

# Team Weak Crossover

*Calixto Agüero-Bautista*

It is generally assumed that the weak crossover (WCO) effect arises when an operator fails to bind a pronoun that stands in a particular syntactic configuration with the given operator. In this article, I introduce a new kind of crossover effect in which the binding dependencies of two different operators work in tandem to yield the given effect. The new effect is radically different from the traditional crossover cases, which involve the binding dependency of just one operator. I show that theories that define the WCO principle as a condition regulating the binding of pronouns cannot account for the new effect. I also show that to account for all the varieties of crossover effects, the WCO principle must be defined as a condition regulating the semantic relation of dependence and must make use of the notion of Spell-Out domain discussed by Chomsky (2001, 2004).

*Keywords:* weak crossover, binding, crossover, multiple cycles, pronoun, dependence, phase

## 1 Introduction

It seems to be a fact of natural language that an operator cannot felicitously bind a given variable if it has to “cross over” it on its way to its scope position. The examples in (1)–(2) illustrate this fact.

- (1) a. \*Who<sub>i</sub> does he<sub>i</sub> love t<sub>i</sub>?  
b. \*He<sub>i</sub> loves every student<sub>i</sub>.
- (2) a. \*?Who<sub>i</sub> does his<sub>i</sub> mother love t<sub>i</sub>?  
b. \*?His<sub>i</sub> mother loves every student<sub>i</sub>.

The deviance of (1a–b), under the intended interpretation, is stronger than that of (2a–b). After Postal (1971) and Wasow (1979), researchers have used the terms *strong crossover* (SCO) and *weak crossover* (WCO) to refer to the phenomena in (1) and (2), respectively. The terms are mnemonics for the difference in deviance between the two pairs.

All theories of these phenomena assume that the crossover effect obtains when a given operator fails to bind a pronominal element that stands in a particular syntactic configuration with

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it. In this article, I introduce a new kind of crossover effect in which the binding dependencies of two different operators work in tandem to yield the given effect. The new effect is radically different from the traditional crossover cases, which involve the binding dependency of just one operator. I will show that theories that define the crossover principle as a condition regulating the binding of pronouns cannot account for the new effect. The reason, as I will show, is that the operator and the pronoun in the offending syntactic configuration (i.e., the configuration that yields the new crossover effect) are not related by binding. If the new effect is indeed a particular case of crossover, the challenge that an adequate theory of the data must meet is to provide a comprehensive account of the new and the old types of the phenomenon.

Meeting this challenge therefore becomes the litmus test for evaluating the empirical adequacy of theories of crossover phenomena. It is this challenge that I set out to meet in the rest of this article, which is organized as follows. In section 2, I introduce the new phenomenon and show that it is a new kind of WCO effect. In section 3, I show that the factors that weaken the WCO effect also weaken the new crossover effect. The results from that section strengthen the hypothesis that we are in fact dealing with a new variety of crossover. In section 4, I introduce a new crossover principle regulating the distribution of overt pronouns and define the syntactic contexts in which the offending pronouns are excluded. In section 5, I show that the new proposal, besides subsuming the main effects of the alternatives found in the literature, can account for the classical crossover effects (i.e., the classical SCO and WCO effects), the newly discovered data, and several other cases that have remained recalcitrant to coherent analysis for decades. In section 6, I generally compare the present proposal with various alternatives, showing that it is empirically superior. In section 7, the conclusion, I comment briefly on issues for further research.

## 2 A Puzzle about Covariance

Chierchia (1993) notices the following contrast:

- (3) a. Who put everything on the platter?  
 b. John, the chicken sandwich; Bill, the chow mein; . . .
- (4) a. Who<sub>i</sub> put everything on his<sub>i</sub> plate?  
 b. \*?John, the chicken sandwich; Bill, the chow mein; . . .

The question in (3a), asked in the context of a dinner party, can be readily answered as in (3b). This type of answer is known in the literature as a *pair-list answer* or *pair-list reading* (henceforth PL). In the PL interpretation, the value of the *wh*-phrase *covaries* with the value of the universal. Notice now that if the *wh*-phrase antecedes a pronoun, as in (4a), the PL reading becomes extremely hard or impossible to construe as an answer to the resulting question: (4b) is not a possible answer for (4a). In attempting to explain the suppressing effect that binding of the pronoun (by the *wh*-phrase) has on the PL interpretation of (4a), Chierchia (1993) conjectures that the PL reading of examples like (3a) is not the normal PL reading found in questions like (5); rather, it is a pragmatically allowed list made possible by the plurality of the two interacting quantificational DPs, as in (6).

- (5) Which sandwich did every cook put on the platter?
- (6) a. Who put those things on the platter?  
 b. John, Bill, and Joe put those things on the platter.  
 c. (More exactly), John put the chicken sandwich; Bill, the chow mein; and Joe, the soup.

(6a) allows the answer in (6b), where the subject and the object DPs are both plural.<sup>1</sup> A speaker confronted with such a question may choose to be more cooperative, expanding an answer like (6b) into one like (6c), which provides more information to the listener (see Krifka 1992, Srivastav 1992). The PL reading in (6c) is thus made possible by the rules of pragmatics rather than by the rules of syntax or semantics.

If the PL reading of (3a) can be accounted for in similar fashion, as Chierchia (1993) implies, then the reading is expected to disappear when the *wh*-phrase antecedes a singular pronoun, as in (4a). The singular pronoun would force a singular interpretation of the *wh*-phrase, which would take away the plurality-induced list.

Unfortunately, however, Chierchia's suggestion cannot ultimately explain the suppressing effect that binding of a pronoun by an indefinite expression seems to have on the reading in which the value of the given expression covaries with respect to the value of a lower quantifier. First, as I have shown elsewhere (Agüero-Bautista 2001a:33ff., 2001b), the PL reading of (3a) is not of the cumulative kind.<sup>2</sup> Second, the suppressing effect of the pronoun occurs in environments in which the question of plurality does not arise.

- (7) a. Who put every dish on the platter?  
 b. John, the chicken sandwich; Bill, the chow mein; . . .
- (8) a. Who<sub>i</sub> put every dish on his<sub>i</sub> tray?  
 b. \*?John, the chicken sandwich; Bill, the chow mein; . . .

In the same dinner-party context in which my informants find (3a) to allow a PL answer, they find that (7a) does too. If anything, some report that the PL answer is easier in the latter case.

<sup>1</sup> Since Scha 1981, it has been known that sentences with two (or more) plural DPs allow for a *cumulative reading* in which the interacting DPs seem to distribute over each other. Thus, the bracketed constituent in (ia) allows the reading paraphrased in (ib).

- (i) a. In this picture of the dance group, [the men are facing the women].  
 b. For all men *x*, there is a woman *y* that *x* faces, and for all women *y*, *y* is being faced by a man *x*.

<sup>2</sup> In Agüero-Bautista 2001a I show, for instance, that while plurality-induced lists survive if the interacting DPs are separated by negation, the PL reading of questions with object *every* does not (see also Agüero-Bautista 2001b). (ia) allows the answer in (ic), but that is not a possible answer for the question in (id), where *everything* is the object quantifier.

- (i) a. Who didn't bring the things we were expecting?  
 b. John and Susie did not bring the things we were expecting.  
 c. (More exactly), John did not bring the camera, and Susie did not bring the phone.  
 d. Who didn't bring everything we were expecting?

But here the PL cannot be attributed to plurality. The reason is that plurality-induced list readings require the (two) interacting DPs to be plural (Srivastav 1992), but *every dish* is morphologically and semantically singular. It enters into singular agreement (in examples like *Every dish is on the table*), and it cannot be the argument of a predicate that requires semantically plural arguments (in sentences like *\*Every dish gathered in the center of the sink*<sup>3</sup>). Notice, however, that here too, binding of a singular pronoun by the *wh*-phrase seems to take away the PL reading; it is very hard to construe (8b) as an answer for (8a).

The phenomenon is not restricted to questions.

- (9) a. Someone put everything on the platter.  
 b. For every thing *x*, there is a person *y* such that *y* put *x* on the platter.
- (10) a. Someone<sub>*i*</sub> put everything on his<sub>*i*</sub> plate.  
 b. *\*?*For every thing *x*, there is a person *y* such that *y* put *x* on *y*'s plate.

(9a) allows a reading, represented in (9b), in which the value of the indefinite covaries with the value of the universal quantifier. I will call an expression whose value covaries with the value of another quantifier the *dependent expression* (DE) relative to that quantifier; and I will call the reading that an expression receives, while being a DE, the *dependent reading* (DR) of that expression. Notice that while the DR of *someone* is readily available for (9a), it is very difficult to construe that interpretation as a possible reading for (10a), where the indefinite binds a pronoun. Treating the PL reading as a DR, the question that arises in connection with the previous contrasts is this: why does binding of a pronoun by the DE make the DR much harder in cases like (4), (8), and (10)? This is the puzzle that I intend to address here.

The phenomenon in question is not restricted to English. The interrogative examples in (11)–(12) illustrate the relevant contrast in Québécois French and Romanian, respectively. (13) illustrates it in Spanish with a noninterrogative indefinite. The preposition that I gloss as *A*, in the Spanish examples, is a dummy preposition different from the directional preposition *a* ‘to’ that happens to have the same pronunciation.

- (11) a. Qui *A* mis chacun des sandwichs sur le plateau? (✓PL)  
 who has put each of.the sandwiches on the tray  
 ‘Who put each of the sandwiches on the tray?’  
 b. Qui<sub>*i*</sub> *A* mis chacun des sandwichs dans son<sub>*i*</sub> assiette? (*\*?*PL)  
 who has put each of.the sandwiches in his plate  
 ‘Who put each of the sandwiches on his plate?’
- (12) a. Cine *A* pus fiecare sandwich de platur? (✓PL)  
 who has put each sandwich on.the platter  
 ‘Who put each sandwich on the platter?’

<sup>3</sup> Compare (i), which is acceptable.

(i) Everything gathered in the center of the sink.

- b. Cine<sub>i</sub> a pus fiecare sandwich de platoul lui<sub>i</sub>? (\*?PL)  
 who has put each sandwich on.the plate his  
 ‘Who put each sandwich on his plate?’
- (13) a. Alguien condujo a todo dios al hotel (en mi carro). (✓DR)  
 someone drove A every god to.the hotel (in my car)  
 ‘Someone drove everyone to the hotel in my car.’
- b. Alguien<sub>i</sub> condujo a todo dios al hotel en su<sub>i</sub> carro. (\*?DR)  
 someone drove A every god to.the hotel in his car  
 ‘Someone drove everyone to the hotel in his car.’

The DR is much more difficult in the (b) cases in (11)–(13) than it is in the (a) cases. In (13a), for instance, Spanish *alguien* ‘someone’ allows a DR in which its value covaries with respect to the value of *todo dios* ‘everyone’. That reading is available, for instance, in a context where one is trying to figure out how the people in a particular group were transported to a particular hotel. But in the same context, the reading in question does not seem available in (13b), where the subject indefinite binds a singular pronoun.

In English, the suppressing effect that binding of a pronoun by the DE has on the DR is found even in questions with the quantifier *each*, which is known for taking extra-wide scope.

- (14) a. Which cook put each sandwich on my plate?  
 b. Bill, the chicken sandwich; John, the BLT; . . .
- (15) Which cook<sub>i</sub> put each sandwich on his<sub>i</sub> plate?

If these sentences are pronounced without any special intonation on the quantifier phrase, most of my informants find that while (14a) can be answered as in (14b), it is much more difficult to give such an answer to (15). The intuitions seem less strong in the case of noninterrogative indefinites. Although binding of a pronoun by a DE seems to take away the DR in examples with universals like *everything* or *everyone*, as in (10a), there is variability in judgments with quantifiers of the form *each/every* + NP. For convenience, (10a) is repeated as (16a). Variability in judgment is represented with the percent sign (%).

- (16) a. Someone<sub>i</sub> put everything on his<sub>i</sub> plate. (\*?DR)  
 b. A taxi driver drove each tourist to the hotel in my car. (✓DR)  
 c. A taxi driver<sub>i</sub> drove each tourist to the hotel in his<sub>i</sub> car. (%DR)

The facts concerning (16a–c) are as follows. All my informants rejected the DR for (16a). With respect to (16b–c), the situation is slightly different. In a context in which the speaker is informing his manager how a particular group of tourists was driven to the hotel (say, from a museum), most of my informants found that the DR is more difficult in (16c), where the indefinite binds a pronoun, than it is in (16b), where no binding takes place and the relevant interpretation is readily available. Some speakers, however, do report understanding (16c) with a DR (i.e., one-taxi-per-tourist reading) of the indefinite. In section 3, I will return to this difference among speakers’ judgments on examples like (16c).

Adding intrigue to this puzzle is the fact that a DE's antecedent pronoun does not block the DR in every syntactic configuration. Crucially, the phenomenon only occurs in structural contexts in which the universal quantifier has to "cross over" the DE (or its trace) in order to license, presumably, the DR.<sup>4</sup> If no crossover configuration is involved, the DR is in fact readily available.

- (17) a. [Who]<sub>i</sub> did [everyone]<sub>j</sub> t<sub>j</sub> introduce t<sub>i</sub> to his<sub>i</sub> advisor? (✓PL)  
 b. [Who]<sub>i</sub> did [every witness]<sub>j</sub> t<sub>j</sub> say t<sub>i</sub> put the sandwiches on his<sub>i</sub> plate? (✓PL)  
 c. Who<sub>i</sub> did [each witness]<sub>j</sub> t<sub>j</sub> say t<sub>i</sub> put the dishes on his<sub>i</sub> tray? (✓PL)
- (18) a. [Someone from New York]<sub>i</sub> seems to [everyone] t<sub>i</sub> to have put the sandwiches on his<sub>i</sub> plate. (✓DR)  
 b. [Someone from Hollywood]<sub>i</sub> seems to every paparazzo t<sub>i</sub> to have driven his<sub>i</sub> mother to the ER. (✓DR)

The DR (i.e., the PL reading) is available in the questions in (17a–c), even though the DE (i.e., the *wh*-phrase) antecedes an overt pronoun. Similarly, the DR is available in (18a–b). For instance, imagine a situation in which I interrupt a meeting of paparazzi, calling my friend Albert from the group and asking him what the matter is. Albert could utter (18b) without committing himself to the existence of a consensus among the paparazzi with respect to the identity of the unfortunate person visiting the ER. Thus, (18b) can be true in a situation in which A seems to Albert to have driven his mother, whereas B seems to another paparazzo to be the unfortunate driver, and so on. In other words, (18b) has a DR.

