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Abstract

In some languages a predicative complement or adjunct agrees in case with the subject of its clause, which provides a reliable clue for identifying the subject of non-finite clauses. This is important in deciding whether cases of ‘functional control’ need a syntactic analysis in terms of PRO or of ‘structure sharing’ (including NP-movement). The paper looks in detail at Russian, Icelandic and Ancient Greek, and concludes that in all these languages the choice between PRO and structure sharing is determined primarily by whether the overt nominal is subject or object of the governing verb, rather than by whether or not the latter assigns it a theta-role. In all these languages, a subject almost always demands structure sharing, regardless of theta-role status, but an object usually allows PRO, though it may also allow sharing and this option may depend on whether or not it bears a theta-role.

1. Introduction and overview

One of the most solid achievements of modern grammar dates back (at least) to the distinction between the two transformations called ‘Equi-NP deletion’ and ‘Raising’ (e.g. Soames and Perlmutter 1979). A non-finite clause may look as though it simply has no subject, but we now know better: either its subject is a covert pronominal such as PRO, or its subject is the nominal which also serves as subject or (possibly) object of a higher verb - what we shall refer to here as **‘PRO-type analyses’** or **‘sharing analyses’**. For example, it would be uncontroversial in (1) to assume a PRO-type analysis for (a) and a sharing analysis for (b) where *he* is shared by both clauses.

- (1) a It is important [PRO] to be honest.
 b He seems [=] to be honest.

The term ‘sharing’ is intended to cover a range of different formal analyses including traces left

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by movement as well as structure-sharing analyses. Whatever formal machinery is used, these sharing analyses agree that the subject of the infinitive clause is the same token (here *he*) as the subject of the higher clause - hence the '=' sign used in this theory-neutral notation.

The purpose of the present paper is not to question this distinction - indeed, the evidence reviewed here will support it strongly - but rather to question a further assumption that is often associated with it: that this **syntactic** distinction mirrors the **semantic** distinction between so-called 'control' and 'raising' verbs. Most textbooks teach that verbs with meanings like 'seem' and (possibly) 'expect' are 'raising verbs' and require a sharing analysis, while those with meanings like 'try' and 'persuade' are 'control verbs' which require PRO. For example, according to Radford (1997:339), "the essential difference between control and raising predicates is that control predicates (like *try*) theta-mark their subjects, whereas raising predicates (like *seem*) do not." This distinction is said to follow automatically from the universal theta-criterion:

(2) Each argument bears one and only one theta-role, and each theta-role is assigned to one and only one argument. (ibid)

If these assumptions are correct, the syntactic structures of the following sentences must be different: with *tried* the two clauses have different subjects (the second being PRO) but with *seemed* they have the same subject.

- (3) a They tried [PRO] to like grammar.
b They seemed [=] to like grammar.

This analysis follows from the theta-criterion because the argument *they* receives a theta-role from *tried* so it cannot also receive one from *like*, whence the need for PRO; in contrast, it receives no theta-role from *seemed* so it is free to receive one from *like*. If the theta-criterion is valid, the reasoning is impeccable and the distinction between control and raising does indeed reflect the argument structure of the higher verb.

One reason for doubting the conclusion is that the theta-criterion may not in fact be valid. It is certainly not a necessary truth about language, and has been questioned on both theoretical and empirical grounds (Williams 1983, 1994:29; Baker 1989, Hornstein 1999). Of

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course the theta-criterion has always been backed up by supposed independent empirical evidence which is often persuasive at first glance; for example, expletives such as *there* are permitted by *seem* but not by *try* (Radford 1997:337).

- (4) a There seemed [=] to be someone living there.
 b *There tried [PRO] to be someone living there.

However the weakness of this kind of evidence is that it does not distinguish semantic and syntactic constraints. It is easy to give a purely semantic explanation for the difference between these sentences which is independent of the syntactic contrast between PRO and sharing: the subject-argument of ‘trying’ must be some entity capable of action, so a non-referential expletive such as *there* will not do. The same problem arises with all the other standard arguments for a syntactic distinction between PRO and sharing, which has led some linguists to draw the conclusion that there is in fact no syntactic difference between so-called raising and control verbs, and that both kinds of verb occur in structures in which the two verbs share the same token as their subject (Bresnan 1982a:64-72, Hudson 1984:112, 1990:237). Bresnan calls both these patterns ‘functional control’ (Bresnan 1982b:321).

In contrast with this disagreement over the analysis of functional-control structures there is relatively widespread agreement on the correct treatment of Bresnan’s ‘anaphoric control’ (ibid:326). In these cases it is generally accepted that a distinct pronominal subject, PRO, is needed in the non-finite clause, there being no local nominal which could be ‘raised’. The following examples are typical:

- (5) a It would be a mistake [PRO] to leave immediately.
 b She said [PRO] to come at once.
 c He realised that it would be a mistake [PRO] to leave immediately.

Even when an antecedent can be identified as in (c), it is not uniquely predictable on the basis of the syntactic structure, in contrast with the examples given earlier. In cases of anaphoric control, therefore, PRO is the only option.¹

¹ Even here, however, there is an alternative to PRO as the subject of the non-finite clause: no subject at all. We return to this option at the very end of the paper.

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It has proved remarkably difficult to find conclusive evidence in English to settle these disagreements. However, one way to move the debate forward is to consider evidence from other languages in which there is solid syntactic evidence such as the evidence from case agreement which will be reviewed below. We shall consider three languages: Russian, Icelandic and Ancient Greek; and we shall find that all three languages support the following conclusions:

- Where the 'controlling' nominal is the subject of the higher clause, with one minor exception the lower verb shares it as subject regardless of the higher verb's meaning.
- Where it is object of the higher clause, the choice between sharing and PRO varies from language to language and may or may not be influenced by the verb's meaning.

An important preliminary to the discussion is to establish unambiguous terminology, because terms like 'raising' and 'control' are used in ways which beg the question of how semantics maps to syntax. We shall use the terms '**theta-marking**' and '**non-theta-marking**' for the semantic distinction, and the terms introduced above for the syntactic structures: 'PRO-like analyses' ('PRO') and 'sharing analyses' ('=').

