A PHRASE STRUCTURE ACCOUNT OF SCANDINAVIAN EXTRATION PHENOMENA

0.0 The aim of this paper is threefold: (i) to present data from Scandinavian languages that any general theory of island constraints must account for; (ii) to describe these data in the framework being developed in Gazdar (this volume), Sag (this volume), Gazzar, Pullum and Sag (1980), and to show that while a straightforward extension of the framework to cover the Scandinavian data is possible, it leads to an increase in generative capacity of the theory so that it no longer provides grammars only for context-free languages; and (iii) to sketch a theory of island constraints that transfers some of the burden of explanation from the syntax to processing mechanisms on the one hand and to discourse organization on the other.

The problems encountered by transformational grammars have recently led to the exploration of alternatives. One such alternative is relational grammar, represented in this volume by Perlmutter and Postal; another alternative is the return to "base-generation" of some or all of the constructions previously thought to involve transformations. Our paper takes the latter approach. By the mid seventies, several linguists had presented arguments that cyclic transformations be eliminated in favour of base-generation of both the underlying and the derived forms, e.g. Freidin (1975) for Passive, Brame (1976) for Equi, and Oehrie (1976) for Dative Movement. More recently, serious attempts have been made to develop grammars that eliminate either entire classes of transformations, or all of them. For example, Bresnan (1978) and Dowty (1978) propose to eliminate the class of "cyclic" transformations, and the "lexical-functional" grammar developed in Bresnan (1980b), Andrews (this volume), and the proposals in Brame (1978), Gazdar (this volume) and Peters (1979) do away with all transformations. The more explicit of these proposals are attractive because they present frameworks that are tightly constrained in generative power and thus make more realistic claims about parsability and learnability than most transformational grammars (see Gazdar, this volume). However, the work done within this perspective does not yet have the scope of work done in the transformational framework; it is not obvious that the formal constraints of these frameworks can be maintained when more data are taken into consideration.

In this paper we propose to widen the data base of the theory by giving an account for a new set of data within the framework developed by Gazdar and others. As we will show, some of the multiple extraction facts actually present a problem for one of the strongest claims made in Gazdar (1980), namely that natural languages are context-free languages.

Not all the problems presented by the data are related to the power of the grammar, however. We will discuss two other issues in some detail, namely the status of a nested dependency constraint as proposed in Fodor (1978) and the relation between resumptive pronouns and "traces."

Although the analysis we present seems to be descriptively adequate, it certainly raises problems of explanatory adequacy. We think these problems cannot be addressed insightfully without a model of the interaction between syntax, processing and discourse organization. We have adopted here the view that the syntax must capture all the generalizations that can be defined structurally, even if one must look outside the syntax for an insightful explanation for certain of them. As a result, our syntax contains some rather ad hoc constraints. We will sketch a model of the interaction between the syntax and processing mechanisms that gives a non-syntactic motivation for these constraints.

The general outline of the paper is as follows. In Section 1 we present the salient facts about Scandinavian extraction that must be accounted for and then discuss briefly their relevance for some of the recent accounts of island constraints. In Section 2 we present the essential features of the phrase structure framework that we will use, and illustrate it with English data. Section 3 contains an account of the Scandinavian data in the framework insofar as they are stable in structural terms, and in Section 4 we discuss some nonstructural factors and sketch a model of the interaction between syntax, processing, and discourse organization.

The work presented here is in many respects inconclusive, but it raises interesting problems that a phrase structure framework must be able to deal with in order to be an attractive option among approaches to syntax.

1. EXTRACTION IN SCANDINAVIAN LANGUAGES: FACTS AND PREVIOUS ACCOUNTS

Ross' (1967) constraints on extraction in English have been found to have parallels in many languages. However, the fact that languages are intriguingly similar in exhibiting such constraints should not lead us to ignore the differences in extractibility that can be found even among languages as closely related as English and the Scandinavian languages. Some of these differences have been documented before in the transformational literature. Extractions out of complex NP's in Danish are studied in detail in Erteschik (1973); Allwood (1976) presents an overview of the problems encountered in Swedish with respect to the complex NP constraint and extractions out of NP's in general. Extractions out of wh-islands in the various Scandinavian languages are documented in Maling (1978) and for Swedish and Norwegian in Engdahl (1979), who also studies "crossing" dependencies. Violations of the Fixed Subject Constraint in Icelandic (as well as Dutch) are documented in Maling & Zaenen (1978).

However a comprehensive overview of the data is lacking. In this section we will attempt to give a systematic overview of the phenomena:

(1) the extraction possibilities in Swedish, Norwegian and Icelandic out of the main structures whose English analogues are islands;

(2) the distribution of resumptive pronouns in these constructions.

In the last subsection we will point out some of the problems that these data pose for several theories of island constraints.

1.1 In this section we will document the extraction possibilities out of the various constructions one by one for Icelandic, Norwegian and Swedish.

1.1.1 Extractions out of Wh-Clauses

As in English, extractions out of that-clauses are allowed in all Scandinavian languages, as illustrated in (1).

(1) a. Vem sa Kari att Jan hade
    b. Hvem sa Kari at Jon hadde
    c. Hvern sagdi Kari að Jón hefði

Who said Kari that John had

sett pa bio? (Swedish, henceforth S)
sett pa kino? (Norwegian, henceforth N)
því í bíó? (Icelandic, henceforth I)

Who did Kari say that John had seen at the movies?

The Scandinavian languages differ from English, however, in also allowing extraction out of wh-clauses, as illustrated below:
However extraction out of a relative clause does not always result in an acceptable sentence. Moreover in the cases where these extractions are bad, the use of resumptive pronouns does not improve the sentence. As we will see, this is different from other cases in which a constituent is extracted out of a structure that in English is an island. An example of an unacceptable extraction is given in (5):

(5) a. *Lisa talar jag med den poiken som kyst (henne). (S)
   b. *Lisa snakker jeg med den gutten som kystet (henne). (N)
   c. *Lisu talaði gł við stráknin, sem kysti (hana). (I)

Lisa talked I with the boy
that kissed (her)

*Lisa, I talked with the boy who kissed (her).

It seems clear that the constraint on extraction out of relative clauses is not a structural one. The contrast between (4) and (5) seems rather to have to do with what the sentence is "about": in (5) the sentence is more about the boy than about Lisa and hence the topicalization is ungrammatical. In (4) on the other hand, the sentence can be interpreted as being about those flowers, and hence topicalization is possible.

One might think that one of the constraints is that extraction is only possible out of indefinite CNP’s, but this seems too strong, if definite means "having a definite article." Taraldsen (1979) gives the following contrast:

(6) Marit finner vi aldri den gutten som kan hamle opp med (T(62))

but

(7) *Marit har vi endelig funnet den gutten som kan hamle opp med (T(61))

In the negative version (6), the boy is non-referential, whereas in (7) it must be referential: again it is much easier to interpret (6) as a statement about Mary than (7).

Some discussion of such functional constraints on extractability can be found in Kuno (1976), Erteschik (1973) and Allwood (1976).
In Section 4 we will come back to the role of functional factors in an account of island constraints.

1.1.3 Extractions Out of Nonrelative NP’s

As is pointed out in Allwood (1976), extraction out of nonrelative complex NP’s is quite common in Swedish; the same holds for Norwegian and Icelandic; as illustrated below:

(8) a. Vilket fängelse finns det foga hoppt att man kommer helskinnad fram? (Engdahl (1979)) (S)
   b. Hvilket fengsel er det lite håp (om) at man kommer helskinnet fra? (N)
   c. Ør hva dø fangelsi er litil von til að maður komi heill?
   ‘Which prison is there little hope (for) that one comes unhurt from’? (I)

Further examples can be found in Allwood (1976) and Engdahl (1979).

Extraction out of simple (non-sentential) NP’s lead to problems of the same type as found in English (see Horn (1975) for a discussion of the English data); extractions like those in (9) are good, just as they are in English, but the examples in (10) are judged much less acceptable. The acceptability depends on the context (see Allwood (1976) for discussion); however extraction seems to be more readily accepted in such cases in the Scandinavian languages than in English.

(9) a. Vem skrev Pelle en bok om?
   b. Hvem skrev Pelle en bok om?
   c. Um hvem skrifaði Palli bók?
   ‘Who did Pelle write a book about?’

(10) a. *Vem förstörde Pelle en bok om?
     b. *Hvem sdeila Pelle en bok om?
     c. *Um hvem eyðilagði Palli bók?
     ‘Who did Pelle destroy a book about?’

As argued in Horn (1975), (9) might not be a case of extraction out of NP at all, but may be derived from a source where the NP ‘a book’ and the PP ‘about who(m)’ do not form one constituent. Although the problems with this approach have never been worked out totally satisfactorily for English, it is tempting to apply it to the Scandinavian languages too, especially since we have been unable to find any clear examples of extractions out of subject NP’s, the only case where such a reanalysis would be impossible.

This concludes the overview of the extractions that are possible in Scandinavian languages but not in English, and that do not lead to the insertion of resumptive pronouns in any of the Scandinavian languages. In the next subsection, we will illustrate the cases where in Swedish, and to a lesser degree in Norwegian, resumptive pronouns are used to “save” otherwise unacceptable extractions.

1.2 The Distribution of Resumptive Pronouns

In several cases where extraction is impossible in Standard English, extraction is possible in Swedish and Norwegian when a resumptive pronoun is left behind in the extraction site. This strategy does not seem to be used in modern Icelandic, in contrast with older stages of that language, where one finds resumptive pronouns with a distribution that is however essentially different from that found in the other modern Scandinavian languages (Maling (1976)).

1.2.1 Sentential Subjects

In none of the Scandinavian languages is extraction possible out of a sentential subject without leaving a resumptive pronoun; in Swedish and Norwegian however, it is possible to extract when such a pronoun is left behind. We have been unable to construct such examples for Icelandic. The Swedish and Norwegian contrasts are illustrated in (11) and (12). As can be deduced from these examples, the “internal NP-over-S” constraint is less strong in these languages than in English. As in English, the embedded sentential subjects are better when the complementizer that introduces them is different from the complementizer that introduces the matrix clause.

(11) a. Det här är en sorts problem som Kalle påstår att hurvida
    Pelle klarer att lösa { det } eller ej kommer att visa om han är
    intelligent. (S)

b. Dette er en type oppgave som Kalle hevder at om Pelle
    greidde a løse { den } vil vise om han er intelligent. (N)
'This is the kind of problem that Kalle says that whether Pelle succeeds in solving it will show if he is intelligent.'

