

Control into infinitival relatives¹

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Abstract

This paper focuses on a novel English construction involving control and infinitival relatives. Examples such as *this is John's book to read* have a head noun (*book*) modified by an infinitival relative clause (*to read*) and a prenominal possessor (*John's*). I argue that there is a control relation between the prenominal possessor and the PRO subject of the infinitival relative. I show that this control relation bears the structural hallmarks of obligatory control whilst at the same time permitting PRO to be interpreted as arbitrary. I discuss these empirical facts in the context of a syntactic, Agree-based theory of control.

Keywords: control, infinitival relative clause, prenominal possessor, PRO

1 INTRODUCTION

This paper focuses on examples like (1), which to my knowledge have not been described or studied before.

- (1) (a) This is John's book to read.
 (b) That is the school's decision to make.
 (c) This is her game to lose.

I argue that these contain examples of infinitival relative clauses (henceforth, IRCs) and are interesting because of the relationship between the prenominal possessor attached to the RC head (i.e. the nominal modified by the IRC) and the IRC subject (i.e. a null PRO). The examples in (1) all have salient readings where the IRC subject is interpreted as co-referential with the prenominal possessor. I argue that this is a case of control and passes the structural diagnostics for Obligatory Control. However, these constructions also permit an interpretation where the IRC subject is interpreted as arbitrary (easier for some examples than for others). In other words, the IRC PRO subject is interpreted either as being controlled by the prenominal possessor or as arbitrary (other interpretive options are not permitted).

The two major theoretical questions are: (i) how is this control relation established, and (ii) why can PRO be either controlled or arbitrary but nothing else? Question (i) is particularly relevant for syntactic theories of control since there is no obvious control predicate in the examples in (1), thus suggesting that control can be established entirely within the syntax independent of any 'control semantics'. Adopting the recent proposal of McFadden & Sundaesan (2016), I will propose an Agree-based analysis of control into IRCs, according to which an (indirect) Agree relation between the prenominal possessor and the IRC subject is obligatorily established provided that the relevant structural conditions on Agree (namely, c-command and locality) are met. If such conditions are not met, Agree fails and the arbitrary interpretation of PRO arises as a default. This provides the beginnings of an answer to question (ii), but raises the more specific question of exactly what causes Agree to fail. I argue that the c-command relations between the prenominal possessor and the IRC subject are identical for both interpretations of PRO. The problem thus seems to lie with the locality condition.

The structure of this paper is as follows: in Section 2, I show that the examples in (1) are genuinely IRCs and not superficially similar-looking purposive clauses. In Section 3, I show that these examples exhibit the structural hallmarks of Obligatory Control, yet interpretively permit both a controlled and an arbitrary reading of PRO. In Section 4, I discuss these empirical findings in the context of an Agree-based analysis of control. Section 5 concludes.

2 INFINITIVAL RELATIVE CLAUSES OR PURPOSIVE CLAUSES?

Let us take (1a) as the main illustrative example. Strings similar or identical to *John's/the book to read* etc. are also found in purposive contexts, i.e. in Rationale Clauses (RatCs) and Purpose Clauses (PurCs). However, I will show that examples like (1) are unambiguously IRCs.

RatCs and PurCs are illustrated in (2) and (3) respectively:

(2) RatCs

- (a) I bought John's/the book to read it.
- (b) I bought John's/the book in order to read it.

(3) PurCs

- (a) I bought John's/the book to read.²
- (b) *I bought John's/the book in order to read.

These two types of purposive clause differ in various ways (see Faraci 1974; Jones 1991; Nissenbaum 2005). First, RatCs cannot contain a gap (unless one counts PRO), hence the object pronoun *it* in the infinitival clauses in (2a), whilst PurCs obligatorily have a gap bound to the matrix object (or the matrix subject of a copular sentence), as in (3a). Second, RatCs are compatible with *in order*, as (2b) shows, whilst PurCs are not, as in (3b). It is widely known that there is control into RatCs and PurCs (see, e.g., Bach 1982; Jones 1991; Landau 2000, 2013), i.e. the PRO subject of *read* in the infinitival clause of the examples above is interpreted as being co-indexed with the matrix subject *I*.

However, various pieces of evidence show that examples such as (4) are unambiguously IRCs, not RatCs or PurCs.

(4) This is John's/the book to read.

First, IRCs are compatible with *wh*-relative pronouns, as in (5), whilst RatCs and PurCs are not, as in (6) (see Faraci 1974). Note that in English IRCs, a *wh*-relative pronoun obligatorily pied-pipes a preposition.

(5) IRC

This is John's/the book in which to write his thoughts and feelings.

² Note that this string is ambiguous between a PurC and IRC, though my consultants more readily interpret it as a PurC out of context. The PurC and IRC interpretations can be distinguished by the diagnostics illustrated below, among others. I will use this example on its PurC interpretation (I claim that PRO cannot be interpreted as *I* on its IRC interpretation, see fn. 5 below).

(6) RatC/PurC

*I bought John's/the book (in order) in which (in order) to write my thoughts and feelings.

Second, in English, IRCs (and finite relative clauses too) do not generally permit resumptive pronouns in the IRC-internal position corresponding to the RC head. Furthermore, they are incompatible with *in order*.

(7) *This is John's/the book (in order) to read it.

The ungrammaticality of (7) thus shows that examples like (4) are not RatCs.

Third, IRCs differ from RatCs/PurCs in their linear ordering with respect to finite relative clauses (RCs). When a finite RC and IRC co-occur, the IRC precedes the finite RC, but when a finite RC and RatC/PurC co-occur, the RatC/PurC follows the finite RC (see Jones 1991: 49). Applying this diagnostic shows that examples like (4) pattern with IRCs, not RatCs/PurCs.

(8) IRCs

- (a) This is John's/the book [to read] [that you were about to sell].
- (b) ??This is John's/the book [that you were about to sell] [to read].

(9) RatCs

- (a) ??I bought John's/the book [(in order) to read it] [that you were about to sell].
- (b) I bought John's/the book [that you were about to sell] [(in order) to read it].

(10) PurCs

- (a) ??I bought John's/the book [to read] [that I was about to sell].
- (b) I bought John's/the book [that I was about to sell] [to read].

Fourth, the antecedent of a RatC/PurC can be a proper name or a pronoun, whilst the RC head of an IRC cannot (see Faraci 1974; Bach 1982; Jones 1991).

(11) IRCs

- (a) *This is **it/The Hobbit** to read.
- (b) *This is **Bill** to talk to.
- (c) *This is **Bill** to whom to talk.

(12) RatCs

- (a) I bought **it/The Hobbit** (in order) to read it.
- (b) I brought **Bill** (in order) to talk to him.

(13) PurCs

- (a) I bought **it/The Hobbit** to read.
- (b) I brought **Bill** to talk to.

These differences can be accounted for through differences in the attachment site of IRCs vs. RatCs/PurCs. IRCs, like restrictive RCs generally, modify the RC head NP. The determiner attached to the RC head, however, scopes over the RC head and IRC, i.e. it is a so-called external determiner (see Kayne 1994; Bianchi 1999; Aoun & Li 2003; Salzmann 2006; among many others). In other words, IRCs modify NPs rather than DPs and are thus DP-internal. Assuming that proper names and (referential) pronouns are DPs (Longobardi 1994; among many others), this accounts for why IRCs cannot modify proper names or pronouns. In contrast, RatCs and PurCs are DP-external (see Faraci 1974; Jones 1991; Nissenbaum 2005 for more detailed discussion) and so can have proper name or pronominal antecedents.

