

Referential Opacity and Extraction from Purpose Clauses

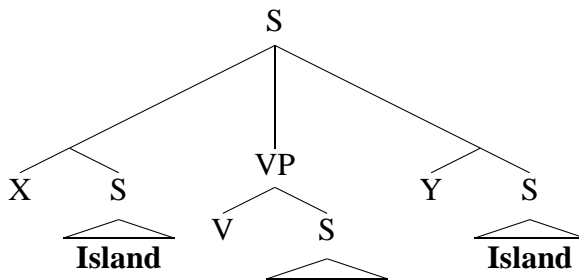
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MIT LF Reading Group, 29/10/07

1 Introduction

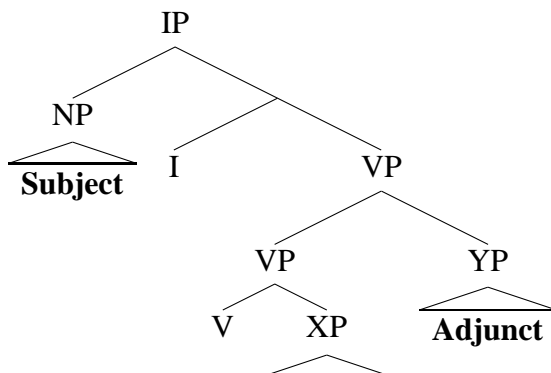
1.1 Adjuncts and Locality: Background

- (1) **Ross (1967):** an S node outside a chain of complementation relations defines an island. “Chopping” transformations cannot cross island boundaries.



Net result: Many adjuncts (those including an S node) behave like islands, whereas this is debatable for others (e.g. untensed adjuncts).

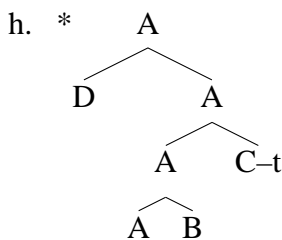
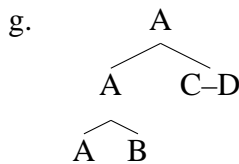
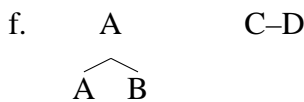
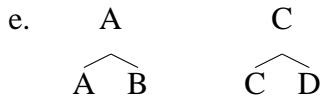
- (2) **Huang (1982):** The Condition on Extraction Domain: A phrase A may be extracted out of a domain B only if B is properly governed (p.505). We can argue about proper government til the cows come home, but this much seems clear:



- a. **Subjects** aren't properly governed (outside the m-command domain of a governing head);
- b. **Adjuncts** aren't properly governed (not assigned a θ -role, possibly also outside the m-command domain of a governing head).

(3) **Uriagereka (1999): Multiple Spell-Out:**

- a. Merge takes a lexical item and attaches it to a tree, making a larger tree;
- b. This means that Merge has problems when it has to join together two syntactically complex objects (neither is present in the lexicon — rather, they exist in separate “derivational workspaces”);
- c. So, in such a case, you need to spell out the nonprojecting sister, essentially making it syntactically atomic;
- d. And you can't move out of syntactically atomic things, so this creates an island.



(4) So over the past 40 years, we have seen two trends:

- a. **Generalisation:** Some adjuncts are islands → all adjuncts are islands → all noncomplements are islands;
- b. **Integration:** Islandhood essentially stipulated → islandhood derived from a “secondary” syntactic relation → islandhood derived from properties of the basic structure-building operation.

1.2 The problem

(5) Adjuncts aren't always islands.

