in (2a) and (2c) such a position exists, if one assumes that the *wh*-phrase leaves a copy adjoined to the VP.[3] The fact that (2a) and (2c) are grammatical thus strongly supports the claim that successive-cyclic *wh*-movement proceeds through passive VPs, as well as transitive vPs. In (2b) and (2d), no reconstruction site exists that will satisfy both binding conditions at once, and the sentences are ungrammatical, as predicted.

To apply this test to unaccusatives, we need an unaccusative verb with two internal arguments; *escape* meaning 'forget' is a possibility.[4]

(3) a. Every $organizer_i$'s embarrassment escaped the invited $speaker_j$ at the conference where he_i mispronounced her_j name.
b. *Every $organizer_i$'s embarrassment escaped her_j at the conference where he_i mispronounced the invited $speaker_j$'s name.
c. [At which conference where he_i mispronounced the invited $speaker_j$'s name] did every $organizer_i$'s embarrassment __√__ escape her_j __*__?
d. [At which conference where he_i mispronounced the invited speaker's $name_k$] did it_k __*__ escape every $organizer_i$ entirely __*__?

The surface subject of *escape* must be an abstract concept, which complicates the examples. (3a) demonstrates that *every organizer* can bind *he* from within the DP *every organizer's embarrassment.* (3b) illustrates the Condition C violation between *her* and *the invited speaker* resulting when the adjunct appears in its merged position. (3c) is the crucial example. The grammaticality of (3c) demonstrates that there must be a position available for reconstruction of the *wh*-phrase between the surface subject *every organizer* and the object *her.* Such a position exists if we assume that the unaccusative VP forms a phase. In (3d), in contrast, reconstruction to either the VP-phase level or the merged position yields a Condition C violation between *it* and *the invited speaker's name.* The grammaticality of (3c), in contrast with

[3] This assumes a ''cascade'' structure in which *at DP* phrases are merged as the lowest argument in the VP. See Pesetsky 1995.

[4] Thanks to David Pesetsky for suggesting this verb, and to an anonymous reviewer for improvement in the examples, which allowed formulation of the ungrammatical sentence to complete the paradigm.

(3d), indicates a reconstruction site at the level of the unaccusative VP. Thus, reconstruction effects support the phasehood of unaccusative as well as passive VPs.

1.2 Quantifier Raising in Antecedent-Contained Deletion

In this section, I consider Quantifier Raising (QR). Either of two possible conceptions of QR renders it a diagnostic for movement to the phase edge. The first is that QR is covert, and covert movement must obey cyclicity just like overt movement.[5] Since the phase is the minimal unit sent to LF for interpretation, the phase edge is the only possible target for QR. The second follows work claiming that covert movement is actually overt movement with pronunciation of a lower copy (Bobaljik 1995, Groat and O'Neil 1996, Pesetsky 1998). Fox and Nissenbaum (1999) and Fox (2002) argue specifically that QR is overt in this sense. Since QR is not motivated by the morphological agreement needs of a particular head, we may assume that (like the intermediate steps of *wh*-movement) it is motivated by convergence requirements that allow positing an EPP feature on the phase edge. A quantificational object, of type $\langle\langle e,t\rangle, t\rangle$, must move in order to be interpreted, since in situ it results in a type mismatch with the verb, of type $\langle e, \langle e,t\rangle\rangle$ (see Heim and Kratzer 1998:178–179, 184–188).

The examples in (4) use antecedent-contained deletion (ACD) to force QR (see, e.g., Bouton 1970, Sag 1976, May 1985, Chomsky and Lasnik 1993, Fox 1995) and scope-bearing elements to ensure QR is targeting the edge of the vP rather than CP phase.

(4) a. Mary didn't [$_{VP_1}$ introduce John to [$_{DP}$ anyone you did [$_{VP_2}$ e]]].
b. Some woman [$_{VP_1}$ gave John [$_{DP}$ every message you did [$_{VP_2}$ e]]].

In (4a), for the negative polarity item *anyone* to be licensed, the DP containing it must have undergone QR to a position no higher than negation, thus to the edge of vP (see Merchant 2000).[6] Similarly, in order to obtain the most salient reading of (4b), in which the existential has scope over the universal, the DP must have undergone QR to a position below the subject: to the edge of vP.

