

## Coordination, ATB-extractions, and the Identification of *pro*

### *Coordination, ATB-extractions, and the Identification of pro*

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#### 1. Introduction

##### 1.1 Sentences with `shared' arguments

Coordinated structures like the Icelandic sentences in (1), which `share' some element(s), have been bothering linguists for a long time.<sup>1</sup>

- (1) a. Ég syndgaði **og** [var fyrirgefið].  
I sinned and [was forgiven]  
'I sinned and was forgiven.'
- b. ?Hvaða mann elskar María **en** [hatar Anna]?  
which man loves Mary but [hates Ann]  
'Which man does Mary love and Ann hate?'
- c. Hnífnum fleygði hann í gólfíð **og** [hljóp í burtu].  
knife-the dropped he in floor and [ran away]  
'The knife, he dropped on the floor and ran away.'
- d. Þessar bækur keypti hann í fyrra **og**

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<sup>1</sup> Acknowledgements are still to be added.

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these books bought he last year and  
[ætlaR nú að gefa frænku sinni].  
[intends now to give aunt REFL]  
'These books, he bought last year and now intends to give to his aunt.'

If we make the reasonable (and presumably uncontroversial) assumption that the second conjunct in each sentence is everything that follows the conjunction (*og* in (1a) and (1c-d), *en* in (1b)), then it appears that something is 'missing' from the second conjunct in all of these examples; the subject in (1a) and (1c), the object in (1b), and both the subject and the (direct) object in (1d). However, the sentences taken as a whole are all perfectly grammatical, and their meaning is also quite clear. This shows that elements of the first conjunct are somehow interpreted as belonging to the second conjunct also. But how?

The purpose of the paper is to show that every theory of sentence coordination will have to take notice of languages with relatively rich case system, such as Icelandic; to show that sentence coordination cannot be reduced to constituent coordination; and to show that Icelandic can have referential *pro* in the second conjunct in coordination. I will discuss three recent modifications of the theory of coordination; (i) the proposals of Williams (1990) and Munn (1992) to treat 'across-the-board' (henceforth ATB) extractions (of nonsubjects) and parasitic gaps as instances of the same phenomenon; (ii) the proposal of Burton and Grimshaw (1992) and McNally (1992) to treat sentences with shared subjects as instances of ATB-extraction from a VP-internal subject position; and (iii) the proposal of Heycock and Kroch (1993) to allow coordination of C' and I' in order to account for German examples similar to (1c). I will demonstrate that certain case-marking facts in Icelandic clearly show that the first modification will not work for that language; and while the other two might work in some cases, they will not be as general as in English and German. Therefore, they will not suffice to reduce all examples of coordination in Icelandic to constituent coordination, thus eliminating sentence coordination from the grammar of the language.

I will also show that an empty category must be postulated in the subject position of the second conjunct in sentences like (1a) and (1c-d); and I argue that contrary to standard assumptions, this empty category must be *pro*. In the final section of the paper, I argue that certain differences between Icelandic and German with respect to sentence coordination can be explained by referring to the fact that Icelandic has 'quirky' subject, whereas German doesn't. Since quirky subject do not trigger verb agreement, Agr in Icelandic is incapable of identifying *pro*; hence, the language is free to use other means for the identification, and I argue that in Icelandic, the identification of *pro* takes place at LF, but not in the overt syntax.

#### 1.2 Standard analyses of coordination

In the Standard Theory, sentences like those in (1) were accounted for by means of a

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deletion transformation commonly called 'Conjunction Reduction' or 'Coordination Reduction' (henceforth CR; cf., for instance, Ross (1967)), which 'deleted' the initial constituent from the second conjunct, if it was identical to the initial constituent of the first conjunct. In the 1970s, it became clear that CR was extremely difficult to formalize (cf. Jackendoff (1977); Williams (1978)), and all proposed formulations made some wrong predictions (cf. Sag et al. (1985)). As the theory of generative grammar moved away from language-particular and construction-particular rules, it also became obvious that CR was not only suspicious for empirical reasons. The theoretical objections against such a rule were even more serious; and most or all linguists have abandoned it.

I think it is safe to say that for the last 10-15 years, sentences sharing the subject (like (1a) and (1c)) and sentences sharing the object (like (1b)) have been analyzed quite differently. Sentences which share an object have been assumed to be derived by ATB-extraction; factorization of both conjuncts and simultaneous movement of the material they have in common. This approach was first proposed by Ross (1967), but was reintroduced and formalized by Williams (1977, 1978). Sentences where the conjuncts share the subject do not involve any extraction under common assumptions, so that they could not be treated in the same manner. Instead, they were claimed to involve VP-coordination at D-structure, thus sharing the subject at all levels of derivation (cf. Jackendoff (1977, 100-104)).

Even though the above-mentioned analyses have been 'standard' or 'mainstream', it has been clear all the time that they were not completely free of problems. This was especially pointed out in various papers written in the GPSG-framework (Gazdar et al. (1982); Sag et al. (1985)), where it was claimed that 'no version of transformational grammar has succeeded in explaining, and often not even in describing, well-known and very basic facts about coordination' (Sag et al. (1985, 168)).

The most serious challenge to the VP-coordination analysis was a squib by Van Valin (1986), who pointed out that sentences like (1a) could hardly be accounted for by means of VP-coordination (cf. also Godard (1989); Burton and Grimshaw (1992); McNally (1992)). Under the standard GB-analysis of passive, the second conjunct involves NP-movement from the object position to an empty subject position in Spec-IP. However, this movement ought to be impossible, since in this case, Spec-IP is not empty at D-structure; it must be occupied by the surface subject, since no movement can be posited in one of the conjuncts, and since the verb of that conjunct clearly assigns a  $\Theta$ -role to its subject.<sup>2</sup>

In the mid-1980s, it did not seem unreasonable to state that '[r]ecent transformational grammar has largely abandoned coordination as a topic of study, and what work there is

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<sup>2</sup> Furthermore, such sentences seem to violate the Ross's (1967) Coordinate Structure Constraint and the ATB-principle of Williams (1978), since extraction (NP-movement) only takes place out of the second conjunct. Since the first VP shows passive morphology, we must posit an NP-trace following the verb. This trace is coindexed with the overt NP in the subject position; but the second VP has no such trace. Hence, the CSC and the ATB-principle have been violated and the sentence should be ungrammatical. However, it is clearly grammatical, so this cannot be the correct S-structure representation, given the validity of the above-mentioned constraints.

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bears a marginal relationship to the mainstream of work in that paradigm' (Sag et al. (1985, 134)). But the early nineties seem to be witnessing a renewed interest in coordination; several long-standing problems have been reconsidered in the light of new proposals in other areas of syntax. Thus, both Burton and Grimshaw (1992) and McNally (1992) have claimed that the problems pointed out by Van Valin (1986) can be overcome by assuming the (by now widely accepted) VP-internal hypothesis of subjects. Under their analysis, sentences with both shared subjects, as (1a), and shared objects, as (1b), involve VP-coordination and ATB-extraction, although different types of movement are at work, and different types of chains are created. In (1a), the subjects are extracted from their base-generated positions in Spec-VP of both conjuncts and moved (and somehow amalgamated) to the common Spec-IP by NP-movement, creating an A-chain; whereas in (1b), the objects are extracted from their post-verbal position in both conjuncts and moved to Spec-CP by *wh*-movement, creating an A'-chain.