- a. We have known this since at least Chomsky (1982) (see also Cinque 1990, Szabolcsi 2006), who lists some examples and claims that they ‘range in acceptability from fairly

- high... to virtual gibberish' (p.72);
- b. The further we proceed down the paths in (4), the harder it becomes to account for these (admittedly fairly rare, but not vanishingly so) problem cases.
- (6) I want to talk about one of the more productive classes of extraction from adjuncts today, namely extraction from purpose clauses.
 - a. Here's the influential professor_i that John went to college [in order to impress ___i] (Chomsky 1982:72)
 - b. Who_i did Mary send John into the office [to talk to ___i]?
 - c. Which car_j did you buy those tires_i [to put ___i on ___j]? (Jones 1984 — see also Jones 1991 for a fuller discussion of such examples)
 - (7)
 - a. And what if it wasn't you that I came here to see?
(<http://michaelmanning.tv/blog/2005/06/funny-movie-scenes.html>)
 - b. This is exactly the type of situation that we work hard to avoid.
(<http://www.adobe.com/epaper/features/amd/pdfs/amd.pdf>)
 - (8) **A non-answer:** Extraction from (rightward) adjuncts is always possible. There are plenty of theories of locality (e.g. the connectedness approach of Kayne 1983, to pick just one very respectable example) which, usually because it isn't their primary concern, don't say anything to ban extraction from (rightward) adjuncts. But we can't just adopt one of those theories, and leave the cases where extraction really is impossible unexplained.
 - (9)
 - a.
 - (i) *Which problems did you get here [despite __]?
 - (ii) *Which directions did you find the restaurant [despite misunderstanding __]?
 - (iii) Etc.
 - b.
 - (i) *Who did John go home [after he talked to __]?
 - (ii) *Who did John cry [after Mary kissed __]?
 - (iii) Etc.
 - c.
 - (i) *Here is the influential professor that John went to college [in order that he might impress __].
 - (ii) Etc.
 - (10) In fact, I'm going to ignore tensed adjuncts like (9b–c) for the rest of this paper. Tensed adjuncts really do behave like strong islands, in at least the vast majority of cases. Hopefully this will be something I can cover at Ling-Lunch, but for now I have to leave it as a stipulation.

2 How Much of This is Syntax?

- (11) The central question: what makes purpose clauses special, compared to those in (9)?
- (12) In most respects, they appear to be just regular adjuncts (syntactically and semantically optional, occur outside arguments,...).
- (13) They have received some attention for their control properties (e.g. Chierchia 1989). Chierchia argues that, within his framework of assumptions determining choice of con-

troller, purpose clauses must be treated as *semantic* arguments of the matrix verb. He is careful, however, to note (p.164) that this does not entail that they are *syntactic* arguments.

- (14) Jones (1984) builds a syntactic account on the following assumptions:
- a. Control is determined at S-structure, while γ -marking of adjuncts *and empty categories within adjuncts* applies at LF. (The part in italics represents the crucial modification to Lasnik and Saito 1984.)
 - b. A null operator moves to the edge of the adjunct at SS to mediate determination of controller for the purpose clause gap.
 - c. A *wh*-phrase moves successive cyclically, also via the edge of the adjunct.
 - d. The null operator's index projects at SS, the *wh*-phrase's at LF (creating a chain of antecedent government relations and allowing $[+\gamma]$ marking of all traces).
 - e. (i) $[[O_i t'_j]_i \text{ PRO to put } e_{i_{[+\gamma]}} \text{ on } e_j]$ (Control at SS)¹
 (ii) $[[O_i t'_j]_j \text{ PRO to put } e_{i_{[+\gamma]}} \text{ on } e_{j_{[+\gamma]}}]$ (LAG [local antecedent government] of *wh*-trace at LF) (Jones 1984)
 - f. This reindexing is unavailable with other classes of adjunct.
 - g. (i) *The champion who I dream of a glorious future whenever I see is Paolo Rossi
 (ii) *... who_i... [[whenever_j t'_i] I see t_i t_j]
- (15) The problems:
- a. It's not clear that anything like failure of this reindexing manoeuvre can always be held responsible for the unacceptability of a case of extraction from adjuncts. Hard to see what would block it in cases such as these:
 (i) *What does John work [building ___]? (*cf.* John works building igloos)
 (ii) *Which problems did you get here despite?
 - b. (Maybe the same problem really:) Cases such as (9c) suggest that trying to reduce the problems entirely to properties of the edge of the adjunct won't get you the whole story (although I'll be laying myself open to the same criticism in this talk).
- (16) But it's hard to know where else to look for an explanatory syntactic account.
- a. The bottom of these dependencies looks like any other regular case of movement of a complement.
 - b. The link between the base position and the edge of the adjunct looks pretty unremarkable syntactically.
 - c. The availability of extraction out of adjuncts in some cases suggests that there is nothing wrong in principle with forming an A'-dependency across an adjunct boundary.
 - d. Stipulating that the special properties hold exclusively of purpose clauses is unattractive, given that plenty of other classes of adjunct allow some extraction:
 (i) The man that I went to England [without speaking to ___] (Chomsky 1982:72 — maybe more on these below, time permitting)
 (ii) What did John arrive [whistling ___]? (Maybe more on these at Ling-Lunch in

