Why does A-movement bleed Weak Crossover?

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Abstract: Weak Crossover (WCO) has many puzzling properties, including that of being obviated by A-movement. We argue that the key to understanding WCO lies in the fact that traces and pronouns have a different semantics. Simply put, traces are interpreted as variables in classical logic; pronouns are interpreted as discourse markers in dynamic logic. The heart of this paper is devoted to exploring the syntactic consequences of this view, that are argued to be far reaching. Not only the basics of WCO follow without construction specific constraints, but one gains new interesting insight of the difference between A- vs. A'-chain, the EPP, and the nature of expletives.

1 Introduction: the status of the debate on anaphora

Weak Crossover phenomena have been studied extensively over the past 30 years and remain still largely mysterious. In this paper I explore a line of analysis based on current approaches to Discourse Anaphora and, more specifically, Dynamic Semantics. The main claim is that these approaches have interesting consequences for and shed some new light on crossover phenomena and on some key related syntactic notions, like the notion of A-position and A vs. A'-movement. In most current textbooks, e.g. Heim & Kratzer (1998), the binding of traces and the binding of pronouns with C-commanding antecedents are treated uniformly by the semantics.

(1)   a.   (i) Who_i Q did John see t_i?
             (ii)   The book O_i that John read t_i
       b. $John_i$ likes his_i advisor

The indices on *who*, on the relative clause operator *O*, and on *John* are all interpreted as λ-abstractors that bind the traces and pronouns in their

C-command domains. In other words, traces and C-command bound pronouns are treated as Tarskian variables that get first abstracted over and then linked to their antecedents. In contrast with this, so called Discourse Anaphora (DA) of the kind illustrated in (2) requires a different take.

(2) a. I saw someone$_i$ in the hall. He$_i$ looked suspicious.
     b. If you see someone$_i$ in the hall, check whether he$_i$ looks suspicious.
     c. In the past few days, whenever I saw someone$_i$ in the hall, there was something suspicious about him$_i$.
     d. Frequently, someone$_i$ or other would wander in the hall, and he$_i$ always looked suspicious.

The coidexing between pronouns and their antecedents in (2) does not meet the C-command condition and cannot be straightforwardly interpreted as a form of λ-abstraction on a par with (1). Non C-command anaphora requires an extension of the classical Tarskian variable binding mechanisms. Basically, it involves making potential antecedents within clausal nuclei accessible to pronouns *across* stretches of discourse and sentential connectives like *if/when*-clauses and conjunction. I am going to argue here for a different way of slicing the anaphora and binding pie up. I will try to make a case that pronoun binding *only* involves the mechanism active in (2). On this basis, one is able to retain traditional insights and one gets, moreover, an arguably insightful account of Weak Crossover. In other words, the division of labor should not be C-command binding, i.e. (1), vs. Discourse Anaphora, i.e. (2); the contrast should rather be traces vs. pronouns. Traces and pronouns have a different syntax (copying vs., say, elision[1]) *and* a different semantics; traces are Tarkian variables, pronouns are 'Discourse Referents' or 'Dynamic Variables'. This difference is ultimately responsible for WCO phenomena, and Universal Grammar does not have any condition specifically dedicated to crossover.

There are two main strategies to deal with DA. One is based on Situation Semantics, the other on Discourse Representation Theory / Dynamic Semantics, two related frameworks.[2] Both situations based and

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[1] I am referring to the view that pronouns are Ds with an NP complement that gets elided under identity with an antecedent, as in example (i):

(i) A boy$_1$ walked in. [$_D$ He$_1$ [$_{NP}$ ~~boy~~]] was sweaty.

For a recent formulation and development of this line of analysis, cf. Elbourne (2005) and references therein.

[2] For situation theoretic approaches, cf. Heim (1990) and Elbourne (2005); for DRT the standard reference is Kamp & Reyle (1993). For Dynamic Semantics, cf. Heim

dynamic approaches contain in nuce a potentially enlightening account for WCO. Here, I will informally sketch an approach based on Dynamic Semantics (DS), deferring to another occasion a detailed comparison with other similarly inspired proposals.[3] I will illustrate how a DS approach may shed light on some key properties of WCO including the observation that A-movement obviates WCO, while A'-movement typically does not and the role of vP-external, 'EPP' subjects (cf. Rizzi 2005, Rizzi & Shlonsky 2007). Of course, WCO has a long history as it involves a complex set of phenomena that interface with many modules of grammar and there is simply no way we will be able to do justice to it all within the limits of the present work.[4] My hope is to show that the perspective explored in this paper has the potential for changing significantly and in a useful way how we think at the universe of crossover phenomena.

2   Background

Let us begin by reviewing some of the key features of DS. The first is that Discourse Referents (i.e. potential antecedents) are 'made active' by existential quantifiers and become accessible to pronouns on the basis of a hierarchy that depends on the semantics of specific propositional connectives. In particular, conjunction is both 'internally' and 'externally' dynamic, meaning that the discourse referents active in the first conjunct are accessible to the second (but not viceversa) and that those active in the second are further accessible to subsequent discourse. Here is an illustration:

(3)   a.   A man$_i$ walked in and Mary greeted him$_i$. He$_i$ smiled.
        b.   *He$_i$ walked in and Mary greeted a man$_i$.

'Internally dynamic' means that the arguments of a connective (in this case *and*) allow for DPs in the first argument to act as an antecedent to pronoun in the second; 'externally dynamic' means that the DPs in a complex propositional constituent (for example [A and B], are accessible to subsequent discourse. In a similar vein, conditionals (or when-clauses, etc.) are internally dynamic but externally static. The antecedent is accessible to the consequent. But material in the conditionals is not gen-

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(1982: Ch. 3), Groenendijk & Stokhof (1991), Chierchia (1995), Dekker (1996; 2012), among many others.

[3]For an interesting approach to Crossover based on Situation Semantics, which constitutes an important antecedent to the proposal developed here, see e.g. Büring (2004).

[4]For example, 'weakest crossover' (Lasnik & Stowell 1991) and resumption (McCloskey 2007 and references therein) are among the the topics we will have to leave for another occasion.

erally accessible to subsequent discourse.

(4)   a.   If a student$_i$ shows up unexpectedly, Mary is rarely kind to him$_i$.

        b.   ...* He$_i$ is a nuisance.[5]

Prima facie, accessibility in the cases above may seem to be determined by linear order, but in fact I think it is structural. When linear order doesn't match with structure, as in the case of postverbal if/when clause, we still see that the antecedent remains accessible to the consequent:

(5)   a.   A teacher won't adopt it, if a textbook is too difficult.

        b.   John always buys it on the spur of the moment, whenever he likes a painting.

Vs.:

        c.   *A teacher refused to adopt it and a textbook was too difficult.

Going on with the main propositional connectives, disjunction is both internally and externally static and negation (a monadic operator) is externally static

(6)   a. ??Mary will buy a new car$_i$ or John bought it$_i$. *It$_i$ must be blue.[6]

        b.   John won't buy a new car$_i$. *It$_i$ must be blue.

