

The Interaction of Event Structure and *Wh*-movement*

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1 Introduction

This paper comes in three parts. Firstly, in section 2, I show that there is evidence from patterns of legitimate extraction out of adjuncts in English that there is an event-structural well-formedness condition on *wh*-chains which does some of the work ordinarily assumed to belong strictly within the domain of syntactic theory. Secondly, in section 3, I explore the possibility of using this new semantic condition to do more empirical work within locality theory, in distinguishing factive islands from regular cases of extraction from a clausal complement embedded under a bridge verb. Finally, in section 4, I put the two parts together, and focus on extraction from an adjunct attached within a complement clause embedded under a bridge verb. In this last section, we see that application of the event-structural well-formedness condition from section 2 in a global postsyntactic fashion leads to severe overgeneration. However, allowing the condition to apply in a local, cyclic fashion gives an empirically adequate set of results. We therefore derive an argument for a model of the syntax–semantics interface in which the semantic component is able to access the output of the syntactic component cyclically, rather than being constrained to apply only after the entire syntactic computation has finished.

2 Events and Extraction from Adjuncts

It has long been noted that extraction from adjuncts is generally impossible. This observation was given an explanation by Huang’s (1982) Condition on Extraction Domain, in (1). As adjuncts are never properly governed, the CED clearly predicts extraction from adjuncts to be universally impossible.

(1) A phrase A may be extracted out of a domain B only if B is properly governed. (Huang 1982:505)

However, counterexamples to this observation have been known to exist since the earliest days of the CED (see, for example, Chomsky 1982:72–3). Surprisingly, these counterexamples seem to be distributed partly along event-structural, rather than phrase-structural, lines. In this paper, I will concentrate exclusively on the class of *bare present participial adjuncts*, which consist of a bare VP built around a present participial verb form, and not introduced by a preposition. Interestingly, extraction is only possible from such adjuncts if they modify a VP which describes an accomplishment (2a) or an achievement (2b), rather than an atelic activity (2c)¹ or state (2d).

(2) a. What did John drive Mary crazy [whistling *t*]?
b. What did John drive Mary crazy [reading *t*]?
c. What did John drive Mary crazy [sleeping *t*]?
d. What did John drive Mary crazy [being *t*]?

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¹Time and space constraints prevent me from discussing the existence of a well-defined class of counterexamples to this claim, as in (i).

- (i) a. What did John lie in bed [reading *t*] all day?
b. What is John wandering around [whistling *t*]?

- b. What did John die [whistling *t*]?
- c. *What does John work [building *t*]?
- d. *Which magic hat does John know Georgian [wearing *t*]?²

Moreover, there is a clear interpretive difference between the two cases which do allow extraction. There is a causal relation between the event described in the adjunct and the event described in the matrix clause in the accomplishment case (2a) which is simply not there in the achievement case (2b). So while (3a) is a reasonable paraphrase of (2a), (2b) *cannot* be paraphrased as in (3b), but can only be paraphrased along the lines of (3c) instead.

- (3) a. What is the *x* such that John whistling *x* caused Mary to become crazy?
- b. What is the *x* such that John whistling *x* caused him to become dead?
- c. What is the *x* such that John was whistling *x* immediately before he became dead?

A purely syntactic theory of locality has little to say about these patterns. Even if we allow ourselves a syntactic instantiation of various decompositional approaches to event structure phenomena, as in the productive line of research reinvigorated by Hale and Keyser (1993), whereby the VP is expanded into a more articulated functional sequence of eventive heads, there is no reason to expect such a theory to interact with any current approach to locality to produce anything like the patterns of grammaticality and interpretation that we see here. Accordingly, I propose the following condition, which makes direct reference to events, rather than approaching this link through the intermediary of an articulated vP structure.

(4) **The Event Locality Condition: Events form locality domains for *wh*-movement**

Wh-questions carry a presupposition that the minimal constituent containing the head and the foot of the chain describes a single event. An instance of *Wh*-movement is felicitous only if the denotation of that minimal constituent can be construed accordingly.