As explained above, the latter pair of terms are intended to be theory-neutral, so **PRO-like analyses** encompass any kind of analysis in which the infinitive's subject is a separate pronominal, regardless of whether this is called PRO or *pro*. The crucial feature of these analyses is that any link between the pronominal and a controlling nominal involves anaphoric binding, i.e. identity of reference rather than identity of form. For example, *Mary* is the antecedent of both the subordinate subjects in the following examples, although the latter is overt in one and covert in the other.

- (6) a I asked Mary_i if she_i would help me.
b I asked Mary_i [PRO_i] to help me.

As for **sharing analyses**, the name invokes the notion of 'structure sharing' in the sense of Pollard and Sag (1994:2). This is meant to cover any syntactic analysis in which the same token functions as part of two different clauses, including those where this relationship is shown by a movement transformation from one clause to the other. We can distinguish at least

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four different theoretical approaches to structure sharing, each of which has its own notation:

- The tradition of attribute-value matrices found in Head-driven Phrase Structure Grammar (Pollard and Sag 1994) and Lexical Functional Grammar's f-structures (Bresnan 1982b). In this tradition structure sharing is shown as an arc connecting the two functional slots concerned.
- The tradition of enriched dependency structures found in Word Grammar (Hudson 1984, 1990, 1999), where the shared token has a direct dependency link to both the verbs.
- The transformational tradition (e.g. Radford 1997) which shows structure sharing either as raising which leaves behind a trace ('e') of the raised nominal, or as 'exceptional case marking' in which the higher verb case-marks the non-finite clause's subject.
- The tradition of 'predication theory' (e.g. Williams 1980, Napoli 1989), which coindexes a predicate to its subject, so that structure sharing appears as two predicates both coindexed to the same nominal.

These theories would all give a structure-sharing analysis to the sentences below, where we continue to use the '=' notation used above:

- (7) a They seemed [=] to like grammar.
b They are [=] working.

What this notation corresponds to in terms of notation can be seen in Figure 1, which contains schematic analyses for sentence (b) in terms of the four mechanisms listed above.

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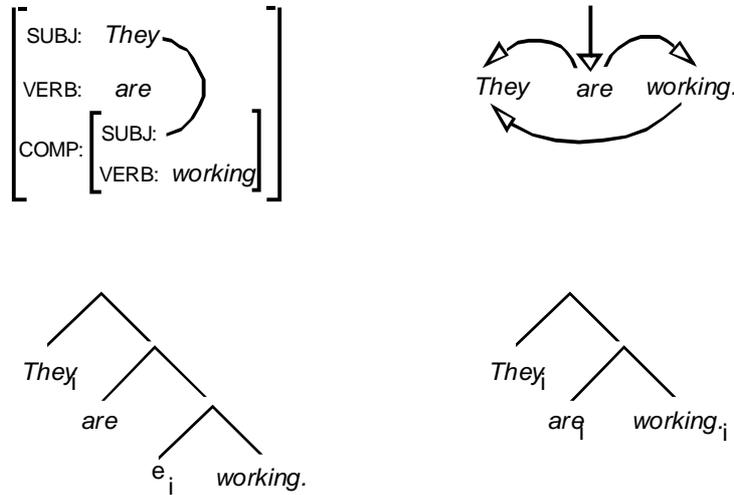


Figure 1

2. Case agreement as evidence for syntactic structure

In this section I shall defend the claim that case agreement is a reliable 'probe' for the distinction between PRO and structure sharing. The case agreement in question is agreement between the subject (the 'source' of the agreement) and some other element of the clause, its 'target'. The target may be a predicative complement of a verb such as 'be', 'seem' or 'consider', or it may be a predicative adjunct, so we can call it a '**predicative**'. The kinds of predicative with which we shall be concerned are illustrated in the following English sentences (though of course a predicative is not an agreement target in English):

- (8) a She seems happy.
 b I consider her happy.
 c She came out of the interview happy.

Other word classes are of course possible for the predicative, and are relevant so long as they can carry morphological case; we shall see examples where the agreement target is a noun

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phrase or a participle.

The logic behind the use of this probe is simple. If the predicative is an agreement target, we can use the case of the predicative to identify the agreement source, and this in turn can help us to decide how to analyse complex clauses containing a non-finite complement clause. Suppose the higher clause contains a nominal which (informally speaking) is understood as the subject of the complement clause as well (e.g. *him* in *I expected/persuaded him to come*). For convenience we might call this nominal the 'controller', but it would be better to avoid the implication that controllers occur with 'control' rather than 'raising' predicates; instead we shall call it the '**anchor**' (because it anchors the reference of the lower clause's understood subject). Now suppose that the language has case-agreement between predicatives and their clause-mate subjects. The question is whether a predicative in the lower clause agrees with the anchor; and the answer will tell us whether the anchor is itself the subject of the lower clause (sharing) or whether it simply controls the reference of PRO.

The following simple paradigm from Icelandic illustrates the logic (Andrews 1982a:445). The subscript letters indicate case (Nominative, Accusative), and as before '=' indicates that the anchor is shared as subject by the lower clause. (This analysis is justified below.)

- (9) a Hún_N er vinsæl_N.
she is popular
- b þeir segja hana_A [=] (vera) vinsæla_A.
they say her (be) popular
'They say she is popular.'
- c Hún_N er sögð_N [=] (vera) vinsæl_N.
she is said (be) popular
'She is said to be popular.'
- d þeir telja hana_A [=] (vera) sagð_A [=] (vera) vinsæla_A.
they believe her (be) said (be) popular
'They believe her to be said to be popular.'

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- e Hún_N er talin_N [=] (vera) sögð_N [=] (vera) vinsæl_N.
 she is believed (be) said (be) popular
 ‘She is believed to be said to be popular.’

In all these examples, the anchor is the pronoun meaning ‘she’ or ‘her’ and the predicative is the adjective ‘popular’.

It is easy to see that the anchor and the predicative agree in case: when the anchor is nominative, so is the predicative (a, c, e), but when the anchor is accusative, the predicative is accusative (b, d). Therefore in each sentence the anchor must be the source of the agreement, so the analysis must explain this agreement. The best explanation will build on the uncontroversial rule that in main clauses the predicative agrees with the subject of its clause. This is shown in the first diagram of Figure 2, where the double line (an extended 'equals' sign) shows the agreement relation and the arrows show dependency relations. According to this diagram, the source and the target of the agreement are both dependents of the same verb - i.e. they are clause-mates.