Differences in attachment site may also account for the linear ordering facts seen in (8)–(10). Being DP-external, RatCs and PurCs are hierarchically higher than restrictive finite RCs, which are DP-internal, and so cannot linearly intervene between a finite RC and its RC head. What about the linear ordering between IRCs and restrictive finite RCs since both of these structures are DP-internal? Cinque (2010: 62–3) observes that restrictive finite RCs are merged very high in the nominal structure, higher than reduced RCs, though not as high as non-restrictive finite RCs. If it is the case that larger RC structures are generally merged higher in the nominal structure than smaller RC structures, and if IRCs are typically smaller than finite RCs (as I have independently argued, see Douglas 2016), it follows that IRCs are hierarchically closer to the RC head than finite RCs. Adopting roll-up movement, one can then account for the fact that IRCs appear linearly closer to the RC head than finite RCs, both following the RC head.

To summarise, this section has provided several pieces of evidence showing that examples of the form in (4), repeated below, are IRCs rather than RatCs/PurCs.

(14) (a) This is John's/the book to read.

- (b) This is John's/the book in which to write his thoughts and feelings.

The strings *John's/the book to read* and *John's/the book in which to write his thoughts and feelings* may be interpreted as involving IRCs in other contexts too, but those contexts often seem to raise independent difficulties. For example, my consultants generally rejected examples like (15a) on the IRC interpretation, saying that it could only be interpreted as involving a PurC. Interestingly, replacing the matrix predicate with one inappropriate for a PurC interpretation did not improve matters for many of my consultants, i.e. many rejected examples like (15b) as nonsensical, suggesting they were not entertaining an IRC interpretation in these contexts at all.

- (15) (a) I bought John's/the book to read.
 (b) (#)I sold John's/the book to read.

I believe that this may be a blocking effect. As an anonymous reviewer points out, adding a *wh*-relative pronoun unambiguously marks the structure as an IRC.

- (16) I sold John's/the glue with which to fix the broken chair.

Nonetheless, to avoid potential interpretive difficulties, I will adopt examples of the form in (14) throughout the rest of the paper.

3 CONTROL

I argue that in cases where the IRC subject is co-referential with the prenominal possessor, we are dealing with a control relation. Furthermore, evidence shows that this relation bears the structural hallmarks of Obligatory Control. However, as pointed out in the introduction, co-reference between the IRC subject and prenominal possessor is not obligatory since PRO may also be interpreted as arbitrary.

3.1 *Is it control?*

PRO is always a subject. If we are dealing with control, we predict that the possessor can only be interpreted as the IRC subject and never as any internal argument of the IRC (unless that internal argument is a derived subject). This prediction is borne out. Consider the following:

- (17) (a) This is the book (for John) to read to Mary.
 (b) This is John's book to read to Mary.
 (c) *This is Mary's book (for John) to read to.
- (18) (a) That is the general (for the Emperor) to give a slave to.
 (b) ?That is the Emperor's general to give a slave to.
 (c) *That is the slave's general (for the Emperor) to give to.
- (19) (a) This is the patient (for the new surgeon) to operate on.
 (b) This is the new surgeon's patient to operate on.
 (c) #This is the patient's new surgeon to operate on.
- (20) (a) This is the man to fix the sink.
 (b) *This is the sink's man to fix.

The (a) examples are the baseline IRCs without prenominal possessors. (17b), (18b) and (19b) show that the prenominal possessor can easily be interpreted as the IRC subject. In contrast, (17c) shows that the prenominal possessor cannot be interpreted as the IRC indirect object. Similarly, (18c) shows that the prenominal possessor cannot be interpreted as the IRC direct object (see also (20b)), and (19c) is odd precisely because world knowledge tells us that surgeons operate on patients and not vice versa. It thus looks as if we are dealing with a control relation, i.e. the prenominal possessor is capable of controlling the IRC subject PRO.

A clear consequence is that this control interpretation should be impossible in subject IRCs, as in (20b), since the IRC subject position (standardly taken to be an A'-variable) is linked with the RC head, not the prenominal possessor attached to the RC head. The same reasoning applies to passivised IRCs, which involve derived subjects.

(21) This is John's book to be read.

Even if one considers the subject gap of a subject IRC to be PRO rather than an A'-variable (see Bhatt 1999), PRO will be interpreted as the RC head *book* and not as the prenominal possessor *John*. The prenominal possessor cannot be interpreted as the implicit external argument of *read* either, consistent with a control analysis. Consequently, subject IRCs are excluded from the present paper. Subsequent references to IRCs thus refer exclusively to non-subject IRCs unless otherwise stated.

So far, I have simply been assuming that there is a PRO subject in IRCs. That PRO is present in IRCs is plausible for *wh*-IRC, i.e. IRCs introduced by an overt *wh*-relative pronoun (with obligatory preposition pied-piping), since the presence of the *wh*-relative pronoun is standardly taken to indicate the presence of at least some portion of the C-domain (see Douglas 2016 for further discussion) and hence the presence of a subject in SpecTP. It is not immediately obvious whether \emptyset -IRC, i.e. IRCs introduced by neither a *wh*-relative pronoun nor the complementiser *for*, should have a PRO subject. Douglas (2016: chapter 3) proposes that \emptyset -IRC may lack a C-domain altogether, but does not make any claims about whether \emptyset -IRC have a full T-domain or not. However, the relation between the prenominal possessor and IRC subject does not seem to be affected by the presence or absence of a *wh*-relative pronoun. I take this to indicate that both *wh*-IRC and \emptyset -IRC have a PRO subject. Note that in standard English, PRO and subject traces are not permitted with the complementiser *for*. *For*-IRC, i.e. IRCs introduced by the complementiser *for*, are thus incompatible with the phenomenon at issue.³

Further evidence for the presence of PRO in both *wh*-IRC and \emptyset -IRC comes from the fact that anaphors are permitted in IRCs.

³ In varieties where *for* can appear without an overt subject in subject position, e.g. Belfast English, we might expect *this is John's book for to read* to be possible, all else being equal.

- (22) (a) These are the sweets on which PRO_i to gorge yourselves_i.
 (b) These are the sweets PRO_i to share with each other_i.

Successful binding of anaphors in IRCs suggests that the IRC subject is a PRO, rather than an implicit argument, since implicit arguments cannot bind (see Wurmbrand 2001).

To summarise, focusing exclusively on non-subject IRCs, the data show that a prenominal possessor can be interpreted as the IRC subject but not as any other IRC-internal argument. I thus conclude that the relation between the prenominal possessor and the IRC subject is one of control.

3.2 *OC or not?*

Since Williams (1980), a distinction has been made between Obligatory Control (henceforth, OC) and Non-Obligatory Control (henceforth, NOC) (see Landau (2000, 2013) for a thorough overview of approaches to control and for extensive discussion of various OC/NOC diagnostics that have been proposed).

For concreteness and because they are widely recognised and adopted, I will use the OC/NOC diagnostics given in Landau (2000: 31):

(23) The OC/NOC Categories

- (a) Arbitrary Control is impossible in OC, possible in NOC.
 (b) Long-distance Control is impossible in OC, possible in NOC.
 (c) Strict reading of PRO is impossible in OC, possible in NOC.
 (d) *De re* reading of PRO is impossible in OC (only *de se*), possible in NOC.

These diagnostics are illustrated below for canonical control cases. The examples in (24)–(27) are (slightly adapted) from Landau (2000: 34–6).

(24) shows that PRO can be interpreted as arbitrary in NOC but not in OC contexts, and (25) shows that long-distance control is possible in NOC but not in OC contexts.

