WEAK CROSSOVER IS NOT A SEMANTIC PHENOMENON

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Abstract

Traditionally, the WCO effect has been viewed as a phenomenon of the syntax-semantics interface. This paper examines the linguistic variation shown by this effect and concludes that semantic approaches to this phenomenon cannot account for the empirically attested variation. The paper then argues that a theory treating WCO as a phenomenon of the syntax-phonology interface can achieve a greater empirical coverage. In particular, the paper argues that the WCO constraint amounts to a violation of a Kayne's (1994) linear correspondence axiom, or some such principle.

1 Introduction

Since Postal (1972), it is a well-known fact that *wh*-operators can straightforwardly bind pronouns in examples like (1a) where the trace of the operator c-commands the pronoun, but not in those like (1b), where the constituent containing the pronoun c-commands the trace of the operator instead.

(1)   a.   Who$_i$ t$_i$ loves his$_i$ mother?
       b. $^{?*}$Who$_i$ does his$_i$ mother love t$_i$?

In (1a), the pronoun can be easily understood as a variable bound by the *wh*-phrase: the question is about male individuals who have the property of loving their mother[1]. By contrast, the *bound-variable* interpretation of the pronoun is not easily accessible in (1b): the sentence cannot easily be understood as a question about the identity of male individuals that are loved by their mother. An influential theory of this phenomenon is that of Reinhart (1983), according to which the binding of a pronoun is constrained by the principle in (2), which she calls *A-binding*.

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[1]I assume that there is no presupposition of uniqueness associated with *wh*-questions containing *who*-phrases, as opposed to what the case is with *which*-phrases (see Beck and Rullman 1999), hence a question associated with the former type of *wh*-expressions is about one or more individuals rather than a single entity.

(2)   ***A-Binding*** (Reinhart 1983)
       A pronoun P can only be bound from an A-position.

A-binding could explain the contrast in (1), since only in (1a) does the pronoun have an A-binder: the trace of the *wh*-operator which is in an A-position. Whatever the merits of the A-binding approach may be, there are strong empirical and conceptual reasons militating against its adoption as a cross-linguistic account of the weak crossover phenomena. On the empirical front, there are cases in which operators seem to bind pronouns from non-argument or Ā-positions (see section 2). On the conceptual front, the concept of A-binding is problematic, as it is based on theoretical tools that are not justifiable as a matter of conceptual necessity; hence the concept is at odds with the theoretical simplicity sought after in the current minimalist program. For instance, A-binding is based on the notion of co-indexing, but this notion requires adding elements (i.e. the indices) in the course of derivations; a procedure that an optimal linguistic system should not have. Thus, this device is not conceptually necessary. Because of considerations of this sort, Reinhart (2006) redefines binding as in (3): the term *A-binding* now used only to differentiate her definition from the notion of logical binding on which it is based[2].

(3)   A-binding (logical-syntax based definition)
       α A-binds β iff α is the sister of a λ-predicate whose operator binds β.

While (2) can distinguish between (1a) and (1b), (3) cannot. In both of these examples the fronted *wh*-phrase must be a sister of a lambda abstract binding its trace (cf. Heim and Kratzer (1998)) and there is no known semantic reason why the lambda operator could not bind the pronoun in both cases. The transit from (2) to (3), therefore, leaves us without the most influential syntactic account of the classical WCO contrast without attributing it to anything on the semantic side. We are therefore left with the task of finding an explanation for the WCO effect. If the explanation is to be principled in the sense of Chomsky (2004, 2005), no principle specific to binding should be invoked in order to explain the WCO effect. Rather, the best explanation of the phenomenon must show that the relevant effect arises from the way the computational system maps representations to the interfaces, from requirements of the interfaces themselves, or from principles of efficient computation (e.g., economy conditions) expected of computational systems like that of natural language.

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[2]A reviewer reacts to the minimalist objection to the notion of an index by questioning the adequacy of theories that dispense with such a notion on the ground that such accounts "have been semantically vague". The reviewer in question seems to believe that indices might constitute a necessary mechanism in an adequate theory of the semantics of binding phenomena. The worry is unwarranted, however, and ultimately orthogonal to the minimalist concern. The minimalist objection is about the unconstrained use of index in the representations generated by the computational system, not about the elements that must be present or absent in a language-external interface like the semantic component. Thus, even if indices were necessary elements of this component, that in itself would not justify adding elements in the course of the syntactic derivation that are not present in the numeration by virtue of being a part of the lexical items themselves. It seems to me, however, that the conceptual argument against indices could extend to the semantic component, at least in the area of variable-binding, since as Reinhart (2006) points out, the real notion that indices are supposed to capture, representationally, is the notion of identity of values/variables, and as both Reinhart (2006) and Reuland (2011) show, the notion of identity of values/variables has a natural correlate in the syntactic derivational process: the notion of identity of set of features under agreement. If so, the use of indices in the syntax (and perhaps in the semantics) is not only conceptually, but also empirically unmotivated, in light of the grammatically viable alternative of natural language agreement.

Adopting (3) as the definition of binding, the question that arises then is this: what part of the overall architecture of the language faculty is responsible for the WCO effect? Is it the way the computational system (here on C_{HL}) maps representations to the interfaces, a particular requirement of the interfaces, or a combination of both factors?

Because the weak crossover condition seems to be a condition on binding, and because binding is a relation of logical-syntax, hence pertaining to the conceptual-intentional interface, many researchers have tried to derive the WCO effect from the mechanics of the binding system at the CI interface, thereby treating the effect as an exclusive phenomenon of the semantics.

In this article, I will argue that although the spirit of the various semantic attempts to account for WCO in terms of properties of one of the interfaces is welcome, a semantic approach to the WCO effect is not very feasible. My argument is based on the fact that the WCO effect is subject to great variation, both cross-linguistically and within a single language, and the semantic interface is not the component of the grammar normally regarded as the source of linguistic variation (see Reuland 2011 for an illuminating discussion of these issues). In order to substantiate my argument, I will indeed show that the various semantic accounts found in the literature cannot, in fact, accommodate the linguistic variation found in the distribution of the WCO effect. The relevant proposals are numerous and considerations of space prevent me from discussing them all in great detail. I will, however, carefully consider one representative proposal, that of Ruys (2000), and will discuss other alternatives in less detailed fashion, when I compare the gist of the most influential semantic approaches in terms of how they handle the linguistic variation in the distribution of the WCO effect.

The paper is organized as follows. In Section 2, I consider Ruy's theory of WCO pointing out its virtues and shortcomings. In section 3, I discuss some data representative of the issue of variation in the distribution of WCO and examine how the major semantic accounts deal with such data. I show that none of the semantic approaches discussed in the article can handle the variation shown by WCO effect. I will then present an account (section 4) that is able to accommodate the attested cross-linguistic and language-internal variation in the distribution of WCO.

2   The Generalized Choice-Function Approach (GCFA)

Because of WCO contrasts like those in (4)-(5), Ruys (2000) argues that the WCO effect is to be derived from the theory of scope rather than from the theory of binding.

(4)   a.   [*Every boy*'s mother] loves *him*.
       b.   [Something in *every city*] hates *it*.

(5)   a.   *?*His* father loves [*every boy*'s mother]
       b.   *?*Its* mayor loves [someone in *every city*]

The pronouns in (4a-b) can apparently receive a bound-variable interpretation in which their value depend on (or *co-vary* with) the value of the quantificational phrase (QP) contained within the subject DP. Throughout this article, I use italics to highlight quantifier-pronoun pairs involved in *covariation*. The bound-variable interpretation is available in (4). By contrast, the bound variable interpretation is not available for the pronoun in (5a-b). Under the assumption that *A-binding* is a necessary step in the process of deriving the bound-variable interpretation (Reinhart 1983), the unavailability of that interpretation in (5a-b) follows from the fact that the quantifier

cannot possibly A-bind the pronoun after raising from the bracketed constituent. In motivating his theory, Ruys points out correctly that the bound-variable reading of the pronoun in (4) is equally problematic for A-binding theories of crossover. The problem is that the pronoun in those examples is not co-indexed with the larger bracketed constituent, but with an operator within that constituent. The operator does not c-command the pronoun from its surface position; hence the former cannot be said to *A-bind* the latter. The grammaticality of the examples in (4), therefore, cannot be easily accounted for in an A-binding based analysis. As an alternative, Ruys suggests that the pronoun in those examples is licensed under the transitivity property of the scope relation. The reasoning here is the following. For some not well understood reason, the highlighted quantifier in (4) can take scope over the bracketed constituent containing it. Since that constituent in turn can take scope over the pronoun, as subjects are higher than objects, the quantifier is licensed to take scope over the pronoun by transitivity and is therefore expected to bind it.

Initially, it seems that no notion of co-indexing or A-binding is necessary for an operator to take scope over a pronoun under transitivity, hence Ruys' hypothesis that WCO must follow from the theory of scope rather than from the theory of binding. The transitivity hypothesis (TH) has at least two very attractive features. First, it respectively dispenses with the notions of A-binding and co-indexing, which cannot even be formulated in the minimalist program (e.g., Chomsky 1995, 2001, 2004, 2005; Reinhart 2006; Reuland 2011) and, second, it makes the WCO effect follow from the way the meaning of operators an pronouns interact at the semantics interface, as we will see below. It treats the phenomenon without invoking special principles of UG, hence the proposal, if defended successfully, would help achieve the minimalist goal of reducing UG (Chomsky 2005; Hauser et al 2002). Unfortunately however, as we will see below, the actual implementation of the TH faces a number of difficult problems.

One problem of the TH is that it predicts a strong correlation between scope and WCO, the latter seen as a failure of variable-binding, resulting from a failure of scope-taking on the part of the relevant binding operator. More precisely, the TH predicts that if an operator takes scope over a particular syntactic position, the operator should be able to bind a pronoun in the given position without resulting in a WCO effect. Let us consider this prediction in light of the examples below.

(6)   a. Who_i loves his_i mother?
        b.   *Who_i does he_i love t_i?
        c.   ?*Who_i does his_i mother love t_i?