However, the ATB-hypothesis has also been subject to criticism (cf. Gazdar et al. (1982)). Most recently, Munn (1992) has claimed that no such thing as ATB-extraction exists, and sentences which share a constituent (other than the subject) should instead be analyzed as having a variable in the second conjunct, bound by an empty operator in Spec-CP of that conjunct. Thus, he claims that this construction should be analyzed in the same manner as parasitic gaps.

The English equivalent of (1c) does not pose any problems, because English does not have verb fronting; such sentences can be analyzed as I'-coordination, with the shared subject in Spec-IP and the topicalized object (which is not shared) in Spec-CP. However, the Icelandic (1c) is more problematic, since Icelandic has obligatory verb movement to C in topicalized clauses. Hence, (1c) can neither be analyzed as involving C'- nor I'-coordination, and it seems to be unavoidable to postulate an empty category in the subject position of the second conjunct. But Heycock and Kroch (1993) have recently argued that the German equivalents of (1c) can be accounted for by allowing the coordination of different categories, in this case C' and I', and thus they are not forced to postulate an empty category in the second conjunct.

There is no reason to doubt that these modifications of the theory of coordination will work for English and German, such that it will not be necessary to postulate any occurrences of referential *pro* in conjoined sentences in these languages. But preferably, of course, there should not be a language-particular theory of coordination. As mentioned above, none of the above-mentioned recent modifications of the theory of coordination makes correct predictions for Icelandic. The behavior of shared objects is consistent with analyzing them as ATB-extractions, but quite different from the behavior of parasitic gaps. On the other hand, the behavior of shared subjects is inconsistent with analyzing such sentences as instances of VP-coordination with ATB-extraction. Furthermore, Heycock's and Kroch's (1993) analysis will not work for sentences like (1d), where the conjuncts share both the subject and the object; in this respect, Icelandic differs crucially from German, where the conjuncts can only share either the subject or the object, but not both. Thus, it will turn out to be unavoidable to postulate an empty category in the subject position of the

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second conjunct in Icelandic; and this empty category will have to be analyzed as *pro*. I now turn to the analysis of sentence coordination in Icelandic.

### 2. Sentence coordination in Icelandic

#### 2.1 Shared objects

As mentioned above, Munn (1992) claims that there is no ATB-extraction in sentences like (2); instead, such sentences are to be analyzed as involving two A'-chains, one in each conjunct.

- (2) ... [<sub>CP</sub> who<sub>i</sub> [<sub>C'</sub> John saw t<sub>i</sub> ]] and [<sub>CP</sub> O<sub>i</sub> [<sub>C'</sub> Bill hit t<sub>i</sub> ] ]?

The chain in the first conjunct is <who<sub>i</sub>, t<sub>i</sub>>, and the chain in the second conjunct is <O<sub>i</sub>, t<sub>i</sub>>, where O stands for an empty operator. At LF, however, the empty operator is deleted and both gaps become members of the same A'-chain (Munn (1992, 12)).

This is similar to the standard account of parasitic gap (henceforth, PG) constructions (cf. Chomsky (1982, 1986)). Since there are two different chains in the (overt) syntax, one would expect that it does not matter whether the same morphological case is assigned to both gaps; and that prediction is borne out in Icelandic PG-constructions, as the following examples show:<sup>3</sup>

- (3) a. Ég heilsa þessum manni oft án þess að tala nokkuð við hann.  
I greet this man (D) often without talk anything to him (A)  
'I often greet this man without talking to him.'
- b. ?Þessum manni<sub>i</sub> / \*þennan manni<sub>i</sub> heilsa ég t<sub>i</sub> oft  
this man (D) / \*(A) greet I often  
án þess að tala nokkuð við e.  
without talk anything to  
'This man, I often greet without talking to.'
- (4) a. Ég sé þennan mann oft án þess að hjálpa honum nokkurn tíma.  
I see this man (A) often without help him (D) any time  
'I often see this man without ever helping him.'
- b. ?Þennan manni<sub>i</sub> / \*þessum manni<sub>i</sub> sé ég t<sub>i</sub> oft

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<sup>3</sup> In these and subsequent examples, (A) stands for accusative case, (D) stands for dative case, (G) stands for genitive case and (N) stands for nominative case.

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this man (A) / \*(D)                      see I                      often  
án þess að hjálpa *e*    nokkurn tíma.  
without    help                      anytime  
'This man, I often see without ever helping him.'

These sentences show that no case-clash arises even though different morphological cases are assigned to the real gap and the parasitic gap; although the parasitic gap (or its chain) is somehow licensed by the real gap (or its chain), there is no direct connection between those two. Admittedly, parasitic gaps are never fully acceptable in Icelandic; however, the contrast in these sentences is quite clear. When different cases are assigned to the real gap and the parasitic gap, the overt moved constituent always bears the case of the real gap; the opposite is sharply ungrammatical. Similar facts can be observed in Finnish, cf. Oraviita and Taraldsen (1984). As Munn (1992, 5) points out, Williams' (1990) claim that parasitic gaps are the result of ATB-extraction predicts that the parasitic gap and the real gap have identical status. Icelandic and Finnish case-marking facts show conclusively, however, that this is not the case.

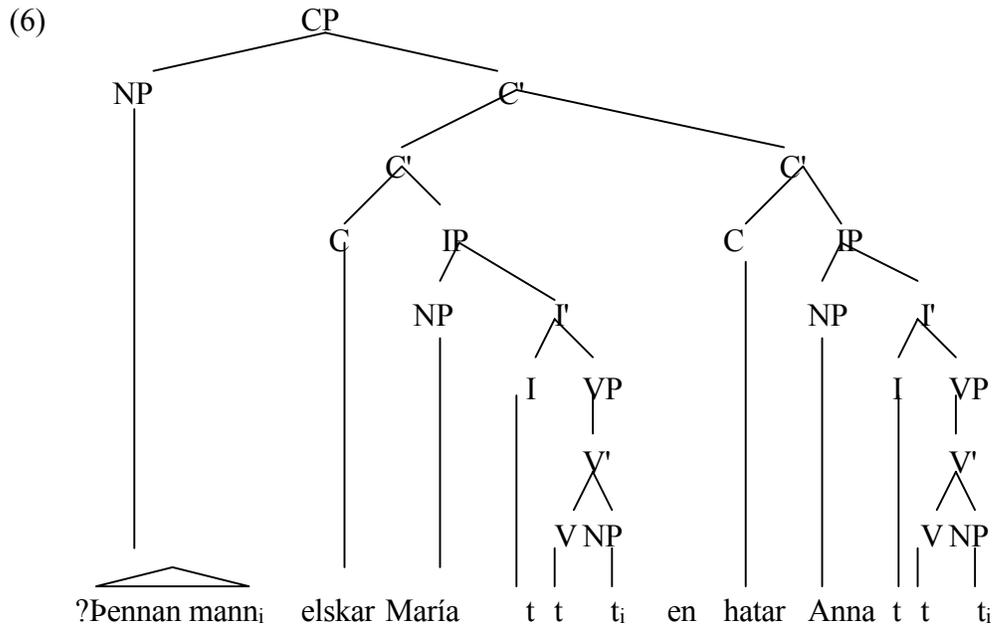
The other possibility of treating these two as instances of the same phenomenon is to analyze all apparent ATB-structures as involving null operators; this is the proposal made in Munn (1992). Note, however, that Munn explicitly excludes sentences with shared subjects from this analysis; he maintains that they are instances of VP coordination, and says that if they are analyzed as involving sentence coordination, with gaps in both conjuncts, the parallelism between ATB gaps and parasitic gaps would be lost (Munn (1992, 4)). Now consider the sentences in (5):

- (5) a. Þennan mann<sub>i</sub> elskar María t<sub>i</sub>.  
this man (A) loves Mary  
'This man, Mary loves.'
- b. Þennan mann<sub>i</sub> hatar Anna t<sub>i</sub>.  
this man (A) hates Ann  
'This man, Ann hates.'
- c. ?Þennan mann elskar María en *e* hatar Anna.  
this man loves Mary but hates Ann  
'This man, Mary loves but Ann hates.'
- d. \*Þennan mann elskar María en Anna hatar *e*.  
this man loves Mary but Ann hates  
'This man, Mary loves but Ann hates.'

