Con PRO, or the virtues of sharing[*]

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1 'Equi' verbs: the alternatives

Verbs such as PERSUADE and FORCE occur as the first verb in the pattern V1 + NP + V2, in which the referent of the NP is a semantic argument of V1 as well as of V2. For example, take (1).

(1) Mary persuaded Fred to help.

This sentence describes two related scenes, a 'persuasion' scene in which Mary says (or does) something to Fred, and a 'helping' scene in which Fred does something. Fred is necessarily involved in both scenes, so he must be an argument of both verbs. This much is (presumably) agreed, and to that extent we agree about the semantic structure. Nor is there any dispute over terminology: verbs like PERSUADE and FORCE are widely called 'Equi' or 'control' verbs, to distinguish them from 'raising' or 'ECM' (Exceptional Case-marking) verbs such as BELIEVE and EXPECT, which we shall discuss later. For simplicity I shall use the terms 'Equi' and 'raising'.

What is in dispute is the syntactic structure around Equi verbs, where current analyses offer two main alternatives. The most popular one is associated with all the Chomskian theories and with HPSG (Pollard and Sag 1994:135), and involves PRO (or its unnamed equivalent in HPSG) - an NP which is the covert subject of *to help*.

(2) Mary persuaded $Fred_i$ [PRO_i] to help.

PRO is intimately related to *Fred*, but only at the level of semantics, where they are necessarily coreferential (as shown by the shared subscript indices). The alternative to this analysis has been proposed within the frameworks of LFG (Kaplan and Bresnan 1982:226) and of Word Grammar (henceforth **WG**; see Hudson 1984, 1990), and has no PRO. According to this analysis, the syntactic link between *Fred* and *to*

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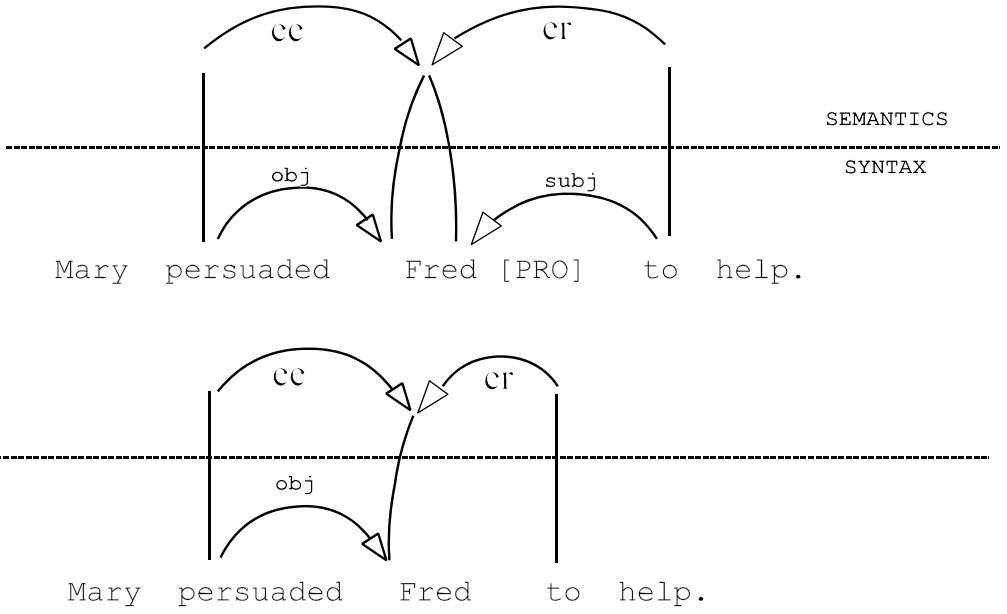
help is direct, rather than mediated by PRO: the word *Fred* itself is the syntactic subject of *to help*. However this analysis also takes *Fred* as the object of *persuaded*, so the one word *Fred* is shared by two verbs, as the object of one and the subject of the other.

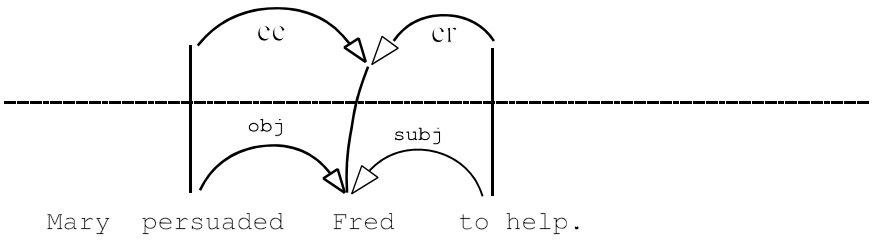
To distinguish these two analyses I shall call them the PRO analysis and the sharing analysis. The bulk of what follows is a defense of the sharing analysis of these structures, and a generalisation to other structures. The discussion involves a major principle of syntactic theory: can one word be part of two distinct constructions (without the use of mediating empty elements)? I shall argue that syntactic theory should indeed allow this kind of pattern (as it does, of course, not only in LFG and WG, but also in HPSG), but I recognise that the empirical evidence may be outweighed by other considerations - facts, theoretical premisses or even personal taste. However I shall end the paper by showing the benefits of sharing analyses for a number of other constructions. It would be easier to rule out sharing as a matter of deep theoretical principle if Equi structures were the only evidence for it.