(5) replicates these tests with passive and unaccusative VPs.

(5) a. Mary wasn't [$_{VP1}$ introduced to [$_{DP}$ anyone you were [$_{VP2}$ e]]].
b. Some woman was [$_{VP_1}$ given [$_{DP}$ every message you were [$_{VP_2}$ e]]].

[5] See Bruening 2001 for arguments that QR obeys Superiority.

[6] This assumes that negative polarity items are licensed at LF rather than S-Structure, the latter no longer a relevant level in the theory. See Uribe-Etxebarria 1996.

c. The road didn't [$_{VP_1}$ go by [$_{DP}$ any of the scenic spots you expected it to [$_{VP_2}$ e]]].
d. Some train [$_{VP_1}$ arrived in [$_{DP}$ every city you expected it to [$_{VP_2}$ e]]].

For the licensing of the negative polarity item in (5a) and (5c), and for the reading of (5b) and (5d) with wide scope of the existential, QR must target the passive/unaccusative VPs. QR thus also supports the phasehood of passive and unaccusative VPs.

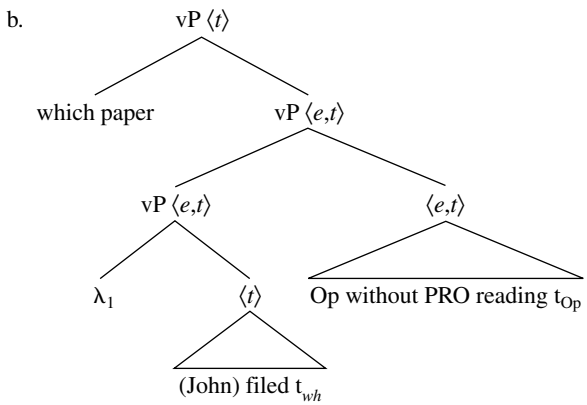
1.3 Parasitic Gaps

Our next diagnostic for movement to the phase edge is the parasitic gap (PG) construction. Nissenbaum (1998) argues for an analysis of PGs whereby a vP-level *wh*-trace is crucial for the interpretation of these constructions. The normal composition of a vP-adjoined adjunct and its host vP[7] uses Predicate Modification to create a conjoined interpretation (see Heim and Kratzer 1998:65). However, the operator movement in an adjunct containing a PG creates a lambda abstract, which results in a type mismatch between the vP, of type $\langle t \rangle$, and the adjunct, of type $\langle e,t \rangle$.

Nissenbaum's idea is that the structure would be interpretable if (a) a *wh*-phrase from the main vP moved to adjoin to vP, creating a lambda abstract; and (b) the adjunct clause containing the PG merged countercyclically just below the root. (See Nissenbaum 1998 for details and supporting arguments.)

(6) a. Which paper did John file [Op [PRO without reading t_{Op}]]?

b.



[7] Nissenbaum shows that the tests that support a cascade structure for certain adverbials argue for a right-adjoined, or ''layered,'' structure for those found in PGs. See Pesetsky 1995 for a discussion of cascade versus layered adverbials.

Therefore, PGs require *wh*-movement to the edge of the vP phase to be interpreted, and so can serve as a diagnostic for such movement.

Applying this test to passives requires use of an overt subject in the subordinate clause, since PRO in these adjuncts, with or without a PG, seems to strongly resist being controlled by a passive subject, instead preferring to be coindexed with an external argument of the host verb phrase. This change makes PGs with transitive vPs slightly marginal; the PGs with passive VPs are correspondingly marginal.[8]

(7) a. ?Which house did John buy [Op [before we could demolish t_{Op}]]?
b. ?Which house was John sold [Op [before we could demolish t_{Op}]]?
c. ?Which story did John show the editor [Op [without anyone verifying t_{Op}]]?
d. ?Which story was the editor shown [Op [without anyone verifying t_{Op}]]?

PGs with the unaccusative verb *escape* are also slightly marginal:

(8) a. ?Whose name did John forget [Op [before he wrote t_{Op} down]]?
b. ?Whose name escaped John [Op [before he wrote t_{Op} down]]?