(12) a. De talade om den skrivning som Pelle undrade om det att Kalle redan läst \{den\} kunde göra någon skillnad. (S)
b. De snakket om den proven som Pelle lurt på om det att Kalle allerede hade lest \{den\} ville ha noen innvirkning på resultatet. (N)
'They talked about the exam that Pelle wondered whether (it) that Kalle had already read it would make no difference in the result.'

1.2.2 Crossing Dependencies

Another place where resumptive pronouns can occur is in the crossing pattern of double extractions (see (14b)). However, this only happens in Swedish; in both Icelandic and Norwegian, we can find double crossing extractions without resumptive pronouns as shown in (13). In Icelandic a resumptive pronoun is totally impossible, whereas in Norwegian it is optional. In cases with triple (crossing) extractions, however, a resumptive pronoun is obligatory even in Norwegian.

(13) a. Den här presenten kan du säkert aldrig komma på vem jag fick \{den\} av___. (S)
b. Denne gaven her vil du ikke gjette hvem jeg fikk (den) fra___. (N)
'This gift can you not guess who I got it from__.'
c. Þessum kraka hérna, geturðu aldrei imyndast þér hvaða gífði, þegi gaf þ, þ. (I)
'This boy here can you never guess what gift I gave.'

(The Icelandic example is slightly different here; gefa 'to give' in Icelandic is a verb that takes a dative and an accusative, obligatorily in that order.)

What distinguishes these examples from those of double extractions given earlier is the pattern of filler-gap dependencies. Whereas in the earlier examples we had the pattern illustrated in (14a), we now have the pattern illustrated in (14b).

(14) a. F₁ F₂ G₂ G₁ b. F₁ F₂ G₁ G₂

As the example shows, in Swedish a pronoun is required in the first extraction site in this case; in Norwegian however this is not necessary, and in Icelandic a pronoun is ungrammatical.

As we will see, whereas triple extractions are impossible in Icelandic, they are possible in Swedish and Norwegian. If the extractions intersect, we need a resumptive pronoun even in Norwegian in those cases. A Norwegian example is given in (15).

(15) Det er politimannen som jeg lurer på hvilke piker dommeren vil vise hvilke droger \{han\} trodde \{de\} hadde solgt \{\Ø\} \{\*Ø\} \{\*den\} til barne. (N)
'This is the policeman, that I wonder which girls, the judge will want to know which drugs he, thought they, had sold ___ to the children.'

As the pattern in (15) and (13) shows, the pronoun appears in the first extraction site of a crossing pair, not in the last. We will come back to the significance of this distribution.

1.2.3 The Fixed Subject Constraint

As is well-known, it is impossible in English to extract a subject NP immediately following a complementizer. This phenomenon, which we will refer to as the Fixed Subject Constraint (Bresnan 1972), is illustrated by the contrast between (16a) and (16b), and by the ungrammaticality of (17):

(16) a. *Who do you think that saw Mary?
   b. Who do you think saw Mary?

(17) *Who do you wonder if saw Mary?

Such extractions are perfectly acceptable, however, in Icelandic, as is amply documented in Maling & Zænen (1978 henceforth M & Z). Two examples are given here:

(18) Hver sagðir þu að væri kominn til Reykjavíkur? (I)
   'Who (nom.) said you that came to Reykjavík?' (M & Z, (6))
(19) Þetta er maðurinn, sem þóir segja að hafi framin glæspinn. (I)
   this is the-man, that they say that has committed the-crime (M & Z, (8))
Subject extractions out of om or wh-clauses seem to be much better. The following sentences were accepted even by the speakers who reject (24):

(25) Montague kan jeg ikke huske hvor \( \{ \varnothing \} \) kommer fra. (N)
    'Montague I can't remember where (*he) comes from.'

(26) Montague kan jeg ikke huske om \( \{ *\text{han} \} \) døde i Kalifornia (N)
    'Montague I can't remember if (*he) died in California.'

After non-deletable at, extractions are also accepted, as in the following examples:

(27) Hvem er du sikker på at \( \{ \varnothing \} \) skulle vinne? (N)
    'Who are you sure that (*he) will win?'

Resumptive pronouns cannot generally be used in Norwegian to fix up violations of the FSC: those speakers who reject (24), also reject

(28) *Hvem tror du at han skulle vinne? (N)
    'Who, do you think that he will win?'

If the extraction site is more deeply embedded, a resumptive pronoun is more acceptable, but as in Swedish, it would be optional in these cases anyhow.

1.2.4. Optional Resumptive Pronouns

The final cases in which resumptive pronouns can appear in Norwegian and Swedish is when the extraction site is embedded more than two clauses down from its antecedent. The use of resumptive pronouns is optional in that case, even in Swedish, unlike the other cases we have discussed. A Norwegian example is given in (29).

(29) Dette er filmen som jeg ikke vet om noen husker hvem (som) har
    spillte i (den). (N)
    'This is the film, that I don't know if anyone remembers who played in (it).'

Further documentation of the phenomenon can be found for Swedish in Engdahl (1979). Erteschik (1973, 122) notes that Danish is less likely to use resumptive pronouns than Swedish; Maling (1978) gives examples where
pronouns are used in Swedish and Danish but not in Norwegian. Here, as elsewhere, Icelandic avoids resumptive pronouns altogether.

1.3 Theoretical Problems

Subsections 1.1 and 1.2 provide a succinct overview of the extraction facts that have to be accounted for. Before presenting our treatment of the data, we will briefly review some recent accounts of extraction constraints for which these data present problems. We will first consider accounts based on subcyclicity: Chomsky’s (1977) proposal as adapted by Rizzi (1978), then as adapted by Reinhart (1979), and finally Taraldsen’s (1979) reanalysis of relative clauses in Norwegian, designed to fit the Norwegian data into the Chomsky-Rizzi model. We will show that none of these proposals can deal with the Scandinavian data.

We will then briefly discuss the constraint on crossing extractions proposed in Fodor (1978), and finally point out that the violations of the FSC in Norwegian are a problem for the correlation proposed in Maling and Zaenen (1978).

1.3.1 Island Constraints and Subcyclicity

Since Chomsky (1973), several attempts have been made to give a unitary account of major island constraints in which the notion of subcyclicity plays a central role. The basic idea is that a grammatical rule can involve A and B only if they are not separated by more than one cyclic node. Successive cyclic movement from COMP to COMP, where the COMP-position is an ‘escape hatch,’ explains the apparent violations of this principle.

1.3.1.1 Rizzi’s account of wh-island violations in Italian. In Chomsky (1973) not only subcyclicity but also the Tensed-S Condition and the Specified Subject Condition played a role in the account of island constraints. Rizzi’s (1978) main innovation is to propose that these conditions are not relevant for Italian, and that it is the subcyclicity condition, together with the assumption that NP and S are binding nodes in Italian, that explains the extraction facts in that language. The way in which these assumptions would allow for some violations of the wh-island constraint is illustrated in (30) (= Rizzi (6b)); the relevant portion of the sentence is diagrammed in (30b).

(30) a. Tuo fratello, a cui mi domando che storie abbian raccontato, era molto preoccupato

b. tuo fratello, [a cui mi domando [che storie] in [abbiamo raccontato [t, t]]]

Wh-movement of a cui ‘to whom’ directly into the higher COMP from its base position, crosses two S-nodes but only one S-node. Hence such extractions will not violate subcyclicity if S rather than S counts as the binding node. Rizzi (1978) shows that these assumptions make the right predictions for the pattern of allowable extractions in Italian.

The Scandinavian cases, however, cannot be reanalyzed in the same way, as shown for Swedish in Engdahl (1979). This can be seen by considering the following Icelandic example from Maling (1978); extraction in this case should proceed as shown in diagram (31b).

(31) a. Þetta eru kveðin, sem kennarinn spurm hjverjir við hlibdum at hefði skrifað.
   ‘These are the poems that the teacher asked who we thought that had written.’

b. kveðin [s, sem [kennarinn spurm [hjverjir, við hlibdum [at, hefði skrifað [t, t, t]]]]]

Example (31b) shows clearly that subcyclicity is violated no matter what sentential node is taken as binding: wh-movement of the relative pronoun from Sj to Si, crosses two S-nodes. Similar sentences are ungrammatical in Italian and are ruled out under Rizzi’s account; but they are grammatical in all the Scandinavian languages under consideration, as illustrated in Maling (1978) and Engdahl (1979); the Norwegian equivalent of (31) is given in (32):

(32) Dette er de diktsom laererinnen spurte oss hvem vi trodde hadde skrevet. (N)

So Rizzi’s parametrization of Chomsky’s proposal does not take care of the Scandinavian extraction facts.

1.3.1.2 Reinhart’s (1979) double COMP-hypothesis. Another modification of Chomsky’s framework can be found in Reinhart’s analysis of Hebrew violations of the wh-island constraint. Reinhart assumes that in Hebrew there are two complementer positions available to which wh-constituents can be moved. This proposal is however not particularly attractive for Scandinavian. First, of course, there should be independent motivation for a second COMP-position. While this might be available in Swedish and
Norwegian, where one finds sequences of the form wh-word + complementizer.\(^\text{10}\) such evidence is totally lacking in Icelandic; yet the extraction patterns for Icelandic are the same.

Even worse for the double-COMP hypothesis, however, is the fact that in Swedish and Norwegian, extractions are not limited to two. The following example of a triple extraction seems to be acceptable to native speakers of Swedish, given enough context; its Norwegian counterpart (33b) was acceptable to some of our informants, but not all. The sentence is diagrammed in (33c).

(33) a. Sådana här känsliga politiska frågor har jag flera studenter som inte tror skulle vilja prata med
    such touchy political questions have I many students that I
    inte finns någon som jag
    not is-found anyone that I
    tror skulle vilja prata med
    believe should dare talk with
    ∅ om ∅
    ∅ about ∅

b. Slika foelsamme politiska frågor har jeg flere studenter som det ikke finner noen som jeg tror ville våge å prata med om.

c. [Diagram]

It seems obvious that allowing two, three (or even more?) COMP positions seriously undermines the explanatory value of successive-cyclic wh-movement.

1.3.1.3 Taraldsen's reanalysis of relative clauses in Norwegian. The last relevant proposal made in the framework of Chomsky (1977) that we are aware of is Taraldsen (1979). It was designed specifically to take care of the problem posed by the existence of extractions out of relative clauses in Norwegian. We will address only the question of extraposition analysis of extractions from relative clauses, and not the other theoretical points that Taraldsen considers. The basic idea is quite simple: the extractions exemplified in Section 1.1.2 will be only apparent violations of the CNPC if in fact S is assumed to be the binding node (together with NP), as in Italian, and if the relative clause is extraposed before extraction takes place. Extraposition is sometimes vacuous, as illustrated in (35):

(35) Per kjenner jeg [NP ingen] [s som liker ...] (N)(Taraldsen (2))
    Peter know nobody who likes
The derivation of (35) would run as follows: the underlying structure is given in (35a); extraposition of S yields (35b), and then wh-movement out of the extraposed clause yields (35c). 11

(35) a. [Per] [S COMP [S jeg kjenner [NP [NP ingen] [S som [S t liker WH]]]]].

b. [Per] [S COMP [S jeg kjenner [NP ingen] [S som [S t liker WH]]]].

c. 