Comparing examples like (4a), repeated in (19), with those in (17)–(18) suggests that we are dealing here with a bona fide case of crossover. The structural difference between the two types of examples is that the operators in cases like (19) end up in a crossover configuration, after raising of the universal, which is not the case in (17)–(18).

- (19) Who<sub>i</sub> t<sub>i</sub> put everything on his<sub>i</sub> plate? (\*?PL)

However, further comparison reveals that we are not dealing with a standard crossover phenomenon here. For one thing, neither the dependency headed by the DE nor the one headed by the universal can be singled out as the sole culprit of the apparent crossover violation. For instance, cases like (7a) (= (20a)), (10a) (= (20b)), and (20c) show that there is nothing wrong with a universal quantifier crossing over the DE (or its trace) to yield the DR.

- (20) a. Who put every dish on the platter? (PL)  
 b. Someone put everything on the platter. (DR)  
 c. What chased every dog in the forest? (PL)

<sup>4</sup> There are two ways of representing the DR (see footnote 11). One involves subordinating the indefinite expression below the universal quantifier as is done in generalized quantifier theory (e.g., Montague 1973). The other involves analyzing the indefinite as a functional expression and letting the universal bind a variable inside the functional expression, as we will see in section 4.2. Both options require that the universal takes scope at least over the trace of the DE.

On the other hand, the grammaticality of examples like (16a) and (19), under the nondependent interpretation of the indefinite expression, suggests that there is nothing wrong with an indefinite anteceding a pronoun, as long as the indefinite is not a DE. What the extreme marginality of the DRs in cases like (16a) and (19) shows, then, is that the lethal combination resulting in the attested crossover effect consists of the crossing configuration involving the positions of the universal and the DE, on the one hand, and the binding configuration between the DE and the overt pronoun, on the other. Clearly, here we have two distinct dependencies working together to yield the attested crossover effect. I will therefore refer to this phenomenon as *team weak crossover* (TWCO), the term meant as a mnemonic for the cooperative role of the two dependencies.

If TWCO is in fact a species of crossover, we expect that general factors ameliorating the latter phenomenon might have a similar effect on the former. In the next section, I show that this is the case.

### 3 Factors Ameliorating WCO and TWCO

#### 3.1 Weakest Crossover

Lasnik and Stowell (1991) observe that WCO effects seem to be entirely absent in certain contexts that nevertheless involve crossover configurations, a phenomenon they term *weakest crossover*. Of the environments discussed by Lasnik and Stowell, only two have clearly emerged as uncontroversial weakest crossover environments: *tough*-movement constructions and parasitic gap structures. Consider Lasnik and Stowell's (1991:691) examples in (21).

- (21) a. Who<sub>i</sub> t<sub>i</sub> will be easy for us [Op<sub>i</sub> to get [his<sub>i</sub> mother] to talk to e<sub>i</sub>]?  
 b. Who<sub>i</sub> did you stay with t<sub>i</sub> [Op<sub>i</sub> before [his<sub>i</sub> wife] had spoken to e<sub>i</sub>]?

The standard analysis of these constructions posits *wh*-movement of an empty operator inside the adjunct clause (see, e.g., Chomsky 1976, 1993, Contreras 1984, Browning 1987, Nissenbaum 1998, 2000). Lasnik and Stowell observe that the null operator and the pronoun in subject position of the adjunct clause are in a WCO configuration. A WCO effect is therefore expected, but unattested, in such environments. I will defer an analysis of these facts until section 5. For now, the relevant point is that the DR is available in weakest crossover environments. Consider the following modifications of Lasnik and Stowell's examples:

- (22) a. Who<sub>i</sub> t<sub>i</sub> will be easy for each detective [Op<sub>i</sub> to get [his<sub>i</sub> mother] to talk to e<sub>i</sub>]?  
 b. A will be easy for D1 (to get his mother to talk to); B, for D2; and C, for D3.  
 (23) a. Who<sub>i</sub> did you introduce t<sub>i</sub> to every woman [Op<sub>i</sub> before [his<sub>i</sub> wife] had spoken to e<sub>i</sub>]?  
 b. I introduced Bill to Jane; John, to Sue; and Paul, to Mary.

The PL answer is perfectly natural for the questions in (22)–(23). However, assuming that the universal NP has to raise over the *wh*-phrase or its trace in order to license that interpretation, we derive the same offending configuration found in examples like (16a) and (19): a configuration involving crossing of the universal over the DE with simultaneous binding of an overt pronoun by the latter. A TWCO effect is therefore expected in (22)–(23), but absent, just as a WCO effect

is expected but absent in those examples. This result is entirely expected if weakest crossover environments attenuate WCO effects generally and if TWCO effects constitute a subset or particular case of WCO phenomena.

### 3.2 *PRO Gates*

Higginbotham (1980) discusses a paradigm that has been recalcitrant for most theories of WCO. He observes that although a fronted operator cannot bind a regular pronoun to the left of its trace, it can if the pronoun in question is the element PRO. Consider (24a–c).

- (24) a. ?\*Who<sub>i</sub> did [his<sub>i</sub> fixing a car] get t<sub>i</sub> fired t<sub>i</sub>?  
 b. Who<sub>i</sub> did [his<sub>j</sub> fixing a car] get t<sub>i</sub> fired t<sub>i</sub>?  
 c. Who<sub>i</sub> did [PRO<sub>i</sub> fixing a car] get t<sub>i</sub> fired t<sub>i</sub>?

(24a) shows the classical WCO effect expected from a construction in which an operator has been displaced over a pronoun that it must bind. (24b) is a control example showing that nothing is wrong with a sentence of the same structure as long as the operator does not bind the pronoun. (24c) is the surprising example, showing that if the pronoun is PRO, the deviance associated with WCO vanishes. Examples of this kind are known as *PRO gates*, under the assumption that binding PRO renders an operator capable of binding a more deeply embedded overt pronoun inside the subject gerundive phrase.<sup>5</sup>

- (25) Who<sub>i</sub> did [PRO<sub>i</sub> fixing his<sub>i</sub> car] get t<sub>i</sub> fired t<sub>i</sub>?

Putting aside, for the moment, the question of what the proper analysis of the phenomenon is, the thing to notice now is that PRO gates also ameliorate TWCO.

- (26) a. Who<sub>i</sub> t<sub>i</sub> convinced each judge by [PRO<sub>i</sub> looking good]? (✓PL)  
 b. Who<sub>i</sub> t<sub>i</sub> convinced each judge [by his<sub>i</sub> looking good]? (?\*PL)  
 c. John<sub>i</sub> t<sub>i</sub> impressed each judge by [PRO<sub>i</sub> looking good].  
 d. John<sub>i</sub> t<sub>i</sub> impressed each judge by [his<sub>i</sub> looking good].

(26c–d) are control examples. They show that a gerundive nominal in an adjunct clause is acceptable and that a possessive in a nonsubject gerundive is fine. The speakers who accepted those examples were asked to judge the pair in (26a–b). For those speakers, the question in (26a) straightforwardly allows a PL answer. For instance, imagine a situation in which three judges are individually writing down the name of the person that each one finds to be the sexiest celebrity alive. Assume also that there is not agreement among the judges. In such a scenario, if we approach the person who collected the judges' answers by uttering (26a), that person might appropriately give a PL answer like *Brad Pitt convinced J1; Tom Cruise, J2; and Denzel Washington, J3*.

<sup>5</sup> The term is a misnomer, however, as binding of overt pronouns in subject gerundives is possible if the pronoun is deeply embedded in the gerundive constituent, regardless of whether the subject of the gerundive is PRO or not. Thus, alongside (25), (i) is also acceptable (see section 4.3).

(i) Who<sub>i</sub> did [Bill's crashing his<sub>i</sub> car] get t<sub>i</sub> fired t<sub>i</sub>?

However, a similar answer seems much more difficult for (26b) even in a similar situation. Here, speakers feel that the question is about the single celebrity (say, Brad Pitt) who convinced all the judges with his good looks. The phenomenon of PRO gates shows, once again, that TWCO is a species of crossover, since it ameliorates the new phenomenon in the same way it ameliorates WCO phenomena generally.

### 3.3 Focusing Particles

Additional evidence that we are dealing with a genuine case of crossover comes from the fact that certain particles that ameliorate regular WCO violations seem to ameliorate TWCO as well. For instance, it is well known that expressions like *own* and other focusing particles can ameliorate WCO effects. Consider the following examples:

- (27) a. ?\*Who<sub>i</sub> did his<sub>i</sub> mother attack?  
 b. Who<sub>i</sub> did his<sub>i</sub> own creation attack?

(27b) is better than (27a) for most speakers I polled for this article. For example, while many speakers have trouble even parsing (27a), (27b) is acceptable, say, as a trivia question for followers of the TV series *Star Trek: The Next Generation*. A short answer for (27b) in that context could be *Dr. Soong*, if Dr. Soong's creation Lore in fact rebels against his human creator in one of the episodes.

Now, notice the effect of such a WCO-ameliorating particle on TWCO.

- (28) a. Which artist<sub>i</sub> attracted each critic with his<sub>i</sub> own creation? (✓PL)  
 b. Someone<sub>i</sub> claimed every painting as his<sub>i</sub> own, and only, creation. (✓DR)

The dependent reading is fine in these examples. (28a), for instance, is natural in a situation in which the person who utters the question knows that each critic has been attracted by two or more artists: one with an original work, and the other(s) with (a) nonoriginal one(s). In this scenario, the question only requests information about the identity of the artists who attracted the critics with their respective original works. In such a situation, an answer like *A attracted the first critic; C, the second; and B, the third* is entirely appropriate if A, B, and C are the artists with original works in the model, and if they in fact attracted the first, third, and second critic, respectively, with their works.<sup>6</sup> Whatever the correct analysis of the attenuating effect of these particles on WCO turns out to be, the point here is that they have a similar effect on TWCO, suggesting again that we are dealing with two instances of the same phenomenon.

To summarize, we have seen that TWCO effects arise in the configurations in which we find WCO effects, and are attenuated in the same constructions in which WCO effects are amelio-

<sup>6</sup> In judging the availability of the DR in sentences like (28a–b), one must make sure that these examples are judged against the background of a context including a set of alternatives ranging over entities of the same semantic type as the focused constituent, as in the context just provided. This is necessary because of the semantic properties and the presupposition associated with focused constituents. See Rooth 1985, 1992 and Reinhart 2006 for comprehensive discussions of the syntax and semantics of focus.

rated, as in the weakest crossover constructions discussed in this section. I conclude therefore that TWCO effects are a kind of WCO. In the next section, I propose a general theory of crossover in which the notion of Spell-Out domain plays an important role. I show that the given proposal can account for all the varieties of crossover, including the newly discovered TWCO effects.

## 4 The Proposal

### 4.1 Background Assumptions

Chomsky (2001, 2004) hypothesizes that syntactic derivations proceed by small cycles called phases. That is, a derivation proceeds incrementally in a bottom-up fashion until it reaches the phase level, at which point the computational system transfers the derivation to PF and LF for linearization and interpretation, respectively. The derivation then continues until it reaches a higher phase, at which point the new cycle is spelled out. Chomsky observes that the phases are “propositional” and are isolable units in the phonology. He hypothesizes that CP and vP are the phases. Converging evidence suggests that the hypothesis is on the right track, and I will assume it in what follows.<sup>7</sup> To see how derivations work under the multiple phase/Spell-Out hypothesis, consider a somewhat simplified derivation for the sentence in (29).

(29) Who did Roger Rabbit frame?

*Derivational steps for (29)*

1. Merge ( $\langle \text{frame}, \text{who} \rangle$ )  $\Rightarrow$  [<sub>VP</sub> frame who].
2. Merge ( $\langle \text{v}, [\text{VP frame who}] \rangle$ )  $\Rightarrow$  [<sub>VP</sub> v [<sub>VP</sub> frame who]].
3. Merge ( $\langle \text{Roger Rabbit}, [\text{VP v} [\text{VP frame who}]] \rangle$ )  $\Rightarrow$  [<sub>VP</sub> Roger Rabbit v [<sub>VP</sub> frame who]].
4. Move *who* to the edge of vP  $\Rightarrow$  [<sub>VP</sub> who Roger Rabbit v [<sub>VP</sub> frame **t<sub>wh</sub>**]].
5. SPELL OUT COMPLEMENT OF v  $\Rightarrow$  [<sub>VP</sub> who Roger Rabbit v [<sub>VP</sub> **frame t<sub>wh</sub>**]].
6. Merge ( $\langle \text{did}, [\text{VP who Roger Rabbit} [\text{VP frame t<sub>wh}}]] \rangle</sub>$ )  $\Rightarrow$  [<sub>TP</sub> did [<sub>VP</sub> who Roger Rabbit v [<sub>VP</sub> **frame t<sub>wh</sub>**]]].
7. Move *Roger Rabbit* to TP  $\Rightarrow$  [<sub>TP</sub> Roger Rabbit did [<sub>VP</sub> who **t<sub>sub</sub>** v [<sub>VP</sub> **frame t<sub>wh</sub>**]]].
8. Merge ( $\langle \text{C}, [\text{TP Roger Rabbit did} [\text{VP who t<sub>sub}} [\text{VP frame t<sub>wh}}]]] \rangle</sub></sub>$ )  $\Rightarrow$  [<sub>CP</sub>[<sub>TP</sub> Roger Rabbit did [<sub>VP</sub> who **t<sub>sub</sub>** [<sub>VP</sub> **frame t<sub>wh</sub>**]]]].
9. Move *did* to C  $\Rightarrow$  [<sub>CP</sub> did [<sub>TP</sub> Roger Rabbit **t<sub>did</sub>** [<sub>VP</sub> who **t<sub>sub</sub>** v [<sub>VP</sub> **frame t<sub>wh</sub>**]]]].
10. Move *who* to CP  $\Rightarrow$  [<sub>CP</sub> who did [<sub>TP</sub> Roger Rabbit **t<sub>did</sub>** [<sub>VP</sub> **t<sub>wh</sub>** **t<sub>sub</sub>** v [<sub>VP</sub> **frame t<sub>wh</sub>**]]]].
11. SPELL OUT COMPLEMENT OF C  $\Rightarrow$  [<sub>CP</sub> who did [<sub>TP</sub> **Roger Rabbit t<sub>did</sub>** [<sub>VP</sub> **t<sub>wh</sub>** **t<sub>sub</sub>** [<sub>VP</sub> **frame t<sub>wh</sub>**]]]].