(7)   a.   ?*His_i mother loves $everyone_i$.
        b.   ?*His_i mother loves each boy_i.

(8)   a.   At least three students helped every teacher ($\forall > \exists$)
        b.   Who did every witness identified? ($\exists > \forall$)

(8a) has a natural reading in which each relevant teacher was assisted by different groups of students consisting of at least three members. Under that interpretation, if there were four teachers, the number of assistants involved in the event of helping is at least twelve[3]. That

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[3]It is often claimed that the interpretation of inverse scope is difficult for informants without a formal training in linguistics. That was not the case for my informants, at least with examples like (5a) with a subject numeral quantifier of the *at least n NP* type. They judged (5a) to be true in a situation with four teachers and where each teacher is helped by three or more students. In other words, they judged (5a) in a situation corresponding to the wide scope interpretation of the universal.

reading corresponds to an interpretation in which the object universal QP has scope over the subject existential DP. Likewise, the question in (8b) can be answered naturally with a single answer (SA). That is, the listener can answer (8b) by uttering a sentence like *every witness identified Bill*. In the literature on questions with quantifiers, there is agreement that in the SA-interpretation of a question like (8b) the *wh*-phrase takes scope over the universal in the subject position (e.g., May 1985, Aoun and Li 1993, Agüero-Bautista 2001, among others).

The availability of inverse scope in (8) shows that object universal quantifiers and wh-phrases can take scope over the subject position of the clause. Notice now that if we consider the scope facts in (8) in the context of the WCO facts in (6c) and (7a-b), we seem to arrive at a paradoxical situation in the TH. On the one hand, because of the data in (8), we need to claim that object operators, regardless of whether they are fronted overtly or covertly, can take scope over the subject position of the clause in which they occur. On the other hand, because of examples like (6c) and (7a-b), we need to claim that object operators, fronted overtly or covertly, somehow cannot take scope over the subject position of the clause. If the TH is to succeed, this paradoxical state of affair must be resolved.

2.1 A Possible Solution

In order to account for the fact that object operators seem to take scope over the subject of the clause in which they occur, while failing (at the same time) to bind a pronoun in the same structural position, Ruys (2000) proposes to differentiate the scope of an operator from the scope of the restriction of the operator (the NP part of the operator DP). He suggests that the desired effect can be obtained if quantificational operators are generally analyzed as quantifiers over choice functions in the sense of Reinhart (1997) (see also Winter 1997 and Reinhart 2006) and if the restriction of the operator is obligatorily reconstructed (interpreted) in the base position. This suggested generalized choice-function approach (GCFA) to quantification, combined with the obligatory reconstruction requirement, has different consequences for *wh*-phrases and non-interrogative quantifiers. For this reason, I discuss each case separately.

2.1.1 The GCFA, Obligatory Reconstruction, and *Wh*-phrases

Under the choice function interpretation of the *wh*-operator, (6a) and (6c), repeated below as (9a-b), are respectively associated with the formulae in (10a-b), assuming a semantics for questions like that proposed by Karttunen (1977).

(9)   a.   Who loves his$_i$ mother?
       b.   ?*Who$_i$ does his$_i$ mother love?

(10)   a.   { P | $\exists f_{cf}$ [[**P =** $^\wedge$**((f(person))** λ**x(x likes x's mother))** $\wedge^\vee$**P**]]}
        b.   { P | $\exists f_{cf}$ [[**P =** $^\wedge$**(his mother likes f person)** $\wedge^\vee$**P**]]}

If one assumes that pronouns exclusively denote individual variables, it follows that existential operators over choice functions cannot bind the variables associated with them[4]. If one then

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[4]This assumption is probably too strong. Relational or functional analyses of pronouns have allowed semanticists to solve some recalcitrant data in the area of E-type anaphora that could not have been solved if pronouns were exclusively analyzed as individual variables (see Cooper 1979 and the discussion on E-type pronoun in Heim and Kratzer 1998).

combine such an assumption with the TH, implemented semantically in terms of GCFA, the intended interpretation of (9b) is excluded because in the formula in (10b), corresponding to (9b), the existential quantifier (being a functional operator) cannot bind the individual-denoting variable associated with the pronoun inside the subject DP. Notice that the constituent consisting of the choice function and the restriction of the operator does not have the subject pronoun within its scope, and therefore its value cannot end up as the value of the variable associated with the subject pronoun by a process of semantic reconstruction, even if the constituent in question is of the individual type and hence able, in principle, to reconstruct semantically to the position of an individual variable. Consider now, by contrast, the formula in (10a), corresponding to the sentence in (9a). Here the individual variable corresponding to the pronoun is bound by the lambda operator that is a sister to the term resulting from the combination of the choice function and the restriction of the *wh*-operator. Since the function variable + restriction combination is of type e, it provides a suitable argument for the property $\lambda x(x \text{ likes } x\text{'s mother})$, and will therefore be placed in the position of the variable inside the possessive constituent by semantic reconstruction (lambda conversion). Thus, in the formula in (10a), the value of the combination of the choice function variable and the *wh*-restriction can effectively end up as the value of the variable corresponding to the pronoun in the associated syntactic structure in (9a).

The choice-function analysis of *wh*-phrases, paired with the requirement that the restrictions of quantificational operators must be interpreted in the base positions, predicts that pronouns can only be bound if the position of extraction c-commands them. That will always be the case when the *wh*-phrase A-binds the pronoun, but not when Ā-binding is involved. In other words, the GCFA effectively recast the A/Ā-binding dichotomy in semantic terms.

This particular implementation of the TH seems to solve the paradox that arises in connection with data like those in (6)-(8). In particular, the account can explain how a quantifier can scope over a position while failing to bind a pronoun in the same position. The analysis shows that having scope over a position is not enough for binding a pronoun in the given position: the operator must still be of the right semantic type for binding to take place. The problem with this solution, however, is that it is committed to two strong assumptions. The first assumption is that quantificational operators must generally and exclusively be interpreted via choice-functions[5].

The second assumption of the TH is that reconstruction of the restriction of *wh*-operators must take place only at the base position (i.e., that restrictions must be interpreted in the extraction

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[5]This assumption is strong for several reasons, I will mention just two. The first reason has to do with the property of conservativity, which, as shown by Barwise and Cooper (1981), seems to be a universal property of natural language determiners, and which some scholars argue follow from certain learnability constraints (see Hunter and Lidz 2013). If one proposes that natural language determiners be unambiguously analyzed as functions from individual properties to individuals (i.e., (choice) functions of type $<<e, t>, e>$), then one is essentially proposing that natural language DPs must unambiguously denote individuals. But since conservativity is defined for relational functions, and not for individuals, this move leaves us without an explanation of this (quasi) universal principle in the semantics of natural language. The second reason has to do with the fact that, as Partee (1987) has shown, a DP can be associated with any of three semantic types depending on the syntactic context in which it occurs. An indefinite, for instance, can occur as an individual, a predicate or generalized quantifier, and there is no semantic ground to gain and quite a bit to lose, indeed, by stipulating that a particular DP must always be associated with a single semantic type. Notice also that a hypothesis claiming that DPs exclusively denote individuals is difficult to defend in light of the fact that under the Boolean analysis of natural language conjunction the individual type is not a conjoinable one, a problematic issue in the light of the fact that natural language DPs can regularly be conjoined.

site rather than in intermediate positions) and, furthermore, that the reconstruction process is obligatory. This assumption is too strong in light of the anti-reconstruction facts discussed below[6].

Commitment to the first assumption follows from the fact that the unavailable bound-variable interpretation of the pronoun in sentences like (9b) could be generated under the standard generalized quantifier treatment of *wh*-phrases (e.g. Karttunen's treatment of *wh*-phrases as existential quantifiers over individual variables). Proponents of the TH must therefore assume that the operator part of a *wh*-DP never quantifies over variables of the individual type. They must similarly commit to the hypothesis that reconstruction is obligatory. This is because, without obligatory reconstruction, examples like (9b) could end up with the syntactic structure in (11), which can no doubt be turned into a Karttunen's style question in which the *wh*-phrase can bind the pronoun even if the operator part ranges over functions.

(11)   [$_{CP}$ Which person [$_{IP}$ [$_{DP}$ his mother] I' [$_{vP}$ [$_{DP}$ ~~his mother~~] v' like [$_{DP}$ ~~which person~~]]]]

In (11), the whole *wh*-phrase, restriction included, is in Spec, CP. The *wh*-operator is taken to introduce a choice-function variable in accordance with Reinhart's (1997) proposal. Since the *wh*-phrase is sister to a lambda predicate that can in principle bind the variables corresponding to the subject pronoun and the object trace, the term resulting from the choice function variable applying to the *wh*-restriction will in fact bind the individual pronoun and the trace according to the definition of A-binding in (3). If existential closure then applies at the top, we will generate a grammatical interpretation for (9b). Thus, unless the TH is coupled with the assumption of obligatory reconstruction of displaced *wh*-phrases, the analysis will incorrectly predict the absence of WCO in such examples.

Again, considerations about the relational properties of natural language determiners and the (possibly) universal principles derived from such properties in the area of generalized quantifiers (see footnote 5) suggest that a GCFA to the semantics of *wh*-phrases might simply be too strong. For reasons of space, I will not delve into the issue more deeply, but will instead focus on the second commitment of the TH: the assumption that the interpretation of *wh*-phrases must involve obligatory reconstruction of its restrictive material. As we will see, also this assumption will turn out to be too strong.

The first reason against an obligatory reconstruction analysis of *wh*-phrases in general comes from the fact that, as shown by Heycock (1995), we find asymmetries in the reconstruction abilities of *wh*-phrases. Consider the pairs in (12) and (13), Heycock's (32) and (31), respectively.

(12)   a.   *Which claim that John$_i$ was asleep was he$_i$ willing to discuss?
         b.   Which claim that John$_i$ made was he$_i$ willing to discuss?