Accessibily is the transitive closure of these lexical semantic properties of propositional connectives (summarized in (7)). These properties are determined in turn by the ways in which propositional conenctives operate on contexts (i.e. their 'context change potential'). For example, in a conditional the antecedent sets up a (provisional) context in which the consequent is evaluated (and not viceversa).

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[5]There are apparent exceptions to this generalizations. For example the following continuation to (4a), in which the quantificational adverb *usually* is added, is less degraded than (4b).

(i)   He$_i$ is usually a nuisance.

These are cases of 'modal subordination,' where the continuation is semantically 'included' within the consequent of the conditional; they typically require the relevant continuations to contain an adverb of quantification or a modal. A classical point of reference in this connection is Roberts (1989).

[6]Again, there are cases of acceptable anaphora across disjuncts. See e.g. Simons (1996) for discussion.

(7)   Accessibility Hierarchy (AH)

   a.   [A [and B]] A accessible to B; A + B accessible to subsequent discourse

   b.   [A [or B]] A ad B are neither accessible to each other nor to subsequent discourse.

   c.   [[if A] B] A accessible to B; A + B not accessible to subsequent discourse

   d.   [not A] A not accessible to subsequent discourse.

The accessibility hierarchy induced by (7) is common to all forms of DS and is explained similarly across all variants. In way, it constitutes DS's core. The semantics of the propositional connectives is generally coupled with the idea that existential quantifiers introduce discourse referents and pronouns 'pick up' accessible discourse referents in a quasi-indexical manner. As should be evident, this mechanism requires a non standard form of variable binding, for assignment functions have to be 'passed on' in a novel way that tracks the accessibility relation in (7). Again, this idea is common to all versions of DS.

What about C-command binding? In most versions of DS, the classical Tarskian approach is lifted whole sale for C-command binding. C-command bound pronouns are treated as ordinary variables. But this amounts to saying that pronouns are semantically ambiguous. On the one hand they are treated as ordinary variables which can be λ-bound (like traces); on the other hand they are discourse referents which pick up their referents in a quasi-indexical manner, following the accessibility hierarchy. This disjunction can be 'hidden' in the interpretive procedure, and not have any reflex in the logical form. But the conceptual and substantial disjunctiveness of this mode of proceeding is, I think, clear.

In retrospect, lifting standard binding techniques and adding to them dynamic binding is a mistake. Why should pronouns be ambiguous in this way? Suppose that pronouns must always get their referent in a quasi indexical manner, because that is their very nature. Then, their antecedent can only be passed on through the hierarchy in (7). This would entail that the antecedent of a pronoun can only be found across a conjunct or a conditional and that pronouns can *never* be directly λ-bound. To emphasize the difference between Tarskian variables and discourse markers, I will use letters of the form u_i, u_j, ... (with letter subscripts) for the former and x_1, x_2, ... (with number subscripts) for the latter, as a formal reflex of their different status.[7]

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[7]Ultimately this formal difference is based on a difference in logical types, and the two lots of variables/variable-like devises is governed by distinct systems of assignment functions. See, e.g., Chierchia (1995), Dekker (1996), Muskens (1996), and Champollion, Bumford & Henderson (2018). However, in the spirit of the largely informal

This very simple observation that anaphora involves two distinct systems, one for pronouns, one for traces, immediately accounts for all the basic crossover cases.

Consider for example:

(8)   a.   who$_i$ Q does his$_i$ mother like t$_i$
       b.   (i)   his$_i$ advisor likes every teacher
            (ii)   every teacher$_i$ [his$_i$ advisor likes t$_i$]

After scope assignment, the structures of sentence (8a) and sentence (8b.i) are essentially identical. What's wrong with the pronoun embedded in the subject position? That pronoun simply has no accessible discourse referent. If pronouns can *only* pick up their referents through accessible antecedents, then there is none to be had in (8a-b) and the lambda operator associated with the A'-bound element is powerless, it cannot provide an 'antecedent' for it. Use of separate systems of indices for traces vs. pronouns formally reflect this fact:

(9)   a.   his advisor likes every teacher
       b.   every(teacher)(λu_i[x$_2$'s adivisor likes u$_i$])

A rather strong formulation of the quasi-indexicality thesis can be found in e.g. Dekker (2012: p. 17):

> "Pronouns are essentially indexical…devices to refer to contextually given entitites…And when I say that a pronoun refers to a contextually given entity, I mean it relates to something that is 'given' at its point of occurrence…by an expression that literally occurs to the left of the pronoun's occurrence in a formula."[8]

Let us call this the Quasi-Indexicality Thesis on the nature of pronouns. If the semantics of pronouns is similar to that of indexicals, they can never be directly A'-bound, and Weak Crossover configurations cannot arise.

But what about canonical cases of C-command binding of the *A student spoke to his advisor* kind? If pronouns are to find their antecedents through the accessibility hierarchy, which requires antecedent activated in previous clauses and passed on via a conjunction or a conditional, then in simple sentences of this sort, we seem to be stuck for there is no previous clause around. In this connection, event semantics becomes crucial. Currently, verbs are viewed as (monadic) predicates of events

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character of the present paper, I won't elaborate on this aspect of the proposal.

    [8]Dekker formulates the accessibility constrains in linear terms, as he is referring to formal languages, where linearity is designed to transparently reflect structure.

and arguments are fed through thematic roles in a structurally determined manner. Thus, for example, a sentence like (10a) winds up being interpreted as in (10b).

(10)   a.   A student spoke to his advisor.
        b. $\exists e[\ [\exists x_2 \text{ student}(x_2) \wedge \text{Ag}(e) = x_2] \wedge [\text{Th}(e) = x_2\text{'s advisor}]$
              $\wedge \text{ speak}(e)\ ]$

The merger of the verb with its arguments gets 'broken up' semantically in a set of conjunctive statements where the first conjunct corresponds to the agent, the second to the theme and the third to the verb itself, the center of the clausal nucleus. Now notice that the agent in (10b) does occur in a position that is structurally accessible to the theme in terms of the Accessibility Hierarchy. Hence a pronoun occurring in the theme region will be able to pick up its reference from a previous conjunct in a manner consistent with its quasi-indexical nature, if the Agent activates a discourse referent. Bear in mind that a fundamental property of the dynamic semantics for *and* is the *absence* of commutativity. In a dynamic setting, coordination is not commutative: the *n*th conjunct provides the environment in which the $n + 1$th conjunct is evaluated, but not *vice versa*. Hence switching around the theme and the agent arguments as in (11b), puts the DP *his advisor* in a position where, again, *his* has no accessible antecedents.