After extraposition, wh-movement directly from the base position to the highest COMP crosses only one S-node.

There are several problems with the extraposition analysis. First, as Taraldsen notes himself, the analysis requires a reordering of extraposition with respect to wh-movement such that extraposition is part of the transformational component rather than the stylistic component. A large part of Taraldsen's paper is devoted to the defense of this move, which we will not discuss here. Second, the extraposition analysis predicts that extraction out of relative clauses on subject NP's will be possible if extraposition has applied. This prediction is wrong, as illustrated in (36)-(37).

(36) a. Ingen som stemte på Nixon ble invitert. (N)
No one who voted for Nixon was invited.

b. Ingen ble invitert som stemte på Nixon. (N)
No one was invited who voted for Nixon.

(37) a. *Nixon ble ingen som stemte på invitert. (N)
Nixon was nobody who voted for invited.

b. *?Nixon ble ingen invitert som stemte på. (N)
Nixon was nobody invited who voted for.

Finally, the extraposition analysis makes the same predictions as Rizzi (1978) with respect to embedded questions, since extraposition from NP cannot be invoked here. Hence it will be falsified by the same examples. A relevant example is repeated here:

(32) Dette er de diktene som laeerin spurte oss hvem vi trodde hadde skrevet. (N)
'These are the poems that the teacher asked us who we thought had written.'

For the representation of this sentence, see the tree given with the Icelandic example in (31b).

Of course, similar violations can also be constructed for relative clauses even when they are extraposed. An example is given in (38).

(38) Det er Chomsky (som) jeg ikke kjenner noen som lurer på om Mariit burde ta et kurs hos.
'It is Chomsky (that) I don't know anybody who wonders whether Mariit should take a course with.'

Taraldsen himself gives an example, shown in (39), of the same kind, except that it contains an embedded or-clause instead of an om-clause.

(39) a. Per kjenner jeg ingen som tror at du liker.
Peter know I nobody who thinks that you like.

b. Per [COMP jeg kjenner [ingen] [S som tror [S at du liker ...]]]]

As shown by the diagram in (39b), this extraction violates the subjacency constraint even after extraposition with S as the binding node. Taraldsen says that he considers this sentence to be ungrammatical; he notes, however, that there are speakers who do accept it. Our own informants were equally divided as to the grammaticality of such sentences.

Taraldsen does not discuss embedded questions, so we do not know if for him (32) is grammatical, as it was for all our informants. If it is grammatical, Taraldsen's analysis of relative clauses actually makes the situation for the subjacency theory worse: certain apparent violations of the CNPC are accounted for by extraposition and the choice of S as a binding node,
whereas the same explanation cannot account for all violations of the wh-island constraint.

Under the assumption that extraction is possible out of both CNP's and wh-islands, as in Swedish, where the reanalysis proposed by Taraldsen cannot be maintained; (see Engdahl (1979) for examples and discussion), there is a trivial way to account for the situation within the Chomskyan framework, namely by assuming that neither S nor S are binding nodes in these languages. This proposal requires giving up the attempt to account for the sentential subject constraint in terms of subjacency and makes it necessary to go back to a special subject constraint, as was the case in Chomsky (1973).

The assumption that there are no sentential binding nodes seems to account for the Swedish data and some Norwegian dialects that pattern like Swedish. However, regardless of the problems caused by other Norwegian dialects that seem to exhibit an asymmetry with respect to violation of the wh-island constraint and the CNPC, the assumption does not extend to Icelandic. In that language, as shown in Sections 1.1.1 and 1.1.2, it is possible to extract out of embedded questions but not out of relative clauses. This situation is not new; for older stages of the language it is documented in Maling (1976). This state of affairs is of course more troublesome for the subjacency account of island constraints, since the predicted relationship between the CNPC and the wh-island constraint does not hold. It is clear that to explain the lack of extraction out of relative clauses we need at least one bounding node at the sentential level in addition to NP.

So Taraldsen's account, far from solving a problem for the subjacency account, creates another one by creating an asymmetry between indirect questions and relative clause extractions even in dialects where this asymmetry does not seem to exist. The Icelandic data show that this problem is unavoidable, even if it is assumed that Swedish and (some dialects of) Norwegian can be accounted for by assuming that there are no sentential binding nodes in these languages.

Although the extraposition analysis does not account for the extraction phenomena, it remains to be explained why sentences like (40a) are better than (40b). 13

(40) a. Per slipper jeg ikke noen inn som liker
    Peter let I not anybody in who likes
  b. ???Per slipper jeg ikke noen som liker inn.
    Peter let I not anybody who likes in.

We have not investigated this problem, but part of the solution seems to be given by Taraldsen (1979) himself: he notices that extraction and extraposition possibilities both correlate with “non-referentiality”: in Norwegian only non-referential NP’s seem to be good foci in the sense of Guéron (1976), and only out of foci can extraposition or extraction take place. However, if this is correct, one would not expect (40b) to be as bad as it is since the extraposition out of foci does not seem to be obligatory. The conditions on extraposition of relative clauses in Norwegian and the differences between Swedish and Norwegian in extractibility out of these clauses clearly need more study; however, it seems unlikely that the right solution to these problems will lead to a solution of the problems encountered by the subjacency analysis in Scandinavian languages.15

1.3.2 Other Constraints on Extractions

In the previous subsection we discussed the problem posed by the Scandinavian data for the framework developed by Chomsky and his students. In this subsection we will point out some problems for some less far-reaching proposals that have been made: in case the constraint against crossing dependencies (Section 1.3.2.1) and the correlation between the FSC and the obliquriness of overt subjects proposed in Maling & Zaenen (1978) (Section 1.3.2.2).

1.3.2.1 The “Nested Dependency Constraint”. It has been noted several times that when double dependencies between gaps and fillers are allowed in one structure, they get considerably worse when the pattern is as shown in (14b) instead of as in (14a) (repeated here for convenience from Section 1.1).

(14) a. F_1 F_2 G_2 G_1  b. F_1 F_2 G_1 G_2

In one form or another, several linguists have proposed a constraint against the (b)-pattern (e.g., Kuno & Robinson (1977), Bordelos (1974), Hankamer (class lectures 1976)), and more recently Fodor (1978) who formulates the constraint as follows:

(41) If there are two or more filler-gap dependencies in the same sentence, their scopes may not intersect.

Fodor (1978) limits the relevance of this constraint to gaps of the same category. She mainly discusses cases where the dependencies are not
"unbounded," since double unbounded dependencies are in general not allowed in English (see Section 2.2).

As a universal constraint, (41) has been attacked on the basis of data in Turkish and Japanese in a recent paper by Kuno, Korfillt and Sezer (1980). However, these languages differ from English in ways that might be thought relevant for the NDC ("free" word order, "free" pro-drop, and case marking in Turkish and to a lesser degree in Japanese). So it is interesting to see how well the NDC fares in languages that are more similar to English. As the examples in Section 1.1 show, only Swedish bears out the NDC, if, as Fodor assumes, resumptive pronouns are not subject to the constraint. The Norwegian and Icelandic data show that the NDC does not have the same grammatical status in those languages as it has in Swedish and English. If the ultimate explanation of the NDC is that it is a processing strategy, the case of Icelandic might not be that aberrant, since case marking will in that language disambiguate most cases of crossing extractions. But this cannot be said for Norwegian, where most case marking has disappeared. It is interesting to note that both in Icelandic and in Norwegian, crossing extractions without resumptive pronouns seem to be limited to two. In Icelandic this seems to be the general upper limit for unbounded extractions. In Norwegian, as we have noted in Section 1.1 (14), resumptive pronouns are used when three extractions with crossing paths are attempted.

1.3.2.2 The fixed subject constraint. Finally the Norwegian data present a problem for the claim made in Maling & Zaenen (1978) that there was a correlation between the non-obligatoriness of subject dummies and the violations of the FSC. We observed that both Dutch and Icelandic, two German languages that allow subject extraction as in (42), also allow sentences like (43), although neither of these languages has a more general "pro-drop" rule:

(42) a. Hver heldur þú að væri kominn til Reykjavikur? (I)
    b. Wie denk je dat naar Reykjavik gekomen is? (Dutch)
       'Who think you that was come to Reykjavik?'
(43) a. I gaer var dansë. (I)
    b. Gisteren werd gedanst. (Dutch)
       'Yesterday was danced', i.e. 'There was dancing yesterday.'

We postulated that only languages where sentences like (43) are possible would allow cases like (42); languages that do not allow (43) would have a surface constraint prohibiting empty subject positions in tensed clauses; such a surface constraint would then also rule out (42).

In Norwegian, however, we have found the following situation: whereas some speakers accept (24), repeated here for convenience,

(24) Hvem tror du at skulle vinne? (N)
    'Who do you think that will win?'

the same speakers do not accept (44).

(44) I gar regnet \{ det \} \{ N \} (Ungrammatical without det)
    yesterday rained it
    'Yesterday it rained.'

However, it will have become clear to the reader that dialect variations are very common in Norwegian. It would be too astonishing, assuming that some speakers accept (44), if the correlation between the grammaticality of (24) and (44) did not hold for all speakers, given the interaction between the different dialects. This obviously needs further investigation among a larger group of informants and we have not as yet been able to carry out such investigations.

In Section 1.3 we have shown that the Scandinavian data cannot be handled by the proposed attempt to "parameterize" Chomsky's (1977) framework to account for other languages. While this does of course not show that another "parameterization" would not be possible for those languages, it casts some doubt on the usefulness of the enterprise, since each adaption of the framework according to a different parameter weakens the predictive power of the framework.

We have also pointed out some problems the data pose for less far reaching proposals such as Fodor's NDC and our own account of the FSC.

In the next sections we will develop a descriptive account of unbounded extractions in Scandinavian and in Section 4 we will come back to the problem of explanatory adequacy.

2. THE TREATMENT OF ISLAND CONSTRAINTS IN PHRASE STRUCTURE GRAMMAR

2.0. In this section we shall briefly recapitulate the main features of the version of phrase structure grammar presented by Gazdar in this volume.
and illustrate from English how island constraints can be handled in that framework. For convenience of reference we shall call Gazdar's framework generalized phrase structure grammar (GP Serg).