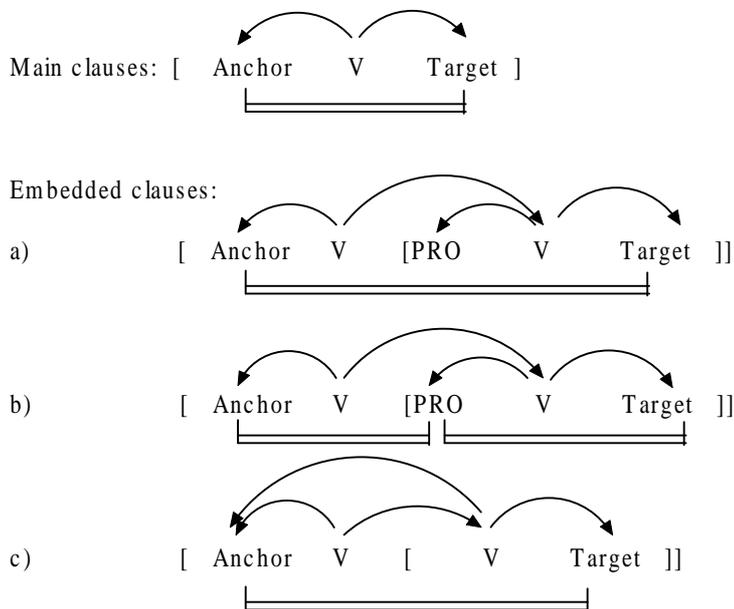


Figure 2

The other three diagrams in Figure 2 show three alternative analyses for a higher clause that contains an infinitive clause, as in the Icelandic examples in (9).

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a. The subordinate clause's subject is PRO, and contrary to the general rule the predicative does not agree with this but with the anchor; so in (9b), *vinsæla_A* agrees directly with *hana_A* although the latter is not a clause-mate. This analysis combines three complementary weaknesses:

- This long-distance agreement is a mere stipulation, not an explanation.
- The long-distance agreement is hard to formulate because it has to distinguish between cases where the anchor is the subject of the higher clause, and those where it is the object.
- The stipulation does not build on the fact that the anchor is also the referential anchor for PRO so it appears to combine two unrelated properties: referential anchor for PRO, and agreement source for the agreement target.

We can therefore eliminate this analysis from further consideration.

b. As in the first analysis, the infinitive's subject is PRO, but this time the agreement is explained by the ordinary main-clause rule: the predicative agrees with PRO, and PRO in turn agrees with the anchor. Thus in (9b), *vinsæla_A* agrees with PRO (which therefore also has accusative case) and PRO agrees with *hana_A*. Here too we find serious weaknesses.

- This would be a very satisfactory analysis if it included an explanation for why PRO should agree with the anchor, but it does not. The anchor is also the antecedent of PRO (in terms of reference), but in general pronominals do not agree in case with their antecedents. For example, in (10), *He* is the antecedent of *him*, but they clearly do not share the same case.

(10) He thought she liked him.

Of course pronominals often agree with their antecedents in terms of other categories such as number and gender, but case is always determined locally rather than by agreement. The proposed analysis would constitute the sole example of a phenomenon which is otherwise unattested.

- Another problem is that (as we shall see in more detail below) in some languages the target may have a different case from the anchor. For example, in the Icelandic sentence (11) the predicative is nominative whereas the anchor is accusative.

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(11) Hún bað hann_A [PRO] að vera goður_N.

‘She requested him to be good.’

In examples like this PRO obviously cannot agree in case with both the anchor and the predicative. We shall see that there are independent reasons for believing that the predicative gets its case from its clause-mate subject, which is PRO, so we can be sure that in at least some examples PRO does not agree with its antecedent. This creates a new problem: why does PRO agree with its antecedent in some constructions but not in others? This question is very similar to the question why the predicative agrees with the anchor in some constructions and not with others, so this analysis simply shifts the problem from one agreement pattern to another.

These two weaknesses eliminate analysis (b), in which PRO automatically transmits the case of the anchor to the predicative.

c) The third analysis dispenses with PRO altogether, replacing it with structure-sharing.

According to this analysis, the anchor is in fact a clause-mate of the predicative although it is also part of the higher clause, so the agreement between anchor and target is just an ordinary example of the target agreeing with its clause's subject. In (9b), vinsæla_A agrees directly with hana_A because the latter is subject of the lower clause as well as being object of the higher one.

The only price for this explanation of the case agreement is the extra complexity due to structure-sharing, but in this case - unlike the purported case-agreement between PRO and its antecedent - we have overwhelming independent evidence that structure-sharing is a normal and wide-spread pattern in syntactic structure. This analysis seems to work well.

To summarise, then, case-agreement is an excellent test for syntactic structure when the anchor is in a higher clause and the predicative is in a lower one:

- (12) a. If the predicative agrees with the anchor, the anchor must belong to both clauses.
b. If not, the lower clause's subject must be PRO.

Case-agreement is different in this respect from agreement for other categories such as gender and number because there is no independent evidence that it is ever involved in anaphor-antecedent agreement.

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Unfortunately this kind of evidence is available only in languages that combine morphological case with subject-predicative agreement. Some languages that have morphological case have no agreement because a complement adjective is always in the same case regardless of the subject's case. This is true, for example, of Malayalam (Mohanan 1982:550,561), where the adjective is always nominative even when its (apparent) subject is dative.

- (13) a kui_N kaan_N aa \emptyset .
 child thief is
 ‘The child is a thief.’
- b kuikk \emptyset _D kaan_N aakaam
 child thief become-want
 ‘The child wants to become a thief.’

Nominative is not the only case that can be imposed on a predicative complement; for example, Classical Arabic and some related languages impose accusative case, as illustrated by the following examples from the Cushitic language Beja (Hudson 1974):

- (14) a uu-tak_N akraab_A k-iike
 the-man strong not-is
 ‘The man is not strong.’
- b uu-tak_N u-akra_N eeya.
 the-man the-strong came
 ‘The strong man came.’
- c tak_A akraab_A rihan
 man strong I-saw
 ‘I saw a strong man.’