(11)   a.   His advisor spoke to a student.
        b. $\exists e[[\text{Ag}(e) = x_2\text{'s advisor}] \wedge [\exists x_2 \text{ student}(x_2) \wedge \text{Th}(e) = x_2]$
              $\wedge \text{ speak}(e)\ ]$
        c.   (i)   a student$_i$ [his$_2$ advisor spoke to t$_i$]
              (ii)   a(student)($\lambda u_i \exists e[[\text{Ag}(e) = x_2\text{'s advisor}] \wedge [\exists x_2 \wedge$
                     $\text{Th}(e) = x_2 \wedge u_i = x_2] \wedge \text{speak}(e)])$

The discourse marker that corresponds to the pronoun *his* in (11b) in the agent region, namely the first occurrence of x_2, cannot pick as antecedent the discourse marker introduced in the theme phrase, in spite of their formal identity, for accessibility reasons. Under the assumption that scoping (i.e. A'-movement) introduces ordinary Tarskian variables of a different type than discourse markers, it follows that applying QR to (11), as in (11c), won't change this situation. We will want of course to flesh this all out further, and we will do so in the next section.

    Summarizing so far, we have reviewed classical Dynamic Semantics, in which propositional connectives are interpreted in terms of context change potentials that give rise to an Accessibility Hierarchy. We have adopted a strong version of the Quasi-Indexicality Thesis, according to which pronouns are uniformly interpreted as dynamic variables that pick

out their antecedents in a quasi indexical manner from accessible antecedents. Married with event semantics this enables us to retain an account of the observation that pronouns can be C-command bound (as that is reinterpreted as Accessibility Binding across a conjunct), while at the same allow for them to be discourse bound (as in (2)).

3 Events, Dynamics and Crossover

In this section, we will discuss the structure of clausal nuclei in a dynamic event semantics. The discussion will remain at a largely informal level, with sufficient details, however, to make the proposal, hopefully, falsifiable. In classical Dynamic Semantics it is generally assumed that discourse markers are 'introduced' or 'activated' by indefinite DPs. But this is not a necessary feature of DS and I am going to propose a different take: Discourse referents are introduced by A-position. Let us see what that means, and how it comes about. Consider a simple sentence like (12a) and (part of) its structure (12b).

(12) a. John walked in.
      b. $[_{vP}$ John v $[_{VP}$ walked in$]]$

Let us assume that Spec of little v is the first merger position for the subject, and that this is also the position in which subject theta roles are assigned (nothing changes if this happens with a different functional head, like *voice*, or what have you). The VP, in event semantics, denotes a set of events, in the case at hand *λe[walk in(e)]*. The little v has to, therefore, introduce an argument slot for the external argument, and my conjecture is that in so doing it also activates a discourse referent that corresponds to such argument slot as follows:

(13) a. [walked in] $\Rightarrow$ λe[walked in (e)]
      b. $v \Rightarrow \lambda P \lambda u \lambda e \exists x_1 [x_1 = u \wedge Ag(e, x_1) \wedge P(e)]$
      c. [v [walked in]] $\Rightarrow \lambda u \lambda e \exists x_1 [x_1 = u \wedge Ag(e, x_1) \wedge$ walked in (e)]
      d. [John v [walked in]] $\Rightarrow \lambda e \exists x_1 [x_1 = $ john $\wedge Ag(e, x_1) \wedge$ walked in (e)]

The little *v*-head combines with a property of events and returns a function from individuals into a new property of events, thereby creating an argument slot via the relevant theta-role, (*agent,* in the case of little *v*). The agent-argument slot is then saturated by the subject. Following top to bottom the formal derivation in (13), we start with the lexical meaning of the verb in (13a). In (13b), we have the meaning of the func-

tional head v (and this meaning is uniform across all applicative heads – see below); it is this head that, as you can see, activates/introduces the discourse marker $\exists x_1$, which gets then equated to the agent argument. The compositional steps in the derivation of the clausal nucleus are in (13c-d). In (13c) we have the *[v walked in]* complex, which creates and argument slot for agent. And in (13c) we saturate this slot by merging the subject. The outcome is a set of events that are walking in's by John. The event-argument (after the contributions of tense and aspect) gets eventually existentially closed, and one gets the usual proposition: there is an event located in the past which is a walking in event with John as agent. You can thus see how the idea that discourse markers are introduced by A-positions can be fleshed out precisely and, in fact, quite simply. The treatment of internal arguments is fully parallel to that of external arguments. For the sake of explicitness, let us assume that internal arguments are composed with the verb via low, possibly abstract, applicative heads into which the verb incorporates:

(14)　a.　$[_{VP} [AP_{TH} \text{ hugged}] \text{ Bill}]]$
　　　b.　$AP_{TH} \Rightarrow \lambda P \lambda u \lambda e \exists x_1 [x_1 = u \wedge Th(e, x_1) \wedge P(e)]$
　　　c.　$[AP_{TH} \text{ hugged}] \Rightarrow \lambda u \lambda e \exists x_1 [x_1 = u \wedge Th(e, x_1) \wedge \text{hugging}$ (e)]
　　　d.　$[AP_{TH} \text{ hugged}] \text{ Bill} \Rightarrow \lambda e \exists x_1 [x_1 = \text{Bill} \wedge Th(e, x_1) \wedge \text{hugging}$ (e)]

Note the parallelism between the meanings of v and AP_{TH}: they are identical, modulo the fact that little v introduces the agent and AP_{TH} the theme.

The fact that that the outcome of th-marking yields uniformly sets of events allows for th-marking to apply recursively. And therefore a (derived) VP like (14) can be then merged with little v, as in (15), with the expected result:

(15)　a.　$[\text{Mary } v_3 [_{VP} [AP_{TH,1} \text{ hugged}] \text{ Bill}]]]$
　　　b.　$\exists e \exists x_3 [x_3 = \text{john} \wedge Ag(e, x_3) \wedge \exists x_1 [x_1 = \text{Bill} \wedge Th(e, x_1) \wedge \text{hugging} (e)]$

In (15a), I notate on the relevant applicative heads the discourse marker each introduces; discourse markers are chosen arbitrarily, but being associated with existential quantifiers, they are subject to the 'Novelty Condition' (Heim 1982, Dekker 1996, among others), i.e. each time a th-marking head is introduced, a fresh index must be picked.