¹This seems to be a technical weakness in Jones' approach: (14a) states that γ -marking of empty categories within adjuncts occurs at LF, but here we have to assume that the trace left by the operator is marked $[+\gamma]$ at SS. But anyway...

December, weather permitting)

(iii) Etc.

- (17) Putting all this together leads me to look for a distinguishing characteristic of purpose clauses outside of syntactic concerns.

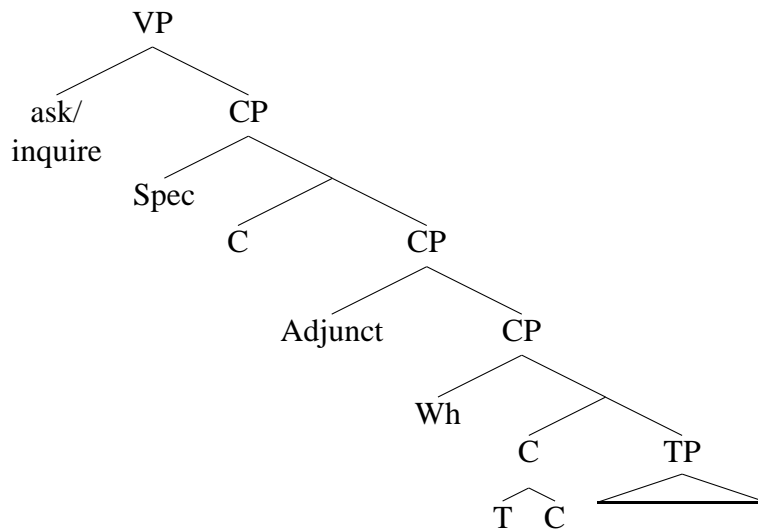
3 The Alternative

3.1 Factive Islands and Extraction from Complements

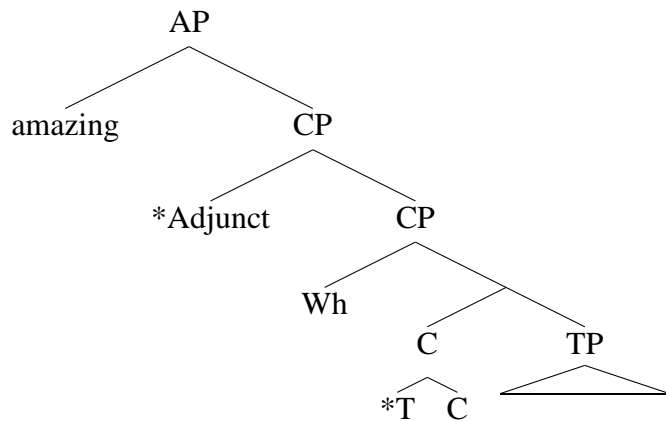
- (18) Of course, extraction from complements isn't always acceptable either.
- a. *This is the girl that it amazes me that Peter likes.
 - b. *This is the girl that I rejoice that Peter likes.² (Erteschik-Shir 1973:90)
- (19) The generalisation, in its most widely accepted form: Extraction is impossible from complements of factive verbs.
- (20) One possibility is that factive complements have a different syntactic structure from complements of bridge verbs. I don't have an argument against that line of inquiry in general, but note that many recent syntactic studies into this issue (e.g. McCloskey 2006) conclude that nonfactive complements are *bigger* than factive complements (*contra* Kiparsky and Kiparsky 1970).
- a. They would have been rebuffed if they had inquired was there anything they could do. (McCloskey, (5b))
 - b. (i) Ask your father when he gets home does he want his dinner. (60b)
(ii) ?Ask your father when he gets home if he wants his dinner. (59a)
 - c. *It was amazing while they were out who had got into their house. (58a)
 - d. *It was amazing who did they invite. (61a)