In these languages the case of a predicative is fixed by the governing verb rather than by agreement with the subject, so it gives no information at all about the subject's identity.

The rest of the paper will apply the probe of case-agreement to languages in which predicatives do show case agreement. It will rest on the assumption that case agreement

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between the anchor and a predicative in the lower clause is conclusive evidence that the subject of the lower clause is the anchor itself, not PRO, and (conversely) that lack of case agreement between the anchor and the predicative shows that the lower clause's subject is PRO. The question is how this syntactic contrast relates to the semantic contrast between control and raising predicates.

3. Russian

We start with Russian because this illustrates particularly clearly the effects of transitivity in the higher predicate. The analysis given below follows those of Neidle (1982, 1988) and Babby (1998).

In Russian, predicative complements show no case agreement but there are two 'floating quantifiers' which do and which occur as adjuncts: *odin*, 'alone', and *sam*, '(one)self'. In Russian, therefore, the predicative is one of these words, and the simplest generalisation is that it always agrees with the subject of its clause as in the first example below. (As usual, the notation with PRO presupposes the analysis which will be proposed below.)

- (15) a Ivan_N vernulsja odin_N. (Neidle 1988:124)
'Ivan returned alone.'
- b Ona_N poprosila ego_A [PRO_D] ne ezdit' tuda odnomu_D. (Babby 1999:17)
she asked him not to-go there alone.
'She asked him not to go there alone.'

In the second example the predicative is dative, although no dative nominal is available as a potential source. The reason for the dative on the predicative must be that the infinitive's subject is dative PRO, and this dative in turn is due to a general requirement on the subject of an infinitive. We can be sure that infinitives assign dative case to their subjects because this can be seen very clearly in examples where the infinitive's subject is overt, such as the following examples (Babby 1999:23) which also illustrate how *sam*, 'self', agrees with the dative subject:

- (16) a Vam_D samoj_D ne spravit'sja.

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you self not to-manage

‘You won’t be able to manage yourself.’

b Počemu by mne_D ne prodat’ ix_A samomu_D.

why (modal) me not to-sell them self

‘Why shouldn’t I sell them myself?’

In each of these examples the infinitive has an overt dative subject which, as expected, triggers dative case on the predicative.

Regarding the choice between PRO and structure sharing in Russian, what emerges when we apply this test is a clear and almost perfect distinction according to whether the anchor is subject or object of the higher verb. If the anchor is the subject of the higher verb it must be structure-shared - what Neidle calls ‘subject control’ (1982:409) - so the predicative must agree with it. The next examples are from Babby (1998:24):

(17) a Ona_N poobeščala [=] bol’še ne ezdit’ tuda odna_N

she promised more not to-go there alone

‘She promised not to go there alone anymore.’

b Muž zastavil ee_A [PRO_D] poobeščat’ [=] bol’še ne ezdit’ tuda odnoj_D

husband made her to-promise more not to-go there alone

‘Her husband made her promise not to go there alone anymore.’

These examples are interesting because the case agreement shows that the verb ‘promise’ triggers subject-sharing rather than the PRO which is expected by the Theta theory. The predicative varies in case with the subject of ‘promise’, giving nominative if ‘promise’ is finite and dative if it is an infinitive. Conversely, the accusative *ee*, ‘her’, does not influence the predicative’s case, which confirms that the subject of the higher infinitive is not shared but PRO. In this one sentence, therefore, we find the two patterns mentioned above: a higher subject which is shared by a lower infinitive, and a higher object with PRO in the infinitive clause.

The correlation between object anchors and PRO is not perfect, however. Babby reports that in colloquial spoken Russian, structure sharing is also possible when the anchor is

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an object (ibid:33):

- (18) a On_{aN} poprosila ego_A [PRO_D] ne ezdit' tuda odnomu_D.
 she asked him not to-go there alone
 'She asked him not to go there alone.'
- b On_{aN} poprosila ego_A [=] ne ezdit' tuda odnogo_A.

The case-agreement test shows that the complement of 'asked' has PRO in the first example but a shared subject in the second. As we shall see, this alternation after object anchors is found in other languages as well.

To summarise, Russian infinitives generally choose between PRO and the anchor itself as their subject according to whether the anchor is the subject or object of its own clause: they share the anchor if it is subject, but they have PRO if the anchor is object of its own clause. In colloquial Russian sharing is possible in both patterns. The distinction between raising and control predicates plays no part in the choice.

4. Icelandic

In Icelandic, case agreement can be seen in predicative complements (as witness the paradigm in (9)), as well as in some adjuncts such as floated quantifiers. We shall establish the following controversial facts about Icelandic:

- a. that a subject anchor allows (and maybe even demands) structure sharing even if it receives a theta-role from the higher verb;
- b. that an object anchor allows either structure sharing or PRO regardless of whether the higher verb assigns it a theta-role.

4.1 Evidence for structure sharing with theta-marking verbs

Examples like the following (Andrews 1982a:453) provide the crucial evidence for structure sharing with verbs such as 'hope' which clearly assign a theta-role to their subject; as before, '=' indicates that the lower clause's subject is the anchor itself (i.e. the pronoun 'I/me').

- (19) a Ég_N vonast til [=] að vera vinsæll_N.

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I hope to to be popular

‘I hope to be popular.’

b þeir telja mig_A vonast til [=] að vera vinsælan_A.

they believe me hope to to be popular

‘They believe I hope to be popular.’

The obvious explanation for the variation of case on ‘popular’ is that it co-varies with that of ‘I/me’, which means that this pronoun must be structure-shared; in fact, in the second example it must be shared by three clauses - as object of the ‘believe’ clause, and as subject of the two lower ones. In short, ‘hope’ is a theta-marking predicate which nevertheless triggers structure sharing.

It is much harder to decide whether or not ‘hope’ also allows the PRO that might be expected, but it seems unlikely. The evidence comes from verbs which assign a quirky case to their subjects, as illustrated below (Sigurðsson 1991:331):

(20) a Strákarnir_N komust allir_N í skóla.

the-boys got all to school

‘The boys all managed to get to school.’

b Strákana_A vantaði alla_A í skólann.

the-boys lacked all in the-school

‘The boys were all absent from school.’

c Strákunum_D leiddist öllum_D í skóla.

the-boys bored all in school

‘The boys were all bored in school.’

d Strákanna_G var allra_G getið í ræðunni.

the-boys was all mentioned in the-speech

‘The boys were all mentioned in the speech.’