The ability of passive and unaccusative VPs to host PGs thus also supports their status as a phase.

2 Evidence for Phases at PF

In this section, I present a tentative test for the phasehood of vPs at PF: the Nuclear Stress Rule (NSR). The exact formulation of this rule is immaterial here (see, e.g., Cinque 1993); it suffices to observe that primary stress in English is assigned to the final stress-bearing element in the VP: *Mary fixed the bike*^{1}/*Mary fixed*^{1} *it.*

Bresnan (1972) argues on the basis of (9) that the NSR applies cyclically.

(9) a. Mary liked the proposal that George leave.^{1}
b. Mary liked the proposal^{1} that George left. (Bresnan 1972: 75)

(9a) illustrates normal application of the NSR, assigning primary phrasal stress to final *leave.* In (9b), on the other hand, the primary

[8] Thanks to Jon Nissenbaum and an anonymous reviewer for improvements in the examples. A few speakers I consulted found the passive (and unaccusative) examples worse than the vP. I can only suggest that the as yet ill-understood thematic requirements of the adjuncts in PGs result in a difference for these speakers.

stress appears on the nonfinal *proposal.* Bresnan's intuition is that the NSR applies normally in (9b), but that its application is cyclic. Thus, assuming that *proposal* in (9b) is moved from the object position of the embedded clause,[9] it receives primary phrasal stress on the first application of the NSR, before it has moved from object position.

The relevance of phases becomes apparent when we consider the data in (10).

(10) a. I'll look up Mary[1], when I'm in Toronto.
b. I'll look her/?Mary up[1], when I'm in Toronto.
c. Please put away the dishes[1].
d. Please put them/?the dishes away[1].

In these examples, the object undergoes short movement within the verb phrase. As functional categories, prepositions resist bearing primary stress; however, in (10b) and (10d), primary stress on the preposition seems possible. Thus, the NSR assigns primary stress to the preposition in these examples, and this stress may shift because of the prosodically light status of the preposition. These examples thus contrast with those in (9), in that the NSR does not assign primary stress to the shifted object.

I propose that the crucial distinction between (9) and (10) is that in (9) the object moves out of the phase, whereas in (10) the object moves within the phase. Thus, the input to PF on the first phase of (9b) is [*left the proposal*], whereas the input to PF on the first phase of (10d) is [*put the dishes away the dishes*].

Let us assume that the PF operation that deletes noninitial copies in a chain treats each phase as a separate unit, as expected. In (9b), the DP *the proposal* is a copy, this DP having moved to the phase edge to be visible for movement during a later phase. However, the phase contains only one occurrence of this DP, and thus the PF operation that deletes noninitial copies in a chain cannot apply to it. The phase proceeds to the application of the NSR unaltered, and primary phrasal stress is assigned to *the proposal.* At a later phase, this occurrence of *the proposal* will be deleted in favor of a higher occurrence, with the primary phrasal stress realized on the higher occurrence.[10] In (10d), on the other hand, the input to PF contains two occurrences of *the dishes.* Thus, the PF operation deleting noninitial copies applies, deleting the lower copy. In the input to the NSR, *away* is the rightmost

[9] See Vergnaud 1974, Kayne 1994, and much subsequent work.

[10] This analysis requires that phonology be able to modify previous phases. This must be the case independently, however, since there exist prosodic units larger than the phase—for example, intonational phrases (see, e.g., Selkirk 1980).

element in the verb phrase and accordingly receives primary phrasal stress.[11]

If this analysis is on the right track, the NSR applies to the phase, thereby providing evidence for the existence of phases. Furthermore, it can test for the phasehood of a phrase: an element moving from a VP-final position out of the phase should bear primary phrasal stress, while an element moving from a VP-final position to a position within the same phase should not.

Turning to unaccusative and passive VPs, the prediction is clear. If these VPs are not phases, and so movement of the object to subject position takes place within the same phase, the subject of unaccusative and passive VPs should not bear primary phrasal stress. If unaccusative and passive VPs are phases, on the other hand, movement from object to subject position will be movement out of a phase.[12] Therefore, if the object was final in the VP before movement to subject position, it should bear primary phrasal stress. This prediction is borne out.