In (5a-b), the object *þennan mann* has been topicalized; and as shown in the glosses, both the verb *elskar* in (5a) and *hatar* in (5b) take accusative objects. As (5c) shows, it is

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possible to have ATB-extraction of the object in these sentences; the result is not perfect, but clearly grammatical.<sup>4</sup> (5d) shows that for this to be possible, the second conjunct must have 'inverted' word order; that is, the object cannot be extracted directly from the post-verbal position. This can be explained by assuming that this is a case of C'-conjunction; the finite verb moves to C in both conjuncts, but they share Spec-CP. Thus, there is no preverbal position for the subject of the second conjunct to move into. I assume that (5c) has the structure shown in (6) on the next page:



In (7a-b), we have also topicalized the object; and, as above, the result is perfectly grammatical. However, as the glosses show, the verbs in these examples assign different cases to their objects. The verb *ógna* takes dative objects, whereas *vernda* takes accusative objects.

- (7) a. Þessum manni<sub>i</sub> ógnaði Pétur<sub>ti</sub>.  
           this man (D) threatened Peter  
           'This man, Peter threatened.'
- b. Þennan manni<sub>i</sub> verndaði Jón<sub>ti</sub>.  
           this man (A) protected John  
           'This man, John protected.'

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<sup>4</sup> It should be noted that some speakers do not like ATB-extraction of objects at all; but for those speakers (including myself) that find it grammatical, the contrast between (5c) and (7c) is clear.

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- c. \*Þessum manni / \*þennan mann ógnaði Pétur en verndaði Jón.  
this man \*(D) / \*(A) threatened Peter but protected John  
'This man, Peter threatened but John protected.'

Now, as (7c) shows, there is no grammatical version of these sentences where ATB-topicalization has applied. Given the fact that in the parasitic gap structures discussed earlier, the fronted constituent always bears the case assigned to the real gap, we would expect (7c) to be grammatical with the topicalized object having dative case, since the verb of the first conjunct takes dative objects; but this is just as bad as having accusative on the topicalized phrase, as the verb of the second conjunct would demand.<sup>5</sup>

This shows that it is not possible to treat ATB-structures and PG-structures as instances of the same phenomenon. Even though Williams' (1990) and Munn's (1992) proposals differ in that the former treats all such structures as ATB, whereas the latter treats them as PG, both seem to predict that the case-marking fact should come out the same in both types of structures; but, at least in Icelandic, they do not. The facts presented above clearly indicate that the fronted object somehow 'belongs to' both conjuncts, as the ATB-analysis claims; the verbs of both conjuncts govern its morphological case. Thus, I conclude that for Icelandic, Munn's (1992) analysis does not present a viable alternative to the ATB-analysis of object extraction.

### 2.2 Shared subjects

Let us now turn to conjuncts which share the subject. As pointed out in the Introduction, such sentences are standardly analyzed as involving VP-coordination, and the VP-internal subject hypothesis has been claimed to free this analysis of the problems that had been pointed out. However, we have only looked at English sentences which seem to support this; but Rögnvaldsson (1982) has argued that VP-coordination cannot account for all instances of sentence coordination in Icelandic (although this appears to be the correct analysis in some cases, cf. Bresnan and Thráinsson (1990)). I will first review

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<sup>5</sup> Interestingly, however, such extraction is sometimes possible even though the two verbs assign different cases to their objects, but only if the two cases in question happen to be formally identical. This is shown in (i):

- (i) ?Maríu ógnaði Pétur en verndaði Jón.  
Mary (D/A) threatened Peter but protected John  
'Mary, Peter threatened but John protected.'

The name *María* happens to have the same form in the dative and the accusative; therefore, (i) is much better than (13c), even though the sentences are identical in all other respects. ATB-extraction in other languages with rich case-marking, like Russian and Polish, seems to behave in a similar manner, cf. Franks (1992).

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Rögnvaldsson's main arguments, and then argue that they are still valid, even if we accept the VP-internal subject hypothesis.

The picture is this: Many Icelandic verbs take 'quirky' subjects. Most or even all of them can be analyzed as originating in object position, but several tests show that they are subjects in the overt syntax (cf. especially Thráinsson (1979); Sigurðsson (1989)). These tests include, for instance, the ability to drop in typical CR-structures,<sup>6</sup> such as those in (8)-(11) below. It is quite clear that the 'argument-drop' in the second conjunct is sensitive to grammatical relations; it is impossible to drop an object which is coreferential with the subject of the first conjunct, even if that object is topicalized;<sup>7</sup> and it is also impossible to drop the subject of the second conjunct if it is coreferential with the object, but not the subject, of the first conjunct.

- (8) a. Mér leiddist.  
me (D) bored  
'I was bored.'
- b. Mig langaði heim.  
me (A) wanted home  
'I wanted to go home.'
- c. Mér / \*Mig leiddist og langaði heim.  
me (D) / \*(A) bored and wanted home  
'I was bored and wanted to go home.'
- (9) a. Jón hafði farið snemma.  
John (N) had left early  
'John had left early.'
- b. Jóni hafði verið ekið heim.  
John (D) had been driven home  
'John had been driven home.'
- c. Jón / \*Jóni hafði farið snemma og verið ekið heim.

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<sup>6</sup> Henceforth, I will use the term 'CR-structures' descriptively to cover coordinate structures where each conjunct has a finite verb and its complement, but there is only one overt subject. Thus, my use of this term does not imply any commitment to the transformational analysis of such sentences.

<sup>7</sup> Actually, the behavior of CR is also consistent with Franks' (1992, 7) principle: 'All gaps in any ATB construction must consistently pertain to either thematically most prominent or not most prominent arguments.' This condition 'holds regardless of the abstract Case or phrase structural position of the gaps in question'.

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John (N) / \*(D) had left early and been driven home  
'John had left early and had been driven home.'

- (10) a. Okkar var saknað í partíinu.  
us (G) was (3sg) missed (neut sg) at party-the  
'We were missed at the party.'
- b. Við flýttum okkur því þangað.  
we (N) hurried us (D) thus there  
'Therefore, we hurried there.'
- c. Okkar var saknað í partíinu og flýttum okkur því þangað.  
us (G) was missed at party-the and hurried us thus there  
'People missed us in the party, so we hurried to get there.'
- d. \*Við vorum saknaðir/saknaðar í partíinu og ...  
we (N) were (1pl) missed (3pl masc/fem) at party-the and ...