(24) Arbitrary Control

- (a) John tried [PRO_{John/*arb} to be quiet]. (OC)
 (b) It is dangerous for babies [PRO_{arb} to smoke around them]. (NOC)

(25) Long-distance Control

- (a) *Mary knew that John dared [PRO_{Mary} to perjure herself]. (OC)
 (b) John said that Mary thought that [PRO_{John} shaving himself] would bother Sue. (NOC)

(26) shows that, under ellipsis, the strict reading of PRO is possible in NOC but not in OC contexts (elided material is demarcated by angled brackets).

(26) Strict reading of PRO

- (a) John tried [PRO_{John} to leave early], and Bill did <try [PRO_{Bill/*John} to leave early]> too. (OC)
- (b) John thinks that [PRO_{John} feeding himself] will be difficult, and Bill does <think that [PRO_{John/Bill} feeding himself] will be difficult> too. (NOC)

Finally, (27) shows that the *de re* reading of PRO is possible in NOC but not in OC contexts (where only the *de se* interpretation is available).

(27) *De re* vs. *de se*

Context: an amnesiac sees a TV programme describing his own exploits and is impressed by that person's courage thinking him worthy of a medal, though he does not realise he himself is that person.

- (a) The amnesiac expects that he will get a medal.
- (b) The amnesiac believes that [PRO getting a medal] would be boring. (NOC)
- (c) The amnesiac expects [PRO to get a medal]. (OC)

(27a, b) are true in the context given, but (27c) is false. This shows that PRO in (27c), the OC example, must be interpreted *de se* (and cannot be interpreted *de re*), whilst in (27b), the NOC example, PRO can be interpreted *de re*.

I now turn to our IRC examples, applying Landau's diagnostics where applicable to see whether the control relation between the pronominal possessor and IRC subject is one of OC or NOC. As will be seen, the results are intriguingly conflicting.⁴

Turning first to the *de re/de se* diagnostic, this is impossible to test with IRCs. The *de re/de se* diagnostic requires the presence of an attitude predicate between the controller and PRO. In our examples, the pronominal possessor is directly attached to the RC head which is directly modified by the IRC. It is thus impossible to construct examples with an attitude predicate between the pronominal possessor and the IRC subject PRO.

Now consider strict/sloppy interpretations. As shown in (28), the strict reading of PRO is impossible in IRCs, i.e. PRO can only be interpreted sloppily under ellipsis.

(28) This is John's book to read and that is Mary's.

- (a) This is John's book to read and that is Mary's <book PRO_{Mary} to read>.
- (b) *This is John's book to read and that is Mary's <book PRO_{John} to read>.

This holds even in a context where, for example, various people (including Mary) are choosing books for John to read. To express such an interpretation, an overt subject with

⁴ All examples have been judged by at least four native speakers of (British) English.

for is required, as in (29) with the structure in (30). In such cases, the overt subject is in the antecedent of the ellipsis.

(29) This is John_i's book for him_i to read and that is Mary's.

(30) This is John_i's book for him_i to read and that is Mary's <book for him_i to read>.

The evidence from (28) thus strongly suggests that the relation between the prenominal possessor and the IRC PRO subject is OC.

Now consider long-distance control. As (31) shows, long-distance control is impossible in IRCs.

(31) (a) This is John's book PRO_{John} to read (to himself).

(b) Mary said this is John's book PRO_{John/*Mary} to read (to himself/*herself).

(c) Mary and Julie said this is John's book PRO_{John/*Mary and Julie} to read (to himself/*each other).

This holds even in a context where, for example, John has chosen a book for Mary (or Mary and Julie) to read. Again, to express such an interpretation, an overt subject with *for* must be used instead.

(32) (a) Mary_i said this is John's book for her_i to read (to herself_i).

(b) [Mary and Julie]_i said this is John's book for them_i to read (to each other_i).

This diagnostic thus also suggests that we are dealing with OC. If the reference of PRO were free, the long-distance restriction would be unexpected.⁵

⁵ An anonymous reviewer claims that it is possible to get long-distance control in the following three examples, thus suggesting that long-distance control of the IRC subject across a prenominal possessor attached to the RC head is possible:

(i) I_i think that this is my grandma's pie [PRO_i to prepare for myself].

(ii) The mechanic_i mistakenly thought that it was my (not your) car [PRO_i to repair].

(iii) Mary_i found Kafka's novel [PRO_i to read].

I have been unable to replicate the reviewer's judgements for (i) and (ii): my consultants uniformly reject (i) and find (ii) marginal at best. These examples can be made perfectly acceptable under the intended interpretations either by using an overt subject with *for*, as in (iv) and (v), or by changing the IRC into a subject IRC, as in (vi) and (vii). In any case, however, we would no longer be dealing with control (see Section 3.1).

(iv) I_i think that this is my grandma's pie [for me_i to prepare for myself].

The diagnostics so far suggest that prenominal possessor control into IRCs is an instance of OC, not NOC. Before moving on to the final diagnostic, let us consider a few predictions that are made if we are dealing with OC.

First, if OC is at stake, we would expect c-command to be relevant, i.e. if the prenominal possessor controls the IRC subject, we would expect that it must c-command the IRC subject.⁶ This expectation is borne out. Compare the following:

-
- (v) The mechanic_i mistakenly thought that it was my (not your) car [for him_i/her_i to repair].
 - (vi) I_i think that this is my grandma's pie [to be prepared (by me) for myself].
 - (vii) The mechanic_i mistakenly thought that it was my (not your) car [to be repaired (by him_i/her_i)].

As for (iii), my consultants agree with the judgement. However, they are not interpreting this structure as an IRC. Although *find* is unintentional and so expected to be incompatible with purposive interpretations, my consultants interpret (iii) as a PurC. I verified this using the diagnostics from Section 2. For example, if (iii) involves an IRC, it should be impossible to replace *Kafka's novel* with a proper name or pronoun whilst retaining the same meaning. However, my consultants accept (viii):

- (viii) Mary_i found The Metamorphosis (Die Verwandlung) PRO_i to read.

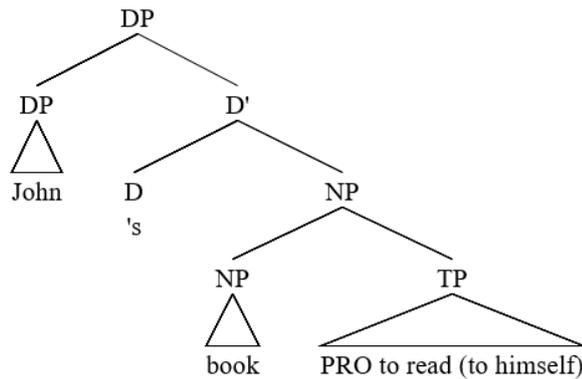
Furthermore, when paraphrasing (iii) as a pseudo-cleft, my consultants accepted (ix) but rejected (x).

- (ix) What Mary_i found PRO_i to read was Kafka's novel.
- (x) *What Mary_i found was Kafka's novel PRO_i to read.