Steps 5 and 11 illustrate the moments in which the vP and CP phases are spelled out or transferred to the PF and LF interfaces for linearization and interpretation, respectively. Notice that when

<sup>7</sup> Fox (2000), for instance, shows that phases are the sites of syntactic reconstruction. See Agüero-Bautista 2007 for a similar argument. Also see McCloskey 2000 and Agüero-Bautista 2001a:149ff. for evidence suggesting that displacement can leave a morphological footprint at the level of the phase.

Spell-Out applies in steps 5 and 11, only the complement of the head of the phase is spelled out. Therefore, the *Spell-Out domain* of a phase  $\alpha$  is  $\alpha$  minus its head and specifier(s). Thus, for CP the Spell-Out domain is IP; and for vP, VP. That means that material in the specifier of a phase is spelled out at a higher phase. This set-up will play an important role in the proposal elaborated below.

A key idea of the multiple Spell-Out model is that spelling out a domain renders the given domain inaccessible, or opaque, to operations from outside the domain. Thus, after Spell-Out, material inside the complement of a phase is encapsulated or protected from changes triggered by operations from outside that phase. On the other hand, material in the specifier position(s) of a phase remains accessible to operations from a higher phase. That is, material in the specifier position(s) of a phase is not encapsulated. This distinction between what is encapsulated and what is available will also play a key role in the proposal to be elaborated below.

#### 4.2 What Goes Wrong during Crossover?

Consider the examples in (30).

- (30) a. ?\*Who<sub>i</sub> does his<sub>i</sub> mother love t<sub>i</sub>?  
 b. Who<sub>i</sub> t<sub>i</sub> loves his<sub>i</sub> mother?  
 c. Who<sub>i</sub> did [PRO<sub>i</sub> fixing a car] get t<sub>i</sub> fired?

The standard assumption is that the problem with examples like (30a) involves the binding of a pronoun contained in a nominal that c-commands the trace of the operator. But examples like (30c) have been recalcitrant to all theories subscribing to such an assumption, because they seem to instantiate the same configuration as the unacceptable (30a). The most frequent strategy in the literature has been to treat examples like (30a) as the representative cases and examples like (30c) as the unexplained ones. I will take the opposite approach here, treating examples like (30c) as the representative cases and examples like (30a) as the unexpected ones. In fact, once this move is made, a good reason for the deviance of (30a) immediately comes to mind. Montalbetti (1984) shows that in some languages, null pronouns must necessarily be used in environments where, from syntactic considerations alone, one would also expect overt pronouns. Consider the Spanish minimal pair in (31).

- (31) a. \*Nadie<sub>i</sub> cree que el<sub>i</sub> es inteligente.  
 nobody believes that he is intelligent  
 ‘Nobody believes he is intelligent.’  
 b. Nadie<sub>i</sub> cree que pro<sub>i</sub> es inteligente.  
 nobody believes that pro is intelligent  
 ‘Nobody believes he is intelligent.’

Example (31a) is unacceptable if the pronoun is bound by the quantifier in the higher clause. The sentence is fine if the pronoun receives a deictic interpretation. (31b) shows that a null pronoun, occurring in exactly the same position as the overt pronoun in the deviant example, can receive a bound interpretation. Montalbetti proposes the Overt Pronoun Constraint (OPC) in order to

account for such contrasts. The OPC has been found to be active in many languages across diverse language families, suggesting that it is probably the reflex of a deeper universal principle. The question that comes to mind now is whether the contrast between (30a) and (30c) could be a reflex of the same principle underlying the widespread OPC effects. I believe the answer is yes. In particular, I will show that the constraint in (32), which can be viewed as a variant of Montalbetti's OPC, is the only new machinery we need in order to explain the many varieties of crossover found in the literature.

(32) *Overt Variable Constraint (OVC)*

A variable  $v$  cannot depend on an operator  $O$  if  $v$  is overt and if it is spelled out in the same Spell-Out domain as  $O$  or any of the copies (or traces) of  $O$ .

(33) *Dependence*

$\alpha$  depends on  $\beta$  iff whenever the value of  $u$  changes,  $u$  a variable bound by  $\beta$ , the value of  $\alpha$  changes as well.

I am not assuming any syntactic definition of the notion *variable* as in traditional analyses of crossover. Rather, that term is used in (32) as it is often used in the semantic tradition. In that sense, a variable is any linguistic expression whose value is determined by a binder or picked directly from the context. The present proposal differs from previous theories of crossover in assuming that the crossover constraint regulates the relation of dependence between a variable and an operator, rather than the relation of binding between an operator and its variables. But since bound variables are dependent variables, (32) also regulates the usual binding relations between a binder and its variable. In section 6, I will show that theories that posit constraints regulating the binding relation between operators and variables cannot explain the TWCO effect, since that effect obtains when certain variables depend on operators in configurations that offend the crossover constraint without the variable being directly bound by the offending operators.

Before trying to explain how (32) applies to the TWCO cases, let us see how it applies to the traditional cases. Consider first an example like (34).

(34)  $\text{Who}_i$  [ $_{VP}$   $t_i$   $v$  said [ $_{CP}$  that Mary [ $_{VP}$  asked Susan to [ $_{VP}$  kiss him $_i$ ]]]]?

In a multiple-cycle derivation, where items are merged in different cycles, a lexical item is not expected to satisfy constraints that were active in earlier cycles. That is, a lexical item is expected to satisfy syntactic restrictions only after it enters the derivation. That is the intuition that the formulation of the OVC in (32) intends to capture. The OVC rules out an overt variable (i.e., an overt pronoun) that depends on an operator only if that variable is spelled out between the time the operator is merged and the time it moves to its final landing place.<sup>8</sup> For instance, the OVC

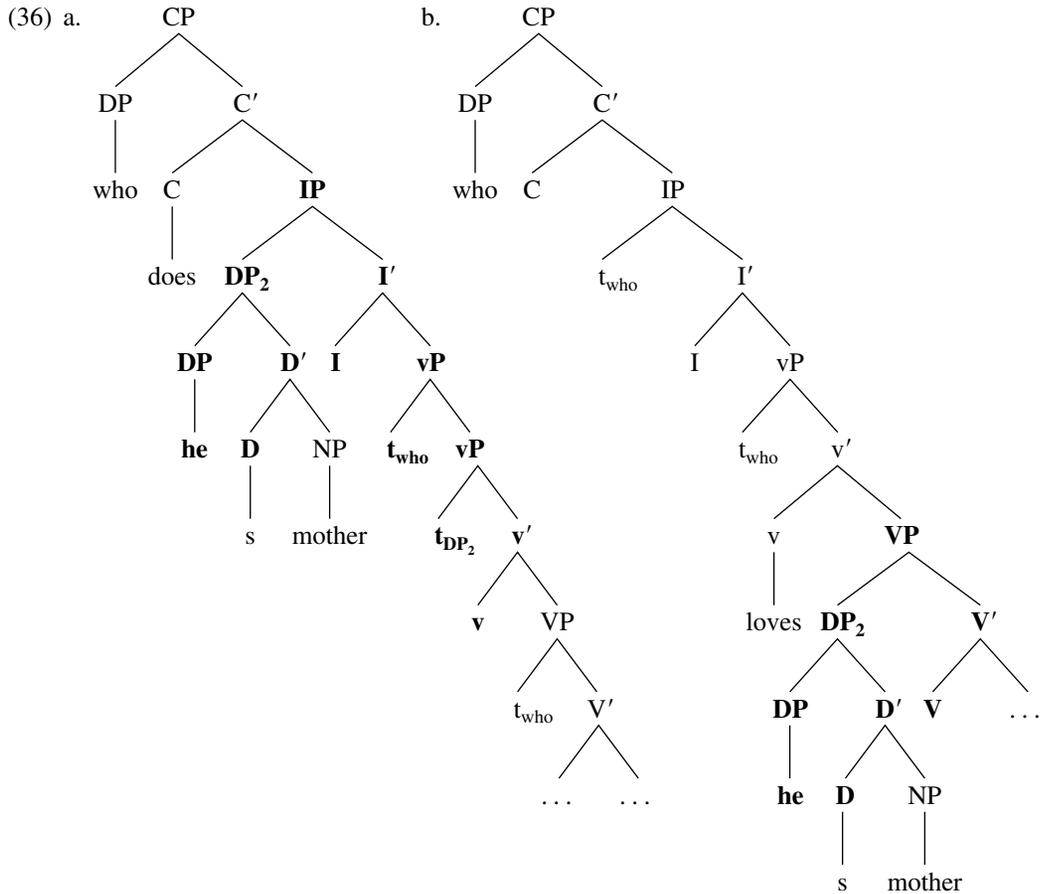
<sup>8</sup> Notice that, in a way, this builds the strict cycle condition into the definition of the crossover constraint. The reason this is necessary is that while binding can relate items occurring in different cycles, it is unrealistic to expect such items to obey the same conditions given that a condition can be active in one cycle while being inactive in another. This is the intuition that I intend to capture in the formulation of the OVC in (32).

does not apply to (34) because the pronoun in that example is spelled out in the lowest cycle, whereas the operator is introduced in the fourth cycle, counting from the bottom. Since Spell-Out domains are inaccessible (i.e., encapsulated) once they are linearized, it is natural to expect that no grammatical process will apply to rule out dependencies across such protected domains.

Here is how (32) explains, without any addition, the classical crossover examples and the problematic PRO gate cases. Consider again the examples in (30), repeated in (35).

- (35) a. ?\*Who<sub>i</sub> does his<sub>i</sub> mother love t<sub>i</sub>?
- b. Who<sub>i</sub> t<sub>i</sub> loves his<sub>i</sub> mother?
- c. Who<sub>i</sub> did [PRO<sub>i</sub> fixing a car] get t<sub>i</sub> fired?

The OVC allows (35c) simply because the pronoun in that example is null (i.e., PRO) and the constraint only rules out overt pronouns under a bound variable interpretation. To see how (32) rules out (35a), while ruling in (35b), consider the respective structures of those sentences in (36a–b).



Recall from section 4.1 that when Spell-Out applies at a particular phase, only the complement of the head of the phase is pronounced or linearized. That leaves material on the edge or specifier position(s) of a phase to be spelled out when the higher phase is completed. Notice now that the pronoun in (36a) is in the specifier of the subject DP. That means that even if DPs are phases, the pronoun is spelled out only when the CP phase is completed and its complement is spelled out. Now, that is also when the trace of the *wh*-phrase is spelled out, as shown by the part of the diagram in boldface, which illustrates the part of the tree spelled out at the level of the CP phase. No nonstandard notion like “almost c-command” is needed in order to illustrate the relation between the pronoun and the trace of the *wh*-phrase in (36a). Their relation is that they both belong to the same Spell-Out domain, a configuration that is penalized by the constraint in (32).

In the structure in (36b), on the other hand, the situation is different. Here, the DP containing the pronoun is spelled out when the complement of *v* (i.e., the VP) is transferred to the PF interface. But the trace of the *wh*-phrase in that structure is spelled out when Spell-Out applies at the CP level, sending the complement of C (i.e., IP) to PF. The constraint in (32) does not apply because the *wh*-phrase and its traces, on the one hand, and the pronouns, on the other, are linearized in different Spell-Out domains.

It has been observed that embedding of the pronoun sometimes has an ameliorating effect on crossover. The interaction of the constraint in (32) with the derivation-by-phase hypothesis predicts that not all cases of embedding should ameliorate crossover. Only and exactly those cases in which the pronoun is embedded under a phase head (e.g., *v* or C) from which the interacting operator has not been extracted should ameliorate crossover. In section 4.3, I will show that this prediction is borne out.

Examples like those in (35) might give the impression that the OVC is all that is needed to account for crossover phenomena generally. However, cases like (37) show that something else is needed.

(37) Who<sub>i</sub> did Mary [<sub>VP</sub> t<sub>i</sub> t<sub>Mary</sub> introduce [<sub>VP</sub> t<sub>i</sub> [<sub>PP</sub> to his<sub>i</sub> advisor]]]?

If the pronoun inside the PP in (37) and the lowest trace of the *wh*-phrase belong to the same Spell-Out domain, as shown in the boldfaced area of the bracketed structure, then a violation of (32) ensues. But the interpretation in which the *wh*-phrase binds the pronoun is in fact available in (37), so we need to find a way to turn off (32) if we are to be able to account for the acceptability of such examples. I suggest that Richards’s (1998) Principle of Minimal Compliance (PMC) turns off the OVC after the constraint has been obeyed once in a top-down scan of the structure being interpreted. The PMC is given in (38), from Richards 1998:601.

(38) *Principle of Minimal Compliance*

For any dependency D that obeys constraint C, any elements that are relevant for determining whether D obeys C can be ignored for the rest of the derivation for purposes of determining whether any other dependency D’ obeys C.

Richards defines relevance as follows (1998:601):

(39) *Relevance*

An element *X* is relevant to determining whether a dependency *D* with head *A* and tail *B* obeys constraint *C* if

- a. *X* is along the path of *D* (that is,  $X = A$ ,  $X = B$ , or *A* *c*-commands *X* and *X* *c*-commands *B*) and
- b. *X* is a member of the class of elements to which *C* makes reference.

As an illustration of the effect of the PMC, consider the contrast between (40) and (41).

(40) \*What<sub>*t*</sub> do you wonder [who bought *t*<sub>*i*</sub>]?

(41) Who<sub>*t*</sub> *t*<sub>*i*</sub> wonders [who bought what]?

Example (40) violates Subjacency because *what* crosses the specifier of the embedded complementizer, which is occupied by *who*. As Richards (1998) points out, (41) has a multiple-question interpretation, a reading classically derived by moving *what* to the complementizer of the matrix clause. But this movement must not violate Subjacency, as the sentence is fully acceptable. The question is why. Richards's explanation of the contrast is that in (41), because movement of the higher *who* into the specifier of the matrix CP obeys Subjacency, the PMC determines that subsequent movement of the embedded *what* into another specifier of the same complementizer does not have to obey Subjacency. In other words, according to Richards's analysis, a *wh*-movement that would otherwise violate Subjacency is allowed by the grammar provided that a Subjacency "tax" has been paid (i.e., the constraint has been obeyed at least once) prior to the movement.