These sentences show quite clearly that the subject of the conjoined structure gets its case from the verb of the first conjunct, but not from the verb of the second conjunct; and no case-clash arises, even though the two verbs assign different cases to their subjects. It is also clear that there is a close connection between verb agreement and case in Icelandic; verbs only agree in person and number with a nominative subject (cf., for instance, Thráinsson (1979); Sigurðsson (1989, 1990-91)). If the subject is non-nominative, the verb always takes the third person singular form, irrespective of the person and number of the 'quirky' subject. The preceding examples show this clearly; note also (10c), where the past participle also has the nonagreeing neut.sg. form. Under Burton and Grimshaw's (1992) and McNally's (1992) analyses, we would expect such sentences to behave just like the sentences which share an object, since both types involve ATB-extractions; but it ought to be clear from this that object-sharing is subject to much more severe constraints.

As pointed out by Rögnvaldsson (1982), it is not possible to claim that certain verbs are simply marked in the lexicon as only having the 3sg form. The reason is that with some of these verbs, there is vacillation in the case of the subject; it is either nominative or oblique. When the subject is nominative, the verb obligatorily agrees with it in person and number, but when it has any other case, the verb invariably appears in the 3sg form. This can most clearly be seen with the auxiliary verbs in (9) and (10) above; it would be difficult to argue that *hafa* 'have' and *vera* 'be' are marked in the lexicon as having only the 3sg form.

Facts similar to those presented in (8)-(10) can be found in Rögnvaldsson (1982); but more can be added, like those in (11).

- (11) a. Strákarnir gengu lengi og var öllum orðið kalt.  
boys-the (N) walked (3pl) long and was (3sg) all (D) become cold

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'The boys walked for a long time and were all getting cold.'

- b. Strákunum var orðið kalt  
boys-the (D)was (3sg) become cold  
en héldu þó allir áfram.  
but kept however all (N)on

'The boys were getting cold, but they all continued.'

In these sentences, we have quantifier-floating (or quantifier-stranding, assuming the VP-internal subject hypothesis) in the second conjunct. A floated (or stranded) quantifier invariably agrees with the NP it 'belongs to' in number and case; however, it is evident that the overt subject *strákarnir* in (11a) is in the nominative, whereas the quantifier *öllum* is in the dative; and conversely, in (11b) the overt subject is in the dative, whereas the quantifier is in the nominative.

It is a well-known fact that NP-movement in Icelandic preserves quirky case without exceptions (cf. especially Sigurðsson (1989)). This can easily be seen from (8)-(11) above. As (10d) shows, the nominative Case we would expect Infl to assign must not be (morphologically) realized on the subject. Different proposals have been put forth in order to account for this. Some have claimed that Infl only assigns nominative when some adjacent NP would otherwise be caseless (cf. Sigurðsson (1989)). Others (for instance Belletti (1988)) claim that Infl really assigns (abstract) structural Case to the subject, but if inherent Case is also assigned to the subject in its base-generated position, the nominative is not morphologically realized. Although two cases are assigned to the subject position, this does not lead to case-clash and ungrammaticality, since the cases are of different nature; one is structural, whereas the other is inherent.

The empirical and theoretical differences between these two proposals need not concern us here. What is important to us is that if these sentences are analyzed as instances of VP-coordination, the subject must bind two different NP-traces, to which different inherent cases are sometimes assigned, as in (8c). Under standard assumptions, the subject should thus get case from two different case-assigners, who sometimes both assign inherent case, as in (8c). This should inevitably lead to some kind of case-clash, but it does not; only one of these positions is allowed to transmit its case to the head of the chain in Spec-IP.<sup>8</sup> Note that it is not such that inherent case simply overrides structural Case; as (9c) shows, the subject necessarily bears the case assigned by the main verb of the first conjunct. This is hardly expected given the analyses of Burton and Grimshaw (1992) or McNally (1992).

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<sup>8</sup> There might also be some problems with  $\ominus$ -role assignment, as Burton and Grimshaw (1992) point out; it appears that the subject receives more than one  $\ominus$ -role (either by being the head of two different chains, or by heading a chain which two different  $\ominus$ -roles are assigned to). Several authors have suggested ways to overcome these problems; cf., for instance, the references in Burton and Grimshaw (1992, 306n). If we assume that the 'shared' NP in subject position heads two chains this should not be a problem according to Chomsky and Lasnik, who write (1991, 23): 'Thus a chain can have no more than one  $\ominus$ -position, though any number of semantic roles may be assigned in this position.'

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Recall also that in Icelandic, finite verbs never agree with a non-nominative subject in person and number, whereas they obligatorily agree with a nominative subject. We would thus expect that the verb in the second conjunct would agree or not agree with the subject in Spec-IP depending on its case, given the reasonable assumption that the chain which the subject NP heads bears only one case. However, the examples show that this is clearly not so. In (10c), for instance, the verb *flýttum* is in the first person plural, even though the subject *Okkar* is in the genitive case (which in turn demands that the verb in the first conjunct is in third person singular). In (9c), the past participle *ekið* is in its (nonagreeing) neuter form, as we would expect if the subject was non-nominative; but the overt subject *Jón* should take the masculine form *ekinn*.

Rögnvaldsson (1982) was, of course, neither assuming binary branching nor the VP-internal analysis of subjects; but note that even though we adopt both proposals (which I do), it does not have any effects on his argument. In the light of the argumentation above, I conclude that the VP-internal analysis of subjects does not solve any problems concerning sentence coordination in Icelandic (even though this analysis may be feasible for other reasons, cf., for instance, Rögnvaldsson and Thráinsson (1990)).

### 3. *pro* and LF-topicalization

#### 3.1 *An empty operator?*

In section 2, I argued that it is impossible to account for certain aspects of coordination in Icelandic without postulating a separate subject in the second conjunct at some level of derivation. Rögnvaldsson (1982) claimed that sentences similar to (8)-(11) made it inescapable to assume the existence of CR as a transformation. Bresnan and Thráinsson (1990) agree that such examples cannot be accounted for by a VP-coordination analysis; but they add that 'it is not at all clear how to formulate a CR analysis that would account for them'. As pointed out above, a CR-transformation is clearly incompatible with current versions of generative grammar, in addition to being difficult to formulate.

Many of the deletion transformations of early generative grammar have been replaced by representations involving different types of empty categories. Since CR was one of these deletion transformations, the natural step to take is to see whether any of the commonly recognized types of empty categories could be postulated in the CR-sentences. Given the standard classification of empty categories (cf. Chomsky (1982)), we have four possibilities; NP-trace, PRO, *pro* and variable. An empty category in Spec-IP will presumably receive case and  $\Theta$ -role and be governed; hence, both NP-trace and PRO are excluded, according to standard assumptions. At first sight, the possibility of postulating a variable in Spec-IP of the second conjunct seems to be excluded, too; remember that we have rejected all proposals which assimilate ATB-structures to PG-structures involving variables bound by empty operators.