The PRO and sharing analyses are not of course the only logically possible analyses. Another approach would be to say that the infinitive has no subject at all, whether overt or covert. This is a serious candidate in LFG, HPSG and WG, but for present purpose we can lump it together with the PRO analysis because it recognises a semantic link between NP (*Fred*) and V2 (*to help*), but not a syntactic one. The main distinction, then, is between 'sharing' and 'non-sharing' analyses, where the PRO analysis is the most illustrious example of the latter. The following diagrams illustrate the differences. The lower arrows show the syntactic relationships between the words themselves, and the arrows above the dotted line belong to the semantic structure. (The notation belongs to WG, but I hope it will be helpful as a simple way of presenting the alternative analyses with the minimum of theoretical assumptions.)

(3) The PRO analyses



The sharing analysis



As these diagrams show, the key question is whether or not *Fred* is the syntactic subject of *to help*.

2 Case as evidence for subject-sharing

It is hard to find conclusive evidence for either of these analyses in English, but other languages are more helpful. What is particularly helpful is a rich system of inflectional case, and the evidence that follows will all be taken from languages of this type - Icelandic, Ancient Greek and Modern Greek. Case has often been used in this way as evidence for 'sharing' analyses; all that this paper will do is to extend the

discussion to Equi structures like the ones found with PERSUADE, and to draw some general theoretical conclusions.

For instance, take the evidence for 'raising' analyses of some verbs in Icelandic surveyed in Andrews (1982:445), where N and A stand for nominative and accusative.

(4) a Hún(N) er vinsæl(N).
She is popular

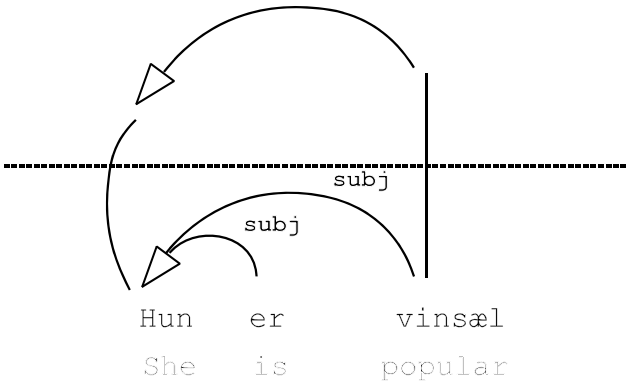
b Þeir segja hana(A) (vera) vinsæla(A).
They say her to-be popular

Clearly the case of *vinsæl* varies with the case of the pronoun. It is hard to dispute the conclusion that Andrews draws, namely that the pronoun is the adjective's subject (as well as subject of the copula) which is separated from it by the application of raising. Given this analysis the rule for the case (and other features) of a predicative adjective in Icelandic is very simple: it must agree with its subject. However, the consequence of this conclusion is that the pronoun must be the subject of more than one word. In addition to being the subject of *vinsæl,* we can be sure that it is the subject of *er* in (4)a because it is in the subject position, it is in the expected nominative case, etc. Similarly in (4)b: *hana* must be the subject of *vera* as well as of *vinsæla*.

However good the evidence for syntactic sharing may be, there is no such evidence for sharing in the semantics (in contrast with the 'Equi' examples which are our principle concern). On the contrary, such evidence as there is seems to suggest that the shared words have only one semantic link - for example, that the referent of *hún* or *hana* is an argument of the sense of *vinsæl,* but not of any other word.