Before we look at how the PMC interacts with the OVC, a few remarks are in order concerning the formulation of the PMC that I will be assuming in this article. It is important to understand that the PMC is not a panacea, exempting a particular structure from having to subsequently obey any other grammatical constraint. As Richards puts it, "[W]e do not want an anaphor that is in a well-formed binding relation to be immune to the Case Filter (or its successors), for instance" (p. 602). I believe that the proper formulation of the PMC, one that solves the panacea problem, requires interpreting *D'* in the definition in (38) as ranging over dependencies of the same type as *D*. In other words, according to such a reading of (38), once a dependency *D* obeys a constraint *C*, one can ignore any of the relevant elements of *D* not for any dependency whatsoever to which *C* might apply, but only for those dependencies that are of the same type as *D*.

To see why this limitation is necessary, consider the data in (42).

- (42) a. Who remembers where we bought what?  
 b. When did you remember where we bought what?  
 c. Why did you remember where we bought what?  
 d. How did you remember where we bought what?

Examples like (42a), discussed in Baker 1968, 1970, allow a multiple-question interpretation. Under that interpretation, the sentence can be given an answer like *John remembers where we bought the iPod, Mary remembers where we bought the cell phone, and Bill remembers where*

*we bought the camera.* *Wh*-questions where the overtly fronted phrase is one of the so-called referential adjuncts (e.g., *when*, *where*) also seem to allow the multiple-question interpretation. Thus, many speakers find that a possible answer for (42b) is *I remembered at 2 o'clock where we bought the camera, at 3 where we bought the iPod, and at 4 where we bought the cell phone.* Things are different, however, when the overtly fronted *wh*-element is a nonreferential adjunct (e.g., *why*, *how*). Thus, the native speakers I consulted for this article feel that the multiple-question reading is not available or is much more difficult in (42c–d). This difference presents a potential problem for a PMC-based explanation of Subjacency. In particular, under the assumption that the movement of the *wh*-phrase in the matrix clause is what deactivates Subjacency, making possible the subsequent displacement of *what* (into the matrix CP) that results in the multiple-question reading, the prediction is made that the Subjacency-obeying movement of *why* and *how* in (42c–d) should have a similar effect. As we just saw, however, that prediction is incorrect: the multiple-question reading is absent in (42c–d), suggesting that something is blocking movement of the embedded *what* in those examples.

I should point out that the preceding problem only arises under the assumption that a Subjacency-obeying movement dependency deactivates the condition for every movement dependency. If we assume, on the other hand, that when a dependency D obeys a given constraint C, we can ignore relevant elements only for those dependencies that are of the same type as D, the contrast in (42) can be explained straightforwardly. In order to articulate such an explanation, one could make use of the fact that *wh*-phrases participate in two distinct types of dependencies: referential and nonreferential (Cinque 1990, Rizzi 1990). In particular, it has been argued that whereas referential *wh*-phrases involve quantification over individuals, the nonreferential ones involve higher-order quantification of some sort (see especially Szabolcsi 1992, Frampton 1999).

Given this distinction, one can argue that the dependency headed by the fronted *wh* in (42a–b) is of the same type as the dependency created by subsequent displacement of the embedded *what*: both involve quantification over individuals. On the other hand, the dependency headed by the fronted *wh* in (42c–d) would not be of the same kind as a dependency headed by displacement of the embedded *what*: the former would involve higher-order quantification, whereas the latter would involve first-order quantification. If a dependency D can only pay a constraint tax on behalf of dependencies that are of the same type, as suggested above, it follows that the Subjacency tax will be paid by movement of the overtly fronted *wh* in (42a–b), but not in (42c–d).<sup>9</sup> That would

<sup>9</sup> Examples with base-generated *wh*-phrases lead to the same conclusion. A case in point is *how come* in the structure in (i), which lacks the multiple-question reading.

(i) How come you remember where we bought what?

The dependency headed by *how come* must obey Subjacency, since the example is acceptable with a single-answer interpretation. What then blocks *what* from being fronted covertly to yield the multiple-question interpretation, taking

account for the difference in interpretation between the two pairs of questions. In other words, in order to account for data like those in (42) one must read the definition in (38) as having the (implicit) condition that only a dependency that is of the same type as the tax-paying dependency can qualify as a D'. Because of data like (42a–d), I will adopt that particular interpretation of the PMC in what follows.

Returning to the main discussion, let us see how the PMC turns off the OVC in the appropriate contexts. Before we look at (37), which motivated the introduction of the PMC, let us consider the classical crossover minimal pair.

- (43) a. ?\*Who<sub>i</sub> does his<sub>i</sub> mother love t<sub>i</sub>?  
 b. Who<sub>i</sub> t<sub>i</sub> loves his<sub>i</sub> mother?

A speaker interpreting (43b) will first construe the *wh*-phrase as the binder of a null variable—namely, its trace—before encountering the overt pronoun. D in this case (i.e., the dependency between the *wh*-phrase and its trace) satisfies the OVC (see (32)), as traces are phonologically null. According to the PMC, then, the OVC can be ignored (or turned off) for the purpose of determining whether any other dependency of the same type as D, and involving any of the relevant elements of D, obeys the constraint. One such dependency is the one between the *wh*-phrase and the pronoun, which is a binding dependency like the one between the operator and its trace. The OVC is thus off by the time the pronoun is evaluated. We can say, borrowing Richards's metaphor, that a *wh*-operator can bind an overt variable (i.e., an overt pronoun) as long as it has paid an OVC tax prior to the binding of the pronoun (i.e., as long as the constraint has been obeyed prior to the binding of the overt pronoun).

Now, consider (43a). Here, the situation is different. When we encounter the pronoun, inside the subject DP, the object trace has not been processed yet. Assuming with Richards that constraint taxes cannot be paid retroactively—that is, that constraints cannot be violated first and obeyed later in order to comply with the PMC—the unacceptability of (43a) follows automatically.<sup>10</sup>

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advantage of the Subjacency tax paid by *how come*? Collins (1991) gives several arguments showing that *how come* must be base-generated in Spec,CP. If we assume that base-generated dependencies are different from movement dependencies, it follows, given the discussion in the text, that the dependency headed by *how come* in (i) cannot pay the tax on behalf of the embedded *what*. That would account for the absence of the multiple-question interpretation in (i). Cases like this show independently that a dependency that obeys a particular constraint can only pay the relevant constraint tax for dependencies of the same type.

<sup>10</sup> Note that examples like (43b) are ruled in by two separate mechanisms. On the one hand, (43b) is ruled in because by the time the operator binds the pronoun, the OVC has already been turned off by the PMC as that constraint is obeyed when the operator binds its trace. On the other hand, even if the PMC were not relevant, the OVC still predicts the example to be acceptable. The reason is that the OVC is irrelevant in such a situation, because the pronoun belongs to a Spell-Out domain different from the ones the operator and the *wh*-trace belong to. Do we need the two separate mechanisms? We do because of examples like (37), where the pronoun is spelled out with the lowest trace of the *wh*-phrase. As we will see, (37) would be incorrectly ruled out by the OVC if the effect of that condition were unconstrained.

Returning now to (37), repeated for convenience, here's how the PMC turns off the OVC in that example.

(37) Who<sub>i</sub> did Mary [<sub>VP</sub> t<sub>i</sub> t<sub>Mary</sub> introduce [<sub>VP</sub> t<sub>i</sub> [<sub>PP</sub> to his<sub>i</sub> advisor]]]?

When we process this example, we encounter two null variables (i.e., the two traces of the *wh*-phrase) prior to encountering the pronoun. The dependency between the *wh*-phrase and the highest trace (i.e., the one in the specifier position of the matrix *vP*) obeys the OVC because the trace is null. Let that dependency be *D* for the purpose of determining how the PMC applies to this example. Since *D* satisfies the OVC, the PMC dictates that any elements of *D* (i.e., the *wh*-phrase or its highest trace) can be ignored for the purpose of determining whether any other dependency *D'* (i.e., any dependency that is of the same type as *D*) satisfies the OVC.<sup>11</sup> Since the dependency between the *wh*-phrase and the pronoun is a binding dependency just like *D*, it follows that *D* can pay the OVC tax on behalf of that dependency. Notice that it is the interaction of the PMC with the OVC that predicts examples like (37) to be acceptable.

The grammaticality of examples like *We introduced every student<sub>i</sub> to his<sub>i</sub> advisors*, provided by an *LI* reviewer, follows in similar fashion. After QR (Quantifier Raising) applies, the structure of this example is similar to that of (37): the displaced operator binds its trace and a pronoun lower than its trace. Both the trace and the pronoun are coindexed with the operator; hence, both elements are in a binding dependency with it. We can say that in binding its trace, the operator pays the OVC tax and can therefore subsequently bind the pronoun without incurring an OVC violation.

One question that arises now is whether the OVC should be reformulated to dispense with the notion of Spell-Out domain, given that the PMC can do the job in examples like (37) and (43a–b) with a version of the OVC that makes no use of that concept. In the next section, I show that we need the concept of Spell-Out domain in order to predict the ameliorating effect that embedding of the offending pronoun sometimes has on WCO.

#### 4.3 *The Effect of Embedding on WCO: Predicting an Asymmetry*

The OVC penalizes an overt pronoun that depends on an operator when the given pronoun is spelled out in the same domain as the operator or its trace(s). Since embedding a pronoun may or may not push it out of the Spell-Out domain of the operator, the present proposal makes

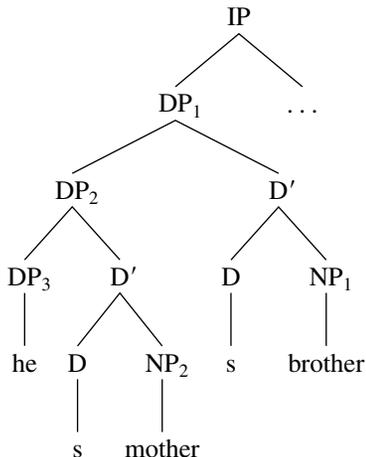
<sup>11</sup> I assume that “ignoring” an operator does not entail that the given operator cannot enter into further binding dependencies. Rather, an operator can be ignored because the part of the structure to which it belongs (i.e., *D* in our case) can be annotated as having already obeyed a particular constraint, so that the operator becomes invisible for the purpose of determining whether another dependency involving the operator in question needs to obey the constraint already obeyed by *D*. Richards (1998) recognizes the advantages of such an approach, but warns of possible problems in the area of reflexive binding. His theory, however, is not couched in a multiple Spell-Out framework, and so the concerns might not be relevant once the data are reanalyzed in the new framework.

different predictions with respect to the effect that the direction of embedding may have on WCO. In particular, the current analysis predicts that *left-embedding* of a pronoun (i.e., placing the pronoun in the specifier position of a phrase that is itself the specifier of the subject phrase) will not ameliorate WCO. This is because the pronoun will still belong to the same Spell-Out domain as the operator or its trace(s). On the other hand, since *right-embedding* (i.e., embedding the pronoun in right-branching structures) can push the pronoun beyond a phase head, the present theory predicts that such a type of embedding may have an ameliorating effect on WCO. The reason is that the pronoun in such cases might end up belonging to a Spell-Out domain different from the one that the binding operator or its trace(s) belong to. Such cases are predicted to be acceptable because the OVC will simply be irrelevant. The following contrasts show that the prediction is borne out:

- (44) a. ?\*Who the hell<sub>i</sub> does his<sub>i</sub> mother love t<sub>i</sub>?  
 b. ?\*Who the hell<sub>i</sub> does his<sub>i</sub> mother's brother love t<sub>i</sub>?  
 c. Who the hell<sub>i</sub> does his<sub>j</sub> mother's brother love t<sub>i</sub>?  
 (45) a. ?\*Who the hell<sub>i</sub> does his<sub>i</sub> washing Bill's car upset t<sub>i</sub>?  
 b. Which employee<sub>i</sub> did Bill's crashing his<sub>i</sub> car get t<sub>i</sub> fired?  
 c. Who the hell<sub>i</sub> does Bill's washing his<sub>i</sub> car upset t<sub>i</sub>?

(44a) is the paradigm case of WCO violations. The pronoun in that example is in the specifier position of the possessive DP, which is itself in Spec,IP. Putting the possessive DP in the specifier of another possessive DP will not push the pronoun beyond a phase head. This can be seen clearly in the phrase marker for the larger subject DP in (44b) given in (46).

(46) *Left-embedding structure for the subject DP in (44b)*



Assuming that Spell-Out linearizes the complement of phases, we can see that the pronoun in (46) can only be spelled out when the CP phase is completed. Suppose that DPs are phases. If

so, when Spell-Out applies at the level of  $DP_1$ , it will linearize only  $NP_1$ , not the DP it has in its specifier (i.e.,  $DP_2$ ). By the same token, if Spell-Out applies at the level of  $DP_2$ , the DP in its specifier (i.e., the pronoun) will not be spelled out either. Therefore, the pronoun in a structure like (46) can only be spelled out when the complement of the CP phase is transferred to PF. But that is also when at least one of the traces (copies) of the *wh*-phrase is spelled out in (44b), the sentence in which the structure in (46) is embedded. The OVC then predicts correctly that such examples should still be unacceptable despite the embedding.

The situation is different when the pronoun is embedded to the right as in (45b), repeated in (47).

(47) Which employee<sub>i</sub> did [Bill's [<sub>VP</sub> **crashing his<sub>i</sub> car**]] get *t<sub>i</sub>* fired?

Suppose I know that Bill crashed the car assigned to a man for exclusive use within a company, and that the company proceeded to fire the employee responsible for the car. I could naturally inquire about the identity of the unfortunate employee by uttering (47). Clearly, here the interpretation where the *wh*-phrase binds its trace and the pronoun is readily available. Crucially, in this example the pronoun is embedded within a phase (i.e., the boldfaced constituent in (47)) that is itself embedded within the subject of the matrix clause. Since extraction did not proceed from that embedded phase, there is no way for the pronoun and the *wh*-phrase, or any of the latter's traces, to be part of the same Spell-Out domain. The OVC is therefore irrelevant, and binding of the pronoun by the *wh*-phrase is allowed by the grammar.

A qualification is in order regarding examples like (47). Higginbotham (1980) treats examples like (48a) and the one in (48b), which he attributes to Jacqueline Guéron, as deviant.

- (48) a. Mary's seeing his father pleased every boy.  
 b. The teacher's writing to his father annoyed every child in the class.