However, Sigurðsson (1989, 1993) has recently proposed this type of solution. He agrees

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with Rögnvaldsson (1982) and Bresnan and Thráinsson (1990) that sentences like (8)-(11) must be analyzed as sentence coordination, but instead of postulating *pro* in the subject position of the second conjunct, he argues that Spec-IP of that conjunct is occupied by a variable, bound by an empty operator in Spec-CP.<sup>9</sup> Thus, his analysis is similar to the one proposed by Huang (1984) to account for empty arguments in Chinese (cf. also Campos (1986) for Spanish, and many others). Sigurðsson refers to Huang's analysis, and other analyses of 'topic-drop' in several languages, to point out that this type of construction is independently needed.<sup>10</sup>

Regardless of the validity of the null operator analysis in accounting for topic-drop, there are several arguments against applying it to CR-sentences. As shown in (12) (cf. also (1d) above), the two conjuncts can share both the subject and the object, such that the second conjunct contains two gaps:<sup>11</sup>

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<sup>9</sup> Sigurðsson (1989, 144-145) claims that empty categories must also be postulated in CR-structures in the Mainland Scandinavian languages and English. However, his arguments lose their force if we assume (as I have already done above) that C'- and I'-coordination is possible.

<sup>10</sup> Although several authors have invoked the null operator analysis to account for the 'drop' of subjects and topicalized objects in various languages, I am sceptical of its general validity. The fact is that in informal speech, the first constituent can often be omitted, provided that it is recoverable from the context (and/or some morphological features of the sentence); and it does not even have to be an NP. Thus, the sentences in (i) are perfectly natural in spoken language:

- (i) a. Komið nokkur póstur í dag?  
arrived (past part) any mail today?  
'Has there any mail arrived today?.'
- b. Gert eitthvað skemmtilegt nýlega?  
done anything enjoyable lately?  
'Have you been doing anything enjoyable lately?.'

Note that what is missing from these sentences is not (solely) an argument, but just the element that should be in the initial position; the finite verb in both cases, and in (ib) also the cliticized second person pronoun. It is rather unlikely that (ia) should be analyzed as having a verb trace variable in C<sup>0</sup> bound by an empty operator in Spec-CP; and it is even more difficult to apply this analysis to sentences where both the verb and the subject are missing, as in (ib). I think that both sentences like (i) and sentences with a missing subject or topicalized object should be analyzed as cases of discourse-conditioned ellipsis, although I have no formalized account to offer.

<sup>11</sup> It would perhaps be possible to account for sentences like (12) by assuming Munn's (1992) adjunction structure. However, Munn does not assume that ATB-extractions exist, so he would have to claim that both gaps in the second conjunct are bound by empty operators. That might in fact be possible, since under Munn's analysis, two Specs are available; Spec-CP and Spec-BP (his 'Boolean Phrase'). However, one of the operator-variable chains would not be licensed by any A'-movement in the first conjunct; and anyway, Munn explicitly states that his account is not ment to cover sentences with shared subjects, as pointed out above.

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- (12) Þessa bók<sub>i</sub> sýndi Jón<sub>j</sub> mér t<sub>i</sub> en gaf e<sub>j</sub> Péttri t<sub>i</sub>  
this book showed John me but gave Peter  
'This book, John showed to me but gave to Peter.'

Presumably, this sentence should be analyzed as an instance of C'-conjunction, as (5c) above; that would explain the word order facts. But note that this entails that there is only one Spec-CP, and it is occupied by the extracted object *þessa bók*. The second conjunct has no special Spec-CP, where an empty operator could be placed.

Another argument comes from an observation made by Cardinaletti ((1990); cf. Rizzi (1992)). She pointed out that even though **subject** pronouns of all persons can be dropped, **object** drop is restricted to third person pronouns. Cardinaletti claims that operators are inherently third person, and hence, they cannot bind first or second person pronouns. From this it follows that the drop of first and second person subject pronouns cannot be topic-drop, and the empty category in subject position cannot be analyzed as a variable bound by an empty operator.<sup>12</sup>

Now, CR crucially involves subjects, but not objects; and it is quite clear that pronouns of all three persons can be freely dropped. Thus, there are both empirical and theoretical arguments against postulating variables bound by operators in the subject position of the second conjunct of CR-sentences.

### 3.2 *pro* revisited

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<sup>12</sup> Instead of postulating *pro* in subject position, Rizzi (1992) assumes that the empty category at stake has the feature composition of variables, [-anaphor, -pronoun], and in addition the feature [-variable] to distinguish it from empty categories bound by quantificational operators (*wh*-words and quantifiers). He also assumes that this type of empty category can receive discourse identification. It must be emphasized that Rizzi does not mention CR-sentences in this connection; and there are reasons to assume that his account would not apply to them. The main reason is that the identification process is quite different; although the empty category in CR-sentences might be claimed to receive discourse identification in the sense that it is interpreted as coreferential to a preceding NP that does not c-command it (cf. below, however), it cannot be interpreted as coreferential with just any old preceding NP; the only possible antecedent is the subject of the preceding clause, as pointed out above. In subject-drop sentences, on the other hand, the referent of the empty category has often not been mentioned in the preceding discourse, and if it has, it does not have to be the subject of some preceding clause.

Furthermore, this account cannot be applied to the empty category in the subject position of the second conjunct of sentences like (12). The reason is that according to Rizzi (1992), an element of the type [-anaphor, -pronominal, -variable] must be identified clause-internally if it can; i.e., if there exists a c-commanding NP which could potentially bind it. Only in the absence of a potential binder can the empty category receive discourse identification. However, such an NP clearly exists in sentences like (12); the topicalized object in Spec-CP. But it is clear, of course, that this object cannot bind both empty categories in the second conjunct.

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Thus, *pro* seems to be the only alternative left; and in fact, Van Valin (1986) (hesitatingly) proposed to posit *pro* in the subject position of the second conjunct. However, he admitted that this analysis left several problems unresolved. For instance, this account makes it difficult to explain why sentences like those in (13) are impossible English sentences.

- (13) a. \*left.  
b. \*John said that *e* stole the car.

Linguists have been reluctant to accept Van Valin's proposal (cf., for instance, Godard (1989), Heycock and Kroch (1993)), since English is, of course, not a 'pro-drop language' like Italian and Spanish, for instance; and neither is Icelandic. Therefore, we must consider whether the objections raised against this hypothesis for English also apply to Icelandic. It might seem problematic to postulate a *pro*-subject in Icelandic conjoined clauses, because although Icelandic has certain instances of both non-referential *pro*, and so-called quasi-argumental *pro* (cf. Sigurðsson (1989); Vikner (1991)), referential *pro* in non-conjoined clauses is impossible in Icelandic; the sentences in (14) are just as ungrammatical as their English counterparts.

- (14) a. \*fór.  
left
- b. \*Jón segir að *e* hafi stolið bílnum.  
John says that has stolen car-the

It is commonly assumed that *pro* must be both licensed and identified, and these two procedures must be kept apart. Several proposals have been put forth regarding the licensing of *pro* (cf., for instance, Chomsky (1982); Rizzi (1986); Jaeggli and Safir (1989); and many others). The differences between these approaches need not concern us here, since there seems to be general consensus that *pro* is formally licensed in Icelandic, as evidenced by the fact that Icelandic obviously has non-referential *pro*; cf. for instance Vikner (1991, 70). Vikner claims that if *pro* is to have any *phi*-features, they must be licensed by its governing head having the same features. This account predicts that Italian and Spanish can have referential *pro*, since I (or Agr) in these languages contains person and number features; and it also predicts that 'among the V2 languages, we may find a language in which *pro* may be formally licensed, but its content cannot be identified, i.e. a language in which only non-referential *pro* is possible' (Vikner (1991, 70)), since its governing head, C, presumably does not contain any *phi*-features. Vikner argues that Icelandic is precisely such a language.