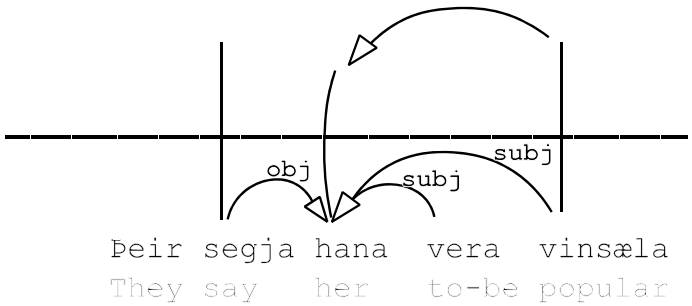
This much is presumably widely agreed and theoretically (relatively) uncontentious, though different theories offer different ways of showing these double allegiances. LFG or HPSG allows different functional slots to share the same filler, WG allows different dependency arrows to converge on the same word, and Chomskian linguists allow chains of NPs and coindexed traces. The different systems are all different ways of showing 'sharing' - two words sharing a single dependent. Here is the simplified WG diagram for (4)a:

(5)



The analysis of the more complex example (4)b is more controversial, depending on whether or not *hana* is taken as object of *segja*. If it is, then *hana* is shared syntactically by three words, as subject of *vera* and *vinsæla* and as object of *segja*. This is the analysis shown in the next diagram, but even without the object link it is still shared as subject by two words.

(6)



Icelandic case favours sharing analyses in other ways as well. In particular, the facts about 'quirky' cases have been quoted as evidence for sharing. The data are summarised conveniently by Pollard and Sag (1994:138). For example, *vanta*, 'lack', requires its subject to be accusative, but if this verb is the complement of *virðist*, 'seems', the latter's subject also has to be accusative (Andrews 1982:462, Pollard and Sag 1994:138):

(7) a Drengina(A) vantar mat(A).
the-boys lacks food
'The boys lack food.'

b Hana(A) virðist vanta peninga(A).
her seems to-lack money
'She seems to lack money.'

In the first example *vantar* governs the case of the first noun, which there are excellent reasons for taking as its subject (Andrews 1982). The same government relationship exists across 'seems', and there are equally good reasons for taking *hana* as the latter's subject too, so we have another clear example of sharing, with *hana* shared as subject by both *virðist* and *vanta*.

In both these examples the evidence for sharing came from a purely syntactic rule for inflectional case, but the first example involved case-agreement while the second involved case-government. An important difference between the two is that the latter can lead to case-conflicts. The normal case for an Icelandic verb's subject is nominative, so one would expect the subject of *virðist* to be nominative; but *vanta* requires its subject to be accusative. The fact that this conflict is resolved in favour of *vanta* suggests that the mechanism is default inheritance - the subject of a verb inherits the default case (nominative, required by the typical verb) unless this is overridden by a more specific case-requirement (accusative, required by the verb *vanta*). Different theories provide different mechanisms for this kind of conflict-resolution, but the basic insight is probably uncontentious. In WG the mechanism is default inheritance itself (Hudson 1990, chapter 3; Fraser and Hudson 1992).

The main conclusion is that case provides strong evidence for sharing in Icelandic, whether we consider the facts of case-agreement between a predicate nominal (noun or adjective) and its subject or the facts of case-government by non-finite verbs. So far as I know there is no serious disagreement about this conclusion, though (as noted) there are different ways of expressing the sharing in terms of structural analyses. However it is important to bear in mind that in all the examples considered so far the sharing was purely syntactic, without any sharing in the semantic structure. The verbs responsible for the sharing were all 'raising' verbs, in whose semantic structure the syntactically shared ('raised') element played no part. It is generally agreed, then, that one word (or phrase) can have two different syntactic roles (e.g. as subject of two different words).

Nor is there any disagreement over the general principle that one word may have two different semantic ('theta') roles. For example, Chomsky (1986:97) accepts that

John has two theta-roles in (8), (9), by virtue of its relations to the words *left* and *angry*:[1]

(8) John left the room angry.

The question is simply a descriptive one: in which constructions should we recognise a word which is shared both syntactically and semantically? In the following I shall suggest that this pattern is needed for a wider range of constructions than is normally recognised.

3 'Equi' verbs: Icelandic

Consider the following examples (Anderson 1992:116). ('D' stands for dative.)

(9)	Ég	bað	hann(A)	að vera	góðan(A) góður(N). *góðum(D).
	I	asked	him	to be	good.

(10)	Hann	skipaði	honum(D)	að vera	góðum(D) góður(N) *góðan(A)
	He	ordered	him	to be	good.

In both examples the adjective may be in either of two cases: nominative, or the same as the preceding pronoun. This choice is easy to explain if we assume a structural ambiguity between a sharing analysis and a non-sharing analysis. In the sharing