(13)   a.   [Which question Gore$_i$ hadn't prepared for]$_j$ do you think he$_i$ messed up
                on the worst t$_i$?
         b.   ?*[How afraid of some question Gore$_i$ hasn't prepared for]$_j$ do you think he$_i$ is t$_j$?

The contrast in (12)-(13) is based on the possibility of coreference between the name in the fronted constituent and the pronoun in the subject position of the matrix clause. At least since van

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[6]Agüero-Bautista (2007) discusses evidence showing that certain pair-list interpretations in questions with quantifiers in weak island contexts require reconstructing the restriction of the *wh*-phrase to intermediate positions outside the island from which extraction has proceeded, something that would not be possible if syntactic reconstruction would necessarily take place at the base position.

Riemsdijk and Williams (1981), it has been known that the position of the name inside the fronted constituent can affect the possibility of coreference. For Freidin (1986) and Lebeaux (1988, 1990, 2009) the relevant distinction is between names contained in arguments of the fronted phrase and those contained in adjuncts. In (12a), for instance, the name *John* is contained in an argument of the head noun *claim* and coreference between the proper name and the matrix pronominal subject is not possible. In (12b), on the other hand, the name is contained inside a relative clause and it can co-refer with the matrix subject pronoun. Since relative clauses are adjuncts, the generalization seems to be that names contained in adjuncts of fronted phrases can be coreferential with a matrix subject pronoun, whereas those contained in an argument of the fronted phrase cannot.

The best known explanation of the preceding contrast is that of Lebeaux (1988, 1990, 2009), who essentially argues that adjuncts, not been selected by the constituent which they are adjoined to, can be inserted late in the derivation. Late insertion is not possible for arguments, as they are selected by the heads they are complements of. This means that adjuncts, but not arguments, can be merged to a phrase after the given phrase has been displaced from its base position. Consider now the pair of sentences in (12) in light of the copy theory of movement of Chomsky (1993, 1995, 2001a, 2001b). According to that theory, movement leaves a copy of the displaced constituent in the original extraction site. Stating Lebeaux's idea in terms of the copy theory of movement (see Fox 1999, for an implementation along those lines) amounts to saying that a displaced phrase containing and adjunct does not necessarily leave a copy of the adjunct in the extraction site, as it is possible to insert the adjunct after displacement has taken place. On the other hand, a copy of material contained in an argument of displaced phrases must be left at the extraction site, since arguments cannot be inserted late: they are selected. In other words, Lebeaux's idea implemented in terms of the copy theory of movement implies that (12a-b) can have the logical form representations in (14a-b), respectively. Unpronounced copies are indicated with strikethrough fonts.

(14)   a.   *[**Which claim that John$_i$ was asleep** was he$_i$ willing to discuss ~~which claim that John$_i$ was asleep~~]

         b.   [Which claim that John$_i$ made was he$_i$ willing to discuss ~~which claim~~]

With the structures in (14), one can understand the nature of the contrast in (12). (12a) is unacceptable because in the structure corresponding to that sentence (i.e. in (14a)), there is a copy of the name *John* inside the unpronounced copy of the fronted phrase left in situ. Since the pronoun c-commands the name and is coindexed with it, the structure registers a violation of Condition C of the binding theory. By contrast, the structure in (14b), corresponding to (12b), represents a derivation in which the adjunct containing the name coindexed with the subject pronoun is attached directly to the copy of the *wh*-phrase in spec, CP. Because of the late insertion of the adjunct, there is no copy of it attached to the copy of the *wh*-phrase in the object position. The pronoun, therefore, does not c-command the name inside the adjunct and no violation of Condition C ensues. The contrast in (12) is thus accounted for. It should be noticed that the interpretation of the adjunct inside the *wh*-DP in (14b) prevents reconstruction of the restriction of the *wh*-phrase. The adjunct is a relative clause and relative clauses are intersective predicates, hence they must combine with the restriction of the *wh*-phrase to be interpreted as part of the sentence. Any theory committing to obligatory reconstruction of the *wh*-restriction in *wh*-constructions will not be able to derive such grammatical examples as (12b) and (13a). That is an unwanted result.

2.1.2 The GCFA and Non-interrogative Quantifiers

To implement the GCFA with non-existential non-interrogative quantifiers, Ruys (2000) suggests that, instead of assuming covert phrasal-movement of QPs, economy considerations dictate that only the operator part of QPs raise covertly, leaving the restriction in situ. If the operator is then taken to obligatorily quantify over choice functions, we derive a situation similar to that obtained with *wh*-phrases, but without the need of syntactic reconstruction of the restriction. The contrast in (15) can then be assigned the structure in (16), which in turn corresponds to the formulae in (17).

(15) a. Everyone$_i$ loves his$_i$ mother.
      b. His$_i$ mother loves everyone$_i$.

(16) a. [Every (t$_{every}$ one) loves his mother]
      b. [Every [his mother loves (t$_{every}$ one)]]

(17) a. $\forall f$ (f(person) λx(x likes x's mother)
      b. $\forall f$ (x's mother likes (f(person))

Under the functional analysis of the universal, one can translate the trace of the displaced operator as a function variable. The formulae in (14) are parallel to those involving *wh*-phrases in (10), with the difference that here we are dealing with assertions, instead of questions, and that the quantificational force of the operator, in this case, is universal rather than existential. But putting those factors aside, in (17a), just like in (10a), the combination of the choice-function variable plus the restriction of the QP is a sister to the lambda operator binding the pronoun inside the object possessive DP. Since *f(person)* is a constituent of type e (i.e. the type of individuals); it can straightforwardly be placed in the position of the individual variable corresponding to the pronoun inside the object possessive DP, via semantic reconstruction. But in (17b), on the other hand, *f(person)* does not have the subject possessive DP containing the pronoun in its scope. The operator does have the pronoun in its scope, but because the former involves quantification over functions, it cannot bind the individual variable corresponding to the latter. The GCFA predicts, correctly, that the universal can bind a pronoun in (15a), corresponding to the semantic formula (17a); but not in (15b), corresponding to (17b). The question to ask in connection with such facts is whether a GCFA is feasible for non-existential quantifiers.

There are at least two major problems in the way of an analysis of the syntax and semantics of non-existential QPs in terms of operator-movement combined with a functional analysis of the operator. The first problem concerns the phenomenon of antecedent-contained deletion (ACD), which requires QPs containing elided VPs to vacate the object position for the proper interpretation of the ellipsis. The second problem concerns the fact that a choice function analysis of non-existential QPs predicts unrestricted wide scope for such DPs. The phenomenon of ACD

is well known in the literature[7]. I will not discuss it here, but will focus instead on the problem of unrestricted wide scope.

If a choice-function analysis of non-existential QPs were feasible, one would in principle be able to interpret the operator part of a given QP at an arbitrary distance from its restrictive material, as it happens with existential QPs interpreted via choice functions (Reinhart 1997, 2006)[8]. Now, one of the generalizations about non-existential quantifiers that one often learns in introductory courses in semantics is the one in (18).

(18)   A quantifier phrase (QP1) can take scope over another quantifier phrase (QP2) iff QP2 does not bind a variable inside the restriction of QP1.

(19)   a.   A least one fan visited every celebrity. ($\exists >$ every; every $> \exists$)
        b.   At least one fan visited every celebrity she met. ($\exists >$ every; *every $> \exists$)

In order to understand the situation giving rise to the generalization in (18), consider the possible interpretation of the sentences in (19). (19a) is ambiguous between the narrow scope interpretation of the universal, in which at least one lucky fan had the chance of visiting every celebrity, and the wide scope interpretation in which for every celebrity there was at least one fan that visited him or her. The wide scope interpretation of the universal is missing in (19b), where the existential binds a pronoun inside the restriction of the universal. The classical account of such a contrast involves interpreting the universal QP as a unit. If the universal QP must be interpreted as a unit, then it follows that in order to take scope over the subject existential, the restriction of the universal must also take scope over the subject existential. But for that to be possible, the existential cannot bind a variable inside the restriction of the universal, since a quantifier cannot bind a variable outside its scope, hence the impossibility of the wide scope interpretation of the universal in (19b). Notice that unlike the classical account, a GCFA predicts that inverse scope should be possible in examples like (19b), in violation of the generalization in (18). (19b) can have the structure in (20a) after raising of the operator part of the universal QP at LF. (20a) can be translated into the formula in (20b).

(20)   a.   [Every [at least one fan visited t$_{every}$ celebrity she met]]

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[7]The class of sentences exemplifying ACD includes examples like that in (i) where the elided VP (represented by "Δ") is contained within the restriction of the object universal QP (see Bouton 1970, Sag 1976, May 1985, Larson and May 1990 for a discussion of the construction).

(i)   Nancy [$_{vP}$ invited [$_{DP}$ everyone that Sue did [$_{VP}$ Δ]]]

As it is well-known, interpreting the restriction in situ in examples like (i) leads to an infinite regress (see the above references). The problem is solved, however, if the entire object DP, not just the operator part, moves out of the VP covertly (See Kennedy 1997 for a nice review of the issues). It follows that any theory advocating a mandatory in situ interpretation of operator restrictions, like the TH, will not be able to account for the grammaticality of examples like (i).

[8]The original motivation of the choice-function approach was to capture the exceptional ability of a subclass of the indefinite DPs to take wider scope by granting them a different mechanism for extra wide scope-taking. By generalizing the approach, we lose the way of capturing the difference between the relevant sub-class and other DPs for which the wide-scope-taking abilities are not so free. Thus, for instance, Reinhart (2006) has argued that existential with modified numerals (occurring with modifiers: less than three, more than three, etc.), which systematically fail to take wide scope, cannot receive a choice-function interpretation, which she argues is expected if Kamp and Reyle (1993) are right in arguing that DPs of this type can only be interpreted as generalized quantifiers.

       b. $\forall f$ (at least one fan) λx(x visited ($f(\lambda$y(celebrity(y) & meet (x, y))))))

In (20b) the choice function variable applies to the predicate $\lambda y(celebrity(y)$ & *meet (x, y))*, corresponding to the denotation of the restriction of the universal QP. Importantly, in the entire formula, the universal operator takes scope over the existential QP *at least one fan*. In plain English, (17b) states that for every choice function *f*, there is at least one fan such that the given fan(s) visited the individual chosen by the function from the set of celebrities that the fan(s) met. Clearly, this is a wide scope interpretation of the universal. The fact that such an interpretation is missing in (19) in accordance with the generalization in (18), as far as I know reflecting a linguistic universal, strongly suggests that a choice function analysis of non-existential quantifier is not feasible. Given such facts, one is forced to conclude that the paradox that arises in connections with the examples in (6)-(8), within the TH, cannot be explained away by appealing to a generalized choice function analysis of operators combined with an in situ interpretation of the operator restrictions.

