Why control of PRO in rationale clauses is not a relation between arguments

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1.   Introduction

After (1) or (2) we can use (3), a *rationale clause*, to mean (4). We then mean that those who acquire a pitcher are the traders of the outfielders.

(1)   The team traded away two outfielders

(2)   Two outfielders were traded away

(3)   PRO to acquire a pitcher.

(4)   because then the trader might acquire a pitcher.

On *grammatical* accounts, this indicates a relation between two arguments that ensures their coreference, for any assignment of values to variables. PRO in (3), for example, would be related in this way to an argument that is linked to the role of trader in either (1) or (2). Such accounts have good motives, sketched in §3. But in this paper we make two objections, one syntactic and one semantic. The syntactic objection comes from *remote control*, as in (5). We can use (5) just like (3), again to mean (4) (Higgins 1973, Dowty 1989, Sag & Pollard 1991, Williams 2015). Yet in this case, we will argue in §4, there can be no local binder for PRO, when there isn't one audible.

(5)   The goal was PRO to acquire a pitcher.

The semantic objection comes from the truth-conditions of the rationale clause construction. These are hyperintensional, and compositionally this is in conflict, we will suggest in §5, with the binding relation that a grammatical account requires.

These two objections, if sound, add weight to a *non-grammatical* account: PRO in a rationale clause acts not as a bound variable, but just as an free expression of type *e* over a restricted domain (Landau 2000, Williams 2015). We discuss the needed restriction and its implementation in §6 and §7, respectively, before ending with a remark on the broader relevance of our conclusion.

2.   Rationale clauses

A rationale clause (Faraci 1974, Williams 1974, Jones 1985) is meant to explain some *target fact* in terms of an expected consequence. In our example the target is the fact that someone traded two outfielders, and we use (3) to mean that this obtains because, as an expected consequence, the trader acquires a pitcher. We will use **R** for this relation of teleological explanation. And when the target fact is expressed or implied by a nearby clause, such as (1) or (2) before (3), we call that clause the *target clause*.

Rationale clauses are infinitival and sometimes have a PRO subject, which we will call PRO_r for brevity. Speakers may mean PRO_r to denote an individual implied, quantified over, referred to, or introduced into discourse by some antecedent expression in the target clause. In that case the antecedent *controls* PRO_r, using this term as a superficial description. Control is *explicit* when the antecedent is an audible DP, as when *the team* in (1) antecedes PRO_r in (3). Otherwise control is *implicit*, as when (3) instead follows (2). The short passive in (2) entails a trader, but no audible DP in it denotes one.[1]

3.   Grammatical accounts

Familiar accounts of controlling PRO_r are *grammatical* (Roeper 1987, Koenig & Mauner 2000). These say that control is fixed wholly by the *sentence* comprising the two clauses, and does not depend on an assignment of values to variables, or on context more broadly.[2] This is done by identifying the reference of two arguments, PRO_r in the rationale clause, and one in the target clause. The 'argument' in the target clause is on some theories a phrase of type *e*, either audible or inaudible, in a certain grammatical relation (Baker et al. 1989); on others it is just a λ-bound variable (cp. Williams 1985). Coreference is then derived in one of two ways.[3] Either structurally, as the semantic interpretation of a syntactic relation between PRO_r and its antecedent, hence as a variety of binding; or nonstructurally, as a nonlogical entailment of the semantic relation, **R**, between rationale and target clauses (cp. Sag & Pollard 1991). Our criticisms in this paper apply equally, we believe, to all of these variants. But for simplicity, we will discuss them all in terms of a single variant, one which envisions structural binding between PRO_r and an antecedent of type *e*.

Grammatical accounts have a very good motive: many constraints on the interpretation of PRO_r can be described in grammatical terms, using distinctions such as subject versus object, or passive versus middle. In particular, PRO_r may be controlled by the subject (S) of the target clause, (6), but never by a surface object (O), (7).

(6)   Sharks cover themselves with parasites (in order) to have their gills kept clean.