In these examples the case on the adjunct ‘all’ agrees rigidly with that of the clause’s subject, which in turn is determined lexically by its verb.

What should we expect when such a clause is used as a non-finite complement of

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‘hope’? If PRO is possible, there should be no problem because it can carry the quirky case and transmit it to ‘all’. If on the other hand PRO is not possible, the only remaining possibility is structure sharing in which the higher subject doubles up as the lower clause’s subject. But this should be problematic because each clause demands a different case.

The facts seem to suggest that PRO is not in fact possible, or is at best marginal. According to Andrews (1976:174) PRO examples like these are marginal², and speakers strongly prefer to use the alternative syntactic pattern in which the lower verb is subjunctive, with its own overt subject that carries the quirky case. In the following pairs of examples, (a) has an infinitive while (b) has a subjunctive.

- (21) a ?Tröllið_N vonast til [PRO_D] að svelgjast ekki á stúlkunni.
the-troll hopes to to mis-swallow not on the-girl
‘The troll hopes not to swallow the girl wrong.’
- b Tröllið_N vonast til að því_D svelgist ekki á stúlkunni.
- (22) a ?Drengirnir_N hlakka til [PRO_A] að reka á land.
the-boys anticipate to to drift on land
‘The boys anticipate drifting ashore.’
- b Drengirnir_N hlakka til að þá_A reki á land.

² The judgements seem to be very uncertain. In a later paper (1990:224) Andrews quotes the following example as grammatical.

- (i) Ég vonast til að verða ekki bjargað einum_D/ein_N frá fjallinu.
I hope to to be not rescued alone from the-mountain
‘I hope not to be rescued alone from the mountain.’

This judgement contrasts with his earlier semi-rejection of the same sentence without the adjuncts ‘alone’ and ‘from the mountain’. If sentence (i) is indeed possible, then it is evidence that PRO is possible with an intransitive higher verb as an alternative to structure sharing. The ‘?’ and ‘??’ judgements are my interpretation of the comments that Andrews gives in the text.

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- (23) a ?Ég_N vonast til [PRO_D] að verða bjargað.
I hope to to be saved
'I hope to be saved.'
- b Ég_N vonast til að mér_D verði bjargað.
- (24) a ??Ég_N hlakka til [PRO_G] að verða vitjað.
I anticipate to to be visited
'I anticipate being visited.'
- b Ég_N hlakka til að mín_G verði vitjað.
- (25) a ??Ég_N vonast til [PRO_G] að verða beðið.
I hope to to be waited-for
'I hope to be waited for.'
- b Ég_N vonast til að mín_G verði beðið.

Similarly, Sigurðsson (1991:331-2) says that 'many speakers are reluctant to embed floating quantifiers into theta-marking infinitives'³, quoting the following examples:

- (26) a Strákarnir_N vonast til [=] að komast allir_N í skóla.
The-boys hope to to get all to school.
'The boys hope they will all manage to get to school.'
- b ?Strákarnir_N vonast til [PRO_A] að vanta ekki alla_A í skólann.
The-boys hope to to lack not all in the-school.
'The boys hope they won't all be absent from school.'
- c ?Strákarnir_N vonast til [PRO_D] að leiðast ekki öllum_D í skóla.
The-boys hope to to bore not all in school.

³ Sigurðsson draws the contrary conclusion from these examples. He uses them as evidence that PRO can carry case, and explains their marginal status as 'presumably for scope reasons'. But why should it be hard for 'all' to appear within the scope of 'hope'? This pattern seems fine not only in English (e.g. 'We hope to all pass the exam', contrasting with 'We all hope to pass the exam'), but also in Icelandic subjunctive clauses (see the examples from Andrews).

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‘The boys hope they won’t all be bored at school.’

- d ?Strákarnir_N vonast til [PRO_G] að verða allra_G getið í ræðunni.
The-boys hope to to be all mentioned in the-speech.
‘The boys hope they will all be mentioned in the speech.’

The difficulty of these sentences is understandable if the first word is shared as subject by both the top clause and the subordinate clause, given that each clause requires it to have a different case. In short, ‘hope’ allows structure sharing but not PRO.

All other theta-marking predicates similarly select a sharing pattern rather than PRO, as shown by the following examples (Andrews 1976:176-8). In the first pair of examples the higher verb itself governs quirky case on its subject, as well as assigning it a theta-role:

- (27) a Mig_A langar [=] að fara í kaupstaðinn einan_A.
me longs to go to town alone
‘I long to go to town alone.’
b Honum_D líkar vel [=]að vera vinsælum_D.
him likes well to be popular
‘He likes to be popular.’

The verb *langa* governs accusative case on its subject, and *líka* governs dative; but this same case shows up on the predicative in the complement clause, which means that the main clause’s subject must also be the subject of the complement clause, as in the structure-sharing analysis. This conclusion is important because the higher verbs concerned are clearly theta-marking verbs.

Similar patterns are found with object theta-marking, where it is nevertheless clear that the main clause’s object must be doubling up as subject of the complement clause:

- (28) a Hann Satan bauð honum_D [=] að verða vinsælum_D.
‘The devil offered him to be popular.’
b Hún bað hann_A [=] að drepa skessuna einan_A.
she had him to kill the-giantess alone
‘She had him kill the giantess alone.’

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- c Hann fékk hana_A til [=]að vera góða_A við barnið.
he got her to to be good to the-child
'He got her to be good to the child.'
- d Hún bjargaði honum_D frá [=]að ganga þangað einum_D.
she saved him from to go there alone
'She saved him from going there alone.'

At least (a) and (d) are clear examples of theta-marking, since the main verb assigns a theta-role to the anchor as goal of the offer and patient of the saving. Example (d) is particularly interesting because the complement clause is also embedded in a preposition-phrase but the dative case on 'alone' shows beyond doubt that this extra structure does not block structure sharing.