²These judgements come *verbatim* from Erteschik-Shir's thesis, and ultimately from a single informant. All sorts of questions arise about the data (acceptability of declarative counterparts, stability of judgements across informants, control for information-structural effects, etc.), but the basic generalisation seems fairly robust across speakers.

(21) a.



b.



c. The reasoning:

- (i) No adjunction to arguments (Chomsky 1986);
 - (ii) Head-movement into the top projection of an argument interferes with selection and yields an illegitimate structure;
 - (iii) The higher CP layer contains an operator turning an 'interrogative radical' into an embedded constituent with real interrogative force (\rightarrow variability with semi-factives under negation, interrogation etc.).
- d. But note that, in that case, an attempt to tie the islandhood of factive predicates to phrase structure would run counter to the basic tenet of syntactic locality theory, that bigger structures are at least as hard to extract out of as smaller structures (as in Kiparsky and Kiparsky's original intuition).

(22) I will therefore assume that Erteschik-Shir's intuition that this distinction is semantic is along the right lines.

- a. A clause or phrase is semantically dominant if it is not presupposed and does not have contextual reference [i.e. does not echo some earlier part of the discourse]. (Erteschik-Shir 1973:22)
- b. Extraction can occur only out of clauses or phrases which can be considered dominant in some context. (Erteschik-Shir 1973:27)

- c. The qualification ‘can... in some context’ is meant to explain some reported gradient judgements concerning extraction from factive complements. I have been unable to replicate these judgements (most people I have asked, in admittedly pretty unsystematic ways, find extraction from factive complements categorically unacceptable in neutral contexts) so I will ignore this qualification.
 - d. Extraction can occur only out of clauses which are not presupposed and do not have contextual reference.³
- (23) Factive clauses are presupposed, more or less by definition.
- a. John regrets that Mary kissed Bill → Mary kissed Bill.
 - b. John doesn’t regret that Mary kissed Bill → Mary kissed Bill.
 - c. *Who does John regret that Mary kissed?
- (24) At least the core class of bridge verbs seems to be those with referentially opaque complements.⁴
- a. If you’re referentially opaque, then you allow extraction.
 - (i) John thinks that Mary kissed Bill ↗ Mary kissed Bill.
 - (ii) John doesn’t think that Mary kissed Bill ↗ Mary kissed Bill.
 - (iii) Who does John think that Mary kissed?
 - b. This is a one-way implication, because of Erteschik’s other class of island-inducing predicates of saying.
 - (i) *What did John mutter that Bill did?
 - (ii) *Who did John yell out that Mary kissed?
- (25) One striking property of purpose clauses is that they are also referentially opaque. A related point has been made by Jackendoff (1985, 2007), who argues that the beliefs and intentions have near-identical conceptual structures, particularly with respect to referential opacity (the following tests are based on Jackendoff 1985:449).
- a.
 - (i) Ralph believed that Susan gave away more than she had.
 - (ii) Ralph intended to give away more than he had.
 - (iii) Ralph called the shopping channel in order to spend more than he had.
 - b.
 - (i) Ralph believed that Susan bought a goat ↗ There is a goat such that Ralph believed that Susan bought it.
 - (ii) Ralph intended to buy a goat ↗ There is a goat such that Ralph intended to buy it.