(7)   *Parasites cover these sharks$_k$ (in order) PRO_k to have their gills kept clean.

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[1]Rationale clauses are distinct from *purpose clauses* like those in: *Abe$_k$ brought Sue$_j$ PRO$_j$ to translate for him and a pencil$_i$ (*in order) PRO$_k$ to write with ε_i*. Among other differences, purpose clauses permit control by an object and resist fronting; see Faraci 1974, Jones 1985, Whelpton 2002 and Landau 2013.

[2]On such accounts, a string with multiple resolutions of PRO_r has a different structural analysis for each.

[3]Theories of control into complement clauses can be divided into the same two genres.

When the target clause is passive, PRO$_r$ can be controlled by its *deep S*—that is, the intended referent may be the entailed satisfier of the role linked to S in an active clause with the same verb—whether or not this is realized by an audible DP, as in (8). Yet this is not possible when the target clause is a middle, as in (9) (Keyser & Roeper 1984, Roeper 1987).

(8)   The sheep are killed (by wolves) in order PRO to survive the winter.
         (⟦PRO⟧=the killers)

(9)   *The sheep kill easily in order PRO to survive the winter. (⟦PRO⟧=the killers)

Moreover, this pattern does not follow just from general guidelines of anaphora resolution, since overt pronouns act differently. For example, we can felicitously use *she* in (10) to refer to Susan, the referent of the matrix O, or *them* in (11) to refer to the sharks, but cannot readily use *he* in (12) to refer to the unspoken ring-thief entailed by the short passive.

(10)   Arthur robbed Susan because then she might collect the insurance.

(11)   Parasites cover these sharks, in order for them to have their gills kept clean.

(12)   #The ring was stolen so that he could buy drugs.

These facts, among others (see §6), provide good evidence for a grammatical account. But there are still others that a grammatical account does not address, and reasons to think that whatever handles these will explain a larger portion of the puzzle.

4.   The challenge of remote control

When PRO$_r$ has an antecedent in the target clause, and that clause hosts the rationale clause as an adjunct, then control is *local*. But rationale clauses are not always adjuncts. They also occur in the object of specificational copular sentences, such as (13), with subjects like *the goal* or *the reason* that allude to the target fact, or pronouns understood similarly, as in (14) (Higgins 1973, Dowty 1989, Sag & Pollard 1991). In this setting, if PRO$_r$ has an antecedent in the target clause, its control is *remote*, since the two clauses are independent.

(13)   Two outfielders were traded. The goal was PRO to acquire a pitcher.

(14)   I don't know why that happened. Maybe it was PRO to acquire a pitcher.

Importantly, remote control exhibits exactly the same profile as local control (Higgins 1973, Sag & Pollard 1991, Williams 2015). PRO$_r$ cannot be controlled by O in the target clause, (15), or by the deep S of a middle, (16) (Williams 2015).

(15)   *Parasites cover these sharks$_k$. The goal is PRO$_k$ to have their gills kept clean.

(16)   *The sheep kill easily in autumn. The reason is PRO survive the winter.
         (⟦PRO⟧=the killers)

Thus remote and local control ought to have exactly the same account.
     But this shared account cannot involve a binding dependency *between* the rationale and target clauses, since in remote control these are syntactically independent, and genuine

binding cannot cross a sentence boundary. Thus the shared account cannot be grammatical, unless PRO_r has a covert antecedent within the copular clause.

We therefore consider the conjecture that it does, in two variants, (17) and (18). The first envisions a silent pronoun within the subject of the copular clause, while the second instead has a silent reprise of the target clause.

(17)   [pro_k the goal] was PRO_k to acquire a pitcher

(18)   [the goal ⟨ the team $_k$ trade two outfielders ⟩] was PRO_k to acquire a pitcher

In neither variant would the antecedent c-command PRO_r on the surface, usually a prerequisite for binding. But specificational sentences are unusual. They exhibit "connectivity" between what is inside the subject of the copular clause, and what is inside the object (Higgins 1973, Heycock & Kroch 1999). Thus (19) is as good as (20), even though *Lee* c-commands *herself* only in the latter.