4.2 Evidence for structural ambiguity

What we have established so far is that at least some Icelandic theta-marking verbs trigger structure sharing, and in the absence of counter-evidence we shall assume that the same is true of them all. This is probably the whole story where the anchor is the higher verb's subject, but the situation is more complicated where the anchor is the object because the predicative may also be nominative as an alternative to the case determined by agreement (Andrews 1982a:451):

- (29) a Hún bað hann_A að vera góðan_A/góður_N.
'She requested him to be good.'
- b Hún skipaði honum_D að vera góðum_D/góður_N.
'She ordered him to be good.'

How can we explain this alternation?

One possibility would be to assume a constant syntactic structure with variable agreement between the anchor and the predicative. The variability could be understood in various ways: for example, the rule could be in competition with some other rule or principle that imposed a structural case as a default. But however we conceptualise it, this approach

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faces two serious problems. First, the agreement rule involves not only case, but also number and gender. There is no evidence at all that number and gender agreement are suspended, so we must assume that the agreement always applies. That being so, the rule would have to be expressed in such a way that case could somehow be excluded from its scope. The onus must be on those who propose such a rule to produce independent evidence for it.

The second objection is that if agreement is optional, it is only optional with theta-marking predicates. With non-theta-marking predicates it is obligatory as illustrated by the following examples (Andrews 1982b:24, 1982a:445, 450, Sigurðsson 1992:92)

- (30) a Ég tel hana_A [=] (vera) ríka_A/*rík_N.
 I believe her (be) rich
 ‘I believe her to be rich.’
- b þeir segja hana_A [=] (vera) vinsæla_A/*vinsæl_N.
 they say her (be) popular
 ‘They say that she is popular.’
- c þeir telja han_A [=] (vera) sagð_A/*sögð_N [=] (vera) vinsæla_A/*vinsæl_N.
 they believe her (be) said (be) popular
 ‘They believe she is said to be popular.’
- d Við sáum hann_A [=] koma fullan_A/*full_N.
 ‘We saw him come drunk.’

If variation after theta-marking predicates is explained by a variable agreement rule, it is hard to see why the same variation is not found with non-theta-marking predicates.

A much more attractive possibility to consider is that it is the syntactic structure that varies. Specifically, the proposal is that Icelandic transitive theta-marking predicates may have either structure sharing or PRO in their infinitival complement. To justify this analysis we must first show that the default case for the subject of a non-finite verb in Icelandic is nominative (rather than the accusative or dative that might be expected on the basis of English or Russian patterns); indeed, according to Sigurðsson (1991:338) it is the overall default case for all nominals in Icelandic. The next example (Maling and Sprouse 1995:170) shows that PRO

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must be nominative in cases of anaphoric control.

(31) [PRO_N] Að vera kennari_N/*kennara_A er mikilvægt.

to be teacher is important

‘It is important to be a teacher.’

Moreover, according to Sigurðsson (1992:98) an overt (and unshared) subject is possible in some bare infinitive clauses, as in the following:

(32) Mér virðist Ólafur_N lesa margar bækur.

to-me seems Olaf read many books

‘Olaf seems to me to read a lot of books.’

Sigurðsson refers to ‘overwhelming evidence’ that the surface subject of *virðist* is *mér*, not *Ólafur*. For example, the verb ‘seem’ can also be used without any nominative NP (ibid:191):

(33) Mér virðist rigna.

to-me seems rain

‘It seems to me to be raining.’

It seems, therefore, that the nominative case of *Ólafur* in (32) is licensed solely by its subject relationship to the infinitive *lesa*, which confirms the view that an Icelandic verb’s subject is always nominative by default, regardless of the verb’s finiteness.

Given this default nominative case, we can now return to the alternation in (29) between nominative case and accusative or dative. Nominative is the default case of PRO, whereas accusative or dative is the case of the anchor; so a nominative predicative indicates PRO and an accusative or dative indicates sharing. It seems, therefore, that in Icelandic an anchor which is a theta-marked object allows either PRO or sharing, in contrast with non-theta-marked objects and theta-marked subjects, both of which allow only structure sharing.

4.3 Evidence against a performance explanation

Andrews has suggested (1982a:450-6) a performance explanation for the variable agreement between the anchor and a theta-marked object. He suggests that theta-marking examples are ‘misanalysed’ by analogy with non-theta-marking patterns, resulting in the same ‘case

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attraction' that had earlier been identified in Classical Greek (see section 5.2 below). If this explanation is correct, then there is no need to assume structure sharing or syntactic ambiguity: as far as Icelandic grammar is concerned, transitive theta-marking verbs take PRO just like their English counterparts.

Andrews' explanation seems implausible, as he now agrees (pc), but it is worth recording some reasons for rejecting it.

- Agreement is optional only after *að* (1982b:26). Without *að* it is obligatory, or at least strongly preferred (1982a:453):

- (34) a *Ég bað hann_A [=/PRO_N] að vera góðan_A/góður_N.*
 'I asked him to be good.'
- b *Ég bað hann_A [=/*PRO_N] vera góðan_A/*góður_N.*
 'I asked him to be good.'

Andrews himself invokes the effect of *að* as support for the idea that agreement is due to the analogy of non-theta-marking patterns, which lack *að*, but the star before *góður* is meant to indicate that it is not only ungrammatical, but impossible in texts. If agreement were simply a performance phenomenon, due to the temporary analogical influence of non-theta-marking structures, why is it obligatory, rather than simply common?

- Some verbs have different valencies for different meanings; for example, in the following pair of examples, *lofa* means 'promise' in (a) and 'allow' in (b) (ibid:453):

- (35) a *Hún_N lofaði honum_D [=] að vera *góðum_D/góður_N.*
 'She promised him to be good.'
- b *Hún lofaði honum_D [=/PRO_N] að vera góðum_D/góður_N.*
 'She allowed him to be good.'

In both meanings *lofa* has a dative complement and an infinitive complement, but dative agreement is possible only when it means 'allow' (and when 'him' doubles as higher object and lower subject). In other words, the predicative only agrees with the dative nominal when it is the anchor - just as expected. Under the performance-error analysis, it is strange that the case of the predicative is attracted to that of one closely preceding nominal but not the other.