³I dropped ‘or phrases’ without saying anything. I don’t think this is particularly harmful. We may want to apply the condition to some sub-clause units (e.g. phrases) but there is no argument that I’m aware of for applying this condition at every phrase.

⁴At this point, I need to say something about semifactive predicates like *know*, which are the obvious counterexamples to that claim. One other way in which semifactives behave like verbs of saying or believing is that they select indicative mood in Romance, as opposed to true factives, which select subjunctive mood. Panzeri (2003) attempts to build a story claiming that this is because semifactives, like bridge verbs, express a relation between an individual and a proposition, while factives express a relation purely between propositions (or sets of worlds). This is close to the division I draw above. However, it seems intuitively backwards, as true factives generally have an emotive element which is absent from semifactives, which makes me sceptical about such an approach. If you have any ideas, please let me know.

- (iii) Ralph went to the supermarket to buy a goat \nrightarrow There is a goat such that Ralph went to the supermarket to buy it.
 - c. (i) Ralph believed that Susan shot the man he saw \wedge The man he saw was Ortcutt \nrightarrow Ralph believed that Susan shot Ortcutt.
 - (ii) Ralph intended to shoot the man he saw \wedge The man he saw was Ortcutt \nrightarrow Ralph intended to shoot Ortcutt.
 - (iii) Ralph went to get his crossbow to shoot the man he saw \wedge The man he saw was Ortcutt \nrightarrow Ralph went to get his crossbow to shoot Ortcutt.
- (26) Claim: extraction from bridge verbs and extraction from purpose clauses are both easy because they're both referentially opaque.
- a. Extraction is only possible from referentially opaque clauses. . .
 - b. . . . Whether they're adjuncts or complements.
- (27)
- a. #Ralph called spendaholics anonymous after spending more money than he had.
 - b. Ralph called spendaholics anonymous after buying a goat \rightarrow There is a goat such that Ralph called spendaholics anonymous after he bought it.
 - c. Ralph called the police after shooting the man he saw \wedge The man he saw was Ortcutt \rightarrow Ralph called the police after shooting Ortcutt.
 - d. *Who did Ralph call the police [after shooting __]?
- (28) Other classes of adjunct suggest that referential opacity isn't quite the right notion here — instead, we want to allow extraction from a proper superset of referentially opaque complements.
- (29)
- a. Ralph called the shopping channel without spending more money than he had.
 - b. Ralph called the shopping channel without buying a goat \nrightarrow There is a goat such that Ralph called the shopping channel without buying it. **BUT**
 - c. Ralph went home without talking to the man on the beach \wedge The man on the beach is Ortcutt \rightarrow Ralph went home without talking to Ortcutt.
 - d. Who did Ralph go home [without talking to __]?
- (30) Instead, the right notion seems to be something like the following:
- The Single Event Condition:** An instance of *wh*-movement is acceptable if, by producing an utterance derived from the minimal constituent containing the head and the foot of the chain, the speaker commits him/herself to the existence of only one event.
- (31) This relies on a theory of presupposition projection (e.g. van der Sandt 1992) where presupposed elements are treated (either by resolution or accommodation) as existing antecedently to, and hence independently of, the presupposition trigger.
- a. (i) John believes that Bill kissed Mary.

(ii)

j b m e ₁		
j=John b=Bill m=Mary		
e ₁ =believe(j, <table border="1"><tr><td>e₂</td></tr><tr><td>e₂=kiss(b,m)</td></tr></table>)	e ₂	e ₂ =kiss(b,m)
e ₂		
e ₂ =kiss(b,m)		

b. (i) John regrets that Bill kissed Mary.⁵

(ii)

j b m e ₁		
j=John b=Bill m=Mary		
e ₁ =regret(j, <table border="1"><tr><td>e₂</td></tr><tr><td>e₂=kiss(b,m)</td></tr></table>)	e ₂	e ₂ =kiss(b,m)
e ₂		
e ₂ =kiss(b,m)		