I assume an approach to the semantics of the aspectual classes which derives four classes from the possible presence or absence of two *subevents* (components of a larger *macroevent*), namely a *preparatory process*, which leads to a pointlike *culmination*, an instant of significant change of state. We then predict four classes, as follows.³

- (5) a. ACCOMPLISHMENTS and TRUE ACHIEVEMENTS: process + culmination.
- b. ACTIVITIES: process
- c. POINTS: culmination

²It would be reasonable to object that declarative counterparts of this example are already pretty terrible, but bare present participial adjuncts modifying stative VPs are generally quite degraded. An example such as *?I only know Georgian wearing THIS magic hat* (due to Annabel Cormack) is about as good as it gets.

³This classification diverges in significant ways from the original taxonomy in Vendler (1957). I do not have time to fully justify this here, but the motivation relates to the different behaviour of two classes of predicate jointly labelled as achievements by Vendler with respect to his progressive test. Vendler claimed that progressives cannot felicitously be formed from achievements and states, unlike accomplishments and activities. However, it is easier to form the progressive from an achievement like *arrive* (ia) than from an achievement like *notice* (ib).

- (i) a. John is arriving in a minute.
- b. *John is noticing the carnage in a minute.

I take this as evidence that the former class of achievements (*true achievements*) behave more like accomplishments, while the latter class (*points*) are distinct. The extraction data correlate well with this division, as shown in (ii).

- (ii) a. What did John arrive [thinking about *t*]?
- b. *What did John notice the carnage [thinking about *t*]?

d. STATES: \emptyset

This gives us a way in which accomplishments and true achievements form a natural class to the exclusion of the other aspectual classes. The structure in (5a) is the only one to contain two distinct subevents, a process and a culmination. In contrast, the structures in (5b–d) do not have this sort of internal articulation.

Moreover, it is natural on this account that only the accomplishments and true achievements should allow subextraction, if we adopt the Event Locality Condition. That condition states that a *wh*-chain must describe a single event, and yet both the matrix and adjunct VPs in examples such as (2a) independently describe a single event, on any standard syntactic treatment of Davidson's (1967) theory of events. One way to fuse these two independent events together to form a single event is to identify the process described by the adjunct (which always describes a process, presumably for reasons related to the semantics of *-ing*) as the preparatory process leading to the culmination described by the matrix VP. If this is possible, then the Event Locality Condition will be met and extraction from the adjunct will be possible.

Some evidence corroborating this approach is that, if the nature of that preparatory process is independently specified by the matrix VP, then extraction from a bare present participial adjunct modifying that VP is impossible. This can be seen by comparing (2a) with (6). In (6), the matrix VP *paint this picture* already describes a specific preparatory process, namely painting, and so this subevent cannot also be identified as the *trying to express* described in the adjunct. In that case, the Event Locality Condition cannot be met by (6) as it was by (2a) and the other grammatical examples above.

(6) *What did John paint this picture [trying to express *t*]?

This condition therefore does a good job of explaining why bare present participial adjuncts modifying accomplishment and achievement VPs allow subextraction so much more easily than similar adjuncts modifying VPs describing other aspectual classes. Although I cannot fully spell out the details here, I wish to claim that it can also discriminate between the accomplishment and achievement cases in a way which gives us a handle on the interpretive distinction illustrated in (3).

The crucial observation is that, although both accomplishments and true achievements contain two subevents, the first of which directly causes the second, the role of the subject with respect to that causing subevent is different in the two cases. Compare (7a) and (7b).

- (7) a. John drove Mary crazy.
b. John arrived in Belfast.

Although nothing in these sentences fully specifies the nature of the preparatory process, it is intuitively correct to say that, in (7a), *something John did* caused Mary to become crazy. In contrast, it is not necessarily the case that something John did caused him to arrive in Belfast, in the same intuitive sense. He could have been kidnapped and brought to Belfast against his will, for example, and it would still be fair to utter (7b). Now, when we add a bare present participial adjunct to such sentences, describing something that John did, as in (8), it is natural to treat this as the subevent which directly caused Mary's craziness in (8a), and rather less natural to treat it as the subevent which directly caused John to be in Belfast in (8b).

- (8) a. John drove Mary crazy whistling hornpipes.
b. John arrived in Belfast whistling hornpipes.

Space reasons prevent me from presenting a theory relating this "naturalness" to the more categorical pattern we saw in (3) (see Truswell 2007 for a detailed account), but the sketch presented here hopefully shows that a theory of locality incorporating an event-structural component such as (4) is a more promis-

ing way to approach the patterns of both grammaticality and interpretation found in the data concerning extraction from adjuncts in English.