2.1 Essential Features of Generalized Phrase Structure Grammar

In a GP Serg, rules of grammar are triples consisting of an arbitrary integer (the rule number), a node admissibility condition, and a formula indicating how the constituent defined by the rule can be translated into intensional logic and thus assigned an interpretation in a model. The node admissibility conditions, which we shall mainly be concerned with, are labelled bracketed strings of the form shown in (45).

\[
(45) \ [\ldots] \\
\text{where } \alpha \text{ is a nonterminal symbol and } \ldots \text{ is either } \sigma \text{ (the empty string) or a string of one or more terminal or nonterminal symbols.}
\]

A node admissibility condition like (45) admits a portion of a tree that has a root labelled \( \alpha \) and has the string \( \ldots \) as its immediate constituents. A set of node admissibility conditions (henceforth syntactic rules, or simply rules) can admit a set of trees: a tree is admitted if every node in it is either (a) a terminal node or (b) the root of a subtree that is admitted by one of the rules. The set of terminal strings of a set of trees admitted by a grammar of this sort is always a context-free language. This result continues to hold even if the definition in (45) is extended to allow \( \ldots \) to contain labelled bracketings as well as just symbols from the terminal and nonterminal vocabularies.

We shall refer to five varieties of rules: basic rules, derived rules, linking rules, elimination rules and metarules. Basic rules simply use the basic vocabulary of node labels familiar from transformational syntax. For English, the basic syntactic rules might include those in (46).

\[
(46) \ \ [\text{NP} \ \text{VP}] \ [\text{VP} \ \text{V} \ \text{NP} \ \text{NP}] \ [\text{VP} \ \text{V} \ \text{NP} \ \text{PP}] \ [\text{PP} \ \text{NP}] \\
\]

Derived rules are automatically added to the stock of basic rules by a universal convention (see 9.2 in Gazdar’s chapter). They involve additional node labels called derived categories. The set of derived categories for a language with nonterminal vocabulary \( V' \) is defined in (47).

\[
(47) \ \{a/\beta; \alpha, \beta \in V'\}
\]

Derived categories label “incomplete constituents” and are used for handling unbounded dependencies. Derived rules expand a derived category \( a/\beta \) in a way similar to the way \( a \) would be expanded except that one of the immediately dominated nodes has the label \( \gamma/\beta \) instead of just \( \gamma \).

Examples of derived rules related to the basic rules in (46) are given in (48).

\[
(48) \ \ [\text{NP} \ \text{VP}] \ [\text{VP} \ \text{V} \ \text{NP} \ \text{NP}] \ [\text{PP} \ \text{NP}] \\
\]

By guaranteeing that a node labelled \( a/\beta \) will immediately dominate a node that is \( \gamma/\beta \) for some \( \gamma \), the derived rules in effect pass information about “holes” up or down the tree, because \( a/\beta \) is interpreted as “an \( a \) constituent with a hole of type \( \beta \) in it”. Apart from this special interpretation, derived rules have no peculiar syntactic or semantic properties.

To permit subtrees rooted by basic categories to contain derived categories, linking rules are provided in the grammar. A linking rule introduces a derived category \( a \) \text{ de novo}. Some examples of linking rules for English are given in (49), in their full form as triples.

\[
(49) \ a. \ <+100, [a = S/a], 2h[(S/a')/(a')] > \text{ where } a \text{ is NP, PP, AP, S, or Q} \\
b. \ <+101, [NP \ R], 2\gamma[NP]/(R') > \\
c. \ <+102, [Q = S/a], 2\gamma[3n[p \land (p = 2h[(S/a')/(a')])] > \\
\]

Rule 100, in (49a), introduces topicalized sentences. Rule 101, in (49b), introduces relative clauses, which are labelled with the category \( R \). Rule 102, in (49c), introduces embedded wh-questions, which belong to the category \( Q \). We will refer to the first term in these constructions as the head phrase of the construction, to the category with a “hole” of the same category as the head phrase as the slashed category, and to the category of the hole (or the hole itself) as the missing constituent.

Elimination rules allow derived categories to dominate strings that do not contain a slashed category. One elimination rule that Gazdar suggests is

\[
(50) \ <+41, [a = t], b_0 > \text{ where } a \in V' \\
\]

This allows categories like \( \text{NP}/\text{NP} \) to dominate \( t \), a dummy terminal symbol that marks the location of “holes” for phonological purposes. Note that other elimination rules could be postulated.

Some rules in a GP Serg are not simply listed, but are generated by higher level statements of the form “if \( r \) is a rule, then \( F(r) \) is a rule” where \( F \) is some
function of the form of \( r \). These statements are called *metarules*. The notation for metarules is illustrated, and examples given, in Gazdar's chapter.

2.2. Some English Island Constraints in GPSG

We now give a few examples of how English extraction constraints might be stated in GPSG. Our aim is not to give either an exhaustive account or a range of new facts. We simply want to draw attention to the fact that many constraints can be stated in a very succinct way in this framework.

As Gazdar points out, an island constraint can be thought of as blocking all derived rules of a particular form. For example, the Sentential Subject Constraint might be viewed as a ban on derived rules of the form (51)

(51) \[ \ast [x, S/a, \ldots] \]

We might generalize this to block all extraction out of \( S \)-dominated subordinate clauses (e.g., adverbial clauses) by stating it as (52).

(52) \[ \ast [x, \ldots S/a, \ldots] \]

Alternatively, if we assume that sentential subjects are \( S \)'s dominated by NP, we can collapse the Sentential Subject Constraint with the constraint that extraction out of subjects is in general prohibited and restate (51) as (53).

(53) \[ \ast [x, NP/a, \ldots] \]

2.2.1 The Double Hole Constraint

A quite general constraint on extraction in English is that it is not possible to extract twice out of the same (tensed?) clause. This constraint has been referred to informally by Jorge Hanks as in class lectures as the "double hole" constraint. In a framework where raising and equi rules are supposed to leave holes, there are, of course, numerous counterexamples to this generalization and the constraint must be limited explicitly to "extraction" rules. But we are not assuming such a framework: raising and equi constructions are instead base-generated without incomplete (derived) constituents. The dichotomy between "extraction" rules and bounded rules is captured in a very straightforward and explicit way in the formalism. The only incomplete constituents are those created by the linking rules.

In fact, given the GPSG framework as we have sketched it thus far, the double hole constraint need not even be stated. The rule schema (47) which creates derived nodes does not define incomplete constituents with more than one hole. Unfortunately, two classes of sentences come readily to mind which suggest that too strong a claim is being made here: (i) sentences involving both tough-movement and unbounded leftward movement, and (ii) sentences involving a combination of leftward and rightward movement.

2.2.1. Tough-movement and the double hole constraint. It is possible to relativize, question and topicalize out of the complement of a tough-predicate, as illustrated in (54).

(54) Tell me what sort of student subjacency is difficult to explain to.

We shall assume that the complements to tough-predicates are of the category \( \mathcal{VP} \), as argued in Bresnan (1971, 1978). The structure of the embedded question clause in (54) is shown in (55).

(55)

To admit such trees we need to make the definition of derived categories recursive. This can be achieved by dropping "basic" from the characterization of set \( O \) in (47). Derived categories will then be characterized as in (56a) and derived rules as in (56b).
(56) a. Let $V_n$ be the set of basic category symbols, and $D(V_n)$ be defined as follows:
   i. If $\sigma \in V_n$, then $\sigma \in D(V_n)$;
   ii. If $\sigma \in D(V_n)$ and $\beta \in V_n$, then $\sigma/\beta \in D(V_n)$;
   iii. Nothing else is in $D(V_n)$.

b. Let $R$ be the set of basic rules, and $D(R)$ be defined as follows:
   i. If $r \in R$, then $r \in D(R)$;
   ii. If $[\sigma_1 \ldots \sigma_n] \in D(R)$, where $1 \leq i \leq n$ and $\alpha$ and all $\sigma_k (1 \leq k \leq n)$ are in $D(V_n)$, then $[\alpha/\beta \sigma_1 \ldots \sigma_n] \in D(R)$, where $\beta \in V_n$;
   iii. Nothing else is in $D(R)$.

Each application of the rule scheme in (56a) defines a finite set of derived categories, but since it is recursive, the set of nonterminal symbols $D(V_n)$ is potentially infinite.

Given rule schema (56), however, the double hole constraint no longer falls out from the definition of derived rules, and needs to be stated explicitly as in (57).

(57) $S/\alpha/\beta$ where $\alpha \in D(V_n)$ and $\beta \in V_n$.

(57) clearly does not hold for the Scandinavian languages. If stated as a constraint on derived categories, it must be stated as a language-specific constraint for English.

Under the analysis of tough-predicates given above, sentences like (54) are no longer a counter-example to (57). The only possible counter-examples would come from sources like (58):

(58) ??These cars are tough to imagine that anyone would sell to his best friend.

However, even for people who accept (58), the following sentence derived by wh-movement out of the that-clause embedded in the tough-predicate is bad:

(59) $\star$Who are these cars tough to imagine that anybody would sell to?

We will assume that the tough-movement construction is not a problem for the double-hole constraint as stated in (57).

2.2.1.2 Advantages of the double hole constraint. The double hole constraint as stated in (57) captures a certain number of generalizations about English extractions in a very economical way. Note that the constraint precludes extraction out of indirect questions, except those introduced by if or whether (since these are basic rather than derived categories). For a great number of speakers of English, extractions out of if and whether clauses are good in contradistinction to extractions out of other embedded questions, and for all speakers, they are significantly better. Although the dialects that do not allow extractions out of if and whether clauses need an extra constraint, we think that (57) captures a real generalization in this case. Not only does (57) exclude extractions out of embedded questions, it also takes account for the ungrammaticality of extractions out of relative clauses but not out of other complex NP's. Again this seems to be the right result.

It has been noticed several times, beginning with Ross (1967), that extraction out of nonrelative complex NP's is not always bad. It seems likely that the cases in which these extractions are impossible should be taken care of by a better definition of the "bridge" conditions under which extraction is possible in general rather than by a structural constraint. This point is argued at length on the basis of French data in Godard (forthcoming) and the arguments presented there carry over to English (see also Erteschik (1979) and Allwood (1976)).

2.2.1.3 One remaining problem for the double hole constraint. In the previous subsections we have shown that (57) would allow us to account for several of the island constraints that hold in English in a very economical way. There is unfortunately one counterexample to the generalization as it stands; it results from the interaction between Right Node Raising or heavy NP shift and leftward movement rules. This interaction creates "doubly slashed" categories, and in some sentences, at least, the double holes seem to be at the S-level. Consider the following examples, which seem fully grammatical:

(60) a. At what booksale did Hilary discover and Rob buy, an autographed copy of Syntactic Structures?
   b. Into the wastebasket, Hilary put tearfully and Rob dropped sheet by sheet, their autographed copies of Syntactic Structures.