 \Rightarrow

j b m e ₁ e ₂ P
j=John b=Bill m=Mary
P \approx e ₂ happened
e ₁ =regret(j,P)
e ₂ =kiss(b,m)

c. (i) John kissed Mary to annoy Bill.⁶

(ii)

j b m e ₁		
j=John b=Bill m=Mary		
e ₁ =kiss(j,m,TO(<table border="1"><tr><td>e₂</td></tr><tr><td>e₂=annoy(j,b)</td></tr></table>))	e ₂	e ₂ =annoy(j,b)
e ₂		
e ₂ =annoy(j,b)		

d. (i) John kissed Mary after talking to Bill.

(ii)

j b m e ₁		
j=John b=Bill m=Mary		
e ₁ =kiss(j,m)		
AFTER(e ₁ , <table border="1"><tr><td>e₂</td></tr><tr><td>e₂=talk_to(j,b)</td></tr></table>)	e ₂	e ₂ =talk_to(j,b)
e ₂		
e ₂ =talk_to(j,b)		

 \Rightarrow

j b m e ₁ e ₂
j=John b=Bill m=Mary
e ₁ =(j,m)
e ₂ =talk_to(j,b)
AFTER(e ₁ ,e ₂)

(32) That's not the whole story, of course.

- a. For one thing, untensed adjuncts systematically behave like *weak* islands, even if they don't always behave like the strong islands they are reputed to be.
- b. Only noun phrases can be extracted.
 - (i) Who did you travel to London [to talk to __]?
 - (ii) *To whom did you travel to London [to talk __]?
- c. And only referential noun phrases.
 - (i) *How many kilos are you dieting [in order to get your weight down to __]?
 - (ii) *This is the headway that we called the meeting [in order to make __].

⁵OK, this is a fudge. See Geurts (1998) for how not to fudge it, but it's more fiddly than I want to be here.

⁶This borrows Chierchia's 'semantic argument' analysis of purpose clauses without comment.

- d. And only complements.
 - (i) *Which politician did John come back [to say [__ was caught in a compromising situation]]?
 - (ii) *The friend that John fixed his car [in order to drive to Mexico [with __]] is Bill.
 - (iii) ?Which painting did John come back [to say [Bill had stolen __]]?
 - e. I have no idea why this should be the case, and if you have any hunches I would be *really* grateful if you shared them.
- (33) The ban on extraction from tensed adjuncts mentioned above needs an explanation.
- (34) And I need to say something else about syntactically smaller adjuncts like (16d) above, which don't have any similar properties — hopefully I'll be able to address these in Ling-Lunch.
- a. #John drove Mary crazy [giving away more money than he had].
 - b. John drove Mary crazy [spending his money on a goat] → There is a goat such that John spent his money on it.
 - c. John drove Mary crazy [talking to the man she saw] ∧ The man Mary saw was Ortcutt → John drove Mary crazy [talking to Ortcutt].
 - d. Who did John drive Mary crazy [talking to __]?

4 Cyclicity

- (35) If we buy all the above (big if...), we also get an argument for successive cyclic checking of the referential opacity condition, and, maybe, *a fortiori*-ish, successive cyclic movement.
- (36) **The logic of the argument so far:**
- a. Factive verbs presuppose their complements, while nonfactive bridge verbs are plugs for presuppositions.
 - b. Presupposed elements are required to have some independent, antecedent reality, in contrast to asserted elements.
 - c. So presupposed events are required to exist independently of those events in the at-issue content, and as a consequence, factive complements are not referentially opaque.
 - d. But anything in the complement of a bridge verb (anything!) is not necessarily present in the actual world.
 - e. *Anything!*
- (37) This means that if we were to view the Single Event Condition as a global condition, any distinction between referentially opaque and referentially transparent constituents should be obliterated, once these constituents are further embedded under a bridge verb.
- a. Purpose clauses are referentially opaque (25)
 - b. *After*-clauses are referentially transparent (27)
 - c. But both are referentially opaque if embedded under a bridge verb.
 - d. (i) John believed that Mary called the shopping channel to spend more money