There are no reasons to question this account of the licensing of *pro*; but I think that its identification, i.e. the retrieval of its content, is quite another matter. This procedure is semantic in nature, and depends heavily on extra-linguistic factors. It seems to me that the relevance of recovering the *phi*-features of *pro* has been grossly overestimated. In Italian

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and Spanish, for instance, the overt agreement on the verb only suffices to retrieve the person and number features of the *pro*-subject; its gender must be supplied either by the preceding context or by the circumstances (cf. Sigurðsson (1989, 133)). Thus, what really is at stake is recovering the **reference** of *pro*, which is 'fixed by context or by some antecedent in an appropriate position' (Chomsky and Lasnik (1991, 16)).<sup>13</sup>

Now, Icelandic unquestionably has Agr with both person and number specifications; but crucially, even if Agr (Case-)governs *pro* (cf. Vikner (1991), Jaeggli and Safir (1989)), it would be incapable of unequivocally recovering its reference in many cases, although it could successfully recover its *phi*-features. This is because Icelandic has quirky subjects, as pointed out in section 2, and further illustrated in (15). In this sentence, *var* 'was' is unequivocally singular, and either first or third person, but not second person. However, there is no doubt whatsoever that those who were cold are second person plural.

- (15) Þið höfðuð gengið lengi og var orðið kalt.  
you (pl) had walked long and was (1/3sg) become cold  
'You (pl) had been walking for a long time and were getting cold.'

It seems reasonable to assume that children acquiring Icelandic soon discover that the *phi*-features of Agr are unreliable as a means of recovering the content of *pro*. Therefore, they only use *pro* in structures where it can be unequivocally identified as referring to 'some antecedent in an appropriate position' (cf. the reference to Chomsky and Lasnik (1991) above); that is, in coordinate structures like those I have been discussing.

As soon as we accept the fact that more than the overt verbal inflection is needed to interpret *pro*, even in typical pro-drop languages, we should also be prepared to believe that different languages may use different strategies for identifying *pro* (cf. also Rizzi (1986), Sigurðsson (1993)), and one of these means can be coreferentiality with an NP bearing the same grammatical function (or having the same status in the thematic hierarchy, cf. Franks (1992)) in a preceding conjoined clause. But of course, we still have to explain why and how *pro* in Icelandic can be identified in exactly this construction, as referring to the subject of the first conjunct but not as referring to just any old NP in the preceding context.<sup>14</sup>

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<sup>13</sup> In this respect, the empirical differences between postulating *pro* in situ and a variable bound by an empty operator are not quite clear to me. The identification of *pro* has been widely discussed, and everybody seem to agree that it is subject to some highly constrained principles. But surely, the reference of empty operators must also be determined. However, this is rarely mentioned; it is usually assumed that this identification takes place by means of some relatively (loosely specified) pragmatic principles. Furthermore, some people at least have assumed that the empty operator **is** actually *pro* 'prior to' moving to Spec-CP; it is only turned into an operator by the movement (cf. Sigurðsson (1989); Browning (1991)). If so, one may wonder whether the difference between these two possibilities is actually that great.

<sup>14</sup> Note that in languages like Chinese, Japanese and Korean, which presumably have no Agr, similar constraints seem to hold; thus, a *pro* subject of an embedded clause must corefer with the closest superordinate subject (cf. Huang (1984); Rizzi (1986)). It has been proposed that in such languages, null subjects are identified either by an overt c-commanding NP or by a (null) topic (cf. Huang 1984). It can also

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Thus, I do not think that the fact that *\*fór* 'left' is an impossible sentence in Icelandic is a sufficient reason to exclude *pro* from the inventory of empty categories in the language. It is possible that the different strategies for identifying *pro* could be parametrized, perhaps along the lines suggested by Sigurðsson (1993). I claim that postulating *pro* in the subject position of the second conjunct in (8)-(11) does not violate any empirical facts or theoretical principles, and as far as I can see, it is the only way to account for such sentences.

#### 3.3 Quantified subjects

Even if the theory of *pro* by itself does not exclude the possibility of postulating *pro* in the subject position of the second conjunct in (8)-(11), it still remains to account for the empirical objections made by Godard (1989) and McNally (1992), among others; the fact that (16a) and (16b) appear to have different interpretations (a similar contrast was originally pointed out by Partee (1970)):

- (16) a. Few politicians behave morally and are rewarded for doing so.
- b. Few politicians behave morally and they are rewarded for doing so.

Godard (1989) and McNally (1992) point out that in (16a), the quantificational NP takes scope over both conjuncts. They claim that the *pro*-account predicts that such sentences 'will have a reading identical to that obtained when an overt pronoun appears in subject position of the second conjunct' (McNally (1992, 338)). However, (16b) clearly shows that this is not the case. To quote McNally (1992, 338): 'This unpredicted contrast, on top of the fact that English is not a pro-drop language, considerably reduces the attractiveness of the null pronominal analysis.'

Sentences similar to (16) can easily be constructed in Icelandic, and they seem to exhibit parallel distinctions in interpretation depending on the presence or absence of an overt pronoun. Such sentences are shown in (17a) and (17b).

- (17) a. Margir stúdentar náðu prófinu og var hrósað fyrir það.  
      many students passed test-the and were praised for it  
      'Many students passed the test and were praised for it.'
- b. Margir stúdentar náðu prófinu og þeim (D) var hrósað fyrir það.  
      many students passed test-the and they (D) were praised for it  
      'Many students passed the test and they were praised for it.'

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be mentioned that in Icelandic, for instance, referential object *pro* appears to be possible under certain circumstances, where its identification is completely unproblematic (cf. Rögnvaldsson (1990)). In all other circumstances, it is impossible.

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- c. Margir stúdentar bæði náðu prófinu og var hrósað fyrir það.  
many students both passed test-the and were praised for it  
'Many students both passed the test and were praised for it.'
- d. Margir stúdentar náðu prófinu og var öllum (D) hrósað fyrir það.  
many students passed test-the and were all (D) praised for it  
'Many students passed the test and were all praised for it.'

Note that the argument which is missing from the second conjunct in (17a) should have dative case, as shown in (17b). As argued above, this means that the second conjunct must have a separate subject position, even when the subject is not phonetically realized, as in (17a). This is shown by the fact that the verb and the participle in (17a) have nonagreeing forms, *var* and *hrósað*, instead of the forms *voru* and *hrósaðir*, which would be expected if the overt nominative subject *Margir stúdentar* were the only available subject at all levels of derivation.

It is certainly true that (17b) does not have the same reading as (17a). But contrary to the claims made by Godard (1989) and McNally (1992), I will argue that there is no reason to assume that it should do so, even though *pro* is postulated in (17b). By definition, *pro* is only a bundle of syntactic features; it has no phonetic content, and it has no semantic content either. Its interpretation is entirely dependent on either some preceding NP or the circumstances, as pointed out above. In (17a), the interpretation of the second conjunct is entirely dependent on the NP *Margir stúdentar*; in (17b), on the other hand, *þeim* has some semantic content of its own. Therefore, I do not think the contrast between (17a) and (17b) is a case in point.

Now consider the other sentences in (17). (17a) and (17c) have the same interpretation; i.e., there were many students who both passed the exam and were praised. However, it is possible that there were also some students who passed the exam but were not praised. On the other hand, both (17b) and (17d) must mean that many students passed the exam, and all of them were praised. These sentences show that it is not the presence or absence of an overt pronoun *per se* that decides which interpretation we get. (17d) is just as subjectless on the surface as (17a) and (17c).