Higginbotham writes that "if the context is properly rigged, then the (a)-type examples [= (48a–b)] can become fully acceptable on the bound interpretation. For instance, Jacqueline Guéron gives (i) [= (48b)]. . . . Virtually this same example was suggested by Bonnie Gildin and others at Columbia" (p. 688). Like Jacqueline Guéron and the others who pointed out these types of examples to Higginbotham, my informants find that the bound interpretation is in fact available in such cases. Consider the following modification of (48), which my informants judged to readily allow the bound pronoun interpretation:

- (49) a. The teacher's writing to his parents got each child in my class into trouble.  
 b. The IRS's scrutinizing his finances exposed each candidate as a tax-evading fraud.  
 c. *Time's* publishing her nude pictures (on the cover) cost each contestant dearly.  
 d. Michael Moore's investigating her company gave each CEO lots of trouble.

I have used *each* in these examples because it has been claimed that *every*-type quantifiers cannot take scope over a subject that does not reconstruct to the original position (see, e.g., Johnson and Tomioka 1998, Agüero-Bautista 2001a). Since it has also been claimed that presuppositional DPs

are interpreted above the vP at LF, it may be wise to use a quantifier like *each* that can take scope over the nonreconstructed subject in order to get irrelevant factors out of the way. In terms of WCO, the change should not make a difference given that *each* shows the same WCO effects as *every*, as in *\*?His mother kissed each boy*. I have also replaced the psych verbs in (48) with regular verbs, so that it cannot be claimed that no crossover configuration is involved under the eventual reconstruction of the subject. For my informants, the bound interpretation of the pronoun in (49) is readily available. We saw above that these examples follow from the present theory without any special addition. In section 5, we will see that these examples are problematic for all the other theories of crossover.

#### 4.4 Explaining Team Weak Crossover

Consider again (4a) and (10a), repeated in (50).

- (50) a. Who<sub>i</sub> put everything on his<sub>i</sub> plate? (\*?PL)  
 b. Someone<sub>i</sub> put everything on his<sub>i</sub> plate. (\*?DR)

Before we can understand why TWCO obtains, we need to understand how these sentences are interpreted. I will illustrate the process with (50a). As in earlier work (e.g., Agüero-Bautista 2001a, 2003, 2007), I will assume that the DR in examples like (50a–b) requires that we analyze the DE as a Skolemized choice function (SCF).<sup>12</sup> Kratzer (1998) uses SCFs for capturing intermediate readings of indefinites. For instance, she assigns the example in (51a) (from Hintikka 1986:332) the logical representation in (51b).

- (51) a. Each husband had forgotten a certain date—his wife’s birthday.  
 b.  $\forall x[\text{husband}(x) \rightarrow \text{had forgotten}(x, f_x(\text{date}))]$

An SCF is a particular type of choice function. A choice function (CF) is a semantic object of type  $\langle\langle \text{et} \rangle, e\rangle$ —that is, a function that takes a set of individuals and returns a member of that set. A CF can therefore occur in the position of a determiner, mapping the restriction of the containing DP into a term. To see how CFs work, notice that the wide scope interpretation of the indefinite QP in (51a) can be represented as in (52), analyzing the indefinite as a CF.

<sup>12</sup> The functional interpretation of the DE allows us to understand why the DR is not available when the former antecedes a pronoun, as we will see. A related puzzle is why we do not obtain an equivalent interpretation in the relevant examples by lifting the universal over the existential by QR and treating both operators as generalized quantifiers. In such a construal, there would be no relationship between the dependencies of the quantifiers, and we expect the value of the indefinite to covary freely with the value of the universal regardless of whether the indefinite antecedes a pronoun. The absence of such interpretations in examples like (50a–b) indicates that something must be blocking the generalized quantifier alternative somehow. Following proposals in Agüero-Bautista 2008, one might argue that the functional interpretation of the DR is more economical than the equivalent option involving two generalized quantifiers. If so, then the latter option will be blocked by economy considerations, while the functional interpretation will be blocked when violating a grammatical principle.

$$(52) \exists f[\text{CH}(f) \wedge \forall x[\text{husband}(x) \rightarrow \text{had forgotten}(x, f(\text{date}))]]$$

The formula in (52) is true in a model  $M$  if there is a method for choosing a member from the set of dates (i.e., a CF), such that it is the case that all the husbands had forgotten the date chosen by the method. That is, (52) is true in a situation in which all the husbands had forgotten the same date.

When a CF is Skolemized, it first combines with an individual variable (called the *parameter* of the function), and the result then applies to the set denoted by the noun phrase and returns a member of that set relative to the value of the individual parameter. Since the individual variable of an SCF can be bound by a quantifier with broader scope than the function variable, such functions are an ideal mechanism for representing DRs.

Returning to (51a), we see that in the semantic formula in (51b), the individual variable or parameter of the SCF is bound by the universal quantifier. The formula is therefore true if for each entity that is a man, the CF returns a date relative to the entity at hand. Here, the function can clearly return a different value for each man in the model.

I will follow Kratzer (1998) in assuming that the determiner part of the indefinite introduces two variables: a functional variable and a null individual parameter. The two variables will combine by conventional function application, and the result will then apply to the set denoted by the noun restrictor of the DP.

Returning to (50a–b), the LF representation corresponding to those sentences, repeated for convenience in (53), is the one in (54), where the copy of the *wh*-phrase, or the indefinite in Spec,IP (in the affirmative example), is analyzed as a parameterized CF.<sup>13</sup> For convenience, I will ignore material higher than the IP node, simply assuming that one of the functions of the copy of the *wh*-operator in Spec,CP (in the interrogative example) is to provide existential closure for the CF variable.

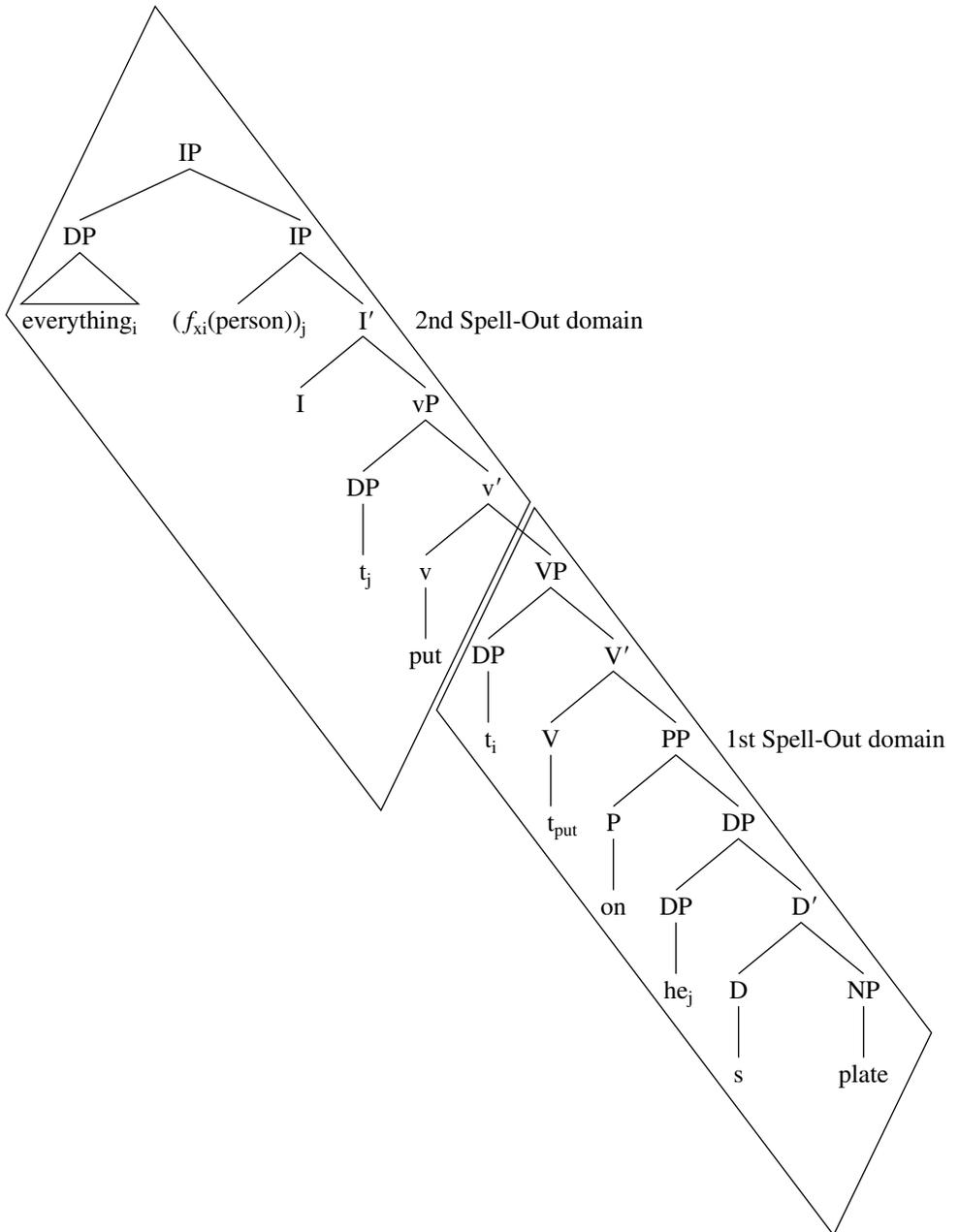
- (53) a. Who<sub>i</sub> put everything on his<sub>i</sub> plate? (\*?PL)  
 b. Someone<sub>i</sub> put everything on his<sub>i</sub> plate. (\*?DR)

<sup>13</sup> As in earlier work (e.g., Agüero-Bautista 2007), I assume that in questions with quantifiers the DR (i.e., the PL) requires reconstruction of the *wh*-phrase below the quantifier, which means, in terms of the copy theory of movement, that one of the copies of the *wh*-phrase must be interpreted below the quantifier. This assumption is a necessary conclusion if one is to account for contrasts like those in (i)–(ii) and other related examples discussed in Agüero-Bautista 2007.

- (i) Which book did Pete \_\_\_\_ say \_\_\_\_ that each professor \_\_\_\_ read \_\_\_\_ ? (SA, FA, PL)  
 (ii) Which student \_\_\_\_ said that each professor read a book? (SA, \*FA, \*PL)

As pointed out in Agüero-Bautista 2007, the question in (i) is three-ways ambiguous, allowing a single answer (SA), a functional answer (FA), or a PL interpretation. The question in (ii), on the other hand, only allows the single answer. The difference between these two examples is that the *wh*-phrase has been extracted from the *c*-command domain of the quantifier in (i), but not in (ii). A result of that difference is that the *wh*-phrase can only be reconstructed below the quantifier in (i).

(54)



In (54), the universal quantifier binds the individual parameter (variable) of the CF and its own trace inside the VP, as indicated by the index *i*. The whole DP in Spec,IP (i.e., the CF + NP

combination) binds the *wh*-trace, in the vP-internal position, and the pronoun inside the possessive DP that is the complement of the preposition. That is indicated with the index *j*. Notice that there is no direct relation between the universal quantifier and the pronoun. That is, since those two elements are not coindexed, they do not form a binding chain or dependency. The pronoun depends on the universal only by transitivity: it depends on the DP in Spec,IP, which in turn depends on the quantifier. The OVC therefore penalizes the structure because the overt pronoun depends on the universal, in the sense of the definition in (33), while belonging to the same Spell-Out domain as the trace of the universal (i.e., the first Spell-Out domain in (54)). Unless the PMC turns off the OVC, the sentence will be ruled out.

At first sight, the situation we have with the structure in (53) seems similar to the situation that arises in connection with (37) and examples like *We introduced every student<sub>i</sub> to his<sub>i</sub> advisors*, brought up by one reviewer and already discussed above. Consider (37) again.

(37) Who<sub>i</sub> did Mary [<sub>VP</sub> t<sub>i</sub> t<sub>Mary</sub> introduce [<sub>VP</sub> t<sub>i</sub> [<sub>PP</sub> to his<sub>i</sub> advisor]]]?

In both (37) and (54), a pronoun depends on an operator while belonging to the same Spell-Out domain as the trace of the operator in question. In both cases, therefore, the OVC will be violated unless the PMC turns it off. We saw above that for (37), and the reviewer's example, the operator can bind the pronoun because an OVC tax is paid when the operator binds its own trace, which means that the OVC is off by the time the dependency involving the pronoun is evaluated. But if the same solution were available for the structure in (54), the dependent reading would be available, contrary to fact, in sentences like (53a–b), associated with that structure. It seems, then, that for some reason or other the PMC cannot turn off the crossover constraint in (54) to prevent the attested TWCO effect. Is there any difference between (37) and (54) that could be attributed to the differential effect of the PMC in the two structures? I believe the answer is yes. The relation mediating the relevant operator and the pronoun is different in the two structures: the *wh*-operator and the pronoun are coindexed in (37), but the universal operator and the pronoun are not coindexed in (54). Taking the dependency between the operator and its own trace to be D in both cases, and given that D satisfies the requirement of the OVC, as traces are null, the PMC dictates that we can ignore the elements of D for the purpose of determining whether any dependency of the same type as D obeys the OVC. In (37), we find a dependency of the same type as D—namely, the dependency between the operator and the pronoun (a first-order binding dependency just like D)—and we can accordingly ignore the operator for the purpose of determining whether the latter dependency obeys the OVC. In (54), however, the situation is different. Whatever relation there is between the relevant operator (i.e., the universal) and the pronoun, it is certainly not like D. D is the binding dependency between the universal and its trace, but the relation between the universal and the pronoun is not a binding dependency: the pronoun and the universal are not coindexed. This means that whatever relation there is between the universal and the pronoun in (54), it does not qualify as D', because it is not a dependency of the same type as D. As a result, the relation in question falls out of the scope of the PMC, under the assumption that this principle ranges over dependencies (i.e., Ds and D's) that are of the same type, an assumption needed independently to account for data like those in (42) and footnote 9. Consequently, nothing can

be ignored for the purpose of determining whether the relation between the universal and the pronoun obeys the OVC. Thus, the PMC does not apply to a structure like (54), which is therefore ruled out by the grammar.<sup>14</sup>

Notice that the universal in (54) cannot pay the OVC tax by binding the DE, either. The reason is the same as before: D in that case (i.e., the dependency between the universal and the DE) is a binding dependency, but the relation between the universal and the pronoun is not. Thus, the latter relation does not qualify as a D' and the PMC does not apply. In general, then, when a pronoun depends by transitivity on a quantifier, the trace of which shares a Spell-Out domain with the pronoun in question, the quantifier will not be able to pay the OVC tax by binding its own trace or the dependent expression. The grammar therefore rules out structures like (54) underlying sentences like (53a–b). The TWCO effect is thus accounted for.