The truth conditional output of a sentence like (15a) is as expected, but the sentence now contains two active discourse markers that can be picked up by pronouns in subsequent discourse:

(16) a. [Mary v_3 [$_{VP}$ [AP$_{TH,1}$ hugged] Bill]]] and he$_3$ thanked her$_1$
      b. $\exists e\exists x_3[x_3 = john \wedge Ag(e, x_3) \wedge \exists x_1[x_1 = Bill \wedge Th(e, x_1) \wedge$
          $hugging\ (e)] \wedge \exists e'\exists x_4[x_4 = x_3 \wedge Ag(e', x_3) \wedge \exists x_5[x_5 = x_1 \wedge$
          $Th(e', x_1) \wedge thanking\ (e')]$
      c. $\exists e\exists x_3[x_3 = john \wedge Ag(e, x_3) \wedge \exists x_1[x_1 = Bill \wedge Th(e, x_1) \wedge$
          $hugging\ (e)] \wedge \exists e'[Ag(e', x_3) \wedge Th(e', x_1) \wedge thanking\ (e')]$

The indices 4 and 5 in the logical form of the second clause in (16b) correspond to the Agent- and Theme-heads in the second clause, positions that are saturated by *he$_3$* and *her$_1$* respectively, which therefore get identified with the discourse referents of the second clause. Notice that the pronouns in the second clause in (16) are not in the syntactic scope of the existential quantifiers introduced in the first clause. But thanks to the dynamic character of conjunction, they can pick up the discourse referents introduced in the first clause in their quasi-indexical manner, and wind up being semantically bound. This the central law of DS, where the inferential schema in (17) comes out valid:

(17) $[\exists x\ A(x)] \wedge B(x) \leftrightarrow \exists x[A(x) \wedge B(x)]$

The readers familiar with DS or DRT might be willing to concede that the idea the discourse referents are introduced by A-position is a relative modest departure from the standard approach, in the sense that it affords the same results vis-à-vis Discourse Anaphora, as we just saw. Still, let me try giving some independent motivation for this move. It is a well-known observation that definites, while being referential, also display forms of sensitivity to the Accessibility Hierarchy, a fact not readily compatible with the idea that that only *in*definite DPs introduce discourse markers. The following paradigm illustrates.

(18) a. Everyone who met John$_i$ had a fight with him$_i$.
      b. ??Everyone who met him$_i$ had a fight with John$_i$.
      c. I met John$_i$ and liked him$_i$ a lot.
      d. *I met him$_i$ and liked John$_i$ a lot.

Pronounced with 'nuclear stress rule' intonation, (18b) is quite degraded with respect to (18a). Sentence (18b) can be marginally improved by a marked destressing for the VP *met him*. But a similar radical destressing of the VP *met him* hardly helps with (17d), which remains pretty deviant even so. Conclusion: while referentiality opens a broader range of anaphoric possibilities, as is to be expected, a parallelism with anaphora involving indefinites remains. The paradigm in (18) replicates the one in (19):

(19)   a.   Everyone who met an Italian$_i$ had a fight with him$_i$.
       b.   *Everyone who met him$_i$ had a fight with an Italian$_i$.
       c.   I met an Italian$_i$ and liked him$_i$ a lot.
       d.   *I met him$_i$ and liked an Italian$_i$ a lot.

By assuming that discourse referents are introduced by A-positions, the sentences in (18) and (19) will obviously have isomorphic anaphoric frames, which stands a better chance at explaining the similar behavior of all types of arguments with respect to accessibility with respect to a theory where only indefinite DPs introduce discourse referents, and hence only indefinites are expected to display sensitivity to accessibility. This provides some independent motivation for the claim that discourse referents are introduced by A-positions.

A further arguably natural move is to assume that quantificational DPs are interpreted as ordinary generalized quantifiers. They must be assigned scope via movement, and their traces are interpreted as an ordinary Tarskian variables. Here as an illustration:

(20)   a.   (i)   every student walked in
             (ii)   every student$_i$ [t$_i$ v_1 [walked in]]
             (iii) $\forall u_i$ [student(u_i) $\rightarrow$ $\exists e \exists x_1$[$u_i = x_1 \wedge$ Ag(e, x_1) $\wedge$ walk in(e)]]
       b.   (i)   A student walked in
             (ii)   A student$_i$ [t$_i$ v_1 [walked in]]
             (iii) $\exists u_i$ [student(u_i) $\wedge$ $\exists e \exists x_1$[$u_i = x_1 \wedge$ Ag(e, x_1) $\wedge$ walk in(e)]]

Now all generalized quantifiers, be they weak, like indefinites, or strong, like universals, give raise to the same syntactic configuration as in (20a-b); but they differ semantically with respect to their anaphoric properties. Strong quantifiers are externally static. Therefore, discourse markers in their domain are inaccessible to subsequent pronouns. Weak quantifiers on the other hand are externally dynamic, therefore they keep discourse markers in their domain active. This accounts for the contrast in (21):

(21)   a.   *Every student$_i$ [t$_i$ v_1 walked in]. He$_1$ was wearing a hat.[9]
       b.   A student$_i$ [t$_i$ v_1 walked in]. He$_1$ was wearing a hat.

Notice that technically speaking the active discourse marker that antecedes the pronoun *he$_1$* in (21) is the one introduced by the litte *v*

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[9]This generalization has exceptions as well, that go under the rubric of 'telescoping':

(i)   Every athlete walked up to the podium. He got his medal and walked back.

Cf., e.g. Poesio & Zucchi (1992) for discussion.

(i. e. the Agent) of the first clause; however, that is equated, by construction, to the index of the trace of the quantified subject, and the sentence thus winds up having the expected interpretation.

So far we have fleshed out two ideas: (i) discourse referents are introduced by A-positions (e.g., th-marking heads) and (ii) traces are static variables. These ideas, which have independent plausibility within a Dynamic Event Semantics derive WCO effects. We can now go over how this happens in a more explicit fashion. Let us begin with standard cases of C-command anaphora:

(22)   a.   everyone likes his advisor
        b. $everyone_j$ [t_j v_3 [$_{VP}$ [$AP_{TH,1}$ likes] his_3 advisor]]]

The LF for (22a) is (22b). Each applicative head corresponds to a separate conjunct in the semantics and introduces a novel discourse referent. And thus the discourse referent associate with the Ag will be accessible to pronouns contained within the theme-phrase. The truth-conditional import of (22) is:

(23) $every(one)(\lambda u_j \exists e \exists \mathbf{x_3}[u_j = x_3 \wedge Ex(e,x_3) \wedge \exists x_1 [\mathbf{x_3}\text{'s advsr} = x_1 \wedge Th(e,x_1) \wedge lk(e)]]$

Here the pronoun (that corresponds to the bold-faced variable $\mathbf{x_3}$) is not directly λ-bound by the subject; however, the experiencer th-role introduces a discourse referent that *is* accessible to the pronoun, as the experiencer is introduced in a higher conjunct; hence the pronoun can pick up its reference from it, as indicated by the arrow. In this way, ordinary C-command bound pronominal anaphora gets reduced to Discourse Binding. In a sense, this is recognizing that clausal nuclei are constituted by a series of more elementary *propositional* units connected by merge syntactically and by conjunction semantically.