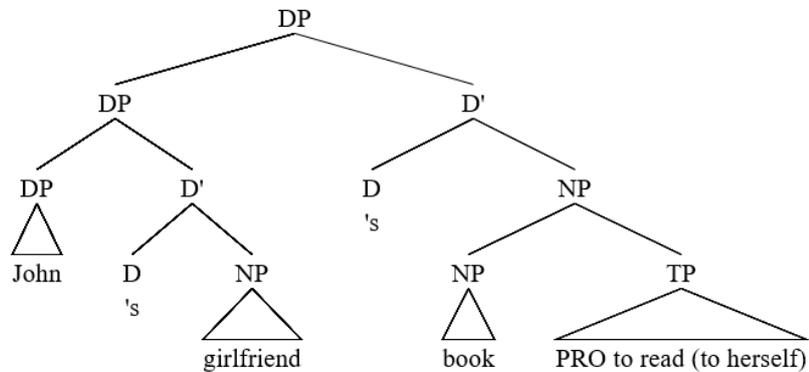
If (iii) involves a PurC, (ix) is correctly predicted to be grammatical as *Kafka's novel* forms a constituent to the exclusion of the infinitival clause, and so can serve as the focal constituent of a pseudo-cleft. Conversely, if (iii) involved an IRC, we would predict (x) to be grammatical as *Kafka's novel to read* would be a constituent and so should be able to serve as the focal constituent of a pseudo-cleft, contrary to fact. This is not to say that the string *Mary found Kafka's novel to read* cannot be interpreted as involving an IRC; the crucial point is that, if it is, *Mary* and PRO cannot be co-indexed. According to my consultants, they can only be co-indexed, as in (iii), under a PurC interpretation.

⁶ As Landau (2000, 2013) points out, strictly speaking PRO need not be c-commanded by the controller itself, but it must nonetheless be c-commanded by the functional head that introduces the controller. This does not affect the arguments here.

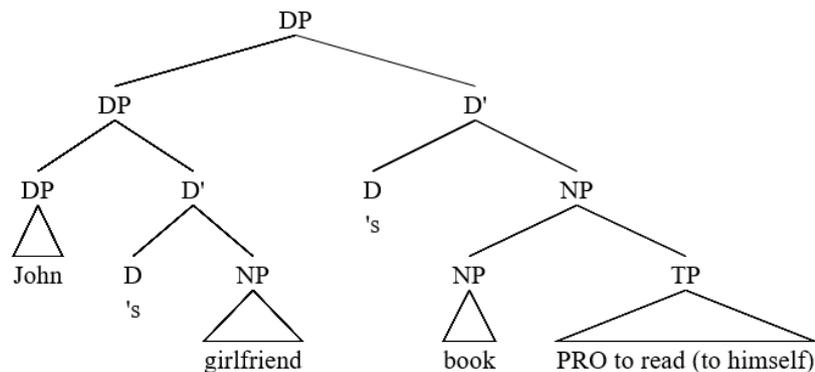
(33) (a) This is John_i's book PRO_{John} to read (to himself_i/*him_i).



(b) This is John's girlfriend_i's book PRO_{John's girlfriend} to read (to herself_i/*her_i).



(c) *This is John_i's girlfriend's book PRO_{John} to read (to himself_i).



The prenominal possessor DP (*John* in (33a) and *John's girlfriend* in (33b)) c-commands PRO and can thus control it, as made clear by the satisfaction of Condition A and the violation of Condition B. However, if the would-be controller is a prenominal possessor embedded inside another prenominal possessor, as *John* is in (33c), this DP fails to c-command PRO and so control cannot be established and the anaphor *himself* cannot be bound, thus violating Condition A.

Note that there is no obvious semantic reason why *John* cannot control PRO in (33c), as this interpretation is perfectly possible with an overt infinitival subject co-referent with *John*.

(34) This is John_i's girlfriend's book for John_i/him_i to read.

The reason thus seems to be purely syntactic.

The importance of c-command can also be seen using postnominal possessors as well, though the argument is somewhat more involved. Consider (35):

- (35) (a) This is John's book to read.
 This is John's book PRO_{John} to read.
 (b) This is the book of John's to read.
 *This is the book of John's PRO_{John} to read.

PRO can be controlled by *John* if *John* is a prenominal possessor, as in (35a), but not if *John* is a postnominal possessor, as in (35b).

Independent evidence from Condition C effects confirms that prenominal possessors attached to the RC head c-command the IRC subject, whilst postnominal possessors do not. The contrast in (36) shows that a prenominal possessor c-commands the IRC subject. Binding conditions are satisfied in (36b), but Condition C is violated in (36a).

- (36) (a) *This is his_i book for John_i to read.
 (b) This is John_i's book for him_i to read.

Evidence involving postnominal possessors is a bit more complicated. First, note that a postnominal possessor version of (36a) does not violate Condition C.

(37) This is that book of his_i for John_i to read.

This is compatible with the idea that the postnominal possessor does not c-command the IRC subject. However, there is a potential confound here. RC heads can generally optionally reconstruct into the IRC in English (see Douglas 2016). Therefore, (37) may be grammatical because the RC head and everything embedded in it (including the postnominal possessor) reconstructs into the IRC to a position c-commanded by the IRC subject. This confound is not present with prenominal possessors, since prenominal possessors (like the external determiner) do not reconstruct into RCs generally in English, i.e. they are external to the constituent containing the RC head and IRC. This is confirmed by the ungrammaticality of (36a); if the prenominal possessor were able to reconstruct with the RC head to an IRC-internal position c-commanded by the IRC subject, a Condition C violation would be avoided and we would expect the example to be

grammatical, contrary to fact. Returning to the issue of postnominal possessors, we thus need an example where the RC head is forced not to reconstruct. Consider the following:

- (38) Context: John has written a book about Mary's adventure, but he is not happy with it and is reluctant to publish it. Mary, however, wants people to know about her adventure and must persuade John to publish it. One can say of the book:
This is the book of his_i about Mary_j's adventure for her_j to persuade John_i to publish.

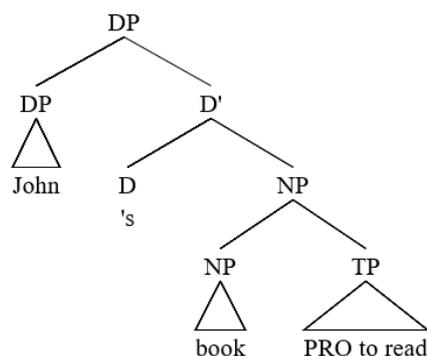
Here, the RC head is *book of his about Mary's adventure*. If it were to reconstruct into the IRC, we would get a Condition C violation since *her* would then c-command *Mary*. Assuming that lack of reconstruction of *Mary* implies lack of reconstruction of the entire RC head and all its modifiers,⁷ this means that *his* is not interpreted in the IRC in (38). Now, *his* can be co-referential with *John* in (38), suggesting that postnominal possessors do not c-command into the IRC. In contrast, if *his* is a prenominal possessor attached to the RC head, it cannot be co-referential with *John*.

- (39) *This is his_i book about Mary_j's adventure for her_j to persuade John_i to publish.

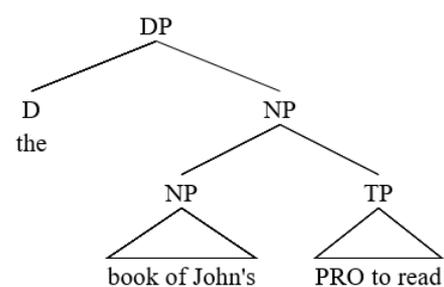
Therefore, controlling for potential reconstruction effects, evidence from Condition C supports the claim that prenominal possessors attached to the RC head c-command the IRC and IRC subject, whilst postnominal possessors do not.

This contrast between prenominal and postnominal possessors falls out reasonably straightforwardly from most analyses of RCs. Consider the following schematic structures (assuming that the RC head does not reconstruct into the IRC):

- (40) (a) John's book to read



- (b) the book of John's to read



⁷ This is the standard assumption in the literature. In Douglas (2016), I suggest that this may be a preference rather than an absolute requirement, since there are cases where partial reconstruction and partial anti-reconstruction in RC contexts occur simultaneously (see also Salzmann 2006).