3 Factive Islands

Although it presents some data which suggest a more interface-driven theory of locality than is currently the norm, nothing in the preceding section makes any strong claims about the architecture of the syntax–semantics interface itself. By formulating the Event Locality Condition in terms of a presupposition, it is possible to describe the locality effect in semantic terms and still maintain compatibility with the Y-model of Extended Standard Theory, for example. The strong claim in the previous section is that many apparently ungrammatical examples of A'-movement out of an adjunct are in fact syntactically quite legitimate, but ill-formed for semantic and pragmatic reasons. In terms of the overall architecture of the grammar, however, any model which can handle a regular case of presupposition failure such as *The king of France* can also, in principle, accommodate this condition. In the rest of this paper, however, I give an argument for a cyclic model of the syntax–semantics interface, based on the interaction of the Event Locality Condition with long-distance A'-dependencies formed by successive cyclic movement.

If we accept the necessity of a condition along the lines of (4), then considerations of theoretical parsimony should lead us to hope that it does more than just regulate patterns of extraction from adjuncts. One other area where such a condition may well come into play is in distinguishing bridge verbs from the class of factive islands identified by Erteschik-Shir (1973). Erteschik-Shir showed that extraction from a complement clause embedded under a factive verb, as in (9b), is significantly degraded in comparison to a similar example embedded under a nonfactive verb, as in (9a).⁴

- (9) a. Who did John say [that Mary kissed *t*]?
b. *Who did John regret [that Mary kissed *t*]?

Already in Erteschik-Shir (1973), the link between the degradation of (9b) and the presuppositional character of the matrix verb is intuitively clear, but less is said about *why* such a link should hold. The Event Locality Condition offers us a way to explain this link.

Without going into the formal details, there is a clear difference between bridge verbs like *say* and factive verbs like *regret* with respect to the presuppositional status of their complements. Verbs like *say* exhibit typical referential opacity properties, and it is consequently not possible to infer *Mary kissed Bill* from (10a).

- (10) a. John said that Mary kissed Bill.
b. John regrets that Mary kissed Bill.

(10b), on the other hand, presupposes that Mary kissed Bill (as can be seen for standard presupposition diagnostics such as invariance under negation), and asserts that John regrets it. This means that the eventuality of Mary kissing Bill has an existence independent from the eventuality of John regretting Mary kissing Bill in (10b), while it does not have an existence independent of John saying that Mary kissed Bill in (10a).⁵ Accordingly, we can only talk of a single event actually taking place in (10a), but of two independent events in (10b). This means that only the nonfactive cases such as (11a) will meet the requirement imposed by the Event Locality Condition, and consequently that extraction is possible

⁴I ignore the second class of islands which Erteschik-Shir concentrates on, namely *manner-of-speaking* verbs such as (i).

- (i) *Who did John holler [that Mary kissed *t*]?

⁵See van der Sandt (1992) for a theory of presupposition which would derive this result in a natural scope-based way within a DRT framework.

from complements of nonfactive verbs, but not from complements of factive verbs.

- (11) a. $\exists e_1 . \text{say}(j, \exists_2 . (\text{kiss}(m, b, e_2)), e_1)$
 b. $\exists e_1, e_2 . \text{kiss}(m, b, e_1) \wedge \text{regret}(j, \text{kiss}(m, b, e_2), e_1)$

4 Bridge Verbs and Successive Cyclicity

If the argumentation in the preceding sections is on the right track, it looks as if the same semantic/pragmatic condition which regulates extraction from adjuncts can also do some work in the apparently unrelated area of bridge verbs and factive islands. However, the argument presented in section 3 overgenerates in a serious way, as things stand, and reining it in will require some more specific assumptions about the way in which the Event Locality Condition interacts with the overall architecture of the grammar.

To see the problem, let's examine the shape of the argument in section 3 a little more closely. I drew a distinction between two classes of verbs. The crucial difference between a verb like *say* and a verb like *regret* is that only a verb like *regret* presupposes its complement, which gives the semantic material denoted by that complement an independence which is lacking in the case of a verb like *say*. But that distinction applies without making any reference to the *internal* structure of that complement. As (12) shows in schematic form, the same distinction will be drawn regardless of the event-structural complexity of that complement.