Ignoring adverbs and subject-auxiliary inversion, such sentences seem to have the structure shown in (61):
In (60b) both extracted PP's are subcategorized for by the verb so it seems unavoidable that the coordination (and hence the double hole) is at the sentential level.

If no solution to this problem can be found (57) will have to be complicated so as to allow for a distinction between right and leftward movement rules; this however would make it less attractive as an insightful generalization. 19

2.2.1.4 Double holes and the power of grammar in English. We have discussed these facts in some detail, not only to show how island constraints might be captured in the framework under consideration, but also because the possible number of holes has to do with the generative capacity of the grammar. If the definitions in (56) are adopted, there is no built-in upper limit anymore to the number of derived categories; if no principled upper bound can be found, the theory will no longer be restricted to providing grammars only for CF languages.

We suspect however that the existence of doubly or even triply slashed categories in English does not pose a real problem for the CF character of the syntax of English since there seems to be a principled upper bound: no "extraction" rule applies more than once in the same domain, so in English the number of holes is less than or equal to the number of extraction rules. Since that number is finite, there is an upper bound to the number of "slashes" a category can have. However, this does not hold of the Scandinavian languages, which do allow multiple applications of the same rule in the same domain. As a result, the definitions in (56) in conjunction with the linking rules of Scandinavian will allow for non-CF languages (see Section 3.1).

3. THE TREATMENT OF ISLAND CONSTRAINTS IN THE SCANDINAVIAN LANGUAGES

3.1 Derived Categories and Context-Free Languages

The grammaticality of extractions out of wh-clauses and some relative clauses was noted in Section 1. It is illustrated here with two examples.

(62) Jag kjenner en melodie som ingen visste hvem skrev. (N)
    'I know a song that nobody remembers who wrote.'

(63) Vilken film kunde han inte minnas vem som regisserat? (S)
    'Which movie could he not remember who directed?'

As should be clear from the discussion in the preceding section the existence of such sentences forces us to extend the class of derived nodes beyond those allowed in ECFL. A straightforward way to do so was proposed in (56). However, rule schema (56) allows for an indefinite number of derived categories. Since the vocabulary we are using is no longer finite, we seem to get out of the class of CFL, if no other principled constraint is found. This can be proved by showing that our rule schema allows the generation of languages of the type $a^2b^3c^5$, which are not context-free (see Gazdar, this volume, for some further discussion).

Of course, there may well be a de facto upper bound on the number of extractions in Scandinavian languages. It seems unlikely that more than three can be processed. However to build such an arbitrary upper bound into the grammar is as unsatisfying as it would be to impose an arbitrary upper bound on the number of center embeddings which the grammar of English would be allowed to generate.

Of course, our proposal is only one way of handling the Scandinavian data. It is a very natural one but it may be that a more sophisticated treatment can avoid the conclusions that have to be drawn from our analysis. 20 In looking for such a solution one should keep in mind that the main attraction of CFG lies in the fact that some results about parsibility and learnability have been proven about them; but since it is not impossible that interesting results about learnability and parsibility could hold for more powerful grammars, there is no reason to require CFG's per se. We leave these problems to more mathematically inclined linguists and in what follows we will spell out our (non-context free) treatment of Scandinavian multiple extractions.

The rule schema in (56) allows us to get the multiple holes; the remaining
problem is to assure the right distribution of resumptive pronouns. We will first argue that resumptive pronouns are of the same syntactic type as holes (Section 3.2), then give the rules that introduce them (Section 3.3), and finally (Section 3.4) we will give a comparative fragment of the grammars of Icelandic, Swedish and Norwegian with respect to long distance dependencies.

3.2 The States of Resumptive Pronouns

In this section we want to make the point that there is no reason to assume that resumptive pronouns are of a different syntactic category than \( i \). In Section 4, we will argue that this phonological realization is motivated by processing constraints. In this section we first give arguments for treating resumptive pronouns as being of the same syntactic category as \( i \), and show that they have a different distribution than anaphoric pronouns. We will then illustrate this difference by looking at the different distribution of pronouns in left dislocation constructions, where we assume the pronouns to be “free,” as compared to topicalization, where they are “resumptive.”

3.2.1 Resumptive Pronouns as Instances of a/a

The reasons for treating resumptive pronouns as being of the same syntactic category as \( i \) are: (i) their behavior in coordination, (ii) the duplication of linking rules that would be otherwise necessary, (iii) the fact that they are not in free variation with epithets, and (iv) the difference in distance requirements as compared to free pronouns.

3.2.1.1 Coordination.\(^{23}\) Gazdar proposes in this volume that coordination is possible only between constituents of exactly the same syntactic type, where a slashed category is not of the same syntactic type as its unslashed counterpart, e.g., S/NP is not of the same type as S. This account predicts that if resumptive pronouns are not of the same syntactic category as \( i \) (i.e., if they are not instances of \( a/a \)), then coordination between constituents containing a gap and those containing a resumptive pronoun should not be possible. However, this is not the case, as shown by the following grammatical example; the relevant structure is shown in (64b).

(64) a. Där borta går en man som jag ofta träffar there goes a man, that I often meet \( \emptyset \) men inte vem vad \( \text{han} \) heter. (S) \( i \), but not know what he is called

As the tree structure shows, this is a case of a VP/NP coordinated with a VP/NP. However, if resumptive pronouns are not analyzed as instances of \( [NP/\text{NP}] \), then the coordination will be between VP/NP and VP, and the sentence should be ungrammatical.\(^{23}\)

3.2.1.2 Duplication of linking rules. To treat resumptive pronouns as a syntactically different category would force us to duplicate the linking rules for each construction type: relatives, topicalizations, questions, clefts, etc. One linking rule will generate the versions with holes and the other will generate versions without holes. We would have to specify the essentially complementary environments in which these pairs of linking rules apply: holes occur in non-subject position and in subject-position not immediately following a complementizer, whereas resumptive pronouns occur in subject position after an overt complementizer. The situation in the Scandinavian languages is here quite different from that in languages where resumptive pronouns can also occur optionally and one has only to block the form with a \( \text{a} \) in certain environments; here we have to block the form with a pronoun in a number of environments as well, so essentially complementary constraints will have to be stated for these two cases. This seems to miss a generalization.

Another problem is that the second type of rule will have to specify that the NP must be a pronoun and cannot be another full NP. The following is ungrammatical in all Scandinavian languages:
(65) *Det var Kalle (son) Petter spurte deg om Maria ville komme tidsmok. (N)
   'It was Kalle (that) Peter asked you if Mary would come on time.'

And the sentence does not get better if there is an NP in the sentence that can be interpreted as coreferential with e.g. the head of the cleft as in (66).

(66) *Var det Kalle Petter spurte deg om den personen ville komme tidsmok? (N)
   'Was it Kalle Peter asked you if that person would come on time?'

This brings us to our third point:

3.2.1.3. Epithets are not allowed in free variation with resumptive pronouns. The following is still ungrammatical:

(67) *Var det Kalle Petter spurte deg om den trolliga ville komme tidsmok? (N)
   'Was it Kalle Peter asked you if that idiot would come on time?'

If one wants to say that the problem creating the ungrammaticality of (65) to (67) is semantic in nature, one will have to develop a quite sophisticated semantic filter to rule these sentences out; it is clear that an appeal to coreference will not suffice.

3.2.1.4 Distance requirements. A last respect in which we find quite a big difference in the relation between resumptive pronouns and their "antecedents" and free or "bound" pronouns and their antecedent is in the distance required between the two.

In Scandinavian languages, as in English, coreference is normally possible when the pronoun is one clause down from its antecedent as in (68):

(68) Kalle, jag påstod att jag skulle lära honom/honon, Engelska. (S)
     'Kalle, I venture to say that I should teach him English.'

As we have already seen this is not the case for resumptive pronouns; the following is impossible:

(69) *Vem, tycker du att jag skulle lära honom/honon, Engelska? (S)
     'Who think you that I should teach him/her English?'

From this example it is clear that the distribution is not only different from that of "free" pronouns but also from that of so-called bound pronouns illustrated by the following example:

(70) Varje lingvist tycker att han borde lära sig åtminstone ett annat språk. (S)
     'Each linguist thinks that he should learn at least one other language.'

3.2.2 Differences Between Resumptive Pronouns and LD Pronouns

The special status of resumptive pronouns in unbounded dependencies can be further clarified by comparing their behavior to that of pronouns in the Left Dislocation construction, which we think are bona fide free pronouns. The constraint on Left Dislocation is not that the pronoun be syntactically bound in any particular way, but rather that the NP (or PP) in initial position must be "taken up" by an NP (or PP) in the sentence which follows.

(i) Distance requirement.

In Left Dislocation constructions, the pronoun can be in the clause immediately following the left dislocated element:

(71) a. Kalle, han är en trevlig grubb! (S)
     b. Kalle, han er en kjekk kar! (N)
     c. Kalli, hann er ágætur strákur! (I)
     'Kalle, he's a fine fellow!'

Resumptive pronouns can never be this close to their antecedents in these languages.

(ii) Epithets.

In a Left Dislocation construction the LD element can be taken up by an epithet instead of a pronoun.

(72) a. Kalle, jag tycker inte om den idioten! (S)
     b. Kalle, jeg liker inte den trolligen! (N)
     c. Kalli, mér likar ekkki fiðr! (I)
     'Kalle, I don't like that idiot!'
However, epithets cannot occur in the constructions that resumptive pronouns occur in as shown in the previous section.

(iii) Islands.

Left Dislocation can go into structures that cannot be saved by resumptive pronouns; for example, left-dislocated NP’s can be linked up with their pronouns even when these pronouns are inside relative clauses with definite heads. The following topicalization out of a relative clause is bad (as pointed out in Engdahl (1979b), with or without resumptive pronoun, whereas the corresponding left-dislocated sentence is good.

(73) a. *Kalle känner jag flickan som gillar (honom). (S)
     Kalle, know I the-girl that likes (him).

b. Kalle, jag känner flickan som gillar honom/√∅. (S)

Note the different position of the matrix verb in (73a) and (b); word order serves to distinguish LD from topicalization unambiguously in the Scandinavian languages (as well as in German and Dutch).

Presumably the syntactic binding relation that holds between a topicalized element and its gap or resumptive pronoun is sensitive to the definiteness (or whatever else the right semantic property may be) of the head of the relative clause; but the anaphoric binding relation is not sensitive to the same property. Here again, anaphoric and bound pronouns pattern together, and are distinct from resumptive pronouns.

(74) Everybody knows somebody that he doesn’t like.