(19)   The way Lee_k disturbs people is with weird images of $herself_k$.

(20) Lee_k disturbs people with weird images of $herself_k$.

This had led many to conclude that, for specificational sentences, binding constraints apply at a non-surface stage of the derivation, one where (19) is more similar to (20). We can therefore suppose that the same exemptions would apply to (17) or (18).

So let us begin with (17). It says that *the goal* or *the reason* are quiet versions of *their goal* or *her reason*, and so forth, where the pronoun denotes the implied author(s) of the goal or reason. And this pronoun in turn provides a sentence-internal binder for PRO_r.

There is an immediate theoretical problem with this, however. Hypothesis (17) provides PRO_r with a binder, but offers no account of why that item has the reference it has. And whatever does explain this, it cannot be a binding dependency with an argument in the target clause, since that clause is syntactically independent. The explanation would have to be, in our sense, non-grammatical. And therefore (17) does nothing to salvage the grammatical account of PRO's reference. It just relocates the question.

Besides this, there is a decisive empirical problem. Despite the unusual connectivity of specificational sentences, a possessor in S cannot syntactically bind into O. Example (21) is clearly acceptable. Yet if *Lin* could syntactically bind *him*, it would violate Principle B.[4]

(21) $Lin's_k$ downfall was that image of him_k on the wall.

There are examples, such as (22), which seem to contradict this conclusion, where a reflexive in O is acceptably interpreted as coreferent with a possessor in S.

(22) Lin_k's favorite possession was that image of $himself_k$ on the wall.

But the acceptability of such examples evidently depends on nonsyntactic factors, such as the 'logophoric center' of the narrative (Sells 1987). When we control for these, the

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[4]In testing for connectivity, it is best that the pronoun/anaphor not exhaust the object of the copula, as it does in *What he fears is himself*, since then any effects may be due simply to coindexation of S and O.

syntactic relations are more pronounced, as in (23). In our judgment, (23) is clearly worse than (21), an odd result if *Lin* could bind *himself* syntactically.

(23)   ??Lin's downfall was that image of himself on the wall.

So let us move on to our second option, (18). This proposes a silent, perhaps elided, relative clause that reprises the target clause. Here again, however, there is a decisive empircal problem: sentence (24) is flawless, while (25) is very bad. Evidently, therefore, it is syntactically impossible to bind out a relative clause embedded within the subject, even in the exceptional setting of a specificational sentence.

(24)   The best evidence that Lin_k has improved is that image of him_k on the wall.

(25)   ?*The best evidence that Lin_k has improved is that image of $himself_k$ on the wall.

As always, nonsyntactic factors may improve the acceptability of a reflexive in sentences structurally similar to (25), such as (19). But this is not relevant to the hypothesis that there is a syntactic dependency between PRO_r and the silent relative clause in (18). That hypothesis is undercut directly by the contrast between (24) and (25), which is exactly the reverse of what it would predict.

There is another problem. Sometimes the target fact is denoted explicitly with an audible pronoun, as in (26) or (27).

(26)   The team traded two outfielders. The only reason for it was to acquire a pitcher.

(27)   "There's a great deal of distortion and deception within the Roman Catholic Church, and the reason for it was to protect the reputation of the institution."[5]

In such cases, provision of a sentence-internal antecedent for PRO_r would require that the pronoun itself contain a silent reprise of the target clause. The *it* of (26) would need a structure something like (28) or (29), with the sister of D elided (Elbourne 2005).

(28)   [D [that the team traded two outfielders]]

(29)   [D [the team's trading two outfielders]]

But once again this would not help, since there could be no binding out this context. We saw in (24) and (25) that there is no binding out of a relative clause within the subject. Thus there could no binding out of *it* in (14). The contrast in (30) suggests the same for binding out of PP adjunct within the subject, which would be required for (26).

(30)   The best evidence for Lin_k's improvement is that image of him_k/?*himself on the wall.