At this point, one could wonder if there is an alternative way of explaining the paradox away, at least for the class of non-interrogative QPs. The obvious move in a theory taking crossover to follow from the theory of scope is to tie the WCO effect in examples like (15b) to the arguably more difficult interpretation of inverse scope. Ruys (2000) in fact contemplates that possibility. Consider an example like (21) (Ruys' example (47)).

(21)   His$_i$ mother likes every boy$_i$.

Concerning (21), Ruys states that:

> ...it is not clear that the difficulty in obtaining the bound reading in (47) (=(21), CAB) differs significantly from the difficulty in obtaining the wide scope reading for the object in (48) (= *Someone loves everyone*, CAB). In other words, the WCO effect detected in (47) may well reflect the general difficulty of assigning wide scope to the QNP in object position. If this is indeed the correct way of looking at these examples, the WCO phenomenon in (47) simply disappears.

But the problem with that suggestion is that the possibility of variable binding in (21) (= Ruys' example (47)) seems to be dissociated from the degree of difficulty of the inverse scope interpretation. Since Ioup (1975), it is well known that inverse scope can become easier with context and/or the type of quantifier involved (See Reinhart 2006 for a recent discussion of the relevant issues). Consider the examples in (22), where *FPA* stands for *foreign policy advisor*. (22a) is originally discussed by Hirschbühler (1982).

(22)   a.   An American flag was hanging in front of every building.
           b.   An FPA accompanied each head of state to the UN meeting.

As Reinhart (2006) points out, inverse scope become easier if the context makes the overt scope interpretation implausible. That result is expected, for instance, if the difficulty of inverse scope is related to interference on the part of the overt scope. The overt scope interpretation of (22a) is the contextually weird reading in which there's just one flag stretching in front of every building. Context, thus, makes the overt scope reading implausible; hence it cannot interfere with the interpretation resulting from inverse scope. All this predicts that the inverse scope or

one-flag-per-building reading should be a salient interpretation of (22a), and the reading is salient indeed.

Concerning (22b), inverse scope is easy to get in examples of that kind when the lower quantifier is each (See the collection of papers in Szabolcsi 1997 and the discussion of the issue in Agüero-Bautista 2001). Thus, (22b) has a very salient interpretation in which each head of state traveled with a foreign policy advisor to his or her country. Notice, however, that the amelioration of the inverse scope interpretation in (22a-b) does not carry over to the WCO effect. Witness the unacceptability of ****Its**$_i$ *flag was hanging in front of **every building**$_i$* and *****His**$_i$ *FPA accompanied **each head of state**$_i$ to the UN meeting*. Such examples show that the WCO effect in examples like (21) is dissociated from the difficulty of covert scope. The WCO effect must therefore be explained apart from the issue of the relative difficulty of covert scope. What we have seen, then, is that the assumption that the WCO effect is a scope effect leads to the paradox discussed in connection with the data in (6)-(8), and that an attempt to solve the paradox by invoking a GCFA to the semantics of operators and by appealing to obligatory in situ interpretation of the restrictive material is not feasible, empirically, as it leads to major problems concerning the syntax and/or semantics of *wh*-phrases and non-existential quantifiers. In the next section, I argue that even if the previous problems can somehow be circumvented, so that the GCFA can be defended successfully, as required by the TH, the theory will still fail to account for the data that motivated it in the first place, namely the contrast in (3)-(4).

2.2   The GCFA, Obligatory Reconstruction and the WCO Effect

Recall that the main purpose of the TH was to account for the grammaticality of the sentences in (3), repeated for convenience, as (23).

(23)   a.   [*Every boy*'s mother] loves *him*.
          b.   [Someone in *every city*] hates *it*.

The intuition is that the quantifier in the bracketed constituent can take scope over that constituent, and since that constituent in turn takes scope over the pronoun, as it c-commands it, the quantifier is licensed to take scope over the pronoun by transitivity. As we saw, however, the paradox that arises in connection with the examples in (6)-(8), forces the TH to appeal to a more complicated implementation of the theory relying on a GCFA to the semantics of quantificational DPs. Paradoxically, however, adoption of a GCFA, besides facing the hard problems discussed above, leaves the theory without a way to account for the grammaticality of (23), the data that motivated the proposal in the first place. To see this, consider (23a) again. In that example, the universal quantifier cannot bind the pronoun from inside the bracketed constituent: the former does not c-command the latter from that position. Following the logic of the GCFA, the universal quantifier ranges over choice functions, hence it cannot bind the pronoun even if it is able to take scope over the latter. Since only the combination of an operator and its restriction ends up with the semantic type of individuals, in this approach, only that combination is capable of binding the pronoun. But the restrictions of the operators in (23) are inside the bracketed constituents; hence pronouns cannot be bound from their positions for lack of c-command. It seems then that the combination of a GCFA and the hypothesis that syntactic reconstruction is obligatory leaves the TH without an explanation of the data that originally motivates it. This is an unwelcome result.

3   Linguistic Variation and Semantic Analyses of WCO

The A-binding theory of WCO (see (2) above) is based on the generalization that a quantifier cannot bind a variable from a non-argument or Ā-position. This generalization is suggested by the classical crossover contrast in (1), repeated below as (24). (24b), the example with the Ā-binding context, is ill-formed.

(24)   a.   Who$_i$ t$_i$ loves his$_i$ mother?
         b. $^{?*}$Who$_i$ does his$_i$ mother love t$_i$?

But there are variations in the manifestation of the WCO effect both cross-linguistically and within a single language that threatens the validity of the A-binding generalization. To my knowledge, there are at least four types of data that are problematic from the perspective of the A-binding generalization. First, there are cases where the trace of the operator does not c-command the pronoun, hence it cannot be said to bind the latter, and yet a bound-variable interpretation of the pronoun seems readily available. The examples in (23) are a case in point. Second, pronouns contained within a right-branching structure can sometimes receive an interpretation in which their value co-varies with that of a quantifier in an Ā-position, as shown by the examples in (25)-(26). The examples in (25) are from Agüero-Bautista 2012, that in (26), from Williams (1994). Irrelevant traces are omitted.

(25)   a.   Which employee$_i$ did [Bill's crashing hi$_i$i car] get t$_i$ fired?
         b.   Who the hell$_i$ does [Bill's washing his$_i$ car] upset t$_i$?

(26)   [That he$_i$ might not survive the first year] worries every beginning medical student$_i$.

The bracketed constituent in each of these examples occupies the subject position of the clause. Thus, the trace of the object quantificational DPs cannot possibly c-command the pronoun contained within that constituent; hence A-binding is not possible. But the bound-variable interpretation of the pronoun is in fact available, suggesting that an operator can in fact bind a pronoun from an Ā-position, contrary to what is expected from the A-binding generalization in (2).

   The third class of problematic data concerns the fact that the WCO effect is absent in languages with null possessive pronouns. This is shown in (27) and (28) with Hungarian and Dakota examples, respectively. The examples in (27) are from Kiss (1987); that in (28), from van Valin (1987).

(27)   a.   kit$_i$ szeret t$_i$ az proi   anyja
             whom loves   t$_i$ the mother his
             'Whom$_i$ does his$_i$ mother love?'
         b.   mindenkit$_i$ szeret ti$_i$ az   proi anyja
             everybody-ACC loves the mother his
             'His mother loves everybody.'

(28)   Ø-tha-khóla-ku   ki twá wąyąka   he?
         3-POSS-friend-POSS the who 3SG.see.3SG Q
         'Who did his friend see?'

The pronoun in these examples is contained within the possessive DP in subject position. Both Horvath (1986) and Kiss (2002) discuss evidence suggesting that subjects are structurally higher than objects in Hungarian. Thus, the trace of the object must not c-command the pronoun in the examples in (27), hence A-binding is not a plausible explanation for the lack of WCO in such examples. The WCO effect is also absent in the Dakota example in (28), despite the fact that the pronoun within the subject possessive DP is bound by the object *wh*-phrase.

Some linguists have taken the absence of WCO effects in examples like (27)-(28) as evidence for non-configurationality of the languages lacking the effect. There's evidence, however, suggesting that the immunity of null pronouns with respect to the WCO constraint is independent of the configurational status of a language. For one thing, there are languages that show a WCO-like effect with overt pronouns, but not with null ones. Malayalam (Mohanan 1981, 1982, 1983; Bresnan 1984, 1994, 1995, 1998) and English are such languages. Regardless of whether these languages are configurational or not, the fact remains that they show a WCO effect with overt pronouns, but not with null ones. Consider the English contrast below.

(29)   a. *?Who$_i$ did his$_i$ writing a book make t$_i$ famous?
         b.   Who$_i$ did PRO$_i$ writing a book make t$_i$ famous?

English is uncontroversially considered a configurational language. The contrast in (29) shows that although an overt pronoun in the Spec of the subject DP cannot be bound by the displaced object *wh*-phrase; a null PRO, can[9]. A comprehensive theory of WCO must explain why null pronouns are exempt from the WCO effect in this way.

The fourth type of problematic data concerns the fact that there are languages in which the WCO effect does not show up even with overt pronouns in traditional WCO contexts. Postal (1993) gives us the French example in (30), which he attributes to Martinon (1927).