This concludes our discussion of the status of resumptive pronouns. We have shown that their privileges of occurrence are quite different from those of free pronouns and given some reasons to think that they are to be treated syntactically like t. We will now proceed upon that assumption and spell out the syntactic rules that are needed to generate the sentences with resumptive pronouns.

3.3 Rules for Introducing Resumptive Pronouns

Thus far we have no rules to introduce resumptive pronouns where they are needed. We will use specific local constraints to introduce them in their different contexts. For example, the rule shown in (75) will introduce resumptive pronouns to circumvent the Fixed Subject Constraint. (We use context-sensitive rule notation to represent a “local constraint”; see Gazdar’s chapter, section 3.)

(75) S/NP → NP/NP VP /{att} ——

The underlining of the slashed category is a simple marking convention which specifies how the slashed category is to be realized; a new elimination rule will be added to spell out NP/NP as a pronoun rather than a trace. More generally, the elimination rule is as given in (76).

(76) [s/ Pronoun]

The semantic translation of this rule is the same as that for the elimination rule introducing traces. Since derived categories have no special lexical or semantic properties, the resumptive pronoun will automatically acquire all agreement features that an ordinary pronoun in the same position would have.

3.3.1 Sentential Subjects

As shown in Section 1.2.1, extraction out of sentential subjects is possible when a resumptive pronoun is left behind. In this case too, coordination facts show that the sentence containing the sentential subject must be of the category S/NP:

(77) Dette er den eksamen som Per sa at hvor godt Lars gjorde det på dem ville bestemme om han kommer inn på medisin og som Lars faktisk greide — bra. (N).

‘That’s the exam that Peter said that how well Lars does on it would determine whether he gets into med school, and that Lars indeed aced — —’

Resumptive pronouns in this construction can be introduced by the metarule given in (78).

(78) [s... S/g... ] ⇒ [s... S/a... ]

Again a filter has to be added to rule out the variant with the gap (see (90)).

3.3.2 Crossing Dependencies and Resumptive Pronouns

In Section 1.2 we noted that Swedish makes use of resumptive pronouns in cases of crossing unbounded dependencies. Note that in the Swedish examples in (79), taken from Engdahl (1979), the interpretation changes with the use of resumptive pronoun.
This method of creating crossing dependencies can easily be extended to three-hole sentences, without ever having more than two missing constituents on hold in memory (see Section IV). Where the holes are all produced by multiple leftward extractions, the following patterns of gaps and resumptive pronouns are predicted:

\[(84)\]
\[
\begin{array}{cccccccc}
F_1 & F_2 & F_3 & G_3 & G_2 & G_1 & \emptyset & \emptyset & \emptyset \\
F_1 & F_2 & F_3 & G_3 & G_2 & \text{pro} & \emptyset & \emptyset & \emptyset \\
F_1 & F_2 & F_3 & G_3 & \text{pro} & G_1 & \emptyset & \emptyset & \emptyset \\
F_1 & F_2 & F_3 & \text{pro} & G_1 & \text{pro} & \emptyset & \emptyset & \emptyset \\
F_1 & F_2 & \text{pro} & G_1 & \text{pro} & \text{pro} & \emptyset & \emptyset & \emptyset \\
F_1 & \text{pro} & G_1 & \text{pro} & \text{pro} & \text{pro} & \emptyset & \emptyset & \emptyset \\
\end{array}
\]

Some Norwegian examples of three-hole sentences with resumptive pronouns as the result of crossing dependencies are given below:

\[(85)\]
\[
\begin{array}{cccccccc}
\text{Det er politimannen som jeg lurer på hvilke piker dommeren} & \emptyset & \emptyset & \emptyset \\
\text{vil vete hvilke droger} & \emptyset & \emptyset & \emptyset \\
\text{han} & \emptyset & \emptyset & \emptyset \\
\text{hadde solgt} & \emptyset & \emptyset & \emptyset \\
\{ \emptyset \} & \emptyset & \emptyset & \emptyset \\
\text{til barne.} & \emptyset & \emptyset & \emptyset \\
\{ \emptyset \} & \emptyset & \emptyset & \emptyset \\
\text{This is the policeman, that I wonder which girls, the judge} & \emptyset & \emptyset & \emptyset \\
\text{will want to know which drugs, he, thought they, had} & \emptyset & \emptyset & \emptyset \\
\text{sold, to the children.'} & \emptyset & \emptyset & \emptyset \\
\end{array}
\]

b. Her er pusher som jeg lurer på hvilke piker dommeren vil
vite hvilka stoffer folk børte ham snakker med dem om \emptyset.
\text{\textquoteleft Here is the pusher, that I wonder which girls, the judge}
\text{will want to know which things, people heard him, talk with them, about \emptyset.\textquoteright}.

The fact that there are two-hole crossing dependencies without resumptive pronouns in Norwegian and Icelandic evidently presents a problem for our approach. The interpretation of such sentences seems to depend on agreement information and selectional restrictions.

### 3.3.3 The Long-distance Principle

There are certain situations where resumptive pronouns are optional rather than obligatory, even in Swedish. The simplest of these cases is the one in which the extraction site is embedded more than two clauses down from its head, as mentioned in Section 1.2.4.
3.4 Island Constraints in Scandinavian Languages: a Summary

Icelandic:
Derived categories: extend the rule schema to allow at most double holes, or give a recursive definition as in (56) and a filter for more than two holes, as in (89):

\[(89) \quad *S/\alpha/\beta/\gamma \quad \text{where } \alpha \text{ and } \beta \text{ are in } D(V_n) \text{ and } \gamma \text{ is in } V_n\]

Sentential Subject Constraint:

\[(90) \quad *[S_n/\alpha/\ldots ] \quad \text{for all } \alpha\]

Complex NP Constraint:

\[(91) \quad *R/\alpha \quad \text{for all } \alpha\]

Genitive Constraint:\n
\[(92) \quad *[_{NP/NP} \ldots \ldots NP/NP/\ldots ]\]

Crossing dependencies with two gaps are allowed because there is no convention to rule them out; resumptive pronouns are generally unavailable in Icelandic, hence they are not introduced.

Swedish:
Derived categories: see definition (56).
Elimination Rules: add \([_{NP} \text{ Pronoun}]\) as in (76).
Sentential Subject Constraint: see (90).

Left-branch constraint:

\[(93) \quad *[_{NP/NP} \ldots \ldots NP/NP/\ldots ]\]
Crossing convention:

(94) \(*[\alpha_{\text{NP}} \ldots B/\alpha \ldots C/\beta \ldots ]\) for all \(\alpha, \beta, A, B, C\).

Devices creating underlined categories:

Fixed Subject Constraint:

(95) \(S/NP \rightarrow NP/NP \text{VP} \{\text{att}\} \{\text{om}\}\)

Sentential subjects with resumptive pronouns:

(96) \([s_{x\text{a}} S/\alpha \ldots ] \Rightarrow [s_{x\text{a}} S/\alpha \ldots ]\)

Crossing dependencies:

(97) \([\alpha \ldots \beta/\gamma \ldots ] \Rightarrow [\alpha \ldots \beta/\gamma \ldots ]\)

Long distance principle:

(98) \([s_{r\text{a}} \ldots \alpha/\gamma \ldots ] \Rightarrow [s_{r\text{a}} \ldots \alpha/\gamma \ldots ]\)

if it occurs in a main projection path of the form \(\ldots \alpha/\gamma \ldots \beta/\gamma \ldots \), where \(\alpha\) and \(\beta\) are sentential categories.

Norwegian. The Norwegian facts are not as easy to capture in a small list of simple node admissibility conditions. For most speakers the Fixed Subject Constraint does not hold, and resumptive pronouns are not allowed in the site of subject extractions. Unlike Icelandic, however, the resumptive pronoun strategy is available to many Norwegian speakers in the case of crossing dependencies resulting from multiple leftward extractions; unlike Swedish, this strategy is not obligatory.

There is a simple way to look at multiple extractions in such Norwegian dialects: they allow both the sentences generated by the grammar postulated for Icelandic and the sentences generated by the grammar postulated for Swedish. We could hypothesize that some speakers of Norwegian have two grammars for multiple leftward extractions. It is clear that to allow for this type of explanation complicates the relation between theory and fact considerably, and makes it much more difficult to falsify a theory. However this situation should not be ruled out on theoretical grounds; other cases of multiple analyses have been proposed in the literature (e.g. Hanks (1975)). Our account of the interaction between perceptual and syntactic constraints suggests that this situation is in fact extremely likely.

4.1 Nonstructural Factors

In the previous section we have written a grammar that will generate only those extractions that are admissible on structural grounds. This grammar will still wildly overgenerate as far as the set of acceptable sentences goes, most notably with respect to relative clauses. As the grammar is written, extraction out of relative clauses is freely allowed in Swedish and Norwegian. Certain examples of such extractions are clearly good; an example is repeated here for convenience:

(6) Marit finner vi aldri den gutten som kan hanle opp med. (N)

'Mary, we'll never find the boy who can handle.'

It seems impossible, therefore, to rule out this type of extraction on structural grounds. However, we have also noted that most extractions out of relative clauses are not good in Swedish and Norwegian. For example, the following sentence is not accepted:

(5) a. *Lisa talr jag med pojen som kysst (hennes). (S)

Lisa, I talked with the boy who kissed (hers).

In such cases, the use of a resumptive pronoun does not lead to acceptability.

This situation is not limited to relative clauses. In Swedish and Norwegian, most extractions out of comparative clauses are bad, as illustrated with the following example:

(99) *Det er mannen som Jon maten flere fugler enn jeg tror bor near——. (N)

'This is the man, that John feeds more birds than I think live near——.'
In these cases as well, a resumptive pronoun does not improve matters:

(100)   *Dets en man som Jon har flere fugler enn jeg tror han

                        "This is the man that John sees more birds than I think live
                        near him." (N)

One can however, find examples of grammatical extractions out of comparative clauses; an example is given in (101):

(101)   Jeg vet om jobber som du bruker mest tid på bilen enn vi til å
                    utføre. (N)

                    "I know of a job, that you spend more time on the-car than will
                    take to finish D." (G)

Once again, the difference between (99) and (101) is not structural. It has been argued that the difference between good and bad extractions out of relative clauses should be accounted for on semantic and pragmatic grounds. The most extensive discussion to date is found in Kuno (1976), who mainly studied the extractions out of relative clauses embedded within relative clauses. He argues that it must be possible to construe the higher relative clause as "about its head." Thus a sentence like the following Japanese one (from Kuno (1979)) is bad, despite the fact that Japanese allows extractions out of relative clauses, because it is strange to characterize a book by the circumstance that the publisher that published it burned down:

(102)   ?? Syuppansita kaisya ga kazi de yakete-simatta hon o yonda,

                    published company fire by was-burned-down book I-read

However the following sentence, which has the same structure as the example in (102), is better:

(103)   Syuppansita kaisya go tooansite-simatta hon o yonda,

                    published company bankrupted-has been book I-read

                    "I read a book which the company that published [it] went
                    bankrupt."