On reasonably standard assumptions, the external determiner attached to the RC head has no (I)RC-internal representation, supported by the fact that it never reconstructs (see, e.g., Kayne 1994; Bianchi 1999; Aoun & Li 2003; Salzmann 2006, among many others). Furthermore, the external determiner *c*-commands the (I)RC (either because it takes the (I)RC as its complement or because it scopes over both the RC head and the (I)RC; the latter being illustrated here). Now, on the standard assumption that prenominal possessors (except those in compounds such as *men's shoes* or *children's book*) are in SpecDP (see Abney 1987; Alexiadou, Haegeman & Stavrou 2007), prenominal possessors are higher than the external determiner and would thus *c*-command the (I)RC and everything in it, including the IRC subject, as in (40a). Postnominal possessors, however, are contained inside a PP attached to the RC head, as in (40b). They are thus unable to *c*-command out of the PP and out of the RC head, and hence cannot *c*-command into the IRC or control the IRC subject.

These facts also support the claim made above that the reference of the IRC subject PRO is not free. If it were, we might expect accidental co-reference to be possible between PRO and a possessor regardless of the possessor's structural position. These facts thus support the idea that the control relation between the prenominal possessor and the IRC subject is one of OC.

Assuming that partial control is a species of OC (Landau 2000, 2008, 2013), we would also predict partial control readings to be possible in IRC contexts. As the following examples show, this prediction is borne out.

(41) Context: There are tours around the set of the *Fifty Shades of Grey* film. The tour guide is pointing out the various rooms and what Christian Grey uses each room for (censored version!).

(a) This is his room to meet in/This is his room in which to meet.

(b) This is his room to kiss in/This is his room in which to kiss.

(c) This is his room to hug in/This is his room in which to hug.

This is his_i room PRO_{i+} to meet/kiss/hug in.

This is his_i room in which PRO_{i+} to meet/kiss/hug.

All of these examples exhibit partial control, i.e. the referent of PRO properly includes the controller (indicated by the index *i*+). Furthermore, verbs like *hug* (and for many speakers *kiss* as well) do not take comitative arguments in English. This shows that the partial control interpretation is not dependent on a covert comitative argument (*pace* Boeckx, Hornstein & Nunes 2010) at least in English (see also Sheehan 2014; Landau 2016).

Partial control can also be seen in the following example:

(42) A: You had to be at school at 7am?!

B: That was the headmaster's time to gather at! It certainly wouldn't have been mine!

The presence of partial control in IRCs thus supports the results from the structural diagnostics above, namely that we are dealing with OC.⁸

The final OC/NOC diagnostic concerns arbitrary control. Given the evidence for OC that we have seen above, we would expect that PRO cannot be interpreted as arbitrary since PRO_{arb} is impossible in OC contexts by definition. However, it is perfectly possible to have a prenominal possessor attached to the RC head whilst simultaneously interpreting the IRC subject as arbitrary PRO. Consider our by-now familiar example:

(43) This is John's book to read.

We already know that this example has an interpretation where the IRC subject is interpreted as *John*. However, it also has an interpretation where PRO is arbitrary, for example, John may have recommended a book for others to read.⁹ This is represented in (44).

(44) This is John's book PRO_{arb} to read.

On this interpretation it is possible to have a pronoun in the IRC in non-subject position that is co-referential with *John* without triggering a Condition B violation.

(45) This is John_i's book PRO_{arb} to read to him_i.

When *John* does control PRO, a Condition B violation is present, as in (46a). To express such an interpretation, an anaphor satisfying Condition A must be used instead, as in (46b).

- (46) (a) *This is John_i's book PRO_{John} to read to him_i.
 (b) This is John_i's book PRO_{John} to read to himself_i.

Inducing Condition B violations is also considered a strong test for partial control. Consider the following non-IRC OC context:

⁸ As pointed out by an anonymous reviewer, a strong test for partial control is to induce a Condition B violation. I consider this diagnostic shortly below, for reasons that will become apparent.

⁹ For the purposes of this paper, it is only important that a controlled and non-controlled interpretation exist. There is an interesting and important question raised by a reviewer about how the semantic role of the prenominal possessor correlates with the availability of controlled PRO and PRO_{arb}. However, this would require more detailed and systematic investigation than can be afforded to it here, so I leave it for future research.

- (47) (a) John_i wants PRO_{i+} to gather at 6pm.
 (b) *John_i wants PRO_{i+} to gather at 6pm without him_i.

In an OC context, *John* is included in the referent of PRO; co-indexing *John* and *him* thus leads to a Condition B violation. Now, let us consider IRCs. If PRO_{arb} interpretations are available, we would expect that it would be possible for *him* to be co-indexed with *John* on certain interpretations. This prediction is borne out. Consider (48):

- (48) This is John_i's room in which to gather at 6pm without him_i.

According to my consultants, in (48) either *John* is considered to be one of those gathering at 6pm, in which case my consultants report a Condition B violation, or *John* is not considered as such (for example, he may simply have suggested a room for other people to gather in), in which case my consultants report no Condition B violation. I thus take this a further evidence that IRCs permit both partial control and PRO_{arb} interpretations.

We saw above that the strict reading of PRO is impossible under ellipsis, as in (28) repeated below.

- (49) This is John's book to read and that is Mary's.
 (a) This is John's book to read and that is Mary's <book PRO_{Mary} to read>.
 (b) *This is John's book to read and that is Mary's <book PRO_{John} to read>.

A PRO_{arb} interpretation can also be licensed in the ellipsis site, but only if such an interpretation is present in the antecedent, as in (50a, b). Furthermore, a PRO_{arb} interpretation in the antecedent cannot license a controlled-PRO interpretation in the ellipsis site, as in (50c).

- (50) (a) This is John's book PRO_{arb} to read and that is Mary's <book PRO_{arb} to read>.
 (b) *This is John's book PRO_{John} to read and that is Mary's <book PRO_{arb} to read>.
 (c) *This is John's book PRO_{arb} to read and that is Mary's <book PRO_{Mary} to read>.

It is important to note that PRO is interpreted either as co-referential with the pronominal possessor or as arbitrary. As we observed above in relation to long-distance control and strict/sloppy interpretations under ellipsis, the reference of PRO in IRCs is not free. The relevant examples from above are repeated below as (51a, b).

- (51) (a) *This is John's book to read and that is Mary's <book PRO_{John} to read>.
 (b) Mary said this is John's book PRO_{John/*Mary} to read.

If the reference of PRO were free, we would not expect these restrictions since the relevant interpretations would presumably be available through accidental co-reference.

Therefore, we conclude that, in IRCs, PRO can be interpreted either as being controlled by the prenominal possessor or as arbitrary.

To summarise, the structural diagnostics very strongly suggest that we are dealing with OC. However, as far as interpretation is concerned, control is evidently not obligatory. In the next section, I will discuss an approach to this paradoxical state of affairs.

4 ANALYSIS

I assume that control is a syntactic relation. A purely semantic account of control, which would claim that the control relation is established on the basis of the semantics of a control verb/predicate, would be inappropriate for control into IRCs precisely because there is no obvious control verb/predicate and, furthermore, because the control relation between a prenominal possessor and the IRC subject is established entirely within DP, i.e. independently of any matrix predicate semantics.

4.1 *Previous accounts of control by a possessor*

Control into IRCs cannot be assimilated to previous accounts of control by a possessor. Control by a possessor can be seen in so-called logophoric extension contexts and control within nominalisations. Let us first consider logophoric extension contexts. Landau (2000: 109ff.) notes that a controller seems not to be a direct argument of the matrix predicate in a well-defined set of cases. The following examples are taken from Landau (2000: 109–10):

- (52) (a) It would help Bill_i's development [PRO_i to behave himself in public].
 (b) PRO_i finishing his work on time is important to John_i's development.
 (c) PRO_i finishing his work on time is important to John's friends_i.
- (53) (a) *It would help Bill_i's friends [PRO_i to behave himself in public].
 (b) It would help Bill's confidence [PRO to plan his itinerary in advance].
 (c) *It would help Bill's car [PRO to plan his itinerary in advance].
 (d) [PRO causing an uproar] is important for John's career.