- than she had.
- (ii) John believed that Mary called the shopping channel to buy a goat \nrightarrow there is a goat such that John believed that Mary called the shopping channel to buy it.
 - (iii) John believed Mary went to get her crossbow to shoot the man she saw \wedge The man she saw was Orcutt \nrightarrow John believed Mary went to get her crossbow to shoot Orcutt.
- e. (i) John believed that Mary called spendaholics anonymous after spending more money than she (actually) had.
 - (ii) John believed that Mary called spendaholics anonymous after buying a goat \nrightarrow there is a goat such that John believed that Mary called spendaholics anonymous after buying it.
 - (iii) John believed Mary called the police after shooting the man she saw \wedge The man she saw was Orcutt \nrightarrow John believed Mary called the police after shooting Orcutt.
- f. (i) What does John think [that Mary called the shopping channel [in order to buy __]]?
 - (ii) *What does John think [that Mary called spendaholics anonymous [after buying __]]?⁷

(38) **The obvious way out:**

- a. Although the gap site in both examples is in a referentially opaque environment when considered globally, only (37fi) has a proper subpart where the gap site is in a referentially transparent environment.
- b. If we can check just those subparts against the Single Event Condition then we will correctly distinguish (37fi) from (37fi).
- c. There are multiple ways to go here, but at least one salient possibility is that this is related to successive cyclic movement of the *wh*-phrase:
 - (i) What does John think [__ that Mary called the shopping channel [(__) in order to buy __]]?
 - (ii) *What does John think [*__ that Mary called spendaholics anonymous [(__) after buying __]]?
 - d. So, making an abductive leap or three:
 - (i) A'-movement is successive cyclic;
 - (ii) The Single Event Condition is checked after each instance of *wh*-movement.
- e. My hunch is that it has to be checked against the head and the foot of the global chain, though, to maintain the distinction between factive verbs and bridge verbs.
 - (i) What does John think [__ that ...]?
 - (ii) *What does John regret [__ that ...]?

But I think that's probably somewhat contingent on a bunch of theoretical options that I can take or leave right now, so I'll stop there.

⁷To me, these judgements seem somewhat idealised, as both questions are straining at the limits of plausibility, but that's only to be expected with long, intricate examples. In general, people's relative judgements about the two examples seem to be preserved when further embedded like this, but with more general degradation and/or confusion all round, which is plausibly related to the length.

5 Conclusion

- (39) These conclusions can be ordered from least controversial to most speculative:
- a. The permissiveness of purpose clauses when it comes to extraction possibilities shouldn't be ignored.
 - b. Purpose clauses look like adjuncts syntactically but don't behave like them when it comes to locality.
 - c. Purpose clauses seem to behave more like (some) complements than adjuncts when it comes to locality.
 - d. So even though A'-movement is undoubtedly a syntactic phenomenon, maybe the natural classes that figure in descriptions of the extent of its application aren't all syntactic (a standard Y-model-based architecture gives us plenty of loopholes for encoding this).
 - e. Moreover, maybe the sources of degradation of a given case of A'-movement aren't necessarily syntactic (as Chomsky has insisted for deviant examples in general, ever since *LSLT*). (We can take or leave this here, as I haven't said anything about *why* the grammar should care about events, referential opacity, etc. in this way.)
 - f. Given the messiness of the data and the judgements, it would be surprising if something as apparently categorical as a minimalist syntax could be behind it all.
 - g. There is no CED. (See Stepanov 2007 for the same claim from the perspective of extraction from subjects). Instead, a conspiracy of factors make subjects and adjuncts strong islands *in the normal case*. The proposals seeking to hardwire the CED more completely into our model of grammar has produced some beautiful theories, but is heading in the wrong direction.

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