Let us now turn to a crossover environment:

(24)   a.   His advisor likes everyone
        b. $everyone_j$ [his_3 advisor v_3 [$_{VP}$ [$AP_{TH,1}$ likes] t_j]]]

The LF for (24a) is (24b). First notice that the QRed object can never directly bind the pronoun, because (i) pronouns are quasi-indexicals and cannot be λ–bound and (ii) traces and pronouns are of a different semantic type. Second note that directly coindexing the pronoun with the experiencer head results in a violation of the Novelty Condition, as the existential quantifier of each th-marking head must introduce a new discourse referent. Thus the discourse marker associated with the pronoun and the one associated with little *v* must be distinct.[10] And finally

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[10]Even without the Novelty Condition, which, however, plays a quite fundamental role in DS, the result of the interpretive procedure we have sketched would be at the

whatever index we pick for the pronoun, there won't be any discourse marker accessible to it. This account is perfectly general (e.g., it obviously extends to cases of wh-movement) and it is quite principled, as it rests on assumptions that have a fair amount of independent support in the treatment of Discourse Anaphora. The fact that WCO finds its root in discourse is plausible per se.

4   Modification

The basic set up we have arrived at is as follows. Discourse Referents are activated by th-marking heads, which are of course introduced in a structurally determined manner. Active discourse markers are potential antecedents of pronouns following an Accessibility Hierarchy that can be read off clause structure. Pronouns cannot get their antecedents in any way other than through accessible antecedents (in particularly, they cannot be directly λ-bound), because of their quasi-indexical nature. These simple assumptions come with strong independent motivation stemming from so called Discourse Anaphora and derive WCO effects in the manner discussed in Section 3. A long-standing issue for all traditional approaches to crossover is constituted by binding from internal arguments into adjuncts:

(25)   a.   We'll sell no wine before its time.   [Ad from the 80s]
      b.   The judge interviewed every suspect in front of his lawyer.
      c.   I talked to every candidate beforehand in order to make sure that he knew what he was getting into.
      d.   no wine$_i$ [we will sell t$_i$ [before its$_i$ time]]
      e.   no student$_i$ [his$_i$ advisor likes t$_i$]

The problem here is that the antecedent for the pronoun is the object, which is structurally lower than the adjunct and hence fails to C-command it. Binding into adjuncts seems to be possible regardless of the attachment site of the adjunct: whether the adjunct is attached relatively low (as in (25a)) or quite high (as in (25c)) doesn't make any difference. The intended reading could be derived by scoping the ob-
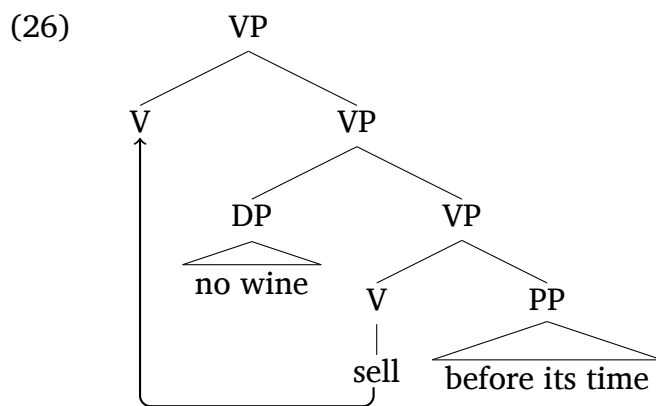
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relevant level the following:

(i)   his$_3$ advisor v_3 [$_{VP}$ [AP$_{TH,1}$ likes] t$_j$]]] $\Rightarrow$

(ii) $\lambda u \exists x_3[x_3 = u \wedge Exp(e, x_3) \wedge \exists x_1 [x_1 = u_i \wedge Th(e, u_i) \wedge like(e)]](x_3$'s advisor)

Notice that the argument of expression in (ii) cannot be converted in the body of the formula, as that would result in an improper variable-capture. Thus the pronoun in (i) cannot be linked to the quantifier in the body of the formula.

ject out as in (25d). But this then would also allow WCO configurations like (25d). Classic C-command based approaches to WCO such as Reinhart (1983), Postal (1993) or the bijectivity line developed in Koopman & Sportiche (1984) fail to differentiate in a natural way between (25d) and (25e). The same holds of parallelism constraints like those explored by Safir (1996).

This situation has led some scholars to propose either VP shells such as those in (26) (cf. Larson 2014 and references therein) or coexisting cascade/layered structures (Pesetsky 1995) in which something isomorphic to (26) is an option, so as to have a level of structure in which arguments C-command adjuncts:

(26)

```
                    VP
                  /    \
                 V      VP
                 ^    /    \
                 |  DP      VP
                 | /__\    /   \
                 | no wine V     PP
                 |         |    /__\
                 |        sell  before its time
                 └──────────┘
```

These lines of investigation tend to blur the argument/adjunct distinction and consequently face severe complications, e.g. with respect to extraction phenomena.

The present approach *predicts* the possibility of binding into adjunct in an elementary and totally straightforward manner. The prediction stems directly from the fact that the core semantics of modification is intersective in nature, meaning that each adjunct is interpreted as a predicate of events that gets added incrementally to the clause nucleus via conjunction. For example, structures with iterated modifiers like *John ate a pizza leisurely on the bench...* (cf. 27a) is going to be interpreted as a set of conjunctions like (27b):

(27)   a.

        b.   ∃e[Th(e, a pizza) ∧ ate(e) ∧ leisurely(e) ∧ on the bench(e)
              ∧ ...]

The bulk of the original motivation for event-semantics, going back to
Davidson (1967) original insight and to Parsons' (1990) development of
it, is precisely to get the logical properties of verb modification of this
sort right, by treating adverbs as predicates of event that get added in
as in (27). In a dynamic setting, where conjunction is asymmetric but
associative, this creates an Accessibility Hierarchy, whereby discourse
marker introduced in possibly lower conjuncts, will be accessible for
pronominal pick up to higher ones. The following is a further theorem
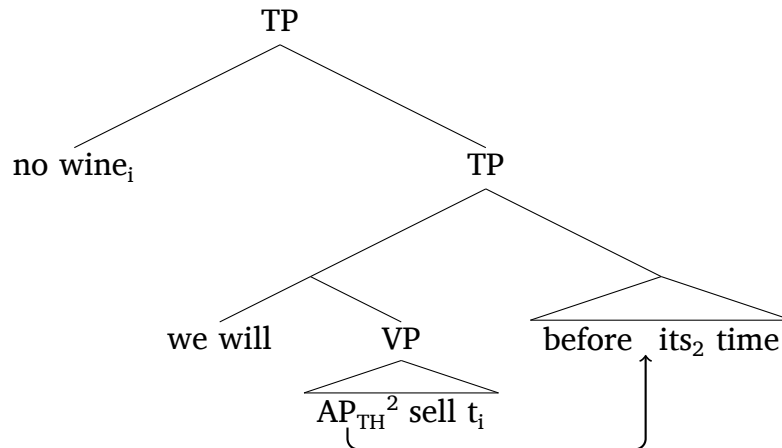of DS:

(28)   a.   [[A ∧ [B ∧ C]] ↔ [[A ∧ B] ∧ C]
        b.   Mary walked in. She saw a man and he was clearly looking
              for trouble.
        c.

        d.   Mary walked in and saw a suspicious man. He had a black
              coat.
        e.