Landau notes that the class of nouns that can contain the controller (as a possessor) is quite small and denotes abstract notions reflecting the individuality of the controller via actions, characters traits or social attributes (Landau 2000: 110). This class contains nouns like *career*, *status*, *confidence*, *performance*, *development*, *image*, *reputation*, *behaviour*, etc. When a prenominal possessor denoting an individual, X, is attached to one of these nouns, Landau calls the result the *logophoric extension of X*. Landau (2000: 111) suggests that the class of logophoric extensions could be assimilated to the class of inalienably possessed nouns: these nouns do not introduce new individuals to the discourse, but rather

highlight some aspect of the individual denoted by the possessor. Consequently, Landau suggests that such nouns do not block the index of the possessor (or, alternatively, such nouns inherit the index of their possessors) and so, in a way, the possessor can be considered an argument of the matrix predicate. However, our IRC examples are not amenable to a similar analysis since the prenominal possessor can control the IRC subject regardless of whether the RC head belongs to the class of logophoric extensions or not.

Now let us consider control within nominalisations. This is potentially more relevant since, in our examples, the possessor controls PRO within the DP projected by the external determiner. Hornstein (2003), cited in Landau (2013: 215), notes that possessors can be related to their head nouns in a number of different ways. In some cases, it looks as if we can choose between OC and NOC, which is particularly interesting from our perspective. Consider (54) (Landau 2013: 215):

(54) [John_i's plan [PRO_{j≠i} to bury him_i in the pit]] just won't work.

(54) can have an interpretation where PRO is disjoint in reference from *John* (ensured by the Condition B effect that would otherwise arise), showing that PRO is not obligatorily controlled by the possessor. However, Landau points out a potential confound. This interpretation relies on *John* not being interpreted as the thematic agent of *plan*, but in such cases, *plan* has a result reading rather than an eventive/process reading. Consequently, in such cases, *plan* does not take genuine arguments. Landau concludes that there is OC within DPs in derived nominals on their event readings (parallel to clauses) but not on their result readings.

However, in our examples, we cannot make recourse to an event vs. result distinction to account for the controlled-PRO vs. PRO_{arb} alternation that we observed above because the RC head is clearly not necessarily eventive and need not be a nominalisation of a canonical control predicate at all, as (55) shows.

(55) This is John_i's book to read to him_i.

This example also forces disjoint reference between the prenominal possessor and PRO, i.e. in this example PRO cannot be interpreted as *John* and must be interpreted as arbitrary. However, unlike in (54), this is not plausibly related to any result vs. eventive ambiguity relating to the RC head *book*. I thus conclude that previous accounts of control by a possessor cannot be extended to control into IRCs by a prenominal possessor.

4.2 *Against a movement account*

Control into IRCs would be problematic for any purely movement-based account (e.g. Hornstein 1999; Manzini & Roussou 2000; Boeckx, Hornstein & Nunes 2010) which attempts to say that the prenominal possessor has moved out of the IRC to its surface position.

First, movement out of IRCs with *wh*-relative pronouns is prohibited.

- (56) (a) This is John's book in which to write a message.
 (b) *What (kind of message) is this John's book in which to write?
 (c) *the message that this is John's book in which to write

It therefore seems unlikely that the IRC subject has moved out of an IRC with a *wh*-relative pronoun to become the prenominal possessor. Furthermore, recall that partial control into IRCs with *wh*-relative pronouns is permitted. As pointed out by Landau (2003), partial control is very difficult to capture on a movement account of control. Furthermore, as pointed out above, whilst exhaustive control and a covert comitative might give the illusion of partial control (Boeckx, Hornstein & Nunes 2010), this analysis has been argued to be incorrect for English at least (Sheehan 2014; Landau 2016).

The situation with IRCs without a *wh*-relative pronoun is potentially more debatable. In some cases, extraction from within the IRC is permitted, but in other cases it is not. In general, it seems that if the resulting configuration involves a nested dependency, the result is fine (at least for some speakers), but if it involves a crossing dependency, the result is degraded or ungrammatical.¹⁰ Consider the following examples:

- (57) (a) This is John's book to give to that student.
 (b) Which student is this John's book to give to?
 (c) To which student is this John's book to give?
 (d) the student who/that this is John's book to give to
 (e) the student to whom this is John's book to give
- (58) (a) This is John's message to write in that book.
 (b) Which book is this John's message to write in?
 (c) the book that this is John's message to write in

In (57) and (58), the direct object of the infinitival clause has been relativised. As the data show, extracting a prepositional object from the IRC is fine. Configurationally, in such examples the IRC relativisation chain is nested within the chain formed by movement of the prepositional object, i.e. there is a nested dependency.

If, however, the prepositional object of the infinitival clause is relativised, and one tries to extract the direct object from the IRC, as in (59) and (60), the result is degraded or ungrammatical.

¹⁰ This nesting vs. crossing contrast is also found in other infinitival null-operator constructions, such as *tough*-constructions.

- (59) (a) This is John's student to give that book to.
 (b) ?/*Which book is this John's student to give to?
 (c) ?/*the book that this is John's student to give to
- (60) (a) This is John's book to write that message in.
 (b) ?/*Which message is this John's book to write in?
 (c) ?/*the message that this is John's book to write in

Configurally, the chain formed by movement of the direct object crosses over the IRC relativisation chain, i.e. there is a crossing dependency.

Importantly, if one were to extract the IRC subject from the IRC, it would always cross the IRC relativisation chain and hence would always result in a crossing dependency. We would thus expect the result to be degraded or ungrammatical, contrary to fact.

I thus conclude that the control relation between a prenominal possessor and the IRC subject is not established by movement.

4.3 *An Agree-based account*

I will assume that the control relation is established by the operation Agree.¹¹ Agree directly between the controller and PRO yields exhaustive control, whilst Agree between the controller and PRO that is mediated by the C-domain of the infinitival clause yields partial control (Landau 2004, 2008, 2013, 2015).

- (61) (a) DP_{controller} ... [PRO ...] (exhaustive control)
 (b) DP_{controller} ... [C [PRO ...]] (partial control)

Since control into IRCs permits partial control, I will assume that the Agree relation between the prenominal possessor and PRO is mediated by a C-domain head in the IRC.¹²

¹¹ As pointed out by an anonymous reviewer, there is a worry about allowing Agree to look into adjuncts (such as IRCs), which are generally islands. However, as shown in Section 4.2, the islandhood of IRCs is not a simple matter, extraction being permitted in at least some instances (see Truswell 2007a; b for further instances of extraction from certain adjuncts in English). Furthermore, although IRCs are traditionally considered to be adjuncts, in many recent syntactic analyses of relative clauses, especially since Kayne (1994), relative clauses are analysed as complements of the external determiner D, in which case we would have Agree between the possessor in SpecDP and a C head in the complement of D.

¹² It is standardly assumed that relativisation involves movement into the C-domain (see Douglas 2016 for more discussion), hence we have independent reasons for thinking that IRCs would exhibit the structure in (61b) rather than (61a).