Note finally that the antecedent for the pronoun in (27) is not a clause but a noun phrase, *distortion and deception*.[6] And unless such noun phrases always have the argument

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[5]*Fresh Air*, NPR, 25 October 2005 (Davies 2008–).

[6]The argument in this paragraph will assume that PRO_r in (27) is meant to denote those responsible for the distortion and deception. If this is wrong, there are other examples that would make the same point.

structure of clauses, which is not a common assumption, a silent reprise of them inside the pronoun could not possibly provide a grammatical binder for a nearby PRO_r.

So there is strong syntactic evidence that remote control involves no silent local binder for PRO_r, and therefore that the right account of remote control cannot be grammatical. But local and remote control ought to have the same account, since they evince the same restrictions on the interpretation of PRO_r. We conclude that the right account of local control cannot be grammatical either.

5. The challenge of hyperintensionality

Say that Mo spoke, and did so very loudly. Presumably a single event may verify both clauses. Yet even then, the reason why Mo spoke may differ from why she spoke loudly. Whether an explanation is good, therefore, does not depend just on the identity of what is explained, but also on how this is described: explanations are not extensional. Further, explanations do not depend just on the intension of the sentence used to denote what is explained. All mathematical truths have the same intension, being true in the same possible worlds. Yet we can explain one without explaining them all. Still more plainly, what explains why Clyde *married* Bertha may not be what explains why he married *Bertha*, even if there was just one wedding (Dretske 1973). What matters here is not the intension of the sentence, but also its focus structure, and in turn the alternatives this evokes. So in at least these ways, explanations are hyperintensional. In addition, what explains a single event may not explain a pattern of similar events. For instance, an explanation of why Eunice the sheep was killed may not explain why sheep in general are killed.

All of these general points carry over to uses of rationale clauses. The explanation we offer with (33) may be correct after (31) and yet incorrect after (32), even if the two target clauses are made true by the very same event. (Besides this, PRO_r in (33) is readily used to refer to sheep killers after (31) but not after (32). We say why in §6.)

(31)   Several sheep were killed

(32)   Several sheep were killed very easily

(33)   in order to survive the winter. (⟦PRO⟧=the killers)

We can use (36) to correctly explain a pattern of killings described by (34), but not a particular episode of killing described by (35).

(34)   The sheep are killed (regularly)   (35)   The sheep were killed

(36)   in order to ensure the balance of predator and prey. (⟦PRO⟧=the killing)

And (39) might seem correct after (37) but not (38), since the difference in focus yields different explananda.

(37)   Clyde *married* Bertha   (38)   Clyde married *Bertha*

(39)   in order to get tax relief. (⟦PRO⟧ = Clyde)

In our view, such judgments of whether the offered explantion is good, or correct, may furthermore count as judgments of *truth* for purposes of semantic analysis. Thus a speaker of (39) may say something true after (37) and false after (38), for example. We also suppose that these are differences in what the speaker says directly, not just differences in what she might mean indirectly.[7] And given this we conclude that judgments of correctness have consequences for the logical form of rationale clauses, or more precisely, of the expression that combines the infinitival clause with the **R** relation.

Namely, it cannot then be that rationale clauses express a relation just to the *event* of the target clause (*pace* Whelpton 2002), or just to the event predicate expressed solely by the target clause verb on its own, for the simple reason that modifiers may matter to the truth-conditions. Nor can it be that rationale clauses express a relation just to the event predicate expressed by the whole extended verb phrase, since modality and focus may matter too. Rather, rationale clauses must express a relation that includes as a term the propositional content associated with (use of) the entire target clause, broadly as in (40).[8] Or, as we might say for convenience, **R** must scope over the whole target clause.

(40)   **R**(that the team traded 2 outfielders, that the team acquires a pitcher)

Now imagine that (40) is also correct in treating **R** as a *two*-place relation between the contents of the rationale and target clauses, with no *third* term for any argument-bearing subpart of the target clause, such as its VP meaning. Then it follows that the target clause VP and its arguments should not be accessible to any semantic dependency, such as a binding dependency. And in that case, no grammatical account of PRO_r can be right. In our view this is exactly the correct conclusion. But we see two objections to dispatch.