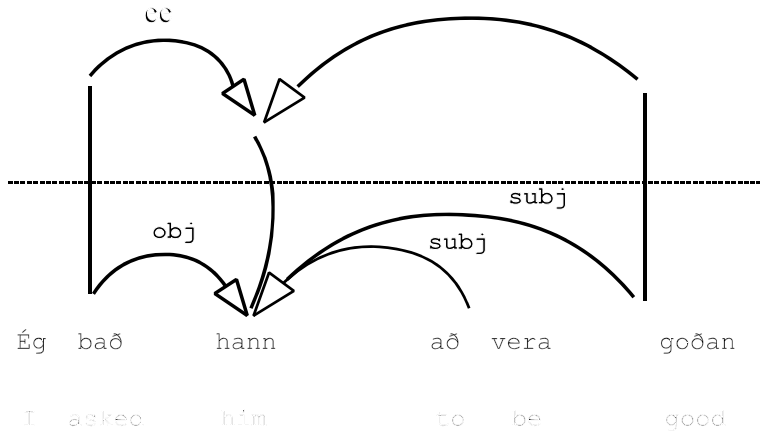
[1]There is some uncertainty about whether the Chomskian paradigm allows sharing in semantic structure. Chomsky (1986) is careful to distinguish 'theta-position' from 'theta-role', on the grounds that a single D-structure position may be assigned more than one theta-role as in *John left the room angry*. However Chomsky's earlier presentation of the theta-criterion (1981:36) allows only one theta-role (not theta-position) per argument NP, and this version has been perpetuated in various introductory works (Radford 1988:391, McCloskey 1988:51, Manzini 1994:502). In any case, regardless of the most general principles, Chomsky's actual practice is clearly at odds with the conclusions of the present paper. The question we are addressing can be reformulated in terms of theta-positions: which are the theta-positions which allow more than one theta-role? For instance, what about the NP position in PERSUADE NP TO V? My conclusion is that this position does allow two theta-roles (as 'persuadee' and also as agent of V), but Chomsky's conclusion is that it receives only the first of these theta-roles.

analysis, *hann* in (8), (9)a is not only the object of *bað* but also the subject of the infitive (and therefore also of *góðan*). In the non-sharing analysis *hann* is merely coreferential with the infinitive's understood subject, so the adjective has no overt subject and takes the default case, nominative. This is the pattern found in examples where sharing is out of the question such as the following (Maling and Sprouse forthcoming):

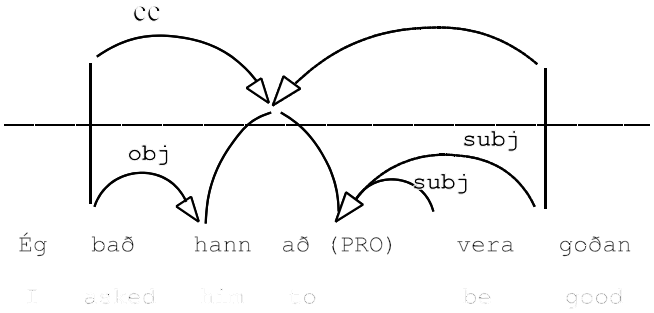
(11)	Að vera	kennari(N)/*kennara(A)	er	mikilvægt.
	to be	teacher	is	important

It is not important here to decide whether the non-sharing infinitive has PRO as its subject or no subject at all, so the second diagram allows for both possibilities by putting PRO between brackets.

(12) The sharing analysis



(13) The non-sharing analyses



What is important in these analyses is that *hann* is semantically (as well as syntactically) related to *bað* 'asked'. In the sharing analysis the sharing is also syntactic, so we have evidence here that one word may be shared by two other words in the semantic structure as well as in the syntactic.

Unfortunately this conclusion is contested by Andrews (1982:432), who argues that the equi verbs in Icelandic, unlike their English counterparts, never share their objects with their infinitival complements (by so-called 'functional control'). They only take infinitives with PRO subjects, which are linked to the intervening NP by 'anaphoric control'. Anaphoric control involves coreference (in semantics), but no syntactic identity, so it predicts that predicate nouns and adjectives should all be in the default nominative case. Why, then, do we find any examples of other cases in apparent agreement with the case of the controlling NP (henceforth '**NP**$_c$')? Andrews' explanation is that this is a performance phenomenon, 'case attraction' (ibid:452), so the sentences containing it are ungrammatical. My reasons for rejecting this conclusion are as follows:

▪ Andrews does not consider the possibility of syntactic ambiguity, so his evidence against a sharing analysis can be reinterpreted as showing simply that only the PRO structure is available in some contexts, rather than that the sharing structure is never available. For example, if there is an intervening NP between NP$_c$ and the infinitive this blocks agreement (453):

(14)	Þeir telya hana(A)	hafa lofað honum	að vera góð(N)/ *góða(A).
	they believe her	to-have promised him	to be good

According to the syntactic ambiguity account, these data show that the verb LOFA 'promise' allows only PRO infinitives. (A similar analysis for the English verb PROMISE would explain why the usual sharing of lower subject and higher object does not apply.)