The validity of the associative law in (28a) has consequences for access-

ibility, which can be illustrated with the examples in (28b) and (28d). In both structures discourse markers activated in the intermediate conjunct B will be accessible to C, as indicated by the arrow, regardless of B's attachment height. In (28b), where B and C are immediate co-arguments of conjunction, this follows from the fact that conjunction is internally dynamic; in (28d), where B and C are not immediate co-arguments, it follows from the fact that conjunction is also externally dynamic (unlike, e.g. conditionals). Now the structure of typical configurations of binding into adjuncts, such as (25a), are isomorphic to (28e), as illustrated below in (29). Hence, we expect that objects (and internal arguments in general) will be accessible to pronouns contained into higher adjuncts.

(29)   a.   We'll sell no wine before its time.
         b.

```
                              TP
                   /                    \
            no wine_i                    TP
                             /                  \
                        we will   VP      before its_2 time
                                 /   \
                             AP_TH^2 sell t_i
```

The internal applicative head AP_{TH}^2 introduces a (fresh) discourse marker ($\exists x_2$) for the theme-argument that is combined conjunctively with the verb; the theme discourse marker will be accessible to pronouns in higher adjuncts for the way conjunction operates in a dynamic setting. After scope assignment, the quantifier *no* will λ–bind *only* the trace, which is of course identified by construction with the discourse marker introduced by AP_{TH}^2. So, the object and the pronoun wind up co-evaluated, indirectly, because the theme argument is in a position structurally accessible to the pronoun. As we saw in detail in section 3, this is not so in crossover configurations such as (25d) above, where the theme-argument is *not* in a position accessible to the pronoun. I know of no theory that makes equally sharp and correct predictions about this difficult issue in an equally straightforward and arguably principled manner.

5   External Subjects

The introduction of discourse referents is not limited to th-marking heads, but applies to A-positions in general and might, in fact, be viewed as defining what A-positions are:

(30)   An XP is in an A-position iff its sister introduces a fresh discourse marker.

The exact scope of the definition in (30) is to be determined empirically. The idea that th-positions introduce discourse referents is motivated by a variety of considerations, some internal to DS, others having to do with crossover phenomena, as argued in Sections 3-4. To what extent the introduction of discourse referents happens beyond th-marking heads depends on the discourse functions of specific heads and in particular on whether such a head can act as a pivot for anaphora. Rizzi (2005) and Rizzi & Shlonsky (2007) have argued that the external subject position (also known as the EPP Subject position) triggers a presupposition of 'aboutness': the complement of the EPP Subject head (call it SUBJ following Rizzi) must be construed as being about the DP hosted in its Spec.

(31)   [$_\uparrow$ SUBJ [$_{vP}$ Bill's truck [$_{VP}$ hit Mary's truck]]]

Another way of going after the same intuition is by saying that the external SUBJ position is instrumental in creating a 'Categorical' proposition in which an individual is put in a category or related to other individuals (as opposed to a 'Thetic' proposition which expresses global judgements about the world – cf. Kuroda 1972, after Brentano). Among the evidence in favor of this view of predication, Rizzi discusses patterns of the following sort:

(32)   A: What happened to Mary's car?
          B: Mary's car hit Bill's truck
          C: ?? Bill's truck hit Mary's car

Sentence (32B) is fine in reply to question (32A), uttered with 'nuclear stress rule' intonation, while question (32C) appears to be substandard, under the same circumstances. This can be due to a clash between the aboutness presupposition associated with SUBJ, requiring (32C) to about Bill's truck, and the Question Under Discussion (QUD) in the background (32A), which is about something else, namely Mary's car. Rizzi proposes that the aboutness presupposition makes the EPP Subject position 'criterial': lower constituents are attracted to it to satisfy the SUBJ-

criterion rooted in the aboutness presupposition, which in this fashion becomes ultimately responsible for the fact that clauses must have subjects. Moreover, given that there is independent evidence to maintain that if something moves to a position to satisfy a criterion, it is frozen in place, i.e. cannot move further ('Criterial Freezing'), it becomes possible to explain in these terms classic Empty Category Principle effects like (33a-b) in English or (33c-d) in French:

(33)   a. *Who do you think that _ loves Mary?
        b. Who do you think that Mary loves _?
        c. *Qui crois-tu que t_{qui} va gagner?
            'Who do you believe that will win?'
        d. Qui crois-tu que Paul va aider t_{qui}?
            'Who do you believe that Paul will help?'

The reason why (33a/33c) are bad is because the wh-word has to be first moved in the SUBJ position of the lower clause to satisfy the Subject Criterion. But then, it is frozen in place cannot be further extracted. This problem does not arise for object extraction, as there is no object criterion. This entails that extraction of subjects has to involve strategies to bypass the SUBJ position. This consequence is explored at length, by Rizzi and others, with important results concerning why, e.g., eliding the Comp alleviates the violation in (33a) or why switching to the Comp *qui* in (33c) has similarly ameliorating effects.

Can Rizzi's proposal be fleshed out in truth-conditional terms? A good strating point might be to hypothesize that the SUBJ head triggers a presupposition that requires a Question Under Discussion about the SUBJ to be active in the initial context. There are several ways to go. The following is an illustration, meant as an existence proof more than as a fully finished proposal. First, let us assume that the index on the DP (generated via movement) is shared with the SUBJ head (perhaps via Spec-Head agreement), yielding structures of the form in (34a):

(34)   a. [DP$_i$ [SUBJ$_i$ XP]]
        b. [DP$_{\mathbf{i}}$ [SUBJ$_i$ XP]]

Normally, the interpretable referential index (i.e. the one that corresponds to λ-abstraction in, e.g., Kratzer and Heim-style semantics), is the one on the DP. In the present case, it is useful, instead, to regard the index on the head as the meaningful one, i. e. the index on the head is interpreted as a λ–abstractor, while the one on the DP is uninterpretable and therefore delited after checking, as in (34b). SUB-phrases as a consequence yield predicative structures of the following form:

(35)   SUBJ$_i$ [t_i left] = SUBJ(λu_i [u_i left]) SUBJ of type $<$et,et$>$

SUBJ is a function from predicates into predicates, that adds to its input the requirement there be a (contextually salient) QUD about its argument:

(36)   a. $SUBJ(\lambda u_i [u_i \text{ left}]) = \lambda u_i : \exists x_1 \exists Q[Q(\lambda u \text{ left}(u), x_1) \wedge x_1 = u_i . \text{ left (ui)}])$ [where the notation $:\phi.\psi$ indicates that ϕ is a presupposition of ψ and $Q((\lambda u \text{ left}(u), x_1)$ is a (contextually salient) QUDs about x_1, addressable by the proposition that John left]

       b. $John_{\overline{i}} SUBJ_i [t_i \text{ left}] = : \exists x_1 \exists Q[Q(\lambda u \text{ left}(u), x_1) \wedge x_1 = john . \text{ left (john)}])$

The outcome is that that *John left* is defined only in contexts were there is a contextually salient question about John that is addressable by the proposition that John left; whenever this presupposition is met, sentence (36b) asserts of John that he left. A question is about John iff it asks something like *what happened to John? /What did John do?*[11]

Now, it is plausible to maintain that as part and parcel of the aboutness presupposition, the SUBJ head also introduces a discourse referent for the relevant individual, much like th-marking heads do. In fact, that is what I already folded into the semantics in (36): notice the appearance of an active discourse marker of the form $\exists x_1$. If predication addresses a question about u, such individual must be or become accessible to pronouns in subsequent discourse.