It is easier to imagine a context in which such a characterization of a book would be appropriate.

Kuno (1976) illustrates the point with Japanese examples, and with

English examples as well. While there is some discussion and disagreement about the grammaticality judgments on the following sentences, it is clear that there is indeed a progression from worse to better:

(104)   This is the child who John married a girl who dislikes.

(105)   This is the child who I know a family which is willing to adopt.

(106)   This is the child who there is nobody who is willing to adopt.

                   (= Kuno 1-20(a-c))

It seems to be the case that some speakers of English find even (106) ungrammatical, even though it can be construed as being about the child. Thus in English, at least for some speakers, the prohibition against extraction out of relative clauses is a syntactic constraint. The same is not true in Swedish and Norwegian, however, where the equivalent of (106) is perfectly acceptable. The Swedish version is given below:

(105)   Det här är barnet som det inte finns någon som vill adoptera.

Allwood (1976) makes observations that point in the same direction, and isolates the following factors affecting acceptability of the extraction: extractions is better if (i) the head of the most deeply embedded relative clause is indefinite, and (ii) the verb of the higher clause is of the type called "bridge verbs" (Erteschik (1973)). The verb know seems to be the most acceptable "bridge" in any language.

While all this is rather vague, the following picture seems to emerge:

a relative clause serves to characterize its head. It is rarely the case that this characterization is successful if it involves extraction out of another relative clause; however, if it is successful, the sentence is grammatical in languages like Japanese and Swedish (but not in English). As Kuno observes in a footnote, the constraint operates not only in relative clauses, but also with respect to topicalizations and wh-questions: the question must be about the questioned constituent, and it must be possible to construe what follows a topic as a predicative about it.26

If this is the right approach to relative clauses, it stands to reason that the insertion of a resumptive pronoun is not going to help: the pragmatic organization of the discourse will be violated regardless of the presence or absence of a resumptive pronoun.27 It remains to be explained, then, why the use of a resumptive pronoun does make a difference in certain other constructions. We turn to this question now.
4.2 Resumptive Pronouns

In the previous section we observed that some constraints on extraction are motivated by discourse principles. It does not seem plausible that the presence or absence of a resumptive pronoun has anything to do with these principles: the general organization of the sentence in terms of backgrounding and foregrounding, old and new information, grammatical relations, etc., remains the same, whether or not a resumptive pronoun is present. Thus it seems reasonable to look for another type of explanation for the observed differences between other clause types with and without resumptive pronouns.28

4.2.1 Resumptive Pronouns and Surface Constraints

A first observation that can be made is that while resumptive pronouns do not influence the overall organization of the sentence, they make a clear difference at the local level. If we assume that there are surface constraints on elements that are obligatory in certain types of sentences, resumptive pronouns can make it possible to respect such constraints, whereas a gap might lead to violations.

In Maling & Zaenen (1978) we hypothesized that the fixed subject constraint was such a surface constraint: in certain languages tensed clauses need an overt subject after a complementizer. Whatever the rationale for such a surface constraint may be, the fact that it is a surface constraint suggests that if the resumptive pronoun strategy is available in a given language, then it could be used to save extractions out of subject position. As we have seen, this is indeed the case. In Swedish, where the fixed subject constraint holds as in English, a resumptive pronoun is used to allow extractions out of subject position without violating the surface constraint.

However, not all resumptive pronouns seem to play this role: In extractions out of sentential subjects, no clause-internal surface constraint is violated. In such cases, the most promising approach seems to be the hypothesis that resumptive pronouns facilitate processing.

4.2.2 Resumptive Pronouns and Processing

The idea that resumptive pronouns facilitate processing is neither new nor counterintuitive. However, it is far from clear why this should be the case. In what follows we will give a broad outline of a model which explicates to a certain degree why pronouns are easier to process than gaps. The basic idea is simple: resumptive pronouns are easier to process than gaps because, unlike gaps, processing them does not lead to an interruption in the primary task involved in the processing of a clause, namely the building up of its predicate argument structure.29

Let us spell out in a bit more detail how this works. The view that a primary task of the language processor is to figure out the predicate argument structure of each clause can hardly be controversial; without this one would not be able to reconstruct the propositional content of the clause. The view that “gaps” lead to an interruption of that process has been substantiated in work by Wanner & Maratsos (1978), who have shown that a peak in processing load30 is found in relative clauses when a hearer encounters the first constituent following a gap. Assuming a language with strict word order and without free pro-drop (e.g. English and the Scandinavian languages), this is the moment when the hearer realizes that there is a constituent missing in the clause that he is currently processing. Wanner & Maratsos attribute this increase in processing load to the fact that the hearer has to go back to his memory store, extract a stored constituent, and assign a grammatical function to it, before going on with the processing of the rest of the clause. They call this increase the assignment load.

That a resumptive pronoun would not lead to such an increase in processing load in the middle of a clause is something that requires testing; but there is some prima facie plausibility to this view: characteristically resumptive pronouns have the same morphological shape as normal personal pronouns. Accordingly when one hears the sentence they occur in, one does not necessarily treat them as related to constituents on hold. Locally, within the clause itself, there is no argument missing, and hence the hearer can continue the process of determining the predicate argument structure without interruption.

Of course, nonresumptive pronouns must also be linked up with their referents. It is essential to the hypothesis proposed here that the linking of gaps to their antecedents is psychologically different from the linking of free anaphors to their antecedents, and that what free anaphor and resumptive pronoun processing have in common is the fact that the mechanism by which they are linked up to their antecedent does not interrupt the processing of the clause they appear in.

This hypothesis leaves several points unexplained: when is a resumptive pronoun assigned to its antecedent? Why is it commonly the case that
resumptive pronouns cannot occur “too close” to their antecedents? etc. We cannot address these questions here; they are the object of our research in progress. But we want to make three points here.

The first one is a defensive one: one rather obvious way of elaborating the hypothesis sketched above is to assume that resumptive pronouns are assigned to their antecedents later than gaps are. If this is the case, one must explain how they can facilitate processing in view of another finding of Wanner & Maratsos (1978), namely the hold load. The hold hypothesis says that the processing load is higher across the interval between the wh-constituent and its following bound anaphor than at other moments (ceteris paribus). Under the hypothesis sketched above however, the wh-constituent stays on hold longer when the extraction site is filled with a resumptive pronoun than when there is a gap, since the resumptive pronoun is not immediately recognized as filling the place of the wh-constituent. Accordingly resumptive pronouns should be more difficult to process than gaps because of the greater hold load.

There are several remarks to be made: first the hold hypothesis has some initial implausibility: it predicts that it would generally be better for gaps to follow their fillers as quickly as possible. However there is no evidence that natural languages are set up to meet such a requirement: for languages in which subjects precede objects, a gap in a subject clause would follow its antecedent more closely than a gap in an object clause; hence extraction out of subject clauses should be preferred. However extraction out of sentential subjects is usually not allowed in these languages.

Another example is the preference noted in Kuno (1973) to have incomplete constituents in clause final rather than in clause initial or clause medial position. These observations are not in accord with the idea that gaps have to follow their fillers as soon as possible to reduce the hold load. More importantly, recent tests have shown that the hold hypothesis is at the very least too simplistic (M. Ford, personal communication).

Another factor that might play a role is the following: the hypothesis sketched above does not necessarily imply that resumptive pronouns are overall easier to process than gaps; it may be that they lead to a more even distribution in processing load. The assignment of a gap is hypothesized to cause a peak in processing load at a particular moment; the assignment of a resumptive pronoun might in itself be as difficult or even more difficult but occur at a moment when the overall processing load is lower.

Secondly the hypothesis implies that the structures in which resumptive pronouns are found are in themselves more difficult to process than those out of which extraction is possible without leaving a resumptive pronoun. One place where resumptive pronouns are used and this seems to be true is sentential subjects. It has been found that non-extraposed sentential subjects are more difficult to process than subordinate clauses which follow their main clauses (see e.g. Holmes (1963)). Again further research is needed.

Thirdly, one set of facts the proposed account of resumptive pronouns would handle well is the distribution between the pronouns and gaps in the case of crossing extractions in Swedish, first noticed and described in Engdahl (1979). As we have seen (cf. section 3.3) we find a pronoun instead of a hole in the following configuration:

\[
F_1 \quad G_2 \quad \text{pro} \quad F_2
\]

The necessary for constraints like the NDC has been hypothesized to be the fact that some aspects of short term memory work like a push-down storage mechanism (Fodor (1978)). Under such a hypothesis the dependency sketched in (106) should not be possible. If however the pronoun is not immediately linked up with its antecedent, we can process such crossing dependencies in a push-down fashion: we bypass the resumptive pronoun, processing it as a normal NP, without assigning it to an antecedent; when we process the "second" gap we assign it to the last filler

When we have one filler left in push-down storage we assign it to the pronoun. Again this hypothesis depends crucially on when exactly pronouns are hooked up with their antecedents. Since little is known about this, even for “free” pronouns, it will take some further research to confirm this hypothesis.

In this last subsection we have sketched a hypothesis explaining the use of resumptive pronouns in certain contexts. Further work is needed to determine the relation between our processing hypotheses and the organization of the grammar itself: in Section 3.2 we argued that resumptive pronouns behave in several ways like gaps and accordingly we have treated them as such in the syntax; in this section we have stressed the differences between resumptive pronouns and gaps, and hypothesized that resumptive pronouns are processed in some respects like free pronouns of the same morphological shape. Obviously this hybridization calls for further clarification of the relationship between syntax and processing, a problem we leave to the future.
For the moment we have shown that island constraints may exhibit a wide range of variation even among closely related languages and that it seems profitable to look upon them as a less unitary phenomenon than has been traditionally assumed. We have also shown that the formalism developed in Gazdar (1980) can easily be extended to describe a wide range of data it was not designed to handle. Several problems however remain: for instance, in modern Scandinavian languages the appearance of resumptive pronouns does not pattern according to the traditional transformational distinction between movement and deletion rules; but in other languages it does—how will a base-generated framework capture that distinction? Also: if our tentative conclusion that “base-generation” is possible but that context-free grammars are not powerful enough to handle the full range of data is correct, we are again faced with a search for constraints that cannot be reduced to a simple-minded limitation of the mathematical properties of grammars.

NOTES

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1 Although the account of extraction phenomena presented here will be in terms of the base-generated framework of Gazdar (this volume), the terminology will make use of the metaphor introduced within transformational grammar, since they will be understood by the largest group of readers.