- (12) a. $\exists e_1 . \text{say}(j, \exists e_2, \dots, e_n . (P_2(e_2) \wedge \dots \wedge P_n(e_n)), e_1)$
 b. $\exists e_1, \dots, e_n . P_2(e_2) \wedge \dots \wedge P_n(e_n) \wedge \text{regret}(j, (P_2(e_2) \wedge \dots \wedge P_n(e_n)), e_1)$

As things stand, then, the analysis proposed in section 3 predicts that we can embed an arbitrary number of unrelated event descriptions under a single bridge verb (as in (12a), unlike the factive case in (12b)), and the result will only assert the independent existence of a single event. This is clearly false.

The empirical problem concerns the data in section 2 which originally motivated the introduction of event-structural factors into this theory of locality, and the interaction of that data with bridge verbs. (4) predicts that, once we have a single event description, as we do in (12a), extraction should be possible, regardless of the internal complexity of that event description. As embedding under a bridge verb always yields a single event description, we should expect to see any event-structural distinctions such as those in (2) nullified if we embed them under a bridge verb, with extraction from any such structure being possible. This is manifestly not what we find. Although some speakers perceive a slight amelioration for the degraded examples in (13) in comparison to those in (2), the effect is far too fragile and far too slight to have any real faith in. For the majority of speakers, it seems that the degraded examples in (13) are just as bad as those in (2).⁶

- (13) a. What would Bill say [that John drove Mary crazy [whistling *t*]]?
 b. What would Bill say [that John died [whistling *t*]]?
 c. *What would Bill say [that John works [building *t*]]?
 d. *Which magic hat would Bill say [that John knows Georgian [wearing *t*]]?

There is, however, a natural way to avoid the overgeneration of this analysis. Consider the syntactic structure of an example like (13c). Until now, whenever we have applied (4), we have assumed that

⁶The reason for the use of *would* in these examples is to avoid the possibility of a contracted form *what d'you say that...*, which functions as a request for previously given information to be repeated. On this interpretation, the degraded examples in (13) become much better for many speakers, but for those speakers, all sorts of apparently unrelated island violations also become much better, such as extraction of an adjunct from within a weak island. This effect is therefore presumably quite independent of the prediction made by the above analysis.

the constituent which is required to describe a single event consists of the entire sentence, as this is the constituent defined by *What* and *t* in (13c). However, there is, of course, also an intermediate trace in the embedded [Spec,CP] in such an example.

(14) [CP What would [TP Bill [VP say [CP t_{what} that [TP John [VP [VP works] [XP building t_{what}]]]]]]]?

Now, consider what the Event Locality Condition would have to say at the point in the derivation where *what* has moved to the intermediate landing site, but not yet to matrix [Spec,CP]. It is clear that this condition predicts this intermediate A'-chain to be just as ill-formed as the A'-chain in (2c), as (15) is presumably identical to that example from an event-structural perspective.

(15) [CP What that [TP John [VP [VP works] [XP building t_{what}]]]]

If the Event Locality Condition were to apply at this intermediate stage, before the bridge verb has been merged, then the structure would already be ruled out as ill-formed before the matrix bridge verb has its ameliorating effect. We therefore have some evidence to support the following.

(16) The Event Locality Condition applies cyclically.

If we are to attempt to maintain the event-structural approach to both extraction from adjuncts and factive islands, then, it is necessary to adopt a model of the grammar which allows a semantic and / or pragmatic condition such as (4) to exert its influence in a cyclic fashion, rather than purely globally. The crucial observation is that, although the final output of the syntax in an example such as (14) satisfies the Event Locality Condition, there is a stage in the middle of the derivation which is ill-formed with respect to that condition.

5 Summary

This paper has had two main aims. The first is to argue that there is evidence for an event-structural component in our locality theory, and that many effects, particularly adjunct island and factive island effects, which are traditionally treated in purely syntactic terms, should in fact be handled at the syntax–semantics interface. Secondly, though, building on that first conclusion, we see that the interaction of the two major empirical domains considered here, namely extraction from adjuncts and extraction from complement clauses, forces us to adopt a view of that interface in which the output of the syntax is passed to the semantics in a cyclic fashion, rather than once and for all. The granularity of that cycle is a matter for future investigation — are we dealing with phase-based cyclic spell-out as in Chomsky (2000 *et seq.*), or with conceivable alternatives such as cycles based on the clause or on movement steps? — but some such cyclic mechanism is necessary if we are to rule out those cases such as (14), which are globally well-formed with respect to the Event Locality Condition, but include a locally ill-formed subpart, (15).

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