(11) a. (What happened yesterday?) My bike[1] was stolen.
(cf. #John[1] stole my bike.)

b. (What happened yesterday?) My bike was sent to John[1].

c. (What happened this morning?) The train[1] arrived.

As (11a) illustrates, in a neutral context primary stress on the subject of a passive sentence is natural; whereas primary stress on the subject of the corresponding active is odd, as expected. (11b) illustrates that if the lower copy of the passive subject is not VP-final, the VP-final element receives primary stress instead. (11c) demonstrates that the subject of unaccusative VPs also receives primary phrasal stress in a neutral context, as the proposed analysis predicts.

In this section, I have presented suggestive evidence that the NSR may distinguish movement within a phase from movement out of a phase.[13] I then used the NSR as a diagnostic to demonstrate the phasehood of passive and unaccusative VPs.

[11] An anonymous reviewer notes that the conclusions also hold on an alternative derivation whereby the particle is merged as a predicate of the object DP and raises to the verb. On such a derivation, the stress assignment on *dishes* in (10c) is the interesting case, the input to copy deletion being *put away the dishes away*.

[12] In fact, the movement to subject position will require an intermediate position at the phase edge, as discussed in section 1. Since this position is also outside the domain of the phase that serves as the input to PF, this intermediate position is not relevant to the discussion here.

[13] It is well known that stage-level and individual-level intransitives differ in nuclear stress patterns (Gussenhoven 1983, 1992, Selkirk 1995).

(i) a. Her EYES are red. (stage-level)
b. Her eyes are BLUE. (individual-level)

These data may provide additional support for the present model, on Diesing's

3 Conclusion

In this squib, I have identified four pieces of evidence for vP phases: *wh*-reconstruction effects, Quantifier Raising, parasitic gaps, and the Nuclear Stress Rule. In all cases, I have demonstrated that the diagnostic equally supports the phasehood of unaccusative and passive VPs. Therefore, analyses that crucially require unaccusative and passive VPs to not be phases may require rethinking.

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(1990) mapping hypothesis. Diesing proposes that whereas the surface subjects of stage-level predicates are generated within the verb phrase and raise to the specifier of IP, individual-level predicates are generated in the specifier of IP and control a PRO within the verb phrase. Therefore, *eyes* in (ia) receives nuclear stress within the VP (or rather AP) phase and retains it on movement to IP. In (ib), on the other hand, nuclear stress is assigned to *blue,* since PRO is phonologically null and so unable to bear stress. Thanks to an anonymous reviewer for raising this issue.

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How Antisymmetric Is Syntax?

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Since the emergence of Kayne's (1994) stimulating proposal for an antisymmetric theory of phrase structure and linear order, much work has been devoted to arguing for or against his theory as well as discussing its empirical predictions. As a result, for a number of phenomena involving rightward positioning, such as rightward adjuncts, heavy NP shift, extraposition, postverbal subjects, and postverbal constituents in OV languages, there now exist both an approach consistent with Kayne's theory (the antisymmetric approach) and another not consistent with it (the symmetric approach). In such a situation, it is often difficult to show on empirical grounds that one approach is superior to the other (see Rochemont and Culicover 1997). In what follows, I describe this situation with respect to two well-known phenomena in English: rightward positioning of adjuncts and heavy NP shift. For each of these phenomena, the symmetric and antisymmetric approaches have been proposed, and both approaches can correctly account for the data discussed in previous studies. Here, I examine the approaches from a novel point of view, showing that data involving the licensing of negative polarity items allow us to differentiate them and to decide which is the right one for each of the two empirical domains. Interestingly, the relevant facts lead to different conclusions for the two phenomena. The results have important implications for the antisymmetric view of syntax.

1 Adjuncts and Heavy NP Shift: Symmetric versus Antisymmetric Approaches

It appears that adjuncts can be high in the syntactic structure while appearing rightward on the surface (see Reinhart 1976, 1981, 1983 and Solan 1983 for much relevant discussion). The contrast in (1) shows that the adjunct α is located higher than the object but lower than the subject.

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