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It is true that Andrews cites empirical evidence that ‘incorrect’ agreement is statistically favoured by various conditions (1982b:27): if the infinitive is bare rather than introduced by *að*, if the anchor is accusative rather than dative, and if the predicative is an adjective rather than a noun or a passive participle. The facts certainly deserve an explanation but there is no reason to believe that they are easier to explain if agreement is a performance error. On the contrary, the mere fact that structural conditions are relevant suggests the effect of grammar rules which are sensitive to structure and whose effect on performance is probabilistic rather than categorical. Such probabilistic effects are commonplace in quantitative sociolinguistics (summarised for example in Hudson 1996, chapter 6), though it is not yet clear how they fit into a formal grammar.

In conclusion, then, where a predicative agrees with the object of a theta-marking verb it is probably not a performance error, but rather a pattern that is allowed by the grammar. Andrews himself has recently (1990:224) suggested a similar conclusion for a somewhat different pattern, in which an adjunct such as ‘alone’ agrees with either of two subjects: the infinitive’s PRO subject or the theta-marking verb’s overt subject. His example is the following:

(36) *Ég_N vonast til [=/PRO_D] að verða ekki bjargað einum_D/einn_N frá fjallinu.*

I hope to to be not rescued alone from the-mountain

‘I hope not to be rescued alone from the mountain.’

Our earlier discussion in 4.1 suggested that PRO may be marginal with verbs like ‘hope’, so the data are problematic, but it is interesting to note the similarity between Andrews’ analysis and the one suggested here. Andrews suggests that “the dative is possible because *bjargað* ‘rescued’ takes a dative subject, and nominative is possible because that is the case of the anaphoric controller.” In terms of the analysis that I am proposing, the dative is possible by agreement with PRO, and the nominative by agreement with the structure-shared *ég*.

In conclusion, then, Icelandic allows structure sharing in every kind of clause, regardless of whether the anchor is theta-marked or not, but a theta-marked object also allow PRO.

5. Ancient Greek

5.1 Case agreement and default case

Ancient Greek turns out to be very similar to Icelandic except that the syntactic alternation between structure sharing and PRO is even more widespread, extending to non-theta-marking verbs and even to relative pronouns.

As in Icelandic, predicative complements agree in case with their subjects (Lecarme 1978:101).

- (37) a Kuros_N andreos_N ēn.
 Cyrus brave was
 ‘Cyrus was brave.’
- b nomízo ton_A agathon_A andra_A eudaímona_A einai.
 I-think the good man happy be
 ‘I think the good man is happy.’

One obvious consequence is that when a finite verb has no overt subject, we must assume a covert pronominal to carry the case with which AE agrees; since the contrast between PRO and *pro* is irrelevant here I shall continue to call this pronominal simply 'PRO':

- (38) a [PRO_N] andreos_N en.
 brave was
 ‘He was brave.’
- b [PRO_N] bouletai eudaímōn_N einai. (Lecarme 1978:102)
 wants happy be
 ‘He wants to be happy.’

Apart from PRO in finite clauses, this is similar to Icelandic. Unlike Icelandic, however, the default case for the subject of an infinitive is accusative, not nominative. As can be seen in the following examples, the accusative subject may be either overt (a) or a covert PRO (b-d).

- (39) a dokei ton Kuron_A einai sophon_A. (Quicoli 1982:107)

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seems the Cyrus be wise

‘It seems that Cyrus is wise.’

b sumphérei autois_D [PRO_A] philous_A einai. (Lecarme 1978:105)

is-useful to-them friends be

‘It is useful to them to be friends.’

c exarkesei soi_D [PRO_A] túrannon_A genésthai. (ibid)

will-suffice to-you king become

‘It will be enough for you to become king.’

d dei [PRO_A] philánthrōpon_A einai. (Ibid:102)

is-necessary philanthropic be

‘It is necessary to be philanthropic.’

5.2 Sharing versus PRO

As in Icelandic, the choice between sharing and PRO is determined by the higher verb’s transitivity rather than by its semantic classification as a theta-marking or non-theta-marking verb.

With an intransitive verb, the anchor is its subject and sharing is the only possibility, as can be seen from the case agreement in examples like the following (Lecarme 1978:102, Quicoli 1982:127, 129).

(40) a Dareios_N bouletai [=] polemikos_N/*polemikon_A einai.

Darius wants warlike be

‘Darius wants to be warlike.’

b dokei ho_N Kuro_S [=] einai sophos_N/*sophon_A.

seems the Cyrus be wise

‘Cyrus seems to be wise.’

c [PRO_N] oida [=] thnētos_N ōn_N.

I-know mortal being

‘I know that I am mortal.’

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- d [PRO_N] [=] persēs_{SN} ephē einai.
 Persian says be
 ‘He says he is a Persian.’
- e apallageis toutōn_G tōn_G [=] phaskóntōn_G [=] dikastōn_G einai.
 rid-of those the claiming judges be
 ‘rid of those who claim to be judges’

In the last of these examples, the genitive on ‘judges’ can only be explained by agreement with the genitive pronoun ‘those’, which must be the structure-shared subject of ‘claiming’ as well as of ‘be’ - whence the genitive case on the participle ‘claiming’.

The ban on PRO when the anchor is subject extends interestingly to examples where a reflexive object provides an additional possible anchor (Quicoli 1982:115).

- (41) a [PRO_N] sunoida emautōi_D [=] ēdikēmenos_{SN}/ēdikēmenōi_D.
 am-aware myself having-been-wronged
 ‘I am aware that I have been wronged.’
- b [PRO_N] suggignōskō emautōi_D [=] eu poiēsas_N/poiēsanti_D.
 am-conscious-of myself well having-done
 ‘I am conscious that I have done well.’

In these examples there are two possibilities for structure sharing, since the predicative may agree either with the main verb’s nominative subject or with its dative reflexive indirect object; but accusative PRO does not seem to be an option.

When the anchor is a non-reflexive object of the higher verb, however, either structure sharing or PRO is possible. This is what we found in Icelandic, but unlike Icelandic, Ancient Greek shows this alternation whether or not the object is theta-marked, so there is clear evidence that the higher verb’s meaning is irrelevant. We start with straightforward theta-marking verbs which take dative or genitive objects whose case is the only possible explanation for the case on the predicative; these examples demand a sharing analysis in spite of their meaning (Lecarme 1978:106, Andrews 1971:130):

- (42) a. [PRO] sumbouleúō soi_D [=/PRO_A] prothúmō_D/próthumon_A einai.