(30)   Un homme$_1$ à qui   sa$_i$ jambe fait   mal t$_i$
         A   man   to whom$_i$ his$_i$ leg   makes pain
         'A man whose leg hurts.'

The pronoun *sa* 'his' in (30) must be bound by the relative operator, as its value co-varies with the value of the DP to which the relative clause is attached. But the relative operator and the possessive pronoun are in a WCO configuration; yet the WCO effect is absent in that example. Structurally similar examples in English, where a relative operator raises from within the c-command domain of a subject DP to bind a pronoun within that DP, are ungrammatical (Lasnik and Stowell 1991). Spanish is similar to French: the sentence in (31) is fully acceptable where the fronted relative operator bind the possessive pronoun *su* 'his' in the subject possessive DP.

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[9]A reviewer wonders if such examples could be analyzed as parasitic gaps, perhaps considering the possibility of attributing their immunity with respect to the WCO constraint to the fact that parasitic gaps have been shown to lack the WCO effect (Lasnik and Stowell 1991). There are two reasons militating against a parasitic gap analysis of the pro-gate phenomena in (29b), however. The first is that, as Lasnik and Stowell point out, parasitic gap construction within argument DPs are marginally acceptable. (29b), however, is fully acceptable. The second reason has to do with the fact that, as shown by Safir (2006), pro-gate phenomena are control structures and, as far as I know, parasitic gap phenomena are not sensitive to the control requirements of such structures.

(31) Ningún niño₁ a quien₁ su₁ madre haya maltratado será   aceptado sin   examen
     No   child₁ to whom₁ his₁ mother has mistreated will-be accepted without exam
     psicológico.
     psychological.
     'No child to whom his mother has mistreated will be accepted without a psychological exam.'

Regarding the acceptability of (30)-(31), one cannot just assume that the WCO effect is simply absent in languages like French and Spanish. The effect shows up in Spanish if we replace the DP *su madre* 'his mother' by *la madre de él* 'the mother of him', as shown below.

(32) Ningún niño₁ a quien₁ la madre de él*₁/₂ haya maltratado será   aceptado sin
     No   child₁ to whom₁ the mother of him₁/₂ has mistreated will-be accepted without
     examen   psicológico
     psychological exam
     'No child to whom his mother has mistreated will be accepted without a psychological exam.'

The sentence in (32) is unacceptable under the bound-variable interpretation of *él* 'him'. If *él* is interpreted deitically (with its value fixed by the context), the example is acceptable. A similar test for determining if the WCO effect is active can be conducted in French, at least in the Quebec variety. In Quebec French it is possible to double a possessive DP like *sa femme* 'his wife' with a dative prepositional phrase containing a pronoun (e.g. *a elle* 'of her'). The value of the pronoun that is the object of the dative preposition must be the same as the value of the pronoun inside the possessive DP. With this information in mind, consider the data in (33).

(33) a. Quelle personnalité politique₁ penses-tu que son₁ marie   (*à elle₁) a
         Which figure   political₁ think-you that her₁ husband (*of her₁) has
         trahi   t₁?
         betrayed t₁?
         'Which political figure do you think that her husband betrayed?'
     b. Quelle personnalité politique₁ penses-tu que son₂ marie (à elle₂) a trahi t₁?

(33a) shows that a displaced object *wh*-phrase, in a question, can bind a pronoun within a subject possessive if the possessive DP is not doubled. A speaker confronted with the doubleless version of (33a) can answer it by uttering an answer like Hilary Clinton if the speaker in fact believes Hilary to be the relevant political figure in the given utterance context. (33b) shows that a doubled possessive DP is acceptable in Quebec French, provided that the possessive and the pronoun are not bound by the fronted *wh*-phrase. The ungrammaticality of the doubled version of (33a) must then be due to a WCO effect induced by the presence of the pronoun *elle* 'her' within the dative DP. A comprehensive theory of WCO must therefore explain why possessive pronouns like French *sa* 'his'/'her' and Spanish *su* 'his'/'her' seem to be immune to the WCO-like effect, whereas non possessive pronouns like Spanish *él* 'him' or French *elle* 'her' are not. In the next section, I will show that the main semantic accounts of the WCO effect that have been proposed in the literature cannot account for the variations in the distribution of the effect discussed above.

3.1   Linguistic Variation and the Generalized Choice Function Approach

Recall that the GCFA essentially recast the A-binding generalization in (2) in semantic terms, by assuming that reconstruction to the extraction site is obligatory. Since the variation data discussed above are problematic for the A-binding assumption, all such data are problematic to the GCFA, given that the latter is just a semantic implementation of (2). Consider the example in (22b), repeated below as (34).

(34) $^{?*}$Who$_i$ does his$_i$ mother love t$_1$?

If this sentence is ungrammatical because only the operator part is interpreted over the pronoun and because operators only range over functional variables, then all the examples in (25)-(33) should be equally unacceptable, contrary to fact. The appearance and disappearance of the WCO effect depending on the phonological shape of the pronoun, as in Malayalam and English, or depending on the possessive status of the pronoun, as in French and Spanish, is very difficult, if not impossible, to capture within this approach. If we allow operators in non-argument position to bind pronouns by playing with the semantics of the operators, then we are left without a mechanism to rule out the classical crossover cases. On the other hand, if we prevent operators in non-argument position from binding pronouns by tampering again with the semantics of the operators, then we are predicting that examples in a WCO configuration should exhibit a WCO effect. I conclude that a GCFA is too inflexible to capture the variation in the distribution of the WCO effect.

3.2   Variable Free Semantics

Jacobson (1999) proposes an approach that "makes no essential use of variables" in the semantics of natural language. To develop her hypothesis of the plausibility of a variable-free semantics, she analyzes expressions containing pronouns, traditionally thought to contain variables in the semantics, as functions from individuals into the type of denotations that the expression would have if it had a constant denoting NP in the position of the pronoun. For instance, the expression *Mary loves him*, extensionally of type t in standard semantic approaches, corresponds in the variable-free framework to the property $\lambda x[love'(x)(m)]$, a function of type $<e, t>$[10]. To better understand how the system works, consider the sentence *Every man loves his mother* (Jacobson's example 20). The object DP contains a pronoun, so it must be a function from individual to something else. If *John* stood in the position of the pronoun, the Object DP would denote an individual; hence in the variable-free approach *his mother* must denote a function from individual to individual. But *love* denotes a relation of type $<e, <e, t>>$; hence it cannot combine with an object of type $<e, e>$. In order to solve this problem, Jacobson introduces an operator that simultaneously shifts the regular relation-denoting *love* to denote a relation of type $<<e, e>,<e, t>>$ and introduces a lambda operator that ends up binding the position of the pronoun. As she puts it: "to z(love) a function f of type $<e, e>$ is to be an x such that x ordinary love f(x)." Let us consider how the parts combine for the previous example.

(35)   a.   [[**his mother**]] = λy.the mother of (y)
         b.   [[**love**]] = $\lambda x.\lambda v[love'(x)(v)]$

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[10]Notice that although Jacobson (1999) uses variables in the metalanguage, she makes it explicit in the article that in her approach "variables are used for representational purposes only" and that, furthermore, such devices "are not part of the semantic machinery in any essential way" (p. 118).

> c. $[[\mathbf{z(love)}]] = \lambda R.\lambda x[love'(R(x))]$
> d. $[[\mathbf{love\ his\ mother}]] = \lambda x[love'(\text{the mother of}'(x))]$

After the type-shifted version of *love* (i.e. z(love)) combines with *his mother* via function application, we end up with the function in (35d) (after the necessary lambda conversions), as the meaning of the subject-less VP *love his mother*. That constituent now can combine with the subject quantifier *every man* by regular function application. Jacobson points out that the classical WCO effect follows from the dynamic of binding in this approach. In particular, since it is the presence of pronouns which triggers the type shifting of any expression containing them, and since it is the type-shifting which creates the possibility of binding the pronoun within this approach, it follows that expressions not containing pronouns, because of their lower position in the syntactic tree with respect to the pronouns, will not type-shift; hence they won't be able to bind the given pronouns. That accounts for the contrast in (36).

(36) a. Every man$_i$ loves his$_i$ mother.
      b. $^{?*}$His$_i$ mother loves every man$_i$.

For this account to work, however, we must make sure that there are no backward version of the operator z, whose type-shifting of the predicate would allow an object QP to bind a higher pronoun. Jacobson assumes that there are no such backward versions of z in the semantics. This is in essence, her account of WCO.

   The virtue of this approach is ultimately its demise. By making the WCO effect follow from the combinatorial mechanics of the system, the approach cannot easily handle the variation found in the distribution of that effect. It is not clear what the predictions of the system is for the classical WCO contrast in (24), repeated below as (37).

(37) a. Who$_i$ t$_i$ loves his$_i$ mother?
      b. $^{?*}$Who$_i$ does his$_i$ mother love t$_i$?

Since the position of traces cannot be exploited in this account, and since the pronoun is preceded by the *wh*-operator in both of these examples, it is not clear how this contrast can be obtained in a variable-free approach. Regardless of whether this contrast can ultimately be characterized in the approach, if one blocks the binding of the pronoun by the *wh*-phrase in (37b) by relying on the mechanics of the system, then we will incorrectly predict all the examples in (25)-(33) to be equally unacceptable, including the acceptable cases involving null pronouns in Hungarian and Dakota in (27)-(28); the grammatical PRO-gate cases exemplified in (29b); and the acceptable French and Spanish examples involving overt possessive pronouns. On the other hand, if we allow a displaced *wh*-phrase to bind a pronoun inside a subject DP, in order to account for the acceptable cases just mentioned, then we incorrectly predict the acceptability of examples like (37b), and the French and Spanish examples in (32)-(33) involving non-possessive pronouns. The variable-free semantics handling of the WCO effect seems to lead us into a theoretical catch 22: no matter what we do, there is always a residue of data that cannot be accounted for. We are therefore forced to conclude, that this approach, as it stands, is too rigid to accommodate the cross-linguistic variation shown by the WCO effect.