Focussing for the time being on the latter feature (namely, discourse refererent introduction), in basic cases, this makes not much of a difference (in fact, it appears to be redundant), for the first merger position will have already established an accessible discourse referent corresponding to the subject:

(37)   a.   John left
       b. $[John_i SUBJ_{i,2} [_{vP} t_i \, v_3 [VP \text{ left}]]]$
       c.   (i) $\lambda u_i \exists x_2[u_i = x_2 \wedge [\lambda u \exists x_3[u = x_3 \wedge Ag(e, x_3) \wedge \text{ leave} (e)](u_i)](John)$[12]

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[11]How to spell this out further, depends on what theory of questions you want to assume. In a Hamblin/Kartunnen approach, for example, a question about John would have the following form:

(i) $\lambda p \exists P \in C[p = P(john)]$

(ii)   {John woke up, John went work, John got hit by a car: p C}
       where C is a contextually salient set of properties.

The formula in (ii) denotes a set of propositions like the one in (i), depending on what set of properties are salient.

[12]Reminder: I am ignoring the aboutness presupposition for simplicity. I am also

    (ii) $= \exists x_2 [\text{John} = x_2 \land \exists x_3 [\text{John} = x_3 \land \text{Ag}(e, x_3) \land \text{leave} (e)]$

    (iii) $= \exists x_3 [\text{John} = x_3 \land \text{Ag}(e, x_3) \land \text{leave} (e)]$

The subject in a simple sentence like (37) is first merged into a th-position, where a first discourse referent (with index 3 in (10b)) is introduced. Then, it moves to Spec of SUBJ, where a second discourse referent (with index 2 in (10b)) is introduced (and the aboutness presupposition is added). The compositional semantics amounts to (37c.i); since the two discourse referents introduced by and SUBJ respectively are equated to each other by the semantic composition, this eventually boils down to (37c), with no effect.

The effects of discourse referent introduction by SUBJ become visible, and crucial, when movement from a position not accessible to pronouns in the main clause is involved, as with raising structures.

(38)   a.   John seems to his coach [t v_2[to be in good shape]

         b.   John$_i$ SUBJ$_{i,2}$ to his$_2$ coach [t$_i$ to be in good shape]

         c. $\exists s \, \exists x_2 \, [x_2 = \text{John} \land \exp(s, x_2\text{'s coach}) \land \text{th}(e, \text{John is in good shape}) \land \text{seem}(s)] =$ There is a state s and there is an individual John such that the experiencer of s is John's coach and the theme of s is the proposition that John is in good shape and s is a state of seeming it to be the case.

Here the subject gets its theta role from the embedded clause where it is first merged. The corresponding discourse referent introduced by v_2 is not accessible to the pronoun in the matrix clause. The DP *John* moves (eventually) to the upper clause's SUBJ position to satisfy the SUBJ-criterion and the aboutness presupposition associated with it; at the same time the upper SUBJ head introduces a corresponding discourse referent in a position which *is* accessible to the internal argument of *seem* (as per the Logical Form in (38b). This yields in a compositional and general manner the truth conditions in (38c), where the final matrix subject *John,* the pronoun *his* and the lower trace t_i wind up being co-valued.

The generalization that emerges from the present line of analysis is that when a head imposes some kind of semantic presupposition on the element it attracts, as is the case with SUBJ, it also introduces a (fresh) discourse referent for it, which will set up a potential antecedent for pronouns occurring in accessible positions. As a result, weak crossover effects will be obviated. The analysis of passive is fully parallel to that of raising in this regard:

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omitting to differentiate what is presupposed from what is asserted, and looking at the global meaning of the clause.

(39)   a.   His coach assisted every athlete
        b.   every athlete was assisted by his coach
        c.   every athlete$_i$ [t$_i$ SUBJ$_{i,3}$ [[was assisted t$_i$] by his$_3$ coach]]

In (39a), the object cannot bind the pronoun for the by now familiar reasons. However, through passive the object can be moved to the SUBJ position, which leads to the introduction of a discourse referent structurally accessible to the whole clause.

   Further support to this general line comes from constructions such as Topicalization. Topics share many of the properties of subjects, including that of setting up the entity upon which a comment will be made. It is plausible therefore that Topic positions should introduce a discourse marker, which will be accessible to subsequent discourse and therefore obviate WCO effects. Factually, this has been indeed noted repeatedly. For example Lasnik and Stowell (1991) point out the following example for English:

(40)   This book$_i$ [I would expect his author to disavow t$_i$]
        but that book$_j$ [I wouldn't _]

They point out the fact that presence of VP-ellipsis makes it unlikely that the co-evaluation between the topic and the pronoun in (40) is just a matter of coreference. A similar case can be made for Clitic Left Dislocation in Italian:

(41)   Uno studente cosi'$_j$ [mi aspetterei che il suo$_j$ advisor lo$_j$ soster-rebbe _ ad oltranza]
        'A student like that [I would expect his advisor to strongly support (him)]'

In (41) the dislocated indefinite DP is doubled by the clitic *lo* in it original site and provides an antecedent for the possessive pronoun *suo* presumably through the very same mechanism at work with SUBJ-heads. The Topic head Top that dives Clitic Lef Dislcation introduces a fresh discourse referent for the topic, whence WCO obviation.

   It is worth comparing Clitic Left Dislocation with standard wh-movement:

(42)   [$_b$Who$_i$ [$_a$ C you expect his$_2$ advisor to APP$_{TH,1}$ support u$_i$]]
        a.   a = λp[p = you expect x$_1$'s advisor to support u$_i$]
        b.   b = λp[a (student)(λu$_i$ [p = you expect x$_1$'s advisor to support u$_i$])] = λp[$\exists$u$_i$ student(u$_i$) $\wedge$ p = you expect x$_1$'s advisor to support u$_i$]

In a question like (15), the object of the embedded clause undergoes

wh-movement. The corresponding discourse referent is introduced in the theme region of the embedded clause (by $APP_{TH,1}$, on the present approach). The interrogative comp -head creates the question meaning, without adding any presupposition specific to the moved constituent – cf. (42a). The moved wh-word is simply an indefinite that gets quantified into the question meaning, yielding the final interpretation in (42b). As no presupposition is added by the head that attracts the wh-words, no new discourse marker is introduced. And hence the discourse marker associated with the wh-word (i.e. the embedded theme) remains inaccessible to the pronoun. Topicalization and WH-movement are both 'criterial' in Rizzi's terms. But the different semantics of the different heads explains their different behavior with respect to WCO phenomena.