Notice the teamwork of the two operators in causing the TWCO effect: the offending configuration is the one between the universal and the pronoun, but that configuration offends the relevant grammatical principle (i.e., the OVC) only because the universal binds the DE, which in turn binds the pronoun, making it depend on the universal by transitivity.

We are now in a position to see why the examples in (17), repeated in (55), are acceptable, even though the DE antecedes a pronoun, when no crossover configuration is involved.

- (55) a. Who<sub>i</sub> did everyone<sub>j</sub> [<sub>VP</sub> t<sub>i</sub> t<sub>j</sub> v [<sub>VP</sub> t<sub>i</sub> **introduce to his<sub>i</sub> advisor**]]? (✓PL)  
 b. Who<sub>i</sub> did every witness<sub>j</sub> t<sub>i</sub> t<sub>j</sub> say [<sub>CP</sub> t<sub>i</sub> [<sub>VP</sub> t<sub>i</sub> **put the sandwiches on his<sub>i</sub> plate**]]? (✓PL)  
 c. Who<sub>i</sub> did each witness<sub>j</sub> t<sub>i</sub> t<sub>j</sub> say [<sub>CP</sub> t<sub>i</sub> [<sub>VP</sub> t<sub>i</sub> **put the dishes on his<sub>i</sub> tray**]]? (✓PL)

In each of these examples, the pronoun depends on the universal quantifier by transitivity on the relevant interpretation: it depends on the DE, which in turn depends on the universal. These structures are acceptable because neither the operator that binds the DE nor its trace shares a Spell-Out domain with the pronoun. In (55a), for instance, the pronoun and the lowest trace of the

<sup>14</sup> An *LI* reviewer observes correctly that the present proposal predicts a contrast between examples like (i) and (ii), with possible clausal restructuring in (ii), assuming that the universal can take scope over the indefinite in such structures.

(i) Someone<sub>i</sub> wants every girl to [read his<sub>i</sub> letter].

(ii) Someone<sub>i</sub> [wants to read every letter to his<sub>i</sub> girlfriend].

Notice that in (i), the universal can raise past the existential to bind a null variable in it without violating the OVC, as its trace and the pronoun belong to different Spell-Out domains. By contrast, in (ii), raising of the universal to bind a variable in the existential results in a TWCO violation, as the pronoun and the trace of the universal belong in the same Spell-Out domain. Since the universal cannot deactivate the crossover constraint (i.e., the OVC) by binding its trace, as we saw in the text for (54), the current analysis predicts that the DR should be more difficult in (ii) than in (i). As far as I know, the prediction is borne out. (i) can be uttered, for instance, in a situation in which the speaker knows that the secret admirer of each girl wants the girl to read his letter. Obviously, in such a context there can be a different secret admirer for each girl. My informants find that an equivalent interpretation (i.e., the DR) is not available in (ii), a fact that contrasts with the availability of the DR in (iii), which can be uttered truthfully in a context in which there are five journalists and five letters, each journalist attempting to read a letter.

(iii) Someone wants to read every letter.

relevant quantifier (i.e., the universal) are separated by one Spell-Out domain (i.e., the boldfaced bracketed constituent). In (55b–c), the distance between the pronoun and the lowest trace of the universal is even greater: three Spell-Out domains intervene between them. The relevant domains are the two of the embedded clause that appear in boldface, and the vP phase of the matrix clause. The OVC is therefore irrelevant and the grammar allows those structures.

At this point, one could ask if there is any way to pay the OVC tax in TWCO structures. I believe there is. Richard Larson and Howard Lasnik have pointed out to me that if the DE is modified by a word like *different*, then the DR becomes available, as in (56a–b).

- (56) a. A different cook<sub>i</sub> put every meal on his<sub>i</sub> tray. (DR)  
 b. A different taxi<sub>i</sub> driver drove everyone to his<sub>i</sub> house. (DR)

Without diving too deeply into the semantics of *different*, the thing to notice is that these examples contain two potential dependent expressions. If *different* receives a contextual interpretation, then only the subject DP without *different* depends on the quantifier. However, under the bound interpretation of *different*, we have two expressions in effect depending on the universal: the DP itself and the adjective-like element *different*. As in (54), binding of the pronoun by the simpler dependent expression (i.e., the DE with the unbound *different*) is disallowed in these examples because the pronoun is part of the same Spell-Out domain as the universal quantifier. But having been obeyed once, the OVC is turned off (by the PMC), and a more complex expression depending on the universal (i.e., the one that includes the dependent *different*) can then bind the pronoun without violating the OVC.

The present proposal then predicts that only when another DE is added to a DP depending on a quantifier will that DP bind a pronoun belonging in the same Spell-Out domain as that quantifier or its trace(s). This prediction is verified by (56a–b): when *different* gets a contextual interpretation—that is, when it is interpreted in (56a) as identifying some cook different from some contextually salient cook—the DR becomes as hard to obtain as in the examples without *different*. This is because when *different* is interpreted contextually, there is only one DE, which, in binding the pronoun, triggers an OVC violation that rules out the structure. Without another DE that can bind the pronoun to take advantage of the OVC tax paid by the first DE, the pronoun cannot depend on the universal by transitivity.

What (56a–b) show, then, is that the way to pay the OVC tax in structures exhibiting a TWCO effect is to include a second expression depending on the quantifier in the offending configuration with the pronoun, so that the pronoun can be bound by the second dependent expression after the OVC tax is paid by the simpler DE, as required by the PMC.

We are now in a position to return to the issue of variation among speakers' judgments reported in section 2 concerning the availability of the DR in examples with indefinites. Consider (57).

- (57) A taxi driver<sub>i</sub> drove everyone to the hotel in his<sub>i</sub> car.

When speakers process such sentences, they encounter a WCO violation. Being cooperative, however, they look for any strategy that allows them to interpret the sentences through alternative

means. One way to do so involves contextually restricting the DE in order to accommodate inside its restriction the equivalent of a null *different*.<sup>15</sup> That strategy happens to restore the DR because the first DE (i.e., the one without the unbound accommodated *different*) has already paid the OVC tax. Notice that such a repair strategy is pragmatic in nature. The differences in judgment among speakers may plausibly follow from speakers' differing pragmatic abilities.

## 5 A Unified Theory of Crossover Phenomena

In the previous section, we saw how the OVC and the PMC can explain the classical WCO cases and the so-called PRO gate phenomena. In this section, we will see how the account can explain, without any addition, the presence or absence of the crossover effect in the various crossover contexts that have been identified in the literature.

First, notice that the present proposal accounts for SCO in the same way it accounts for WCO. Consider again the cases in (1).

- (1) a. \*Who<sub>i</sub> does he<sub>i</sub> love t<sub>i</sub>?  
 b. \*He<sub>i</sub> loves every student<sub>i</sub>.

In processing (1a–b), on the relevant interpretation, a speaker will encounter the pronoun before the trace of the operator. Binding the pronoun thus runs into an OVC violation, because the constraint is active at the point where the pronoun is encountered. The situation is the opposite in a sentence like *Who<sub>i</sub> t<sub>i</sub> loves himself<sub>i</sub>?*, where the operator can pay the OVC tax by binding its own trace before the pronoun is encountered. So the present proposal unifies SCO with WCO, assuming that the greater deviance of the sentences in (1) involves the violation of some additional constraint (e.g., Condition C).

Now, consider the WCO environment identified by Lasnik and Stowell (1991), as exemplified by the questions in (58)–(59). (58a–b) are from Lasnik and Stowell 1991:691.

- (58) a. Who<sub>i</sub> t<sub>i</sub> will be easy for us [Op<sub>i</sub> to get [his<sub>i</sub> mother] to talk to e<sub>i</sub>]?  
 b. Who<sub>i</sub> did you stay with t<sub>i</sub> [Op<sub>i</sub> before [his<sub>i</sub> wife] had spoken to e<sub>i</sub>]?  
 (59) a. Who<sub>i</sub> t<sub>i</sub> will be easy for each detective [Op<sub>i</sub> to get [his<sub>i</sub> mother] to talk to e<sub>i</sub>]?  
 b. Who<sub>i</sub> did you introduce t<sub>i</sub> to every woman [Op<sub>i</sub> before [his<sub>i</sub> wife] had spoken to e<sub>i</sub>]?

<sup>15</sup> Such a strategy also explains why examples like (57) become acceptable if we rig the context so that the elements the universal ranges over are distributed over a vast geographical area. For instance, if we let the universal in (57) range over members of the UN arriving at conferences held in different countries earlier this morning, I can report the fact that they were taxed to their respective hotels by uttering that sentence. In that context, *a taxi driver* really means what a *local* or a *nearby taxi driver* means. We therefore seem to accommodate a null *local* or *nearby* in those examples. *Local* and *nearby* belong to the group of null variable expressions studied by Mitchell (1986). The present theory then predicts that the addition of such extra dependent expressions to a first DE will restore the DR just as in the case of *different* above.

There are two reasons why the examples in (58) are acceptable. On the one hand, the *wh*-phrase pays the OVC tax by binding its own trace so that the constraint is inactive by the time the operator binds any overt pronoun coindexed with it. On the other hand, the pronoun inside the adjunct clause belongs to a different Spell-Out domain than the one the *wh*-phrase and its trace(s) belong to. The OVC therefore does not apply to such structures.

The absence of the TWCO effect is also expected in (59). Consider (59a), for instance. The LF trace of *each detective* and the pronoun inside the adjuncts belong to different Spell-Out domains. The OVC is again irrelevant, and the pronoun is allowed to depend on the universal by transitivity. Nothing else needs to be said with regard to the absence of the WCO and TWCO effects in these constructions.

Now, consider examples with relative clauses, which exhibit the classical crossover effect (Higginbotham 1980, Lasnik and Stowell 1991, Postal 1993). (60a–b) are from Lasnik and Stowell 1991:706.

- (60) a. \*[every man<sub>i</sub> [that his<sub>i</sub> mother rejected t<sub>i</sub>]]  
 b. \*[no house<sub>i</sub> [that its<sub>i</sub> owner sold t<sub>i</sub>]]

Assuming a head-raising analysis of relative clauses (e.g., Kayne 1994, Borsley 1997, Bhatt 2002), these examples follow from the present approach without any additional machinery. The key here is that the quantifier binds a pronoun in its restriction before it can bind the trace of the head of the relative. Assuming that the outer specifier of the vP phase contains a trace or copy of the head of the relative, which will belong to the same Spell-Out domain as the pronoun in the subject possessive DP, the OVC prohibits such cases of binding because (if bound) the pronoun will depend on the universal quantifier while sharing a Spell-Out domain with the trace of a part of the universal DP (i.e., the head noun). Nothing more needs to be said about these cases.

Now, consider the following minimal pair from Higginbotham 1980:693.

- (61) a. [Everybody in [some city]<sub>i</sub>]<sub>j</sub> t<sub>j</sub> hates its<sub>i</sub> climate.  
 b. ??[Its<sub>i</sub> climate] is hated by [everybody in [some city]<sub>i</sub>].

In these examples, the phrase coindexed with the pronoun is inside the phrase that moves. Therefore, the pronoun cannot be said to be A-bound under any standard definition of such a notion. Postal (1993) calls such cases *secondary crossover*. The secondary crossover paradigm remains a problem for most theories of WCO. Büring (2004) argues that in examples like (61a–b), the larger DP (i.e., the constituent that moves as a whole) is the one that binds the pronoun; the latter is interpreted as an E-type pronoun along the lines proposed by Cooper (1979). Under that analysis, the LF representation of (61a) is something like (62).

- (62) [Everybody in some city] x hates [the R/city that x is from]'s climate

In (62), *R* is a variable whose value is specified contextually. In the linguistic context of the sentence, it gets the value of the property *city that x is from*, where the individual variable is bound by *everybody in some city* under the meaning assigned to the DP as a whole. I believe that the semantics that Büring assigns to these constructions is correct. What is relevant to our

discussion is that it is the larger bracketed DP in (61) that binds the pronoun interpreted as a Cooperian E-type pronoun. More specifically, the larger bracketed DP binds the individual variable in the E-type pronoun. That, in effect, makes the overt pronoun dependent on the bracketed DP. The configuration into which those two elements enter is therefore within the scope of the OVC. The contrast in (61) is thus just like the classical crossover contrast discussed before. Examples like (61a) are ruled in because the larger bracketed DP, in binding its own trace, pays the OVC tax before it binds the individual variable in the E-type pronoun. Examples like (61b) are excluded because, after QR, the larger DP binds into the overt pronoun before it can pay the OVC tax by binding its own trace.<sup>16</sup>

Now, consider the absence of WCO in raising structures.

- (63) a. Someone<sub>i</sub> seems to his<sub>i</sub> mother to have been mistreated t<sub>i</sub>.  
 b. Who<sub>i</sub> seems to his<sub>i</sub> mother to have been mistreated t<sub>i</sub>?

(63a–b) do not show the familiar WCO effect, even though the indefinite NP occupying the subject position of *seems* has crossed over the pronoun in the prepositional phrase. The common explanation for such examples is that A-movement does not trigger WCO (e.g., Mahajan 1990). But that amounts to a mere description of the facts, at best. The real question (i.e., why the expected WCO effect is absent in such constructions) remains unanswered. If we assume that the raised subject stops in the specifier of the phrase headed by *seems*, before it reaches the specifier of the matrix TP, there will be a trace or copy of the raised subject before the pronoun. The indefinite can then use that trace or copy to pay the OVC tax. The grammaticality of (63a–b) then follows from the fact that the WCO constraint (i.e., the OVC) is obeyed at least once before the pronoun is encountered. In other words, an operator in a raising construction can bind a pronoun in a prepositional argument of the raising verb, not because crossover effects are suspended for a particular type of movement, but because the relevant constraint (i.e., the OVC) is off by the time the pronoun is encountered. Notice that this way of looking at the absence of WCO effects in (63), without appealing to the spurious A/ $\bar{A}$  distinction, predicts that even *wh*-movement (considered as  $\bar{A}$ -movement in the Government-Binding Theory years) should ameliorate WCO if there is a copy or trace of the *wh*-phrase between the pronoun and the operator in Spec,CP. This prediction is borne out. Consider the following examples from Ishii 2006:158:

- (64) a. Which student<sub>i</sub> do you think [that his<sub>i</sub> teacher scolded t<sub>i</sub> in yesterday's geology class]?  
 b. \*?Who<sub>i</sub> do you think [that his<sub>i</sub> teacher scolded t<sub>i</sub> in yesterday's geology class]?