▪ If the apparent case-agreement were a performance phenomenon, involving short-term memory limitations, one would expect it to be insensitive to abstract structure; why not, for example, a dative adjective in (14) under the influence of the pronoun *honum*? According to Andrews this is not possible, although a dative adjective is possible with LOFA when it means 'allow' (ibid):

(15)	Hún	lofaði	honum(D)	að vera	góðum(D).
	she	allowed	him	to be	good

A more plausible explanation for the difference between (14) and (15) is that when LOFA means 'promise' it takes a PRO infinitival complement, in contrast with the sharing complement that it takes when it means 'allow'. If this is right, it is the grammar rather than the production system that makes 'good' agree with 'him' in one case but not in the other.

■ The predicative adjective is more likely to agree with NP_c if it is accusative than if it is dative (ibid:452). Why should this be if the agreement is a performance matter? Case-attraction should apply to datives as strongly as to accusatives. An alternative explanation for the facts that Andrews reports - patterns of responses from informants and text-frequencies - is that the grammar favours the sharing of accusative objects. This would not be surprising given that the raising/ECM constructions always have accusative objects.

■ In some examples the predicate nominal does not even allow nominative case. With some verbs that allow a bare infinitive (without *að*), the accusative of the object is highly favoured, or even obligatory (ibid:453). An example is BIðJA, 'ask':

(16)	Ég	bað	Maríu(A)	vera	?góð(N)/góða(A).
	I	asked	Mary	to be	good

If the accusative case was a performance error it would have to be an obligatory performance error, which would be hard to distinguish from a grammatical rule. A much easier solution would be to say that the verb BAð 'ask' takes an accusative object which doubles up as subject of the infinitival complement.

■ The supposed case-attraction seems to apply much less readily, if at all, when the equi verb is intransitive (in a pattern NP + V1 + V2). Most of these verbs (as V1) take ordinary nominative subjects, but some take subjects with quirky case (e.g. *langar*, 'longs' takes an accusative subject). Whatever the case of V1's subject, the preferred case for the predicative nominal after V2 is nominative, and according to Andrews it is doubtful whether it would ever be accusative (ibid:454). The following are Andrews' examples and judgements:

(17)	a	Ég(N)	vonast	til að	vera	vinsæll(N).
		I	hope	for to	be	popular
	b	Hana(A)	langar	að	vera	rík(N)/?ríka(A).
		She	longs	to	be	rich

Why should case-attraction not apply in examples like this? Admittedly the presence of the intervening V1 might weaken the contaminating effect of NP, but not to this extent. Furthermore, if mere adjacency was relevant, subject-inversion should produce a subject whose influence should be as strong as that of an object; so an accusative adjective should be as likely in (18)a as in (18)b (= (15)):

(18)	a	Langar	hana(A)	að vera	ník(N)/níka(A)?	
		Longs	she	to be	rich	
	b	Hún	lofaði	honum(D)	að vera	góðum(D).
		she	allowed	him	to be	good

It would be surprising if this turned out to be true.

■ Furthermore, Sigurðsson (1991) shows that the case of V1's subject is irrelevant to V2's dependents. Apparently a floated quantifier always agrees with the expected subject of V2, and is never 'contaminated' by the nominative of V1's subject instead. The crucial point of the following examples is the accusative case of *alla* in the last one, which can only be explained if we assume that the understood subject of the infinitive *vanta* is **different** from the nominative subject of *vonast*, 'hope'.

(19)	a	Strákarnir(N)	komust	allir(N)	í skóla.
		the boys	get	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	Strákarnir(N)	vonast	til að	komast	allir(N)	í skóla.
	the boys	hope	for to	get	all	to school
	'The boys hope to all manage to get to school.'					

d	Strákarnir(N)	vonast	til að	vanta	ekki	alla(A)	í skólann.
	the boys	hope	for to	lack	not	all	in the school
	'The boys hope not to all be absent from school.'						

Sigurðsson's evidence shows very clearly that at least some intransitive equi verbs are absolute barriers to 'case-attraction'. This is not what we should expect of a

performance influence, but unsurprising if case is determined by grammatical structure. The natural conclusion (which Sigurðsson takes as given) is that verbs like 'hope' in Icelandic take a PRO infinitive, i.e. they do not share their subject with their infinitival complement.