First, the claim that **R** scopes over the whole target clause might seem inconsistent with facts like (41), where the target clause O takes scope over the adjoined rationale clause.

(41)   Mason opened no jar_k to protect the flavor of its_k jelly.

But it is not, since (41) means something like (42), and cannot mean anything like (43).

(42)   For no jar_k was the reason [Mason opened it_k] [to protect the flavor of its_k jelly]

(43)   The reason [Mason opened no jar] was [to protect the flavor of each jar's jelly]

Thus the quantifier of (41) has **R** in its scope, and hence both of its arguments. Following Barker (2012), we assume that this semantic scope suffices for the quantifier to bind the pronoun, regardless of its surface position.

Second, why assume that **R** is two-place? Why not add a third term that has an argument to bind PRO_r, as required by grammatical accounts? This might be the target clause VP, as we sketch in (44), with subscripts that allow reference to each of the three terms.

(44)   **R**($_c$⟦target clause⟧, $_b$⟦target VP⟧, $_a$⟦rationale clause⟧)

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[7]Thus we are not assuming that rationale clauses express just an extensional relation of causation, with the sense of explanation being some sort of pragmatic overlay.

[8]We cannot dwell here on the important question of how to understand "content" so that it includes the effects of focus structure. We care only that this be the content of tokens or uses of the whole clause.

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The truth conditions of the construction do not require the addition of term *b*, so simplicity counsels against it. But more important, problems arise when we ask how a logical form like (44) might be derived compositionally. How are the contents of terms *b* and *c* to be provided, in deriving the meaning of the sentence?

One way would be to give our example a denotation like (45): a function with terms *b* and *c* both as arguments, to be saturated by the target VP and target clause in turn.

(45) $\lambda f \lambda q \, . \, \mathbf{R}(q, f, \text{that the trader acquire a pitcher})$

But absent unattractive complications, the required derivation could not be compositional, since the phrase that saturates *b* would be syntactically contained within the one that saturates *c*. To avoid this problem, we might instead propose (46), where term *c*, the target fact, is now to be valued by context, via a free variable, *q*.

(46) $\lambda f \, . \, \mathbf{R}(q, f, \text{that the trader acquire a pitcher})$

But this creates a different problem: it will give the wrong truth-conditions for sentences where a quantifier in the target clause takes scope over **R**. Consider (41) again. This would have truth conditions like (47), where *q* is now a proposition supplied by context. But then the fact for which the reason is given would not co-vary with the jars, as it must: the reason Mason opened jar 1, the reason he opened jar 2, and so on. The problem is, a proposition given by context will provide no variables to bind in the compositional semantics.

(47)   For no jar$_k$ was the reason [that *q*] [to protect the flavor of its$_k$ jelly]

For these reasons we take the minimally sufficient logical form in (40) to be correct, and stand by what we claim it implies: control of PRO$_r$ has no grammatical account.

6.   Responsibility and control

A nongrammatical account treats PRO$_r$ as a free expression of type *e*, not constrained by the sentence meaning to corefer with an argument in the target clause. For this to work, PRO$_r$ must range over a narrowly restricted domain. We now ask how to describe that restriction. Then in §7 we remark on how this might be implemented in the grammar.

The domain for PRO$_r$, we suggest, comprises no more than those things viewed as explanatorily responsible for the target fact (Williams 2015).[9] This is a variant of what is said in Landau 2000, which endorses part of a broader proposal in Farkas 1988. Sometimes the party responsible for a fact, when that fact involves an event *e*, is a certain participant in *e*, such as its agent. But not always. And this allows a *responsibility account* to capture several facts that grammatical accounts do not. We note four, echoing Williams (2015).

First, the surface S of a passive controls PRO$_r$ only when its referent is viewed as responsible for the target fact. Thus (48) implies that Sam is responsible for her own arrest (Zubizaretta 1982, Roeper 1987).