3.3   Büring's (2004) Semantic A-binding

In order to recast Reinhart's (1983) A-binding approach in semantic terms, Büring (2004) introduces two operators: an operator β_n stipulated to be the sister to a quantificational QP in argument position, and an operator μ_n stipulated to be the sister to a QP in an Ā-position. It is further stipulated that β_n and μ_n must bind variables of different syntactic origins: the former only binds pronouns; the latter, traces. Since this analysis is just literally putting A-binding in the semantics, it inherits all the problems of the syntactic account. In particular, the objections raised above in connection with GCFA regarding its inability to account for the variation in display in the classical WCO contrast in (24) and the examples in (25)-(33) apply mutatis mutandis to the semantic A-binding approach. I leave it to the reader to verify that this is in fact so.

3.4   Shan and Barker's (2006) Continuation Approach

Shan and Barker (2006) argue for an approach to quantifier scope and binding based on continuations, a concept they import from the semantics of programming languages. According to these authors, a continuation is "a prefix of the computational future of an expression." For instance, in order to determine what the continuation is for the object QP in the example *John saw everyone*, imagine what the sentence would mean with a gap in the position of the QP. In variable-free theories of semantics, in which expressions containing gaps and pronouns denote properties, rather than propositions relative to assignments of values to variables, that example denotes the property $\lambda x[saw\ x\ j]$. This is the property of being seen by John. A sentence could be made up of a QP and this property in a syntactic sisterhood relation and when the time for evaluating the QP comes, the previous property would represent the continuation or computational future of that sentence with respect to the QP. In general, the nuclear scope of a quantifier coincides with its continuation. In this system, the scope of a quantifier depends on when the quantifier has access to its continuation, that is, when the quantifier is evaluated. In sentences with two quantifiers which quantifier takes wide scope depends on which quantifier's computational future is taken to include the other quantifier's evaluation.

Shan and Barker introduce a number of operators that allow regular denotations to combine with continuations. They argue that WCO follows from the directionality of processing: left to right. For sentences like (36b), the claim is that since the pronoun is evaluated first, it must lie out of the scope of the quantifier, since expression evaluated first get wider scope in this system, for expressions evaluated at the same level of lifting. A question that arises is why can't the QP simply be lifted to a level higher than the level at which the pronoun is evaluated so that it can take the entire expression containing the pronoun as its nuclear scope. That can in principle be done, but Shan and Barker make that result impossible to achieve given the combinatorial properties of their type-shifting operators. This is an unwanted result, since then the theory predicts, incorrectly, that examples like the Hungarian one in (26a) and the English one in (27b) should be unacceptable.

In order to explain the classical WCO contrast in (37), Shan and Barker argue that when a pronoun occurs to the left of a trace bound by an operator, the pronoun, if also bound by the operator, will disrupt the binding relation between the operator and the pronoun. Again they make this result follow from the combinatorial properties of their operators and again this is an unwanted result, as now this approach, like the other semantic approaches discussed above, incorrectly predicts the examples in (25)-(33) to be uniformly ungrammatical, contrary to fact. I

conclude that this approach is not flexible enough in order to handle variation of the WCO effect, as discussed above.

3.5   The Non-redundancy Account

Schlenker (2005) proposes a semantic/processing account of binding. In Schlenker's approach, as in other semantic approaches, a sentence is interpreted by evaluating its constituents with respect to a sequence of evaluation. A sequence of evaluation is construed as the sentence is processed in a top-down fashion. Schlenker argues that when a referential expression is processed, its denotation is added at the end of the sequence of evaluation. For illustration, consider the derivation of the sentence *John hates Bill*. When the subject has been processed, [[**hates Bill**]] is evaluated with respect to the sequence $s^\wedge j$, as the denotation of *John* has been added to the end of the sequence. When the object has been processed, [[**hate**]] is evaluated with respect to the sequence $s^\wedge j^\wedge b$ which contains the denotation of the subject and the object.

Non-deictic Pronouns are different from R-expressions. They do not add a denotation to the end of the sequence of evaluation. Rather, they retrieve an element already present in the sequence of evaluation and move it to the end. Schlenker argues that a principle prevents the same object from occurring more than once in the same sequence of evaluation. He calls the principle *Non-redundancy*. With Non-redundancy, the approach can derive Condition C, as the processing of examples like *John likes John*, where both NPs denote the same individual, will involve the creation of a sequence of evaluation with two instances of j; hence violating non-redundancy.

Schlenker notes that the Non-redundancy approach to binding leads to a problem with quantification. The problem is that the approach predicts that for an example like *Chomsky thinks that every linguist should be minimalist*, whoever utters the example could not possibly attribute to Chomsky the property of being a linguist, since otherwise the sequence of evaluation will contain two instances of the denotation of Chomsky, when the elements in the domain of quantification are added to the evaluation sequence.

Schlenker stipulates a solution for the problem that at the same time allows him to treat crossover phenomena generally. He stipulates that the elements in a domain of quantification are added not to the sequence of evaluation, but rather to a quantification sequence. Elements in a quantification sequence can appear in a sequence of evaluation only if they are cross-referenced to the sequence of evaluation by the trace of the quantifier. The WCO effect then result from the fact that if a pronoun is higher than a trace of a quantifier, it will be processed before the trace of that quantifier, but since it is the trace that can cross-reference an element from a quantificational sequence in the evaluation sequence, the pronoun will look for an element in the evaluation sequence that has not been added, as the trace has not been processed yet. I personally find this solution elegant. Unfortunately, however, it suffers from the same inflexibility of the other approaches when dealing with the cross-linguistic variation attested in the distribution of the WCO effect. Like the previous approaches, this approach incorrectly predicts that all the examples in (24)-(36) should be equally ungrammatical.

4   Towards a Principled Account of the WCO effect

We saw that the semantic accounts of WCO discussed in the previous section fail to account for the cross-linguistic variation in the distribution of the WCO effect. I believe that this is not just

an accidental theoretical gap. Rather, this problem seems to be a matter of principle. The reason why semantic approaches to WCO are not successful in explaining the cross-linguistic variation in the distribution of the effect is that the semantic component is a source of invariance rather than a source of variation in natural language. As Chomsky has repeatedly pointed out in many of his publications, agreeing with many linguists before him (e.g., Otto Jespersen), while the prospect of a universal conceptual-intentional system seems to constitute the null hypothesis ever since the notion of a universal grammar entered the horizon of inquiry, no one has seriously considered the possibility of a universal morphology. For this reason, current minimalist linguistics adopts the view that parametric variation (by definition the source of linguistic variation) is restricted to certain morphological properties of lexical items.

In keeping with such considerations, we need a theory of WCO that is descriptively adequate in accounting for the manifestation of the effect in the various different languages. A principled explanation of the phenomenon in the sense of Chomsky (2004, 2007) must show how the variations in the distribution of the effect, as well as its invariant aspects, follow from the way the computational system interacts with the various lexical items in the different languages and the way the computation uses such items in mapping representations to the interfaces. If it can be shown that the effect in fact follows from this interaction without the need of positing new principles for inclusion within universal grammar, we will have gone beyond explanatory adequacy in explaining the WCO effect.

I believe that this goal is in fact achievable. For that, however, we need to drop the assumption that WCO is a semantic phenomenon. But if WCO is not a semantic effect, then what kind of effect is it? In the next section, I adopt a proposal developed at length in Agüero-Bautista (2014), arguing that the WCO effect arises because of the way the computational system maps phrases sharing grammatical features to the external interfaces. From this perspective, the WCO effect is an architectural or derivational constraint, in that its main effects are derivable from the way the different components of the human language architecture interact. The mapping of linguistic expressions to the language external interfaces is a process external to such interfaces, and hence without homologues within such components. What this means is that the effect of architectural constraints that are the result of the cumulative interaction of different components of the language architecture cannot be captured by positing local constraints operating at the level of the interfaces. This is the reason, I think, why semantic accounts of WCO have so far failed in this effect. As we will see below, the WCO effect arises when the computational system tries to meet certain legibility conditions at both the phonological and semantic interfaces by making use of the single operation Merge, but it arises in the context of binding because binding is based on agreement (Reuland 2011) and the linearization of agreement might incur violations of some syntax-phonology interface principle like Kayne's (1994) linear correspondence axiom (LCA).

4.1 Parallel Merge

Consider the derivation of a phrase like *the man read the book*, as it appears in a context like *I see [the man read the book]*. Adopting the derivation by phase model of Chomsky (2001), as I do, a question that arises is how the pieces of this example are put together. There are several possibilities. Verbs can combine with objects consisting of a determiner and noun, but not with determiners alone: the sequence *the man read the* is ungrammatical. If this is the case, then before the verb can be merged with anything in the above example, *the* and *man*, and the and book could

be merged in parallel to form what end up being the subject and object constituents, respectively. Since cyclicity is driven by phase heads in the derivation-by-phase model, and since no phase head has yet been merged by the time the subparts of the subject and object constituents are merged together, there is no sense in which those applications of Merge can be considered counter-cyclic. This will become important shortly.

4.2   Proposal

My proposal is based on the following set of assumptions[11]:

(38)   Working Assumptions about Pronouns.
   a.   Some pronouns belong to the category of determiners (Postal 1966), others belong to other syntactic categories.
   b.   Determiner pronouns are merged with nouns, just like other determiners are.
   c.   Determiner pronouns spell out the ϕ-features of their complement nouns, with which they agree.

The first part of the assumption in (38a) is not problematic. Postal (1966) shows the determiner behavior of English pronouns and many scholars ever since have done the same in other languages (see for instance Uriagereka 1995 for Romance). The second part of that assumption is not problematic either. There are languages like Italian, in which possessive pronouns like *sua* 'his/her' can be preceded by determiners as in *la sua machina* 'the his car'. The pronouns of such constructions have been traditionally analyzed as adjectives.