2 Given that Erteschik (1973) was the first to point out the differences between English and the Scandinavian languages with respect to extraction constraints, it is a bit ironic that we do not have further data to present on Danish. The lack of readily available informants has prevented us from taking Danish into account here.

3 Maling (1978) reported an asymmetry with respect to wh-islands, namely that extraction is possible by relativization but not by questioning. It seems that this asymmetry does not exist for all speakers (cf. Engdahl 1979; Taraldsen 1978); and for some speakers who do find such an asymmetry, the reason may well be an overriding preference for clausal versions of both wh-questions and topicalizations (cf. Svein Lie 1980).

4 To talk about Swedish, Norwegian and Icelandic as monolithic entities with no variation among the speakers of each language is of course an oversimplification. As will become clear, the variation among Norwegian speakers is so important that even for an overview like this one, it is not possible to maintain the fiction of one grammar. In Icelandic we found less variation among the different speakers that we consulted; some differences are pointed out at the relevant moments. For Swedish we have relied mostly on data from E. Engdahl; some of the data can be found in her papers, and some were communicated personally.

5 For some discussion see Lie (1980)

6 One of our informants accepted one extraction out of a relative clause, namely (i):

(i) Kaffi pekki og vegg i landsi, sem siki drikkar.
   Coffee know I no one in Iceland that not drinks.

All other informants rejected even this sentence. This situation seems similar to English, where some speakers will also accept an occasional violation of the CNPC.

7 In Scandinavian languages, the difference between topicalization and Left Dislocation is clearly marked by the difference in word order; even when a resumptive pronoun is present in a topicalized sentence, it is possible to distinguish it from a LD construction because in the former the verb will be in second position, whereas in LD the verb will (superficially) be in third position. See Maling & Zeevaert (1978).

8 As in English, the extraposed versions are very much preferred, and extraction out of the extraposed clause is possible without leaving a resumptive pronoun behind.

9 In some nonstandard dialects there seems to be another option: namely to use some after or
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(Meta Markey, personal communication); it is not clear whether zero is in complemen
tor or subject position. We have not been able to investigate this further.

10 The evidence consists of sequences of wh-word zero which occur primarily in case of subject extraction; the status of zero is not clear, however.

11 For the sake of the argument, we give the structure assigned under Chomsky's (1977) wh-movement analysis of topcization, in which topcization is collapsed with left dislocation. For arguments against this analysis see Zaanen & Maling (1977), Maling & Zaanen (1978b), and Zaanen (1980).

12 This was pointed out independently by E. Williams in a discussion with E. Engdahl and M. A. C. Huybregtse after the presentation of some of this material in a workshop at Harvard in November, 1979.

13 In Scandinavian languages, it is conceivable that the SSC falls under subcacy even if it is the bounding node because sentential subjects can be introduced with a lexical head, der 'it', and could therefore be assigned the structure of a complex NP.

14 It is not particular to Icelandic, either; see Goldsmith (to appear) for a discussion of a similar case in Igbo.

15 The following version is also accepted, and in fact, preferred, by our informants:

(i) Per zipper jag ikke inn noen som liker.

Peter let I not in anyone who likes.

In (i) the entire NP has been extraposed. Presumably Taraldsen will analyze these sentences as being derived by applying Heavy NP Shift first, followed by extraposition from NP. This implies that Heavy NP Shift cannot be a syntactic rule either.

16 One can try to combine the features of Reinhart's and Rizzi's analyses by assuming a double-COMP position and S as a binding node, and by abandoning the SSC and the tensed-S conditions as constraints on wh-movement. We leave this exercise to the patient reader.

17 The exact conditions on pro-drop in these languages are unknown. To talk about free pro-drop is certainly an exaggeration. One needs to investigate the phenomenon further to see if the pro-drop pattern can be used to explain the apparently crossing extractions. The point we want to make is that whereas it is clear that the prohibition against crossing dependencies such as n is not universal, it might be possible to link its existence or nonexistence in a language to other characteristics of the language.

18 This is essentially the correlation noticed in Perlmutter (1971) as refined in Maling & Zaanen (1978b) to make the distinction between personal pronoun subjects and dummy subjects. For a more detailed discussion of the FSC and some problems with it, see those works and the references cited therein.

19 Resumptive (or rather p-resumptive pronouns) are never possible as "placeholders" for rightward movement rules. This holds also true in Swedish and Norwegian, which might be an indication that the two phenomena (rightward and leftward dependencies) should be distinguished more than they are in Swedish. Note that the term "extraction" rule is traditionally intended to cover only leftward movement.

20 Another way of looking at the situation was suggested by B. H. Partee in a discussion at the Workshop on Linguistics and Mathematics, Amherst, 1979: we might assume that Swedish speakers have several grammars, one that allows only one extraction, one that allows two extractions, one that allows three extractions, etc. Each of these grammars allows only a finite number of extractions, and hence the notion of any finite set of these is still context-free.

21 Arguments to the same effect are given in McCloskey (1979) for Irish. The arguments given here are further elaborated in Zaanen and Maling (1980) and Zaanen, Engdahl and Maling (1981).

22 As far as we can see, the version of across-the-board extraction presented in Williams (1978) in a wh-movement framework also necessitates the assumption that resumptive pronouns are the spelled-out traces left after wh-movement has applied. This is a problem for the assumptions about the constraints on wh-movement made in that framework.

23 As pointed out in an earlier version of this paper, and independently by McCloskey (personal communication), this account runs into trouble with sentences like (i):

(i) This is the woman that John said that she and Bill are having an affair.

In (i) we have coordinated an NP/NP and an NP. Similar sentences are good in Scandinavian languages and in Irish. On the other hand, the following combinations have to be excluded: i and i or i and pro. We assume this latter problem to be of a different nature, but the acceptability of sentences like (i) seems to be an indication that our syntactic treatment of resumptive pronouns might be too simplistic.

24 The distance requirement of Scandinavian resumptive pronouns is quite different from the requirements found in certain other languages (and even from those of an earlier stage of Icelandic); for a more typical case, see e.g. McCloskey (1979) and Clements (1979).

25 We refer to this as the Genitive NP Constraint rather than the Left Branch Constraint since the normal position for possessives in Icelandic is pronominal rather than prepositional. Extraction from either position is impossible.

26 This cannot be the whole story. Extraction out of relative clauses in Swedish seems to be less free than in Japanese. We have no suggestions to offer about what the relevant difference may be, but the possibility of null anaphora in Japanese is an obvious place to look.

27 This is not contradicted by languages where relativization normally involves a resumptive pronoun, since in these languages the syntactic constraints are obviously different.

28 This might lead to the view that Topicalization and LD should have the same function too. This is not, however, the case, as argued for English by E. Prince (1980). It also does not follow from our own assumptions; as we have argued elsewhere (Maling & Zaanen 1978b), the left dislocated constituent is outside of the sentential domain, whereas the topicalized constituent is inside that domain. Thus there are other differences between the two constructions than just the presence or absence of a resumptive pronoun.

29 Note that resumptive pronouns are not used to help locate the gap and so reduce ambiguity. The reader can verify for himself that they could not be used for this purpose given the fact that resumptive pronouns have the same morphological shape as other personal pronouns.

30 We are simplifying the discussion by calling "processing load" two phenomena that would have to be distinguished in a more adequate model; some instances that are memory load and others that are more clearly processing load itself. The discussion in Wanner & Maratossi is not totally clear. They talk about memory load, but it is not evident that the assignment load is a memory load; however, the task that they gave their subjects was a memory task. We are currently investigating whether the results would be the same if the task were a reaction time task.

31 The experimental finding that sentential subjects are more difficult to process than their extraposed counterparts does not explain why this should be so. One possible account would be to assume that the difficulty has to do with the fact that in SVO languages the functional role (i.e. the sense of Bremer 1978) of subjects is not clear until the verb is processed (since this role depends on the nature and the voice of the verb). It seems to be true in general that one cannot
extract out of constituents whose functional role is not yet assigned. This holds for
nonessential subjects too, as shown by the following example:

(i) *Island constraints, nobody's theory of works.

The following observations might also be relevant: as is well known, it is impossible to extract
out of proposed wh-constituents as illustrated in (i) and (ii).

(ii) *Island constraints, I can imagine which theory about Robin prefers.

(iii) *Which cars did the insurance adjuster want to know which parts of the fire had

(Since in GPEG these proposed constituents are not themselves slashed categories, the
extraction does not fall under the "double hole" constraint.)

Since wh-constituents have no functional role assigned to them no binding inside is possible.
The same constraint could also explain the subjunctive behavior of "raised" subjects noted in
Chomsky (1973) and illustrated in (iv)

(iv) *Who did you expect stories about to tell Mary?

Since the grammatical object of expect has no functional role in the main clause extraction is
currently predicted to be impossible.

A problem for this account is that it predicts *expected (sister partibus) that extractions out of subjects
should be allowed in VGO languages. However that is not generally the case (McCloskey, personal communication).

This model has to be relaxed to account for the limited crossing extractions of Norwegian
and Icelandic.

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SYNTACTIC REPRESENTATION, SYNTACTIC LEVELS, AND THE NOTION OF SUBJECT

1. GOALS

This paper addresses two questions:

(1) What is the nature of syntactic representation?
(2) What is the notion of 'subject' in linguistic theory?

It is argued that these questions are crucially interrelated, and without a proper answer to the first it is impossible to provide a proper answer to the second.

The recent literature contains considerable discussion of (2) and of how one can "identify" subjects in one language or another. In some cases it is concluded that particular languages do not have subjects or that there is no viable notion of subject, either in linguistic theory or in the grammar of individual languages. The position taken here is that such work is fundamentally misguided because it assumes that the notion of subject is to be defined in terms of other notions — whether phrase structure configurations (Chomsky, 1965), "behavioral properties" (Keenan, 1976), or case (Hale, Jeanne, and Platero, 1977). Some discussion, e.g. that in Chomsky (1977, 75–76) and Breman (1978, 14–18), assumes definitions of grammatical relations in terms of different notions in different languages. However, all of this work shares the assumption that grammatical relations are not to be taken as primitive, but rather defined in terms of other notions. The inadequacies of the various attempts to define grammatical relations in terms of other notions are not to detain us here; they are discussed in Johnson (1977, 1979), Klopströ (1980), and Perlmutt (to appear c). The position taken here is that of Perlmutt and Postal (1974) — that grammatical relations are primitives of linguistic theory.

Attempts to define grammatical relations in terms of other notions have depended on certain assumptions about the nature of syntactic representation. Chomsky (1965, 68–74) considered representing grammatical relations ("functional notions") in phrase markers directly. He rejected this alternative, claiming that such representation would be superfluous, and that grammatical relations could be defined in terms of structural