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[9]For want of space, we put aside cases where PRO$_r$ names the target fact itself, such as (36), or Williams (1974)'s: *Grass is green to promote photosynthesis*. A satisfactory unified account has long been elusive.

(48)   Sam$_k$ was arrested just PRO$_k$ to seem like a radical.

On a grammatical account of PRO$_r$, this is just an additional observation. On a responsibility account it is a direct consequence of how the reference of PRO$_r$ is determined.

Second, modifiers and modality in the target clause may block a control relation that is otherwise permitted (Williams 2015). For example, while (49-b) is acceptable after (49-a), (50-b) is not good after (50-a), even though the intended claim is reasonable.

(49)   a.   Sheep were killed.
        b.   The reason was to survive the winter. ($[\![$PRO$]\!]$ = the killers)

(50)   a.   Sheep are easily killed.
        b.   #The reason is PRO to survive the winter. ($[\![$PRO$]\!]$ = the killers)

On grammatical accounts this is a surprise. Why should modality impede a binding relation between two arguments? But on a responsibility account it is expected. The agent of an event may not be responsible for all properties of that event, much less for any patterns it is part of. The addition of modifiers or modality in the target clause may therefore affect whether PRO$_r$ can denote the agent of its event, since it may change whether we view that agent as responsible for the fact expressed by the whole clause.

Third, control by the deep S is blocked in middles (Keyser & Roeper 1984, Roeper 1987), as in (51).

(51)   a.   These sheep kill easily
        b.   #in order PRO to survive the winter. ($[\![$PRO$]\!]$ = the killers)

On a responsibility account this is expected, inasmuch as middles require that the referent of their surface subject be viewed as responsible for the fact they express (van Oosten 1977, Ackema & Schoorlemmer 2006). But grammatical accounts have needed to make an additional postulate, to distinguish middles from passives: the latter but not the former, they say, have an argument in the deep subject role, silent but grammatically active. But this is unexplanatory, since the deep S of a middle *can* control PRO in other constructions (Vinet 1987, Bhatt & Izvorski 1998, Iwata 1999), as in (52).

(52)   "[A] Ruger 7-1/2" .44 Magnum carries easily while hunting."[10]

Fourth, the referent of PRO$_r$ may be an individual not named by any part of the target clause, but only if it is viewed as responsible for the target fact. In (53), for example, or (54) and (55), PRO$_r$ may refer to parties responsible for there being a fundraiser, or for how the ribbon was cut. This is expected on a responsibility account, but should be impossible on a grammatical account.[11]

(53)   There was a fundraiser, just PRO to get some additional cash.

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[10]*Guns Magazine*, 1 February 2001 (Davies 2008–).

[11]Tom Roeper suggested to us at NELS47 that (54) represents the young girl as standing for the organizers of the ribbon cutting, by synecdoche or metonymy. We disagree, since if it did, it should always be correct to say after (54) that *she* got the support of voters, or after (55) that the beaver did, which strikes us as wrong.

(54)   A young girl cut the ribbon, just PRO to acquire the support of women voters.

(55)   A beaver cut the ribbon, just PRO to acquire the support of environmental voters.

Of course these several benefits do come at a cost. We saw in (7) that PRO_r cannot be controlled by a surface O in the target clause. Thus a responsibility account will need to stipulate something like (56).

(56)   Responsibility Postulate
        The referent of a surface object is defeasibly depicted as nonresponsible.[12]

And this is unattractive, at least because it posits a conventional effect of sentence structure on discourse beyond those of information structure, and independent of truth-conditions.

Yet we note in defense that some such effects must be recognized in any case. Consider the interpretation of gerundival complements to *for*, on uses like (57) or (58).

(57) Abe_k got a cake for PRO_k/his_k writing nice poems.

(58)   Sue married Abe_k for PRO_k/his_k writing nice poems.

The subject of the gerund may be coreferent either with S in the host clause, (57), or with O, (58). Both resolutions are possible for (59), and the choice follows our understanding of the situation described: if we view the baking as an apology or reward, we infer that the burden is Sue, while if we view it as a punishment, we bestow that title on Abe.