   Assumption (38b) seems to be imposed on us by certain distributional facts associated with the syntactic behavior of determiner pronouns cross-linguistically. In English, for instance, we find determiner pronouns occurring with post-nominal NPs in expressions such as *we linguists, you communists, and them cars*, which, as shown by Postal (1966), strongly suggest the determiner status of such lexical items. Related to this co-occurrence possibility is the fact that across languages, phrasal reflexives can be made up of a determiner pronoun plus a nominal expression of the self-type (e.g., English *himself*, Spanish *ella misma* 'herself'), which again shows that determiner pronouns can combine with complement NPs. Assuming with Postal and others that such combinations demonstrate the determiner status of the co-occurring pronoun, the question that arises is whether such pronouns must be merged with NP complements as is the case with other determiners. I believe that under the standard assumption about the syntax and semantics of noun phrases the answer must be yes. On the syntactic side, sentences containing regular determiners without their corresponding complement NPs are ungrammatical; hence determiner pronouns must be merged with corresponding NPs, even if the NPs are phonologically inaudible, if we are to reconcile their determiner status with the full grammaticality of sentences containing them. From a semantic perspective, on the other hand, there are in principle three different semantic types that can be associated with a given DP: the type of predicates, that of individuals, and the type of generalized quantifiers (Partee 1987). A potential type mismatch will exclude

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[11]Developing a full-fledged account of the WCO phenomena is beyond the scope of this paper. Below, I sketch the general outline of what I take to be a principled theory of such phenomena, ignoring, for reasons of time and space, many important questions that arise. For a full version of the theory, I refer the reader to Agüero-Bautista (2014), where these questions are explored in a book-length investigation.

the predicate meaning of an NP occurring in an argument position. This leaves two available types for pronominal DPs occurring in argumental positions: the type of individuals or the type of generalized quantifiers. Now, I know of no semantic theory claiming that natural language determiners can denote individuals directly. Rather, determiners can denote function from individual properties to individuals (type e,t, e,) (e.g., the iota-operator, choice-functions), or they can denote function from properties to generalized quantifiers. If so, then the NP part of a determiner pronoun is required by virtue of the general meaning of determiners, as omitting the argument of the determiner will result in an unsaturated function that will cause the derivation to crash in the semantic component as the DP dominating the pronoun will receive no semantic value.

Assumption (38c) is commonly found in the literature (see Reuland 2011 for recent discussion of relevant issues). Consider now the derivation of the WCO contrast in (39), in light of these assumptions.

(39)   a.   Which man$_i$ t$_i$ loves his$_i$ mother?
        b. $^{?*}$Which man$_i$ does his$_i$ mother love t$_i$?

Let us first consider the deviant example (39b). How does the derivation of this sentence proceed? As we saw above, it is possible to assemble DPs by merging their parts before any phase head is merged. Consider the possibility of the following derivational steps for that example in (40). The example is ultimately spelled out as in (41).

(40)   Possible Derivational Steps for (39b).

        a.   Merge <he, man> and <which, man> simultaneously
        b.   Merge <'s, mother> and <love, <which, man>> simultaneously
        c.   Merge <<he, man>, <'s, mother>>
        d.   Merge <<<he, man>, <'s, mother>>, <love, <which, man>>> simultaneously

(41)   ***Which man*** does he ~~***man***~~'s mother love ~~***which man***~~.

Consider the step in (40a). The *wh*-operator *which*, being a determiner, needs to be merged with a noun and so does the pronoun *he*. If they merge simultaneously with the *noun* man, we end up with a situation in which two syntactic objects, which are not yet part of the same syntactic tree, share one subcomponent. This type of merge looks like both external merge (EM) and internal merge (IM) (see Citko 2005) and is reminiscent of sideward movement (Nuñez 2001). Citko (2005) analyzes a number of syntactic phenomena in terms of this type of merge, which she calls Parallel Merge (hereon PM). In a system without special stipulations about the timing of merge, the existence of PM seems a plausible hypothesis. I will assume it in what follows, but see Agüero-Bautista 2014 for a discussion of plausible alternatives.

Consider now what happens after the *wh*-DP is internally merged in Spec CP and the complete sentence is finally spelled-out, yielding the structure in (41). In this structure there are three copies of *man*. If one assumes that the original copy of *man* enters the derivation with unchecked case features, it will follow that the copy of *man* complementing the pronoun will bear the same unchecked features as the copy of the *wh*-phrase[12]. But since the pronominal DP is not merged

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[12]A reviewer wonders what prevents an analysis of (41) in which the NP complement of the *wh*-phrase and that of the pronoun are taken to be distinct copies, as in the sentence "This man saw that man." The suggested analysis is prevented by a combination of Full Interpretation (FI) and the principle of recoverability of deletion (PRD) (Reuland

with the same head that the *wh*-DP is merged with, the features of the noun of the pronoun does not get a chance to be checked against the right functional head. The noun inside the pronominal DP must therefore contain an unchecked uninterpretable case feature (a kind of syntactic virus, Uriagereka 1999), which, if pronounced, will cause the derivation to crash at PF. I will assume that this is the reason why the complement of a pronoun must (almost) always be phonetically null.

Let us examine now the structure in (41) in light of the assumption that pronouns phonetically spell out the ϕ-features of their complement nouns (see (38c)). If this is so, then the ϕ-features of man are phonetically realized in two different syntactic positions: the position of the *wh*-DP in Spec, CP, and that of the pronominal DP inside the subject possessive DP, as there is a deleted copy of the noun inside the latter DP. But this must constitute a violation of Kayne's (1994) linear correspondence axiom (LCA), as the same syntactic element (i.e. the set of ϕ-features of man) ends up linearized in two different positions. I hypothesize that this is what the WCO effect is: a violation of the LCA. I will argue that if evaluation for compliance with the LCA occurs within a phase-memory window, the cross-linguistic variation in the distribution of the WCO effect follows straightforwardly.

One way of implementing this idea is to assume that for any given copy C of a DP that is the sister to a probe, the domain of the procedure that check for compliance with the LCA is exactly the domain of the probe, which reaches to the edge of the preceding cycle(s), assuming some version of the phase-impenetrability condition (PIC) of Chomsky (2001). Assuming that compliance with the LCA is in fact evaluated this way, let us see how this approach can handle the cross-linguistic facts discussed above. Consider the examples in (39) with the structure in (42).

(42)   Structures of the Examples in (39)
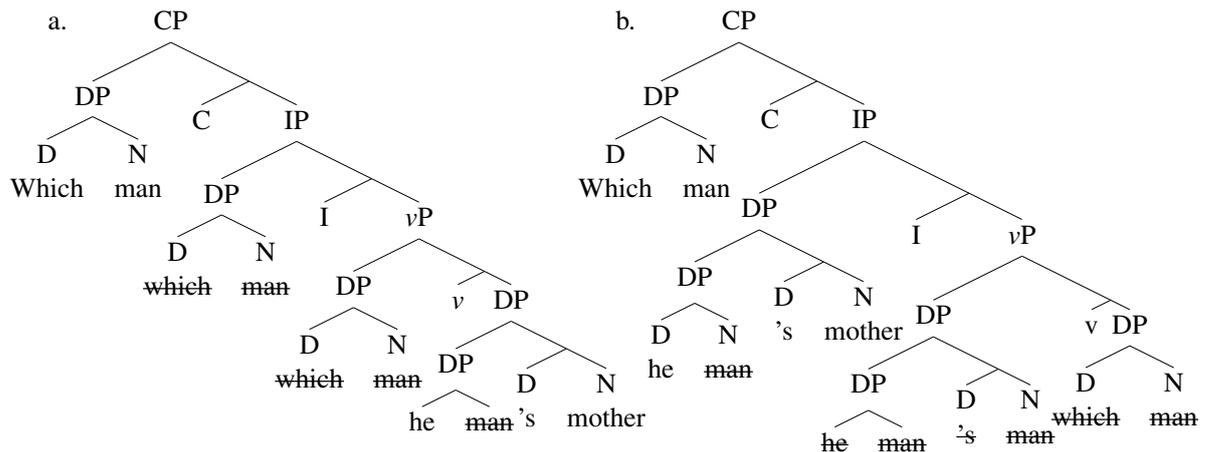
In the structure in (42a), corresponding to the example in (39a), the possessive DP containing the pronoun is within the domain of little *v*. Since little *v* is a strong phase head (Chomsky

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2011). The latter principle dictates that linguistic expressions can be deleted only when the information associated with them can be recovered from the linguistic context. This is the case in (41) where the information associated with the complement of the pronoun occurs redundantly as the complement of the antecedent as well. On the other hand, if the complement of the pronoun were an independent occurrence in itself, it could not possibly be elliptical, as its phonological deletion would undoubtedly violate the PRD. This entails the conclusion that elliptical material must be anaphoric, which explains the difference in interpretation between *this door broke* and *this door broke this door*: the object of *break* is anaphoric to the subject in the first example, but not in the second.

2004), the pronoun is inaccessible from outside of the little *v*'s domain, given the PIC. When the procedure that inspects the structure for compliance with the LCA applies to this structure, to see if linearization of the *wh*-phrase is sanctioned by the LCA, it will not be able to detect the pronoun, as the domain of the procedure coincide, by assumption, with the domain of the probe that is a sister to the phrase being evaluated for compliance, and this latter can only reach to the edge of the vP phase. If the LCA is an absolute condition, as stated in Kayne's (1994), (49a) can be seen as a violation of the LCA that is not detected by the grammar, because the cyclic transfer of the grammar makes it "forge" the violation, hence the example associated with such a structure is fully grammatical. Alternatively, if the LCA is a phase-internal requirement, (49a) is simply not a violation of this principle, as the pronoun and the phase being evaluated span two distinct phase heads. Either way, the present analysis predicts the grammaticality of this example.