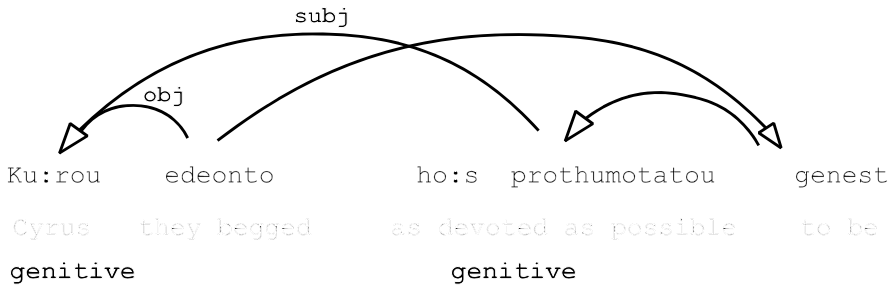
My conclusion, then, is that Icelandic allows either sharing or PRO structures after most transitive equi verbs, though it only allows PRO structures after intransitives. The main point is the existence of some equi verbs which demonstrably do allow sharing - i.e. which allow their object to act as the syntactic subject of their infinitival complement. If this conclusion is correct, then it establishes the general principle that syntactic sharing **can** be combined with semantic sharing, because in all these examples NP_c is very clearly a semantic argument of the first verb as well as of the second, as shown in the diagrams in (12).

Another language in which equi verbs seem to allow sharing is Ancient Greek, pace Andrews (ibid:452). For example, take the following example from Andrews (1971:130), with G standing for genitive:

(20) Ku:rou(G) edeonto ho:s prothumotatou(G) genesthai
of Cyrus they begged as devoted as possible to be
'They begged Cyrus to be as devoted (to them) as possible.'

The obvious explanation for the genitive case on *prothumotatou* is that it is agreeing with *Ku:rou*; in general predicate nominals agree with their subjects (which are also the subject of the associated copula verb, in this example *genesthai*), so *Ku:rou* must be the subject of *prothumotatou*. But *Ku:rou* gets its case by government from *edeonto*, so it must be the latter's object. Therefore it must be shared by the two verbs. The assumed structure is shown below.

(21)



I have included in this structure more than the two relevant links converging on the shared word in order to show the intersecting dependencies that result; sharing solves some problems, but leads to others. How these can be solved is a separate matter (Hudson 1990, 1994).

This example seems to be typical of Ancient Greek, as witness the following. The first (provided by Anna Morpurgo Davies) is from Herodotus VII 160, the second (via James Tauber) from the New Testament (Titus 2.4):

(22)	sù ... ou	me(A)	épeisas	askhe:mona(A) ...	genésthai
	you not	me	persuaded	indecorous	to be
	'You have not persuaded me to be indecorous.'				

(23)	so:fronizo:sin	tas neas(A)	philandrous(A)	einai
	they may train	the young women	husband-loving	to be

4 Relative clauses

Having established the principle that one word (or phrase) may have two separate functions not only in the syntax but also in the semantics we can explore some further applications, starting with relative clauses. Relative clauses are particularly interesting because (by definition) the antecedent noun not only plays its normal part in the syntactic structure of the main clause, but it is also involved at least semantically in the structure of the relative clause.

Relative clauses are often defined simply as clauses which modify a noun, but this would allow both the subordinate clauses in the following to count as relative clauses, as they both 'modify' the meaning of *(the) fact* (in the sense of making its meaning more precise):

(24) a We were discussing the fact [which he talked about].
b We were discussing the fact [that he talked about her].

But only the first of these examples is in fact a relative clause, the other being a 'content clause'. The crucial difference between the two examples is that the meaning of *(the) fact* is itself included in the semantic structure of the relative clause, which can be paraphrased as 'the fact such that he talked about it'. Thus the fact is shared, as an argument, by *discussing* and *talked about*. Admittedly the relationship is somewhat more complex than this, as *fact* is arguably related by its sense to *talked about* but by

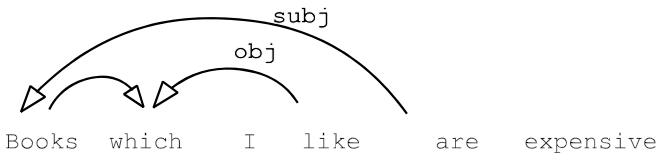
its referent to *discussing* (Hudson 1990:391) but the main point is that the meaning of *the fact* plays no part at all in the semantic structure of the content clause.

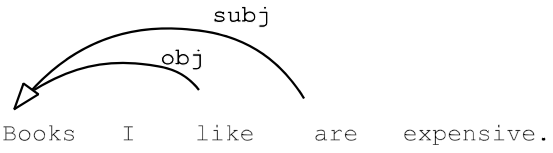
The link between the antecedent *fact* and the relative clause is mediated in this example by *which*; this is the complement of *about*, and is linked to *fact* only by coreference in the semantics, and an adjunct dependency in the syntax. But a relative clause does not have to be introduced by a relative pronoun. For example:

(25) a Books which I like are expensive.
b Books I like are expensive.