(59)   Sue baked Abe a cake for PRO being such a burden.

Now, grammatical role has an effect on this. The story we tell with (58) is not easily told with (60), even though Abe married Sue just in case Sue married Abe.

(60)   #Abe_k married Sue for PRO_k/his_k writing nice poems.

The problem is not merely that Abe is the marrier in (60) but the married in (58), since (61) is much better than (60), though Abe is the marrier here too.

(61) Abe_k got to marry Sue for PRO_k for writing nice poems.

The problem with (60) is rather that *Abe* is the subject of *Abe married Sue*. Absent further elaboration, this presents Abe as the instigator of marriage more than (58) does. With (61) this sense is diminished, however, since one is not in charge of what one *gets* to do. And this matters, because of what *for* means, namely that one event is an intentional response to the other. So (60) entails that the marriage was an intentional response to the poetry, and suggests that it was instigated by Abe. Thus it would be odd if Abe were the poet as well.

So surface structure does have effects beyond those of information structure, to which anaphora resolution may respond. For rationale clauses, however, unlike with *for*, the response is specific to the medium of anaphora: remember, if we replace the PRO_r in (7) with

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[12]The effect is defeasible, as further remarks may represent the individual as responsible, e.g.: *Parasites cover these sharks. Surprisingly this is the sharks' own doing. The goal is to have their gills kept clean.*

an overt *them* in (11), the direct object in the target clause becomes a fine antecedent. So unlike in a *for*-gerund, PRO in a rationale clause is not resolved in whatever way yields the most plausible story given the discourse. Rather, its domain must be specifically restricted to parties responsible for the target fact.

Before remarking on how that might be done, we acknowledge a major remaining challenge. Even (56) will not prevent a DP embedded *within* a subject or object or adjunct from naming a party that can be viewed as responsible, and being a candidate referent for PRO_r. Is this acceptable, or must we elaborate (56) with further restrictions?

Roeper (2009) presents (62) as evidence that embedded antecedents are impossible.

(62)   *These pots are $Indian_k$-made PRO_k to sell at craft fairs.

But (62) may be bad for other reasons. Most likely a speaker of (62) would be addressing the question in (63), and giving the answer in (64). But in general this would be a strange answer, since it is not easy to see how it could possibly be right.

(63)   Why was it Indians who made these pots?

(64)   ??So that Indians might sell them.

And interestingly, rationale constructions that offer bad explanations are often heard as unacceptable. If we hear (65) as explaining why the judge is bribed *very easily*, for example, the sentence can register as unacceptable. But its only fault is a puzzling explanation: how could the prospect of a favorable jury explain why it is *very easy* to bribe the judge?

(65)   #This judge is bribed very easily, in order to secure favorable juries.

Examples like (62) improve when they do provide a good explanation, as in (66). Surely a speaker of (66) may mean that the computer hardware is made by Indians in particular, because then *they* might earn new respect. And in our judgment, this would coincide with a judgment that the Indians are also responsible for the hardware being Indian-made.

(66)   These days our Indian neighbors are happy to buy their homewares from IKEA.
        But the computer hardware is now all Indian-made, in order PRO to earn respect
        in a new area of technology.

This blunts the objection from incorporated nouns. Still it remains true that good examples of embedded antecedents are hard to come by. Example (67) is the best we can do, and even this requires elaborate crafting.

(67)   ?(In accord with his_k plans,) the documents were all in his_k right pants pocket, just
        in order to PRO_k reach them more easily.

So the challenge remains for any nongrammatical account of PRO_r. We contend, however, that it remains an equal challenge for everyone, due to remote control. The contrast between subject and embedded antecedents persists in remote control. Yet if §4 is correct, remote control cannot have a grammatical account. It requires a nongrammatical account. And whatever we say there will carry over to local control as well.

7. Implementing restrictions on the domain for PRO$_r$

The major restrictions on the domain for PRO$_r$ are not cancelable, and therefore appear to be semantic. We now remark briefly on how this might be implemented.