<sup>16</sup> I have adopted the structure in (62) as the LF representation of (61) because of arguments given by Buring (2004) and others against applying QR out of DPs. However, as an *LJ* reviewer points out, Sauerland (2005) argues that it is possible to move quantifiers out of DPs by QR under certain conditions, so perhaps one can after all move the universal to a position in the matrix clause in (62) by QR and let it bind the Cooperian pronoun. Nevertheless, I will continue to assume Buring's analysis, mostly because I have not evaluated the full range of semantic predictions of Sauerland's proposal. Under either alternative, however, the present proposal predicts that an OVC tax must be paid prior to binding of the pronoun.

To explain this contrast, Ishii proposes that D-linked and non-D-linked *wh*-phrases make use of different movement strategies to get to Spec,CP. However, the contrast needs to be qualified as follows. Unmodified *who*-phrases can be given a specific or D-linked interpretation just as *which*-phrases can. Thus, under the specific or D-linked interpretation of *who* in (64b), the sentence is as acceptable as its counterpart in (64a). The question regarding (64b), therefore, is not whether it has a WCO effect (it does not if the *wh*-phrase is D-linked), but why a nonspecific interpretation of the *wh*-phrase is not natural. Fodor and Sag (1982) give a hint about why that may be the case. They observe that among the many factors that can contribute to what they call a *referential interpretation* of the indefinite (what I call a *specific interpretation*), “the content of the noun phrase, or of the remainder of the sentence, can be relevant” (p. 358). Specifically, contexts that reveal a certain amount of knowledge on the part of the speaker associated with the indefinite description favor a specific interpretation of the indefinite. Imagine for instance that in the possessive DP, in (64a–b), *he* refers to some contextually salient individual—say, Bill—instead of being bound by the *wh*-operator. If so, by uttering either sentence, the speaker presupposes that there is someone who the hearer thinks that Bill’s teacher scolded in yesterday’s class. That in itself reveals enough knowledge on the part of the speaker and the hearer to favor a specific interpretation of the *wh*-phrase. Use of the singular pronoun in connection with the *wh*-phrase, under the given coindexation in (64), reveals that the gender of the person whose identity is being questioned is also known. I believe that the length of the sentence, in long *wh*-movement, combines with the amount of knowledge that use of a pronoun reveals on the part of the speaker, regarding the person whose identity is in question, to favor a specific interpretation of the *wh*-phrase. That would make use of the non-D-linked *wh*-phrase unnatural in the relevant context. If so, then expecting (64b) to be acceptable under a nonspecific interpretation of the *wh*-phrase is simply an unrealistic expectation rather than a WCO violation. This is the view taken here regarding the previous contrast.

Notice, however, that under the relevant interpretation of the *wh*-phrases (i.e., the D-linked interpretation), the absence of WCO in (64a–b) is expected in the present proposal. In both sentences, the *wh*-phrase stops in the specifier of the matrix vP before it lands in Spec,CP. It can therefore bind one trace before it binds the pronoun. The OVC tax is paid in these examples in the same way in which it is paid in the raising construction: before binding of the pronoun takes place. Notice now that if the pronoun is in the subject of the matrix clause, the WCO effect reappears even with the D-linked *wh*-phrases. Ishii (2006:158) gives the following examples:

- (65) a. \*?Which student<sub>i</sub> does his<sub>i</sub> teacher think [that Mary scolded t<sub>i</sub> in yesterday’s geology class]?
- b. \*?Who<sub>i</sub> does his<sub>i</sub> teacher think [that Mary scolded t<sub>i</sub> in yesterday’s geology class]?

The difference between (64) and (65) is that here there is no trace between the overt pronoun and the *wh*-phrase in Spec,CP. As a result, the WCO constraint (i.e., the OVC) is still active when the *wh*-phrase binds the pronoun. The present theory predicts such structures to be unacceptable, as they in fact are.

I should point out that the explanation that Ishii (2006) suggests for the contrast between (64a) and (65a) is that D-linked phrases, unlike their non-D-linked counterparts, move first by A-movement to the specifier of the CP where they are merged, and then proceed through  $\bar{A}$ -movement the rest of the way to their scope position. In that analysis, (64a) is fine because the first movement of the *wh*-phrase (i.e., the one that crosses the pronoun) is an instance of A-movement, which Ishii claims does not trigger WCO. On the other hand, (65a) is ruled out because a second movement of a D-linked phrase is an instance of  $\bar{A}$ -movement. However, this analysis predicts that if we lengthen the example in (64), so that another clause intervenes before the pronoun and the trace, the sentence will be ill-formed, as the *wh*-phrase will cross the pronoun in an instance of  $\bar{A}$ -movement. This prediction is incorrect: (66) is as good as (64a) on the bound interpretation of the pronoun. What this sentence has in common with (64a), from the perspective of the current proposal, is the existence of a *wh*-trace between the pronoun and the operator in the specifier of the matrix CP. The current proposal therefore predicts both examples to be acceptable, as the OVC is off by the time the operator binds the pronoun.

(66) Which student<sub>i</sub> do you think [that his<sub>i</sub> father is afraid the principal might scold t<sub>i</sub> in tomorrow's geology class]?

Before leaving this section, I'd like to point out another advantage of the present proposal: the fact that it correctly predicts the absence of WCO effects in dependencies involving resumptive pronouns. The received wisdom about such dependencies is that the operator binding the resumptive element is merged directly in Spec,CP (see, e.g., Sells 1984). That conclusion seems forced on us by the fact that unlike movement chains, resumptive chains can span syntactic islands, even in languages where resumptive pronouns are allowed outside of islands. Further confirmation for this conclusion is the fact that resumptive chains are not sites where syntactic reconstruction takes place (Safir 2004), as is the case with traces. With that in mind, imagine a language where the equivalent of the English structure *Who<sub>i</sub> does [his<sub>i</sub> mother vP t<sub>sub</sub> [vP love him<sub>i</sub>]]?* is well-formed. In such a structure, the object and the possessive pronoun are linearized in the first and second Spell-Out domains, respectively, whereas the *wh*-phrase is linearized when the third Spell-Out domain (i.e., the root of the clause) is sent to the interfaces. At no time, then, does the operator or its trace (there's no trace in this case) share a Spell-Out domain with either pronoun. The OVC is therefore respected and the present theory correctly predicts the absence of the WCO effect in such constructions.<sup>17</sup> Notice that although the theory predicts a concomitant absence of the TWCO

<sup>17</sup> Some researchers have argued (see, e.g., Engdahl 1985) that resumptive pronouns are sometimes the spell-out of traces. Under such a possibility, the pronoun might just be adjoined to a copy of the fronted *wh*-phrase. All other things being equal, the present proposal predicts that such cases should behave exactly like the movement cases in showing the classical WCO effect.

effect, in the same resumptive environment, it does not predict that the DR should be available in such contexts. The reason is that, as I have shown elsewhere (see Agüero-Bautista 2001a, 2003, 2007), the DR in quantified *wh*-constructions requires syntactic reconstruction of the *wh*-operator (see footnote 12), something that is not possible in resumptive chains. Thus, in the example *Which student<sub>i</sub> did each professor deny having said whether she<sub>i</sub> will make a good faculty member?*, the DR is absent not because there would be a WCO violation (there wouldn't be a violation because the trace of the universal and the pronoun belong in different Spell-Out domains), but because the *wh*-phrase cannot be syntactically reconstructed in that example and furthermore because, as shown in Agüero-Bautista 2007, the DR in quantified *wh*-constructions is never obtained by the result of the quantifier taking scope over the CP node.<sup>18</sup>

## 6 Comparison with Previous Theories

To my knowledge, all theories of crossover assume that the crossover effect arises when an operator cannot bind a pronoun that it nevertheless needs to bind under a particular interpretation. I will call any such theory a *binding theory of crossover* (BTCO) to distinguish it from a theory incorporating the OVC, which penalizes certain configurations between a given operator and the pronouns that depend on it. Call a theory of the latter type a *dependence theory of crossover* (DTCO). Since all pronouns bound by an operator are pronouns that depend on that operator, a theory that rules out dependent pronouns in a given configuration can also rule out the bound pronoun in the same configuration. But a pronoun can depend on a quantifier without being bound by that quantifier. The contexts of dependence by transitivity discussed above are a case in point. In such contexts, BTCOs cannot exclude any configuration between the quantifier and the pronoun, simply because the quantifier does not bind the pronoun to start with. On the other hand, a dependence-based theory of crossover, like the present one, can still rule out certain configurations between the quantifier and the dependent pronoun. A DTCO thus has greater empirical coverage than the standard BTCO. In the following section, I review BTCOs generally, showing that the TWCO effect cannot be accounted for in any such theory. In addition, I will show that the present

<sup>18</sup> Note that this conclusion is independently confirmed by the difference between examples like (i) and (ii) from Collins 1991:38.

- (i) Why did everybody hate John?
- (ii) How come everybody hates John?

Example (i) with *why* has a DR (i.e., a PL interpretation) in which for each person there is a different reason why that person hated John. Example (ii) with *how come* does not have a comparable interpretation. Collins provides several arguments showing that whereas *why* could move to Spec,CP from a position inside the clause (e.g., from a VP-modifier position), *how come* must be merged in CP, as we saw in footnote 9. The fact that *everybody* does not take scope over *how come* in (ii) simultaneously shows that a subject universal cannot take scope over the CP node, and that the DR requires reconstruction as I concluded in Agüero-Bautista 2007.

proposal has greater empirical coverage with respect to the other crossover data found in the literature.

### 6.1 *Binding Theories of Crossover*

Let us consider Koopman and Sportiche's (1982) Bijection Principle (BP), which states that a variable can only be bound by one  $\bar{A}$ -position and that an  $\bar{A}$ -position can only bind one variable. Clearly, the BP cannot capture the TWCO effect, as it cannot distinguish (67b) from (67a) under the DR of the indefinite. Assume something like (67c), as the LF representation of (67b).

- (67) a. Someone put everything on the platter. (DR)  
 b. Someone<sub>i</sub> t<sub>i</sub> put everything on his<sub>i</sub> plate. (\*?DR)  
 c. [Everything<sub>j</sub> [someone<sub>i</sub> t<sub>i</sub> put t<sub>j</sub> on his<sub>i</sub> plate]]

The BP does not apply to a structure like (67c) because the pronoun in that structure is A-bound, which prevents it from satisfying Koopman and Sportiche's definition of variable. In section 4.4, we saw how the unavailability of the DR in (67b)—that is, the TWCO effect of (67b)—follows from a violation of the OVC.

The same criticism applies *mutatis mutandis* to theories of crossover incorporating Chomsky's (1976) Leftness Condition, which states that a pronoun must not occur to the left of a variable on which it depends. In (67c), the pronoun occurs to the right of all the variables in the structure. So no crossover effect should arise in such structures according to the Leftness Condition, contrary to fact.

The same is true of theories incorporating Reinhart's (1983) generalization that the acceptable cases of pronominal binding are cases of A-binding. Again, the pronoun in (67c) is A-bound in the intended sense, but that is not enough to make the sentence acceptable under the DR of the indefinite.

The so-called linking theories of crossover starting with Higginbotham 1980 suffer from the same limitations. Proponents of linking theories usually build Reinhart's (1983) generalization into their definition of the crossover constraint, by stipulating that a pronoun can only be linked to a variable that c-commands it. It is obvious that such theories cannot account for the TWCO effect in cases like (67b) with the structure in (67c). The reason is that the pronoun in such cases is actually c-commanded by all the variables in the structure. In principle, then, it can be linked to any of the variables in the structure. The absence of the DR in that sentence therefore cannot be attached to a crossover effect according to linking theories, contrary to what we have seen.

Safir's (2004) theory of crossover also implements Reinhart's (1983) generalization that pronouns must be A-bound. Safir stipulates that dependent pronouns must depend on traces of operators. He then proposes a condition, the Independence Principle, prohibiting a pronoun from c-commanding a trace that it depends on. But like the other theories discussed above, this theory cannot account for the TWCO effect. In (67c), the pronoun is c-commanded by all the variables in the structure, so the Independence Principle predicts no crossover effect in the sentence with that structure (i.e., (67b)).

## 6.2 Why Binding Theories of Crossover Fail

The reason why all these theories fail to capture the TWCO effect is that they are all about binding, as noted at the beginning of this section.<sup>19</sup> As we have seen, two things are necessary for the TWCO effect to obtain. First, a pronoun must end up depending on a quantifier after the quantifier binds a DE that in turns binds the pronoun. Second, the pronoun must belong to the same Spell-Out domain as the quantifier or any of its traces. As we saw, in such cases there is no binding dependency between the crossing quantifier and the pronoun. Therefore, theories of crossover built around the binding relation cannot account for such cases.

Interestingly, in all areas in which the previous theories do poorly, the present proposal does very well.

- (68) a. \*?Who<sub>i</sub> does his<sub>i</sub> fixing a car get t<sub>i</sub> fired?  
 b. Who<sub>i</sub> does [PRO<sub>i</sub> fixing a car] get t<sub>i</sub> fired?
- (69) a. ?\*Who<sub>i</sub> does his<sub>i</sub> mother's brother love t<sub>i</sub>?  
 b. Who<sub>i</sub> did [Bill's [<sub>VP</sub> **crashing his car**]] get t<sub>i</sub> fired?  
 c. [The teacher's [<sub>VP</sub> **writing to his<sub>i</sub> parents**]] got each child<sub>i</sub> in my class into trouble.
- (70) a. \*?Which student<sub>i</sub> does his<sub>i</sub> teacher think [that Mary scolded t<sub>i</sub> in yesterday's geology class]?  
 b. Which student<sub>i</sub> do you think [that his<sub>i</sub> teacher scolded t<sub>i</sub> in yesterday's geology class]?

None of the theories discussed above can account for these contrasts. Take the BP, for instance. If (68a) is ruled out because the operator binds two variables in the relevant interpretation, then all the other examples in (68)–(70) should be ruled out as well, as the *wh*-phrase also binds two variables in those examples. The BP thus predicts all those cases to be equally unacceptable, contrary to fact. Linking theories cannot do any better here. If (68a) is ruled out, on the intended interpretation, because the pronoun cannot be linked to the trace in the base position, as it “(almost) c-commands” it, then so should the other sentences in (68)–(70), again contrary to fact.