These sentences both have the same semantic structure, with *books* related via its referent to *are expensive* and via its sense to *(which) I like*. But syntactically they are different, and it is at least tempting to think that *books* in the second sentence carries both the syntactic relations (subject of the higher verb and object of the lower one). The diagrams in (26) show part of the WG structures for these examples (Hudson 1990:383ff):

(26)





But temptation is not enough. How can we make a principled choice between the proposed sharing analysis and one in which there is an empty relative pronoun? The trouble is that English does not provide clear evidence to help us make this decision. Similarly for 'reduced' relative clauses, containing a participle:

(27) Books describing WG are rare.

At least in the semantics, *books* clearly belongs to the relative clause *describing WG* (as the 'describer'), as well as to the main clause; but is this semantic link also supported by a syntactic link? The sharing analysis takes *books* as the subject of *describing*, and the non-sharing analysis assumes either that *describing* has some kind of covert pronoun as its subject, or that it has no subject at all. Either analysis would fit the facts.

Other languages are more helpful, and once again the crucial feature of the examples is their inflectional case. For this construction we can turn to Modern Greek (a language which was irrelevant to equi verbs because it has no infinitive verb-forms).[2] If MONOS TOU, 'alone', is used as an adjunct, MONOS must agree with the subject of its clause in case as well as in gender and number (TOU also varies in gender and number, but is always genitive):

(28)	a	aftos(N)	kathotan	monos(N) tou(G)
		he	sat	alone
	b	afte:(N)	kathotan	mone:(N) te:s(G)
		she	sat	alone

A (passive) participle may be used to modify a noun as a 'reduced' relative clause, agreeing with the noun in gender, number and case:

(29)	a	o(N)	antras(N)	kathismenos(N)
		the	man	sitting
	b	ton(A)	antra(A)	kathismeno(A)
	c	e:(N)	gynaika(N)	kathismene:(N)
		the	woman	sitting
	d	te:n(A)	gynaika(A)	kathismene:(A)

Now the crucial fact: when we add MONOS TOU, it varies in case (as well as in number and gender) with the modified noun:

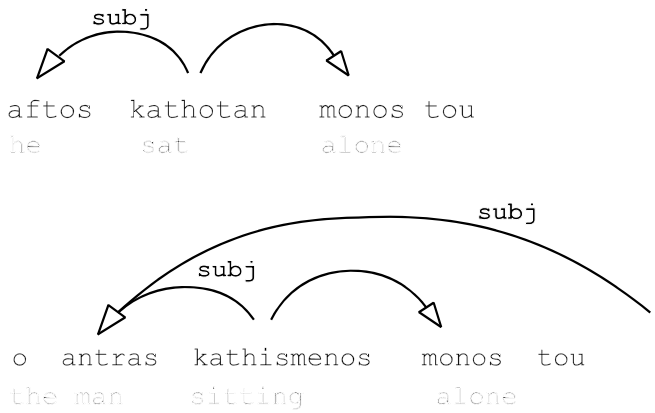
(30)	a	o(N)	antras(N)	kathismenos(N)	monos(N) tou(G)	
		the	man	sitting	alone	
	b	ton(A)	antra(A)	kathismeno(A)	mono(A)	tou(G)

[2]I am endebted to Elisa Konstantinou and Dimitra Tzanidaki for the data.

c	e:(N)	gynaika(N)	kathismene:(N)	mone:(N)	te:s(G)
	the	woman	sitting	alone	
d	te:n(A)	gynaika(A)	kathismene:(A)	mone:(A)	te:s(G)

Since MONOS TOU agrees with the subject of its clause if the latter is a main clause, it is a reasonable conclusion that the same is true when it is part of a relative clause; but if that is so, the modified noun, i.e. the relative clause's antecedent, must itself be the relative clause's subject in addition to whatever function it satisfies in the higher clause. In other words, the one word must be shared by both the main clause and the relative clause. The WG diagram shows this sharing structure:

(31)



Case-marking provides also a different kind of evidence of sharing in relative clauses; these patterns, like the Icelandic examples we considered earlier, are traditionally attributed to 'case-attraction'. Comrie (1981/1989:153) gives a particularly clear example from Persian (where the suffix *-i* marks the noun *zan* as modified):

(32)	a	a:n	zan-i-ra:(A)	ke	diruz	a:mad	didam
		that	woman	that	yesterday	came	I-saw
		'I saw that woman who came yesterday'					
	b	a:n	zan-i(N)	ke	diruz	a:mad	didam

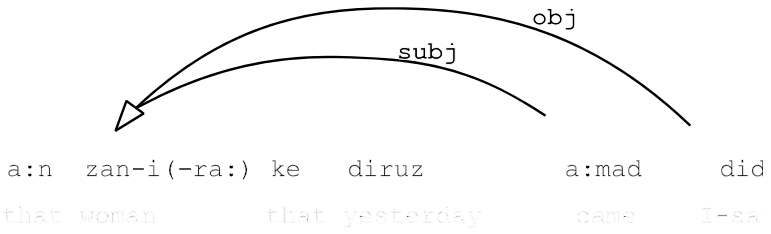
These two sentences have the same meaning, but the case-marking of *zan-i*, 'woman', can reflect either of its two functions, as object of the main clause or as subject of the

relative clause. The same alternation is possible if the head-noun is subject of the main clause and object of the relative clause:

(33)	a	a:n	zan-i(N)	ke	dididd	inja:-st
		that	woman	that	you saw	is here
	b	a:n	zan-i-ra:(A)	ke	dididd	inja:-st

The most obvious interpretation of these facts is that *zan* is shared by the two clauses:

(34)



Why are nominative and accusative both possible? Presumably because Persian grammar stipulates that either is possible for a noun which is both subject and object at the same time.

The best evidence for sharing in English comes from free relatives like the following:

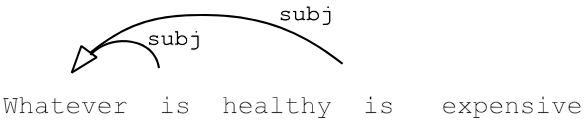
(35) a Whatever is healthy is expensive.
b Whatever foods are healthy are expensive.

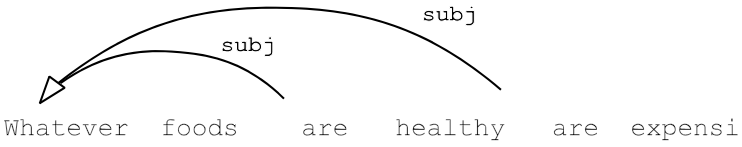
The most obvious surface analysis for sentences like these takes the relative pronoun (or the NP containing it[3]) as shared by both verbs. This sharing analysis is shown in

[3]It could of course be argued in a constituency-based analysis that the subject of the higher clause is the whole NP/DP, including the relative clause, whereas the subject of the relative clause is just part of this phrase. This option is not available in a pure dependency analysis, but it is not obvious that it is allowed by X-bar theory either. What is the recursive node which allows adjunction of the relative clause? If this node is XP, the determiner *whatever* is part of the relative clause, which gives the wrong semantics. But if it is X', we have to allow X' to be a subject. The obvious solution to this dilemma is to introduce some kind of zero relative pronoun to carry the internal subject role, but this faces the problems mentioned in the text.

the following diagrams (where I have assumed for convenience that *foods* depends on *whatever*, as in the DP analysis and also in WG):

(36)





This analysis is very easy to justify (and to generate), but how can we argue against a PRO-like analysis in which an extra (but inaudible) pronoun carries one of the syntactic dependencies? Let's call this pronoun simply ZERO. If ZERO really is part of the syntactic structure, *whatever (foods)* must be its antecedent and it must be in the normal position for relative pronouns inside the relative clause: *whatever foods [ZERO are healthy]*. But by separating the antecedent from the relative pronoun we have created a double problem: how to rule out the following sentences:

(37) a *Whatever foods are expensive.
b *Whatever foods that/which are healthy are expensive.

In other words, how do we guarantee first that the relative pronoun is always ZERO and second that there is always a relative clause? The first problem may be soluble with an obligatory movement rule (McCawley 1988:456), but it is very hard to imagine any grammatical constraint which could be imposed by a determiner and which could require its complement noun to have a relative clause as adjunct. If, on the other hand, we take *whatever* itself as a relative pronoun, both of these restrictions follow automatically just as they do for all relative pronouns: after a relative pronoun (a) no other relative pronoun is possible, and (b) a relative clause must follow.

5 Conclusion

Our starting question was how to analyse *Mary persuaded Fred to help*. How should a grammatical analysis show that *Fred* acts both as the object of *persuaded* and also

as the subject of *to help*? The choice lay between a 'sharing' analysis in which *Fred* really does have both these syntactic relations and a 'PRO' analysis in which some other element (or nothing at all) is the subject of *to help*. I showed that the case patterns of similar examples in Icelandic and Ancient Greek supported the sharing analysis. Then I looked at some evidence that relative clauses could share their antecedent with the main clause; once again some of the evidence came from inflectional case (Modern Greek and Persian), but some came from English verb agreement.

Sharing is already established as a recognised pattern in most modern theories of grammar: in GB (and its successors, which we might call collectively 'ex-GB'), LFG and HPSG, as well as in my own preferred theory, WG. These theories all agree in allowing sharing in 'raising' structures, where the raised NP belongs to both the lower and the higher clause in terms of syntactic structure. What is controversial is whether syntactic sharing may be combined with semantic sharing; in other words, the Theta criterion. Can a single NP have more than one semantic role? The conclusion of this discussion is that it can.

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