Starting with local control, let us suppose that some part of the derivation, RAT, pronounced either as silence or as *in order*, introduces the **R** relation, and takes an infinitival clause C with a PRO subject as argument or operand. We might then restrict the domain of this PRO in at least two ways, sketched semi-formally in (68) and (69). For simplicity we ignore intensionality, and say nothing definite about what sorts of things are related by **R**: propositions, situations, states of affairs, what have you.

(68) $[\![\mathrm{RAT}]\!] = \lambda P_{\langle e,t \rangle} \lambda q \,.\, \mathbf{R}(q, P(\iota x[\mathrm{Resp}(x,q)]))$

(69) $[\![\, \mathrm{RAT}\ \mathrm{C}\,]\!]^k = \lambda q \,.\, \mathbf{R}(q, [\![\mathrm{S}]\!]^{k[a \mapsto \iota x[\mathrm{Resp}(x,q)])]})$

In both variants RAT introduces the **R** relation between the target fact q and a proposition or situation restricted by C. Variant (68) takes RAT to have an $\langle e,t \rangle$ argument, to be derived by abstracting over the PRO$_r$ subject of C. It then applies this predicate to $\iota x[\mathrm{Resp}(x,q)]$, the individual responsible for q (cp. Farkas 1988, Sag & Pollard 1991). Variant (69) instead treats **R** as an operator, shifting the index of evaluation k for C, its type t sister. Here k includes a parameter a that gives the value for PRO (cp. Anand 2006, Pearson 2013, Landau 2015), and RAT then sets a to the individual responsible for q. Consideration of these options, and the choice between them, is left for another discussion.

Turning to remote control, it might seem that we can again prefix RAT to the infinitival clause, as in (70), making just one simple adjustment to (68)/(69), here marked with an asterisk: unbind q and let it be a free variable valued by context.

(70)   The goal was [RAT* [PRO to acquire a pitcher]]

But there are several worries; we voice two. First, (70) would mean that the goal was, not that the party responsible for q acquire a pitcher, but that this be an expected consequence of q. And that seems wrong. Second, *in order* is sometimes unacceptable in this setting, as in (71), casting doubt on the otherwise attractive idea that RAT serves the role of *in order*.

(71)   ?*The goal was in order to acquire a pitcher.

In response we might pursue an intuition: perhaps in remote control, the role of RAT is served instead by the subject of the copular clause, such as *the goal*. But unfortunately, we see no good way to execute this idea. One option would be to say that *the goal* is polysemous, with (68)/(69) among its values; following the "reverse predication" analysis of specificational sentences (Moro 1997), it could then serve semantically as a predicate of *PRO to acquire a pitcher*. Another option would be to have an equative semantics for specificational sentences (Heycock & Kroch 1999), and then to say: when the two terms of an equation describe their referent as, respectively, the goal of q and the proposition that Px, then x must be the party responsible for q.[13] But both stipulations are grotesquely ad

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[13] A similar stipulation is made by Sag & Pollard (1991), but in the context of a grammatical account.

hoc, and also compromised by the fact that we can replace *the goal* with an anaphoric *it* used to refer to a reason, as in (14). Lacking a better alternative, we leave the issue open.

8. Conclusion

Rationale clauses have hyperintensional truth-conditions, and PRO in this setting (PRO$_r$) need not have a local antecedent. On these grounds we have argued that 'control' of PRO$_r$ is not a relation to an argument in the target clause. This has two consequences that we consider important. One, it expands the repertoire of discourse anaphora in a way that demands further study, theoretical and experimental. Two, it weakens the familiar claim (Roeper 1987, Baker et al. 1989, Koenig & Mauner 2000), based on implicit control of PRO$_r$ by the deep S role of a short passive, that short passives have an argument in this role that is silent but grammatically active. In turn, this raises doubts as to whether there are any such arguments with nonanaphoric ('indefinite') interpretations, an issue important to the division between pragmatics and semantics (Stanley 2002, Cappelen & Lepore 2005).

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