Following McFadden & Sundaresan (2016), I will assume that OC PRO, NOC PRO, PRO_{arb} and definite *pro* are manifestations of the same underlying minimal pronoun (UPro). As a minimal pronoun, UPro is maximally underspecified, i.e. contains only unvalued features, when it enters the derivation. Assuming its unvalued features must be valued at Spellout, UPro must enter an Agree relation. According to McFadden & Sundaresan, OC PRO, NOC PRO and *pro* are all consequences of UPro entering into an Agree relation: OC PRO results when UPro Agrees with a matrix controller, NOC PRO results when UPro Agrees with a perspective-holder in the left-periphery of the infinitival clause, and *pro* results when UPro Agrees with a null topic in the left-periphery. As for PRO_{arb}, McFadden & Sundaresan propose that, if UPro fails to Agree with an antecedent, the derivation does not crash (see Preminger 2014) and UPro receives a default PRO_{arb} interpretation. In other words, PRO_{arb} is the elsewhere case and only arises where Agree fails to be established.

I have claimed above that PRO in IRCs is either controlled or interpreted as PRO_{arb}, i.e. NOC PRO and *pro* are unavailable in English. The absence of *pro* is perhaps unsurprising for English given that it is a non-*pro*-drop language. Furthermore, I have independently argued in previous work that English IRCs (and English RCs more generally) do not permit topics in their C-domains (Douglas 2016), i.e. UPro cannot Agree with a null topic in English and hence *pro* will not arise in IRCs. As for the absence of NOC PRO, we would have to say that IRCs do not contain a perspective holder in the left-periphery. Generally, if there is a perspective holder, we would expect only mind-possessing subjects to be possible, since only minds can hold perspectives. If, however, a perspective holder is absent, both mind-possessing and mind-lacking subjects should be possible. As (62) shows, it appears to be possible to have a mind-lacking controller.

(62) Context: A landscape gardener is designing an elaborate rock garden with several waterfalls and rivulets. The gardener takes the client to the proposed site of the rock garden and explains where various things will be, including where the water will be flowing. The gardener can indicate the proposed path of the water by saying:

- (a) This will be the water's path to flow down.
- (b) This will be the water's path down which to flow.
- (c) This will be the water's path to follow.

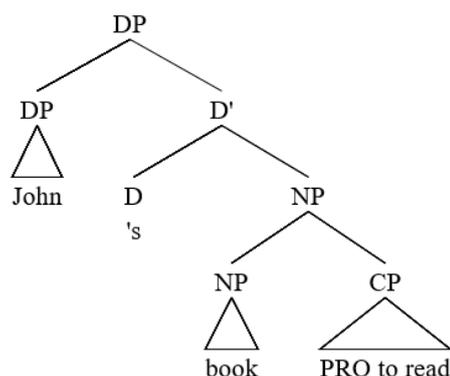
Water is not mind-possessing yet it can still serve as the controller of the IRC PRO, thus suggesting that there is no perspective holder in an IRC and hence accounting for the absence of NOC PRO.¹³

¹³ UPro may be able to agree with syntactically represented speech act participants. Recall (22a), repeated as (i):

- (i) These are the sweets on which PRO_i to gorge yourselves_i.

We can now turn to the analysis of controlled-PRO and PRO_{arb}. Let us first consider IRCs where the prenominal possessor *does* control PRO, i.e. when a (mediated) Agree relation is established between the prenominal possessor and UPro. For this to happen, the prenominal possessor must (i) c-command UPro, and (ii) be local to UPro. That UPro is c-commanded by the prenominal possessor was demonstrated above, so I will focus here on the issue of locality, which I will assume is defined in phasal terms. Consider again the following structure (note that the IRC is now illustrated as having at least part of a C-domain given the framework adopted above):

(63) John's book to read



For *John* to be able to control PRO, there can be no phase boundary between them (where phase boundary means the maximal projection of a phase head). Infinitival clauses in canonical control contexts are generally considered not to be phasal because they lack all or part of the C-domain (see, e.g., Landau 2015). More specifically relating to IRCs, recall from (57) and (58) that extraction out of IRCs is possible provided that nested dependencies are involved. As pointed out by an anonymous reviewer, assuming that the ‘phase’ edge is occupied by the relative operator, the fact that extraction is still permitted suggests that IRCs cannot be phases. In addition, in previous work I have independently argued that IRCs either lack the C-domain or only contain a truncated C-domain (Douglas 2016), so may not be phasal. One piece of evidence in favour of this comes from Distinctness effects. Richards (2010) proposes that the reason *wh*-relative pronouns must pied-pipe a preposition in IRCs, as shown in (64), but not in finite RCs, as shown in (65), is due to Distinctness.

- (64) (a) The book in which to write is there.
 (b) *The book which to write in is there.

In such cases, PRO may be controlled by the addressee in a discourse/performative domain in the left periphery. I leave this possibility aside for future research.

- (65) (a) The book in which you should write is there.
 (b) The book which you should write in is there.

Distinctness says that two categories of the same type cannot be in the same Spellout domain because they will be unlinearisable. Adapting the details of Richards' exact analysis slightly (see Douglas 2016 for discussion), Richards proposes that the RC head and *wh*-relative pronoun are in the same Spellout domain in IRC contexts and so cannot both be DPs. To avoid this problem, the *wh*-relative pronoun pied-pipes a preposition, i.e. it is a PP. Because P is phasal in English, the DP *wh*-relative pronoun and the DP RC head are no longer in the same Spellout domain, and the structure can be successfully linearised. In contrast, *wh*-relative pronouns in finite RC contexts do not have to pied-pipe a preposition. Richards proposes that this is because finite RCs have a phase boundary. Consequently, the RC head and *wh*-relative pronoun will always be in separate Spellout domains in finite RC contexts. Exact details aside, the important claim is that there is no phase boundary at the left edge of an IRC.¹⁴

English D is commonly assumed to be a phase head (see, e.g., Bošković 2014) and the prenominal possessor is standardly taken to occupy SpecDP in English. Elements in the phase edge may form Agree relations with elements in the phase head's complement. Furthermore, recall that restrictive RCs (including IRCs) modify NPs, which are considered to be non-phasal in English (Bošković 2014). Consequently, we would not necessarily expect there to be a phase boundary between the prenominal possessor and PRO (though see below). These considerations lead us to expect that the prenominal possessor and PRO are local in the phase-theoretic sense.

I will thus assume that UPro Agrees with a C head and that this C head Agrees with the prenominal possessor in SpecDP.¹⁵ Because there is no phase boundary between SpecDP and UPro, UPro can be valued by the prenominal possessor via the C head. I will set aside the interesting question of which C head this is and what its properties are for future research. Landau (2015), for example, draws a very tight connection between this C-position and logophoricity. However, if my characterisation of the IRC data is correct

¹⁴ Note that the prenominal possessor in SpecDP is in the phase edge; it is not in the same Spellout domain as the RC head or any *wh*-relative pronoun. Consequently, there is no Distinctness effect between these elements. As for PRO, since linearisation is concerned with overt elements and PRO is null, a PRO DP may exist in the same Spellout domain as another DP without triggering Distinctness effects.

¹⁵ If one assumes a raising or matching analysis of (I)RCs in which the RC head also c-commands the (I)RC, the question might arise as to why the RC head itself cannot Agree with PRO, yielding an interpretation where the RC head both controls PRO and binds the variable/gap in the (I)RC. As an anonymous reviewer points out, the RC head (which is an NP rather than a DP) is not an intervener because it is not an A-position for binding. They note that DP/NP binding distinction also accounts for why *our pictures of each other* cannot refer to each picture showing the other picture (and all owned by us).

(recall (62)), this C head should not be equated with the logophoric centre (see also McFadden & Sundaresan 2016).

Let us now consider IRCs where PRO is interpreted as PRO_{arb}. According to the theory of control being pursued here, this means that we are dealing with a case where UPro fails to be valued by anything via Agree. There are thus two analytic possibilities that could in principle account for why the pronominal possessor fails to value UPro: (i) the c-command condition is not met, or (ii) the locality condition is not met.