#### 3.4 LF-topicalization

But how can we account for the fact that the quantifier in the first conjunct can somehow bind the empty category in the subject position of the second conjunct, be it *pro* or not? Remember that it is commonly assumed that quantifiers are raised at LF, and either moved to Spec-CP or adjoined to IP (or CP) (cf., for instance, May (1985)). Let us suppose that this is what happens in (17); the quantifier is raised at LF and adjoined to the higher IP (or CP). Thus, it gets scope over both conjuncts.

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This analysis seems to face serious problems. First, how can a quantifier moved out of the first conjunct bind an NP which is not its trace in the second conjunct, in addition to binding its own trace in the first conjunct? Second, how can we move something out of one of the conjuncts but not the other without violating the CSC and the ATB-principle? Third, why doesn't such movement lead to case-clash, as the object extraction described in section 2 inevitably does if different cases are assigned to the object positions of the two conjuncts? And fourth, how can we explain the difference in interpretation between (17a) and (17c)?

I propose that we can freely move the subject of the first conjunct to a position adjoined to the coordinate structure as a whole, and from there we can form chains which link it to positions in both conjuncts, since it now c-commands everything in the coordinated structure. Since *pro* is only a collection of syntactic features, devoid of semantic content, it is nondistinct from the topicalized subject (and from any other NP, for that matter); and therefore, this chain-formation does not violate any principles. By becoming a member of the chain, *pro* 'changes into' a variable; but remember that *pro* and *variable* are just labels for empty categories that are heads of (possibly one-membered) A-chains and non-heads of A'-chains, respectively. The empty category in the subject position of the second conjunct in coordinate structures heads an A-chain in the overt syntax, but at LF, it is bound by the (by then) c-commanding subject of the first conjunct.

I have assumed that *pro* is formally licensed at spell-out, but not identified. Being semantically empty, *pro* presumably is not visible to LF-rules (cf. Chomsky's (1992, 43) treatment of auxiliary verbs); but this would result in an illegitimate structure. The only way to save the structure is to make *pro* a member of a legitimate LF object, i.e. a chain with a head having semantic content.

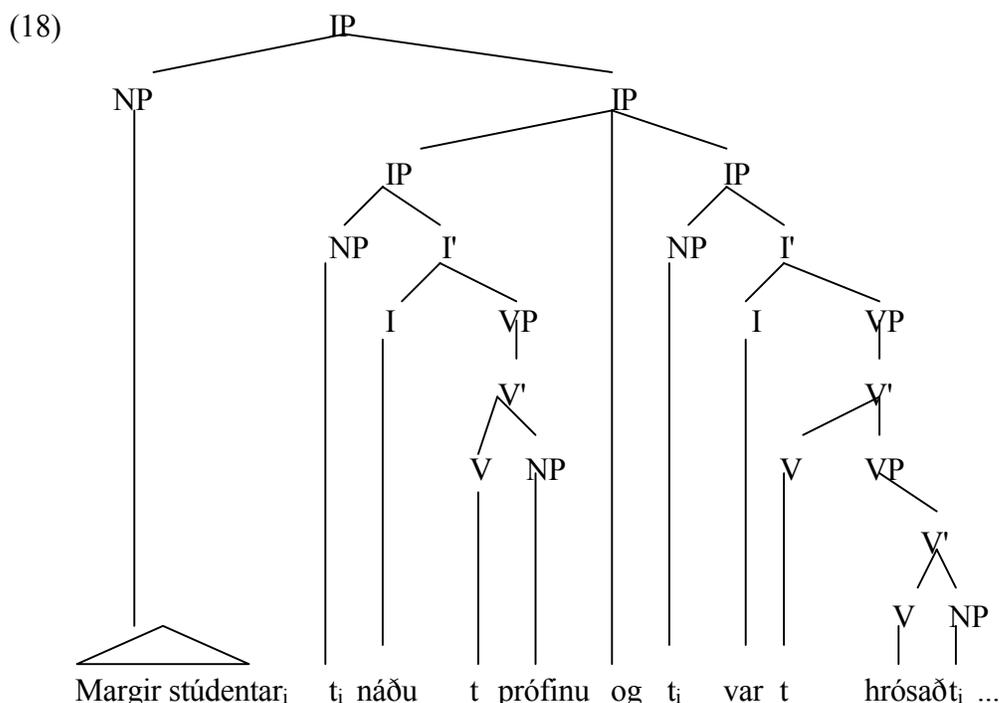
Since movement is now reinterpreted as chain-formation, we can presumably also reinterpret the CSC and the ATB-principle (to the extent that they are valid, cf. Heycock and Kroch (1993)) as conditions on chain-formation, instead of conditions on movement. Instead of stating that movement must take place out of both conjuncts, the condition would then be that the 'shared' constituent binds traces in both conjuncts. According to the analysis presented above, this condition would be fulfilled.

Furthermore, such chain-formation will not lead to any case-clash, because there is no reason to assume that morphological case plays any role at LF, and it can easily be shown that the requirement of the shared constituent being assigned the same case in both conjuncts is morphological, not abstract. Remember that ATB-extraction of object is possible even though the verbs of the two conjuncts assign different cases to their objects, if the shared objects happens to have morphologically identical forms for the two cases in question (cf. fn. 5 above). This also explains that it is necessarily the verb of the first conjunct that governs the case of the subject. What we get in PF is the subject of that conjunct; it is only at LF that both conjuncts share a subject.

In (17b), however, the subject is lexically realized, and has some meaning on its own, as mentioned above. Hence, ATB-topicalization (or chain-formation) is impossible. In (17d), on the other hand, the subject is not lexically realized; but that sentence has a quantifier of its own. This quantifier must be topicalized at LF, which explains that the quantifier in the

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first conjunct does not get scope over the second conjunct as it does in (17a). The LF-representation of (17a) is shown in (18).



Now, I propose that the same account can be extended to cover the examples in (8)-(11) above. Thus, I suggest that in coordinate structures like those we have been discussing, there is in fact topicalization of the subject of the first conjunct at LF, adjoining to the highest IP, and subsequent chain-formation into both conjuncts, so that the structure would look like the one we have in (18).<sup>15</sup> If this topicalization does not take place, *pro* will not be identified, and the derivation will not converge.

But why can't a topicalized **object** be topicalized again in LF and adjoined to the higher

<sup>15</sup> This account also explains why the antecedent of *pro* in the second conjunct must always be the subject of the first conjunct, like (i) shows:

- (i) Jón<sub>i</sub> barði Maríu<sub>j</sub> og *ø*<sub>i/\*j</sub> fór þá að gráta.  
 John<sub>i</sub> hit Mary<sub>j</sub> and *ø*<sub>i/\*j</sub> started then to cry  
 'John hit Mary and then he/\*she started to cry.'

In this sentence, *pro* can only be understood as referring to John, although semantically, it would be at least equally possible that it referred to Mary. However, it seems to be reasonable to assume that if an object is topical, it has to be topicalized in the syntax (the relevant operator feature presumably being strong, cf. fn. 16 below). An object topicalized in the first conjunct will not have scope over the second conjunct at S-structure.