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I-advise you zealous be

‘I advise you to be zealous.’

- b [PRO] Kýrou_G edeonto [=] hōs prothumotatou_G genesthai.

Cyrus they-begged as most-devoted be

‘They begged Cyrus to be as devoted to them as possible.’

- c [PRO] déomai sou_G [=] prothúmou_G einai.

I-ask you zealous be

‘I ask you to be zealous.’

- d tōn_G deoménōn_G mou_G [PRO_A] prostátēn_A genésthai

those asking me chief become

‘of those who ask me to become their chief’

The same alternation is found with at least one personal non-theta-marking verb, ‘know’

(Lecarme 1978:107):

- (43) [PRO] sunoidá soi_D [=/PRO_A] eu poiēsanti_D/poiēsanta_A.

I-know you well having-done

‘I know you have done well.’

It is also found with impersonal verbs that have SN as an overt object (Lecarme 1978:105).

- (44) a prépei soi_D [=/PRO_A] einai prothúmō_D/prothúmon_A.

befits you be zealous

‘It befits you to be zealous.’

- b éxestin umin_D [=/PRO_A] genesthai eudaimosin_D/eudaimonas_A.

is-allowed you be happy

‘You are allowed to be happy.’

Contrary to the theta-criterion, there seems to be no syntactic difference at all between non-theta-marking verbs and theta-marking verbs.

In short, Ancient Greek imposes structure sharing whenever the anchor is the higher verb’s subject (or is coreferential with this subject), but allows either sharing or PRO in other cases. This explanation for the agreement facts is very different from the traditional one,

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according to which accusative is the ‘logical’ case for the subject of an infinitive and is replaced by nominative, dative or genitive only ‘by attraction’ to the case of the shared element (Lecarme 1978:108, Quicoli 1982:122). As an informal summary of the data ‘case attraction’ is probably helpful to learners, but (as with Icelandic) it hardly explains the facts surveyed above. What is traditionally called case attraction is what we are calling structure sharing, and according to the evidence surveyed above this is distributed by quite simple rules which are based on sentence structure alone. This is not how we might expect performance errors to be distributed.

One of the main characteristics of the proposed analysis is that variable case agreement indicates variable structures - PRO or structure sharing. We can contrast this analysis with other more recent explanations of the supposed case-attraction data. Both Lecarme (1978) and Quicoli (1982) offer analyses in which the variation is located within the agreement rule. (For Lecarme the variation is due to the ordering of agreement relative to other rules, while for Quicoli the agreement rule itself is defined in such a way that it may be sensitive to an NP outside the embedded clause.) One of the empirical advantages of the present analysis is that it automatically extends to agreement in adjuncts, as in the following example (Andrews 1971:136):

(45) [PRO_N] bouloimēn [=] an lathein auton_A apelthōn_N.

I-would-like to escape-notice-of him leaving

‘I would like to leave without his knowing it.’

The participle ‘leaving’ is an adjunct of the infinitive ‘escape-notice-of’, and takes its case from the latter’s nominative subject. This is easy to explain if such adjuncts agree in case with the subject of their clause, and if the predicative adjunct of an intransitive verb shares the latter’s subject. If, however, non-accusative cases are explained by a rule which only applies to predicative complements (as those of Lecarme and Quicoli do), adjunct agreement with a non-accusative has to be covered by a separate rule.

In conclusion, it seems that Ancient Greek had structure sharing when the anchor was a subject and either structure sharing or PRO when it was an object. This is remarkably similar

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to the pattern found in Russian and Icelandic.

6. Conclusions

The conclusions regarding Russian, Icelandic and Ancient Greek are summarised in Table 1, which reveals important similarities among these three languages. In each language the possibilities are distributed around two extreme kinds of anchor nominal: non-theta-marked subjects and theta-marked objects. These two patterns select the structure predicted by the theta-criterion, with structure sharing for non-theta-marked subjects and PRO for theta-marked objects. What the theta-criterion does not predict, however, is that structure sharing is in competition with PRO throughout the table, and that it is the dominant pattern. The pressure from structure sharing prevents PRO from having any standing at all with marked subjects, and structure sharing is an alternative to PRO even in the latter’s home territory, theta-marked objects. The only battles in which PRO wins are, first, in Russian where structure sharing is only marginal with theta-marked objects and, second, in Ancient Greek, where it seems to have established itself as an alternative to structure sharing with all objects, including those that are not theta-marked. Even if these three Indo-European languages turn out to be untypical, they suffice to show that the link between verb meaning and subordinate clause structure is less simple than some of us have assumed.

anchor		Structure (Structure Sharing or PRO)		
meaning	function	Russian	Icelandic	Ancient Greek
non-theta-marked	subject	SS	SS	SS
theta-marked	subject	SS	SS (??PRO)	SS
non-theta-marked	object	--	SS	SS, PRO
theta-marked	object	(SS), PRO	SS, PRO	SS, PRO

Table 1

What does this discussion tell us about the analysis of languages like English in which

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case agreement does not distinguish structure sharing from PRO? At the very least we can be sure that the theta-criterion is not universally relevant, so it cannot be invoked as evidence in any language. Do verbs such as *try* and *seem* license different structures? In the absence of clear syntactic evidence for a difference we must assume that they do not, and similarly for those like *persuade* and *expect*. If PRO and sharing cannot be distinguished, how do we, as analysts, choose between them? Here the syntactic evidence is clear (and very familiar): at least 'raising' verbs such as *seem* demand sharing rather than PRO in order to explain the raising of expletives (e.g. *There seems to be a mistake.*) and idiom chunks (e.g. *The hatchet seems to have been buried.*) The logical conclusion is therefore that sharing is the natural analysis for **all** cases of 'functional control', as claimed since the earliest days of Lexical Functional Grammar (Bresnan 1982a:64-72) and Word Grammar (Hudson 1984:112, 1990:237).

On the other hand, case-agreement also provides conclusive evidence for at least one null element in syntax, the null pronominal that I have called PRO. This conclusion is important because some of us have built theories which at least implicitly deny it, such as my own theory Word Grammar. If PRO exists in Russian, Icelandic and Ancient Greek, it exists in human language so in principle it is available to speakers of all languages. This is an uncomfortable conclusion for languages like English because we may (possibly) never know exactly what null elements there are.

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