In this section we have explored how discourse marker introduction extends from th-marking heads, to (some) non th-marking ones. The basic idea is that heads that impose semantic requirements on their Specs that are 'similar enough' to those of th-marking heads, will tendentially introduce a fresh discourse marker (with the potential of the obviation of weak crossover effects). Presuppositions of topicality are a case in point. Movement that happens purely for marking scope (like wh-movement or QR) are the contrast case. There is of course a margin of indeterminacy as to what counts as 'similar enough' to th-marking in this context, that hopelly future research will narrow down further.

6 A note on expletives

In Rizzi's framework, the SUBJ criterion is a formal syntactic criterion that requires the Spec position of SUBJ to be projected and filled; this particular criterion is motivated semantically by the observation that Spec of SUBJ is associated with an aboutness presupposition (and the activation of a discourse referent), for which we have explored a specific implementation in the present paper. Rooting predication in semantics is viewed as problematic in light of the presence of expletives:

(43)   a. It_i $SUBJ_i$ [rains]
          b. It_i $SUBJ_i$ seems [t_i to rain]

Why? Where is the problem, exactly? Well, if SUBJ introduces a presupposition about the subject, then it should do so also in (43a-b). So the proposition should address a question about the denotation of the subject pronoun; but the latter denotes nothing.

Various ways of addressing this issue have been put forth in the syntactic and semantic literature. The one that at present strikes me as most promising is along the following lines. Some verbs denote events that for

which core th-roles of the agent/theme type are just not defined. Raining events, for example, have no agents or themes (though they have locations, and happen at a time, etc.). This means that at the moment in which vP (or what ever appropriate category) is merged with SUBJ, the denotation of the vP will have to be a closed proposition. There is nothing to move into Spec SUBJP, that can 'open up' the proposition and make it about one of the verb's arguments. Now remember that the index on SUBJ corresponds to a abstractor. But in the case we are contemplating, such an abstractor won't find a variable to bind within the vP.[13] Hence, the interpretation of the SUBJP in such cases will yield *constant* propositional functions, i.e. propositional functions that yield the same value for any input whatsoever:

(44) SUBJ_i [rains] $= \text{SUB}(\lambda u_i.\text{rain})$
          where $\lambda u_i.\text{rain}$ is that constant function that maps every u into
          the proposition that it rains.

Clearly, if the complement of SUBJ is a constant function, SUBJ cannot impose any aboutness presupposition, for constant functions, being constant, cannot be about anything in particular. In that case, we may assume that SUBJ simply returns its input unchanged. In other words:

(45) $\text{SUBJ}(P) = \begin{cases} P, \text{ if } P \text{ is a constant function} \\ \\ \lambda u : \exists x_1 \exists Q[Q(P, x_1) \wedge x_1 = u] . P(u), \text{ otherwise} \end{cases}$

So, we simply have to say that SUBJ imposes an aboutness presupposition whenever it can (i.e. whenever its complement expresses a genuine property as opposed to a constant propositional function).

What about expletive subjects? Well SUBJ turns propositional creatures like *rain* into properties of type $<e,t>$, albeit constant ones, $\lambda u.rain$. Hence semantic coherence still requires an argument for that function to be projected. This is why the Spec position of SUBJ needs to be filled. But by what? It doesn't matter, for the predicate, being a constant function doesn't care. It makes sense that languages typically choose minimal pronouns to express these type of 'non argumental' arguments. Anything more would carry more information, which however would be useless. One can assume that the denotation of expletive pronouns is set in the usual way by the relevan assignment function to either

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[13]The vP may of course contain pronouns. But in the present framework, pronouns, being quasi-idexicals, can never be directly bound. Therefore the abstraction index on SUBJ will not be able to catch a pronoun, turning the vP by accident into a 'genuine', non constant function

some abstract object with no content or to, say, the whole universe.[14]

To summarize, SUBJ adds an aboutness presupposition whenever it can (i.e. whenever its complement is argument taking and can express a genuine property). If the complement of SUBJ is propositional, because the eventualities associated with the V lack argument th-roles, the semantic type of SUBJ is such that it still creates a constant property/propositional function. Such a property will be applied with vacuous results to a subject whose reference doesn't matter, and can be set arbitrarily. In this way the semantics of SUBJ provides grounding for the SUBJ criterion.

7 Concluding remarks

The leading idea we have explored in this paper is that the semantics of traces and the semantic of pronouns differs significantly. Traces are (interpretd as) Tarskyan variables, bound by the operator (wh- or other) associated with them by the syntactic construction (e.g. movement) that are trace-creating. Pronouns are discourse referents that pick their antecedent on the basis of the Accessibility Hierarchy. This is rooted in in Dynamic Semantics, where propositional connectives are interpreted as 'context change potentials' that determine accessibility, existential quantifiers activate discourse referents, and pronouns pick them up in a quasi indexical way. The mostly intrasentential nature of Discourse Anaphora can, and indeed, must be 'transferred' internally to clause nuclei under the assumption that verbs are predicates of events. Under the assumption that discourse markers are activated at A-positions, one derives how and why basic Weak Crossoever Effect come about. This approach derives also the observation that pronouns contained in adjuncts can be anteceded by arguments, in spite of the lack of C-command. Along the way we have discussed and developed a specific thesis on the nature of A-positions. Th-marking heads impose specific th-requirements on their argument and introduce discourse reference in correspondence with that. Heads that are sufficiently similar to th-markings in imposing specific semantic requirements and introducing discourse referents acquire properties that makes it appropriate to view them as A-positions. One such property is that of obviating Weak Crossover effects on pronouns, which

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[14]This is a variant of a semantic tradition of dealing with expletives that has a fairly long history, the so calle 'ugly object' approach to expletives. The term is attributed to Kartunnen by Dowty (1985). Examples of analysis in a similar vein are Sag (1982), Gazdar et al. (1985), Chierchia (1989, published 2004), Rothstein (2004), among others. The one sketched in the text strikes me as a particularly simple execution of the general idea pursued in this line of work.

follows directly from the fact that A-heads introduce fresh discourse markers that enter into the accessibility hierarchy. We have discussed in some detail how this takes place in connection with the EPP/SUBJ head, building on Rizzi's work, and explored the consequence of that for the theory of expletives. Many formal details, as well as points of substance could not be addressed. But the arguments we have developed here lends support to abandoning the traditional take on anaphora and pronouns as Tarskian variables and embrace the idea that their semantics, in a precise sense, recycles intrasentential devices internally to elementary clause nuclei. A case of grammaticization, if you wish.

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