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IP, thus getting scope over both conjuncts and being able to form chains into them? It has been claimed (cf. Epstein 1992) that *wh*-phrases and quantifier phrases that have been topicalized in the overt syntax must occur in their PF-position at LF. If we make the reasonable assumption that this extends to all operators, and furthermore assume that topics are a type of operators, this principle would explain that an object cannot get scope over both conjuncts at LF, and hence it cannot form a chain with the empty category in the second conjunct.<sup>16</sup>

#### 3.5 The identification of *pro* in Icelandic and German

I pointed out above that there is no reason to doubt that coordination in English and German can be analyzed without recourse to *pro*; but I also pointed out that the theory of coordination should preferably not be language-particular. Since I have claimed that we must postulate *pro* in sentence coordination in Icelandic, one might ask what implications this has for the general theory of coordination; does this mean that we also have to postulate *pro* in similar sentences in other languages?

Heycock and Kroch (1993) point out an interesting contrast between English and German; (what looks like) conjoined sentences can 'share' both a subject and an object in English, as (19) shows; but in German, such sentences can only share either the subject or the object (unless they also share the finite verb):

(19) These books<sub>i</sub> he bought t<sub>i</sub> last year and now intends to give t<sub>i</sub> to his aunt

(20) [<sub>CP</sub> Die Briefmarken<sub>i</sub> [<sub>C'</sub> zeigt [<sub>IP</sub> Karl dem Onkel t<sub>i</sub> ] ]  
the stamps (A) shows Karl the uncle (D)  
und [<sub>C'</sub> bietet [<sub>IP</sub> \*(er) t<sub>i</sub> zum Verkauf an ] ] ]  
and offers he to-the sale prt  
'The stamps, Karl shows to his uncle and offers for sale.'

As (20) shows, such sentences are ungrammatical in German unless the second conjunct has

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<sup>16</sup> In the minimalist framework (Chomsky (1992)), all movement is assumed to be driven by morphology and conditioned by the principle of Greed; i.e., no category is allowed to move just because that movement would license some other category. It is not obvious that the subject of the first conjunct gains anything by LF-topicalization; however, I propose that what is at stake here is some kind of feature-checking, similar to the one that drives the movement of operators: 'For appropriate C, the operators raise for feature checking to the checking domain of C: [SPEC, CP], or adjunction to specifier (absorption), thereby satisfying their scopal properties. Topicalization and focus could be treated the same way. If the operator-feature of C is strong, the movement must be overt' (Chomsky (1992, 45)). I assume that conjoined structures contain some (weak) operator-feature which must be checked against the shared subject of the two predicates. Obviously, this needs to be worked out in detail.

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a separate (overt) subject. The reason for this difference, according to Heycock and Kroch (1993), is that German has obligatory movement of the finite verb to C in topicalized clauses, whereas English has not. This means that it is impossible for both conjuncts in a German sentence to share the topicalized object and the subject without also sharing the verb.

Interestingly, however, Icelandic patterns with English in this respect, despite the fact that Icelandic is a V2 language and has obligatory verb raising (cf. (1d) above):

- (21) [<sub>CP</sub> Þessar bækur<sub>i</sub> [<sub>C</sub> keypti [<sub>IP</sub> hann<sub>j</sub> t<sub>i</sub> í fyrra ]]  
these books bought he last year  
og [<sub>C</sub> ætlar [<sub>IP</sub> e<sub>j</sub> nú að gefa frænku sinni t<sub>i</sub> ]]]  
and intends now to give aunt REFL  
'These books, he bought last year and now intends to give to his aunt.'

I have argued that such sentences have *pro* in the subject position of the second conjunct, and this *pro* is identified through LF-topicalization. One might thus ask why this isn't also possible in German; recall that according to most analyses, *pro* is formally licensed in German, just like in Icelandic, but since its *phi*-features cannot be identified, only nonreferential *pro* is possible. The reason for this difference could either be that such LF-topicalization is not available in German, or that it does not suffice to identify *pro*. The first possibility does not look promising (see, however, fn. 17 below). One would obviously like to postulate some universal demand to the effect that shared phrases c-command both conjuncts at some level of derivation.

But why should LF-topicalization not be possible as a means of identification in German? I think this can be answered by referring to Rizzi's (1986) account of *pro* (which is more or less standard, cf. Chomsky (1992)), where he argues that in languages that have Agr, its *phi*-features are always involved in the identification of *pro*. If a language has both person and number specifications in Agr, it can have referential *pro*. Crucially, this account does not apply to languages that arguably have no Agr, such as Chinese and Japanese; in those languages, *pro* can (and must) be identified by other means (cf. Rizzi (1986)).

This means, as far as I can see, that in languages like German, *pro* would have to be identified prior to spell-out (cf. Chomsky and Lasnik (1991, 47-48)). German has both person and number features in Agr, and hence it is forced to use them to identify *pro*, according to Rizzi (1986); but it cannot, since the relevant head does not govern *pro*. Therefore, sentences like (20) will always be ill-formed in German; an LF-operation cannot save a structure that is illicit at PF. Therefore, LF-topicalization in coordinate structures will be nonexistent in German (and in English); shared constituents will have to be topicalized before spell-out. Hence, referential *pro* is excluded in coordinate structures in German.<sup>17</sup>

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<sup>17</sup> This means in fact that LF-topicalization in coordinate structures will be impossible in German, because it is not necessary; the scopal properties of the shared constituent are satisfied already at surface structure.

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Of course, Icelandic also has Agr with both person and number features; but crucially, these features are not reliable indicators of the person and number of the subject, as pointed out above, since Icelandic has quirky subjects. On this point, Icelandic differs from German, because the dative experiencers in German, whose unmarked position is to the left of the verb, crucially fail typical subject tests, cf. Zaenen, Maling and Thráinsson (1985). Hence, in contrast to German, Icelandic is free to use other means for licensing and identifying *pro*, just like Chinese and other languages that lack Agr entirely. It seems reasonable to assume that in these languages, the identification of *pro* can be postponed until at LF, like the interpretation of other operator-variable pairs.

#### 4. Conclusion

In this paper, I have argued against recent analyses which claim that so-called ATB-extractions and parasitic gaps are essentially the same phenomenon. I have shown that these two behave differently in Icelandic, so that neither Williams' (1990) proposal that parasitic gaps are to be analyzed as ATB-extractions, nor Munn's (1992) proposal that ATB-extractions are to be analyzed as parasitic gaps, can be maintained. I have also shown that even though Burton and Grimshaw's (1992) and McNally's (1992) analyses can simplify the analysis of coordination in English, they still do not make it possible to analyze all cases of apparent sentence coordination in Icelandic as VP- (or I-) coordination; and it is unavoidable to postulate an empty category in the subject position of the second conjunct in coordinate structures.

Furthermore, I have argued that this empty category must be *pro*, and argued against an analysis involving a variable bound by an empty operator. I have also claimed that the LF-representation of all sentences which share an argument has the same structure; the shared constituent has in all cases been adjoined to the conjoined structure as a whole, so that it c-commands and binds variables in both conjuncts. Finally, I have argued that the existence of referential *pro* in coordinate structures in Icelandic can be related to the fact that Icelandic has quirky subjects, which make Agr unusable for identifying *pro*; hence, *pro* does not have to be identified before spell-out, but only at LF, where topicalization of the subject of the first conjunct and subsequent chain-formation into the second conjunct is available because no case-clash is longer possible.

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