Safir's (2004) theory suffers from the same problem. If (68a) is ruled out, in this theory, because the nominal containing the pronoun c-commands the trace on which it depends, the same should be true in all the other cases in (68)–(70). So Safir's theory predicts incorrectly that all these examples should be equally deviant. We saw above how the present theory accounts for these contrasts. The (a) cases in (68)–(70) are ruled out because when the pronoun is encountered, in each of those structures, the OVC tax has not yet been paid. Since the pronoun belongs to the

<sup>19</sup> The theories of Büring (2004) and Ruys (2000) also fall in this group. These two theories basically implement Reinhart's (1983) idea that pronouns must be A-bound, and in so doing, they can capture neither the TWCO effect introduced above nor the contrasts in (68)–(70). Note that although Safir (2004) considers his crossover theory to be about dependence, it is actually about binding, given that he implements the A-binding requirement by stipulating that pronouns must depend only on traces that they cannot c-command.

same Spell-Out domain as one of the traces of the *wh*-phrase in those sentences, the OVC penalizes the structure in which they depend on the *wh*-phrase. (68b) is acceptable because the OVC only rules out overt variables (i.e., overt pronouns). (69b–c) are acceptable because the pronoun belongs to a Spell-Out domain different from the one the *wh*-phrase and its traces belong to. Finally, (70b) is acceptable because the *wh*-phrase pays the OVC tax by binding the trace in the specifier of the matrix *v*P before it binds the pronoun. The successful account of the TWCO data in combination with the correct prediction of contrasts like those in (68)–(70) makes the current proposal empirically superior to the alternatives found in the literature.

For the sake of completeness, however, I should mention that Hornstein (1995) discusses examples like those in (71), which have been taken to provide support for linking theories of crossover. The claim is that (71b,d,f) are better than (71a,c,e). Hornstein claims that the good examples in (71) are good because the lowest pronoun can be linked to the variable of the operator, whereas the highest pronoun can be linked to the lowest pronoun without violating the prohibition against a pronoun's being linked to the variable it c-commands.

- (71) a. \*His<sub>i</sub> mother gave his<sub>i</sub> picture to every student<sub>i</sub>.  
 b. His<sub>i</sub> mother gave every student<sub>i</sub> his<sub>i</sub> picture.  
 c. \*His<sub>i</sub> mother packed his<sub>i</sub> sandwiches for every boy<sub>i</sub>.  
 d. His<sub>i</sub> mother packed every boy<sub>i</sub> his<sub>i</sub> sandwiches.  
 e. \*His<sub>i</sub> mother introduced every boy<sub>i</sub> to Mary.  
 f. His<sub>i</sub> mother introduced every boy<sub>i</sub> to his<sub>i</sub> teacher.

There are two reasons for doubting the relevance of this paradigm to WCO. First, the purported amelioration disappears with *wh*-phrases.

- (72) a. \*?Who<sub>i</sub> did his<sub>i</sub> mother introduce t<sub>i</sub> to his<sub>i</sub> teacher?  
 b. \*?Who the hell<sub>i</sub> did his<sub>i</sub> mother place t<sub>i</sub> on his<sub>i</sub> bed?

Second, the amelioration does not occur with negative quantifiers, either.

- (73) a. \*?His<sub>i</sub> mother gave no one<sub>i</sub> his<sub>i</sub> picture.  
 b. \*His<sub>i</sub> mother packed no boy<sub>i</sub> his<sub>i</sub> sandwiches.

Although Hornstein's theory can account for the amelioration in (71b,d,f), it cannot account for the unacceptability of (72a–b) and (73a–b). But there are reasons to believe that the amelioration in (71b,d,f) is related to a paradigm described in Agüero-Bautista 2001a concerning the phenomenon known as *telescoping* (see Poesio and Zucchi 1992). The phenomenon in question is the following. Universal quantifiers, which normally cannot be anaphorically related to a pronoun in another sentence (as in (74a)), allow the unexpected long-distance anaphoric relation if they have a dependent (in)definite expression in their scope, as shown in (74b,d).

- (74) a. \*Every man<sub>i</sub> came in. He<sub>i</sub> sat down.  
 b. Every man<sub>i</sub> brought in his<sub>i</sub> chair<sub>j</sub>. He<sub>i</sub> put it<sub>j</sub> under the table.  
 c. \*Every man<sub>i</sub> sang. He<sub>i</sub> whistled.  
 d. Every man<sub>i</sub> sang a song. He<sub>i</sub> whistled it.

Interestingly, negative quantifiers cannot telescope: witness the unacceptability of *\*No one<sub>i</sub> brought in his<sub>i</sub> chair<sub>j</sub>. He<sub>i</sub> left it<sub>j</sub> outside*. Poesio and Zucchi argue that telescoping involves the pragmatic strategy of *accommodation*. Specifically, they argue that during telescoping the speaker accommodates or copies a part of the universal quantifier over the pronoun that the universal telescopes over. It might not be plausible to accommodate the denotation of a question word until the identity of what is being questioned is revealed. If so, it follows that an accommodation strategy will not be able to save examples like (72a–b). In addition, accommodation has been argued to not be possible in the case of negative quantifiers (Poesio and Zucchi 1992). If this is correct, we can explain the lack of amelioration in (73) as a reflex of the unavailability of accommodation with negative quantifiers. Unlike in Hornstein 1995, the view taken here is that all the examples in (71)–(73) are deviant, but that a repair strategy of accommodation might apply to extend the scope of the binding operator when possible. Such a strategy would be pragmatic in nature; hence, it must lie outside the scope of the WCO constraint.

Before leaving this section, I would like to address some issues concerning the interaction of WCO with the binding of null variables. It is often claimed in the literature that a WCO effect obtains when a quantifier crosses over a null variable that it has to bind (e.g., Chierchia 1993, Ruys 2000). The idea comes from Chierchia (1993), who proposes that the subject-object asymmetry found in *wh*-quantifier interaction results from a violation of the WCO constraint. Chierchia defends a functional approach to the PL interpretation of questions with quantifiers. In Chierchia's view, the PL interpretation results when a universal quantifier binds a null pronominal element in the trace of the *wh*-phrase. His approach purports to account for the contrast in (75). I follow his convention of representing the posited pronominal element as a superscript on the trace.

- (75) a. Which beer<sub>i</sub> did every man<sub>j</sub> drink t<sub>i</sub><sup>j</sup>? (PL)  
 b. Which man t<sub>i</sub><sup>j</sup> drank every beer<sub>j</sub>? (\*PL)

In (75a), the universal can bind the pronominal element (represented by the *j* index) in the trace of the *wh*-phrase, as the quantifier *c*-commands the trace. On the other hand, for *every beer* to bind the *j* index in the trace of the *wh*-phrase in (75b), it would have to cross over it. Chierchia argues that whatever principle generally rules out WCO configurations should also rule out the binding of the trace by the universal in cases like (75b), therefore preventing the PL reading.

If null variables are subject to the WCO constraint, as Chierchia (1993) argues, then we are faced with contradictory facts. On the one hand, we have examples like (68b), where the *wh*-operator binds a null PRO without triggering a WCO effect. On the other hand, we have dependencies like (75b), which according to Chierchia obeys the WCO constraint. What, then, is the right interpretation of the data? Does the WCO constraint apply to null variables, as suggested by Chierchia, or does it not, as the PRO gate cases suggest?

It turns out that there are reasons to believe that Chierchia's (1993) characterization of the subject-object asymmetry is incorrect. As other researchers and I have pointed out (see, e.g., Beghelli 1997, Agüero-Bautista 2000, 2001a, 2003, Krifka 2001), the asymmetry breaks down when the quantifier is *each*, as in (76).

- (76) a. Which beer<sub>i</sub> did each man<sub>j</sub> drink t<sub>i</sub><sup>j</sup>? (PL)  
 b. Which man<sub>i</sub> t<sub>i</sub><sup>j</sup> drank each beer<sub>j</sub>? (PL)

The PL interpretation is readily available for both of these questions, despite Chierchia's prediction that the interpretation should not be available in (76b). This is a real problem for Chierchia's approach. Since *each* triggers a WCO effect just like the quantifier *every* (\*?His mother<sub>i</sub> kissed each boy<sub>i</sub> is as deviant as \*?His mother<sub>i</sub> kissed every boy<sub>i</sub>), it cannot be the case that WCO effects are generally suspended with *each*. To make matters worse, the problem is not restricted to *each*. As I have shown elsewhere (see Agüero-Bautista 2000, 2001a,b, 2003, 2009), the asymmetry also breaks down with *every* and the less definite *wh*-phrases, as shown in (77), where "less definite" means something like "able to occur felicitously in the *there*-insertion construction." In fact, even a definite *which*-phrase can license a PL reading with *every* if it is number-denoting (see also Agüero-Bautista 2009), as shown in (77c).

- (77) a. What chased every dog in the forest? (PL)  
 b. How many dogs bit every bear? (PL)  
 c. Which natural number immediately follows every odd number between 0 and 10?  
 (PL)

The PL reading is readily available in each of these cases. I sent out (77c) as a simple question with a blank where my informants were instructed to fill in their answers. Most of my informants filled in the blank with the list of the even numbers between 0 and 10. The only minor difference among the lists was that some informants included the number "10" and some didn't. I take that to show that (77c) has a PL reading, just like (77a–b). Notice that if one drops the assumption that the WCO constraint applies to null variables, then a modified version of Chierchia's approach will still predict the acceptability of the PL readings in the examples in (76)–(77). In such an approach, the absence of the PL reading in (75b) would have to be linked to something other than WCO. I pursue an approach along those lines in Agüero-Bautista 2001a,b, 2003, 2007.

Chierchia (2001) attempts to extend his theory of WCO to specific indefinites. He considers the example in (78), claiming that the absence of the apparent narrow scope of *a certain technician* follows from the inability of the object quantifier to take scope over the indefinite without causing a WCO violation.

- (78) A certain technician inspected every plane.

But if that were the case, specific indefinites would never be able to take narrow scope with respect to universal quantifiers in their syntactic scope. Hintikka (1986) shows that that is not the case. He gives the examples in (79a–b) (p. 332). In addition, if *certain* modifies a number-denoting indefinite, inverse scope is possible with *every*; witness the acceptability of (79c).

- (79) a. A certain sum of money will be paid for each quantity of this commodity.  
 b. The bank makes a certain profit out of each business transaction. The profit is the greater the larger is the amount of money involved in the transaction.  
 c. A certain natural number immediately follows every natural number—namely, the successor.

The objections that I raised before in connection with Chierchia's (1993) characterization of the subject-object asymmetry in questions with quantifiers apply *mutatis mutandis* to his (2001)

explanation of the absence of the DR in (78). If the relevant reading in that example is blocked because the quantifier cannot bind a null variable inside the indefinite without violating the WCO constraint, why is the reading available in (79a–c)? I discuss the interaction of WCO with null variables in more detail elsewhere (see Agüero-Bautista 2000, 2001a,b, 2009). For now, I take data like those in (76)–(77), together with the PRO gate cases discussed above and the availability of the DR in (79), to show that null variables are exempt from obeying the WCO constraint. That is expected if the WCO constraint is the OVC, a kind of overt pronoun constraint.

## 7 Concluding Remarks

In this article, I have introduced a hitherto unnoticed variety of crossover phenomena that I have called team weak crossover (TWCO). I have presented a novel account of crossover in which the relevant principle is a kind of overt pronoun constraint banning dependent overt variables (e.g., overt pronouns) belonging in the same Spell-Out domain as the operator (or the trace(s) of the operator) they depend on. The new crossover principle, the OVC, differs from its predecessors in that it regulates the relation of dependence rather than the relation of binding. This theory has greater empirical coverage than the available alternatives, since it can account for the novel TWCO effect and a variety of other cases that remain recalcitrant to coherent analysis in the alternative accounts of crossover.

However, the present analysis raises some questions that I unfortunately must leave open for further research. One such question is why the grammar should care about whether a pronoun is spelled out in the same domain as that of the operator (or the traces of the operator) it depends on. I suspect that the answer has to do with the way movement chains are spelled out or linearized. In a way, dependent pronouns are interpreted in the same way as the traces in the base positions of the operators are interpreted. That is, to a certain extent, a dependent pronoun is interpreted as a copy of the operator it depends upon. Now, assume some phonological principle P dictating that only one of the copies of a displaced operator is pronounced (e.g., Nissenbaum's (2000) Chain Pronunciation Algorithm). If an operator or any of its traces is pronounced in the same Spell-Out domain as a pronoun depending on that operator, the grammar might "believe" that two copies of the chain of the operator are being pronounced, in violation of some principle like P. It could be that at some stage of its evolution, Universal Grammar incorporated a principle like the OVC in order to prevent possible disruptions of P. Admittedly, these remarks are speculative and the questions concerning the phonological flavor of the OVC will have to await further research.

Another question that the present proposal raises is what the relationship is between the OVC and Montalbetti's (1984) Overt Pronoun Constraint (OPC). Clearly, the OVC is a stronger constraint than the OPC. The OVC rules out overt variables in every language; the OPC only rules out overt pronouns in languages that have both overt and null pronouns. I believe that the principle that is part of Universal Grammar is the OVC rather than the OPC. However, once the OVC is active in a grammar, another principle for avoiding the use of overt pronouns whenever possible might also be implemented in the given grammar as a way to avoid computational complexity. That is, a grammar with the OVC requires that every use of an overt bound pronoun

be inspected to verify that the principle has not been violated. Further computation is also required to determine whether the principle is active or inactive. But these computational steps can be skipped if a null pronoun is used instead. What this means is that the existence of a principle like the OVC will force a strategy of avoiding overt pronouns when possible—namely, because the use of the overt pronoun will be computationally more costly than the use of null ones. For languages that in principle could allow both overt and null pronouns in the same context, like Spanish, only null pronouns will be used because they instantiate the less costly alternative. In contexts where only overt pronouns are possible, they will be used if they do not violate the OVC, as there will not be a less costly alternative. The OPC can therefore be viewed as an interface strategy for minimizing computation because of the existence of the OVC. But clearly the relation of the OVC to the OPC is a topic for further research.

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*Université du Québec à Trois-Rivières*  
*Département de langues modernes et traduction*  
 3351 boul. des Forges  
 C.P. 500  
 Trois-Rivières, QC G9A 5H7  
 Canada  
 kalixto1@yahoo.com