We can rule out the c-command condition option by showing that the pronominal possessor c-commands UPro even in cases where UPro is interpreted as PRO_{arb}. This can be shown using Condition C effects. We have already seen that pronominal possessors generally c-command the RC head and the RC, as shown by the Condition C violation in (36a), repeated below.

(66) *This is his_i book for John_i to read.

If it were possible for the pronominal possessor to appear in a position that did not c-command the IRC subject (except for those possessors appearing in compounds, as mentioned above), we would expect it to be possible to avoid the Condition C violation. However, this does not seem to be possible, suggesting that the c-command relations between the pronominal possessor and the IRC subject do not change.

Indeed, we can get a Condition C violation in the IRC whilst simultaneously getting a PRO_{arb} interpretation. Recall (55), repeated as (67a). Swapping the pronoun and R-expression results in a Condition C violation, as in (67b), showing that the pronominal pronominal possessor c-commands into the IRC.

(67) (a) This is John_i's book PRO_{arb} to read to him_i.

(b) *This is his_i book PRO_{arb} to read to John_i.

The same point can be made for (68) (thanks to an anonymous reviewer for suggesting the example from which this is adapted).

(68) (a) This is Mary_i's image to compare oneself to using her_i recognition software.

(b) *This is her_i image to compare oneself to using Mary_i's recognition software.

In (68), use of *oneself* in the IRC is designed to make the PRO_{arb} interpretation of the IRC subject more salient. The adjunct *using Mary's/her recognition software* modifies the IRC verb phrase, i.e. it is the means by which the comparison is carried out, and thus it is c-commanded by anything that c-commands the IRC as a whole. (68b) shows that *her* and *Mary* cannot be co-indexed, i.e. a Condition C violation, thus showing that *her* (the pronominal possessor) c-commands into the IRC without necessarily simultaneously controlling the IRC subject (PRO_{arb}). (68a) shows that switching the pronominal and R-expression results in a grammatical example.

These data show that the c-command relations between the IRC PRO subject and the prenominal possessor attached to the RC head do not change depending on whether PRO is controlled or PRO_{arb}. Consequently, a violation of the c-command condition cannot be the reason for the failure of the prenominal possessor to value UPro in PRO_{arb} cases.

By the process of elimination, this leaves the locality condition. The existence of PRO_{arb} interpretations suggests that there must be a phase boundary between the prenominal possessor and UPro. There are in principle two ways of implementing this idea: (i) the prenominal possessor is merged higher than SpecDP in PRO_{arb} contexts, i.e. it is external to the DP phase, or (ii) there is a DP-internal phase boundary between the prenominal possessor and UPro (this phase boundary would have to be optional to account for the availability of the controlled-PRO interpretation).

Option (i) is reminiscent of possessor raising constructions in which the possessor is syntactically external to the DP with which it is semantically associated. This could be implemented either as a type of raising operation or as a type of control (see Deal 2013 for an overview). However, syntactically speaking, in cases of possessor raising, the possessor and possessum generally constitute separate constituents and separate arguments of the verb. If this were so in our IRC examples, we might expect it to be possible to extract one without the other. However, this is not possible.

(69) *Which book to read did you say that this was John's?

(cf. You said that this was John's crime novel PRO_{arb} to read)

This suggests that we are not dealing with anything resembling a possessor raising construction.

This leaves option (ii); there is an optional phase boundary between the prenominal possessor and UPro. This would predict that there is an intermediate landing site for elements undergoing successive cyclic movement. We saw above that *wh*-movement from IRCs is permitted provided there is a nested dependency between the relativised element and the *wh*-extracted element (at least for some speakers). We should therefore, in principle, be able to test whether an element can be licensed only in that intermediate position. Following Fox (2000), I will attempt to isolate this position by using a combination of variable binding and Condition C diagnostics. Consider the following on the interpretation where *Mary* is the subject of *write*:

(70) This is every fan_i's message for Mary_j to write on the picture that he_i took of her_j.

We can force a Condition C violation by switching *Mary* and *her* (again, on the interpretation where *her* is the subject of *write*).

(71) *This is every fan_i's message for her_j to write on the picture that he_i took of Mary_j.

For *every fan* to variable bind *he*, the former must c-command the latter, and to satisfy Condition C, *her* must not c-command *Mary*. Now consider what happens when the constituent containing *picture* and its relative clause is questioned. (70) thus becomes (72).

(72) On which picture that he_i took of her_j is this every fan_i 's message for $Mary_j$ to write?

(72) permits simultaneous variable binding of *he* and satisfaction of Condition C. For this to happen, the questioned constituent is interpreted in a position c-commanded by *every fan* (via reconstruction). Now consider what happens when *Mary* and *her* are switched, i.e. (71) becomes (73).

(73) On which picture that he_i took of $Mary_j$ is this every fan_i 's message for her_j to write?

Unlike (71), which contains a Condition C violation, (73) permits simultaneous variable binding of *he* and satisfaction of Condition C. For this to be possible, the questioned constituent must be reconstructing to a position where it is c-commanded by *every fan* but not c-commanded by *her*. The availability of this interpretation in (73) indicates the presence of an intermediate landing site somewhere between the IRC subject (*her*) and the pronominal possessor (*every fan*). Assuming this is evidence for a phase boundary, when this phase boundary is present, a UPro subject will be spelled out before the pronominal possessor in SpecDP has a chance to value UPro's features. By assumption, this does not cause the derivation to crash, but it does result in UPro's features being valued by default, yielding PRO_{arb} .

Ideally, one would like to show that this intermediate phase edge is absent in cases where the pronominal possessor controls the IRC subject. However, the sort of test employed above will not work as the control relation itself forces the pronominal possessor and IRC subject to be co-referential (or partially so in the case of partial control). An intermediate landing site between the pronominal possessor and IRC subject would thus be indistinguishable from an intermediate landing site in clause-medial position in the IRC (at least in terms of the interpretations it licences).

Therefore, given the tools and diagnostics currently available, I conclude that the proposal of there being an optional phase boundary between the pronominal possessor and IRC subject is at least not inconsistent with the data. However, further research would be required to make any firmer conclusions. I thus tentatively conclude that there is an optional phase boundary between the pronominal possessor and UPro. When the phase boundary is absent, the pronominal possessor values UPro's features (mediated by a C head) resulting in the controlled-PRO interpretation; when the phase boundary is present, UPro is spelled out before the pronominal possessor can value UPro's features resulting in the PRO_{arb} interpretation.

5 CONCLUSION

This paper focused on a novel empirical problem, namely the relation between a prenominal possessor attached to an RC head and the PRO subject of an IRC. I showed that this relation is one of control but that it exhibits apparently paradoxical properties, i.e. it bears the structural hallmarks of OC, yet PRO_{arb} interpretations are possible. I discussed how such data can be accounted for in a syntactic, Agree-based theory of control, tentatively concluding that there is an optional phase boundary somewhere between the IRC subject and prenominal possessor. When the phase boundary is absent, the prenominal possessor can form an Agree relation with UPro (mediated by a C-domain head), resulting in OC. However, when the phase boundary is present, the prenominal possessor and UPro are no longer in the same local domain. Valuation via Agree thus fails, resulting in a default, PRO_{arb} interpretation. Although this is in some sense a restatement of the original problem, the analysis identifies the locus of this problem within the syntactic structure and rules out a number of other *a priori* possible reasons for why the control relation may appear to be optional. I thus hope to have shown that control into IRCs is both empirically and theoretically interesting with important consequences for the analysis of control and the structure of infinitival relative clauses.

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