Consider, by contrast, the structure in (49b), corresponding to (39b). In this structure, the pronoun is situated in the Spec of the subject possessive DP. The Spec of a phrase is part of the edge of that phrase, so even if DPs turn out to be phases, the spec of the possessive DP will be accessible to operations from outside of the domain of the head D. This means that when the procedure inspecting structures for compliance with the LCA inspects the structure in (39b), it will see the pronoun in Spec of the possessive DP. Since the pronoun is a phonetic spell-out of the ϕ-features of its complement, which is in turn a copy of the complement of its antecedent, the pronoun is by extension, the spell-out of the ϕ-features of the complement of its antecedent. This instantiates a violation of the LCA, and when the procedure that checks the structure for compliance sees the pronoun, it detects the violation. The sentence, thus, crashes at PF because of the LCA violation. The ungrammaticality of (39b) is thus accounted for.

4.3   Empirical Coverage of the Account

Let us see now, how the current proposal can explain the recalcitrant data in (25)-(33). Consider first the data in (25)-(26), repeated below as (43)-(44).

(43)   a.   Which employee$_i$ did [Bill's crashing his$_i$ car] get t$_i$ fired?
        b.   Who the hell$_i$ does [Bill's washing his$_i$ car] upset t$_i$?

(44)   [That he$_i$ might not survive the first year] worries every beginning medical student$_i$.

In (43a-b), the pronoun is embedded under the little v from which the gerundive nominal is derived. Thus, the procedure inspecting the structure of the matrix clause for compliance with the LCA will not be able to see the pronoun as it only will have access to the edge of the subject DP. These examples are grammatical because no violation of the LCA is detected by the grammar. The grammaticality of (43) follows similarly. Assuming that the universal quantifier can take scope over the position of the pronoun, the pronoun can be bound without yielding a WCO effect only because in being shielded by the head C, a phase-head, any procedure inspecting the matrix CP will not have access to the pronoun, given some version of the PIC. Consider next the Hungarian and Dakota examples in (27) and (28), respectively, repeated below as (45)-(46).

(45)   a.   kiti   szeret t$_i$ az proi   anyja
              whom loves   t$_i$ the mother his
              'Whom$_i$ does his$_i$ mother love?'

      b.   mindenkit$_i$ szeret t$_i$ az   pro$_i$ anyja
           everybody-ACC loves the mother his
           'His mother loves everybody.'

(46)   ∅-tha-khóla-ku   ki twá wąyąka   he?
           3-POSS-friend-POSS the who 3SG.see.3SG Q
           'Who did his friend see?'

The pronouns in these examples are null, hence they cannot trigger a violation of the LCA since the lack of phonetic content prevents them from entering a linear ordering. These facts, together with the PRO-gate phenomena discussed by Higginbotham (1980) receive a simple explanation within the present account. That I know of, there's no comparable explanation for such facts in the literature, which have resisted coherent analysis for decades.

    Consider now the French and Spanish data discussed in (31) and (32), respectively, and repeated below as (47) and (48).

(47)   Un homme$_1$ à qui   sa$_i$ jambe fait   mal t$_i$
           A man   to whom$_i$ his$_i$ leg   makes pain
           'A man whose leg hurts.'

(48)   Ningún niño$_1$ a quien$_1$ su$_1$ madre haya maltratado será   aceptado sin   examen
           No   child$_1$ to whom$_1$ his$_1$ mother has   mistreated will-be accepted without exam
           psicológico.
           psychological.
           'No child to whom his mother has mistreated will be accepted without a psychological exam.'

In order to explain the difference in grammaticality between these examples, on the one hand, and their English counterparts, on the other, we may search for any difference between English possessive pronouns and their Romance counterparts, in the hope that their different behavior with respect to the WCO effect might be related to that difference.

    One difference seems to be the categorial status of these elements in the two language families. In Italian and Spanish, there is evidence that possessive pronouns can be adjectival. This is clear in Italian, where an article can precede a possessive pronoun as in *la sua casa* 'his/her house' (literally: 'the his/her house'). In most dialects of Spanish they can sometimes co-occur with a demonstrative pronoun as in the phrase *esta su casa* 'this his house' and in some dialects of Spanish they can in fact be preceded by an article (Picallo and Rigau 1999). Since French possessive *sa/son* are related to the possessive pronouns of Italian and Spanish, it is plausible that pronouns in the former language could also belong to the category of adjectives. The agreement pattern of possessive pronouns in Romance, generally, seems to add plausibility to the hypothesis of their adjectival status. Whereas English possessive pronouns agree grammatically in number and gender with their antecedents, the Romance possessive pronouns agree instead with the following NPs (Cardinaletti 1998; van Peteghem 2012)[13]. As shown by a number of researchers, this is actually

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[13]This is illustrated with the English and French examples in (i) and (ii) below. In (i), singular *her* agrees in number and gender with the antecedent *she*, not with the plural and masculine NP *brothers*. On the other hand, French *son/ses*

the agreement pattern of prenominal adjectives in Romance (see Van Peteghen 2012 for a recent discussion).

The Romance possessive pronouns have sometimes been analyzed as determiners. The main argument for that analysis has been the observation that such possessive pronouns cannot co-occur with other determiners. This however does not force the conclusion that these items have been diachronically reanalyzed as determiners: proper names do not normally co-occur with determiners in many languages despite the fact that they enter the derivation as nouns, having the option to raise to D^0 or not. According to Longobardi (1994), in languages where N to D raising is obligatory, proper names cannot co-occur with determiners, whereas in languages where N to D does not necessarily take place (e.g., Modern Greek), proper names are preceded by determiners. What we learn from Longobardi's study is that the movement of nominal elements to the left periphery of the DP might render such elements incompatible with other left-peripheral material within the DP, like the determiners themselves. In light of Longobardi's findings, it is entirely plausible that Romance possessive adjectives (including the French ones) start the derivation as adjectives and then move toward the left periphery of the DP, thereby becoming incompatible with the left peripheral determiners[14]. Since I know of no analysis or data disconfirming such a hypothesis I will adopt it in what follows.

Now, unlike determiners, adjectives do not select complement nouns; hence adjectival pronouns cannot be merged with the complement of their potential antecedents. What this means is that in languages with adjectival pronouns in their possessive DPs, unlike what happens with determiner pronouns, there is no derivational stage equivalent to (40a), in which the pronoun is merged with the same noun as its antecedent. Thus, there is no sense in which adjectival possessive pronouns can be the spell out of the nouns of their antecedents; hence their phonetic realization cannot possibly violate the LCA. The grammaticality of (47)-(48) is thus accounted for.

The situation is different, however, if we try to express a possessive relation, periphrastically, by using a determiner pronoun in the object position of a dative preposition, the counter part of English *of*. In such a case, just like in the English case, the determiner pronoun will be merged with the same noun as its antecedent, thereby incurring in a violation of the LCA when the pronoun is phonetically realized. This is the source of the ungrammaticality in examples like (32) and (33), the former repeated below as (49).

(49)   Ningún niño$_1$ a quien$_1$ la madre de él$_{*1/2}$ haya maltratado será   aceptado sin
        No   child$_1$ to whom$_1$ the mother of him$_{1/2}$ has   mistreated will-be accepted without
        examen   psicológico
        psychological exam

'his/her' agree in number and gender with the following NP rather than with the antecedent:

(i) She brought her brothers.
(ii) Elle a apporté son frère/ ses frères
     She has brought her brother/her brothers

This shows that the Romance possessive pronouns have the agreement pattern of adjectives.

[14]Notice that this analysis can explain why the Romance possessive pronouns bear the agreement pattern of adjectives: they start the derivation as adjectives. The analysis can also explain why they cannot co-occur with articles: they move to a left-peripheral position (probably D^0). The hypothesis that these elements are synchronically determiners cannot account for both properties at once.

> 'No child to whom his mother has mistreated will be accepted without a psychological exam.'

What we have seen then, is that the difference in grammaticality status between the examples in (47)-(48), on the one hand, and (49), on the other, follows from the way the CHL system interacts with the different categories of the pronominal items, and the manner in which these items are mapped to the phonological interface. This is a welcome outcome.

Consider now, by way of comparison, how the present proposal accounts for the data in (4)-(5), repeated below as (50)-(51).

(50)   a.   [*Every boy*'s mother] loves *him*
         b.   [Someone in *every city*] hates *it.*

(51)   a. $^{?*}$*His* father loves [*every boy*'s mother]
         b. $^{?*}$*It*s mayor loves [someone in *every city*]

In light of findings by Sauerland (2005), showing that DP is not a scope-island, we can just assume that the quantifier can raise out of the DP in these example to be merged at some position in the matrix clause. Although that result is not possible within an A-binding approach, it is unproblematic to the present account, which does not make any use of co-indexing or stipulate any condition on binding. All we need to do is assume that in these examples as well, the pronoun is merged with the same noun of its antecedent DP. The examples in (50) are then acceptable for familiar reasons, namely because the pronoun, by being buried inside the domain of *love*, a phase head, will be invisible to a procedure scanning the structure for compliance with the LCA at the level of the upper phase. The situation is different, however, for the examples in (51), here the pronoun is in the Spec of the subject possessive DP, a position that is accessible to inspection taking place at the level of the CP phase.

5   Conclusion

There are some open questions that unfortunately I cannot address in this article. In evaluating the current proposal, however, the reader should have in mind what we have accomplished and how we have done it. The proposal succeeds in accounting for the data in (25)-(33), which, as we saw, could not be accommodated under any of the previous proposals discussed in the article. At the same time, we have seen that the analysis defended here can also account for the classical crossover contrast in (39) and the recalcitrant data in (50)-(51), thereby achieving a greater empirical coverage than previous approaches. Such an achievement, however small, has been gained without invoking any special principle specific to binding and attributed to universal grammar. No complication of the syntax and/or the semantics has been proposed either. Rather, the present proposal explains the cross-linguistic variation of the WCO effect, by appealing to the different grammatical properties of pronominal lexical items; the way the C_{HL} interacts with such items; and the way the C_{HL} maps domains containing such items to the phonological interface. Chomsky (2004) call explanations achieved by sole recourse to the mechanics of the language faculty, as I have tried to do in this article, *principled*. I know that the current proposal must be examined more extensively. I lack the space and time to that here, but I hope to have at least

sketched the beginning of the properties required by an understanding of the WCO phenomena beyond explanatory adequacy.

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