The restriction of *tough*-movement via the feature +LEX is reminiscent of similar proposals by Gazdar et al. (1985, 151) and Jacobson (1992b, 278), who suggest that the adjective subcategorizes for an accusative (or nonnominal) NP. It also resembles a GB analysis in which it is assumed that extractable subjects must be antecedent-governed. Like those related accounts, the one proposed here leaves unanswered the question of why -LEX arguments should be excluded from this particular cluster of constructions.23

This analysis also predicts the following asymmetry in multiple long-range dependencies induced by the interaction of *tough*-movement and relativization, noted by Fodor (1978). The categories in (53b) cannot combine to give the same predicate-argument structure as (53a). They can only combine to yield a different, and anomalous, predicate-argument structure.

(53) a. a violin which [this sonata is]_{S/AP} [hard to play]_{AP/PP}
   [upon]_{PP/NP}.

b. #a sonata which [this violin is]_{S/AP} [hard to play]_{AP/PP}
   [upon]_{PP/NP}.

We thereby avoid any need to stipulate *wh*-island status for *tough* complements (Chomsky (1977, 105–106)), together with the attendant complications. As Hukari and Levine (1991, 223) note, this asymmetry continues to present problems both for GB approaches following Chomsky (1981), and for phrase-structure-based approaches following Gazdar et al. (1985). In the former case it has led to unconstrained operations of reanalysis, and in the latter to proliferating distinctions between types of slash (Hukari and Levine 1991; also advocated in categorial frameworks by Moortgat (1988) Jacobson (1990, 1992b), and Morrill, (1994, 1995; Morrill and Solias 1993)), or to the invocation of supposedly performance-related nesting constraints (Fodor 1978; Pollard and Sag 1994, 159).

3.5 Asymmetric Islands

The unboundedness of the dependencies involved in relativization is notoriously limited by “island constraints,” which have been related to the principle of Subjacency and the notion of barriers to movement. These have been discussed in categorial terms by Hepple (1990) and Morrill (1988, 1994). The following remarks are confined to the question of asymmetries in island effects.

3.5.1 Adjunct Islands

The fact that both adjuncts and relative clauses are in general islands in English would follow from the assumption that the only category they bear is that of a (backward) modifier, as can be seen from the categories in the following unacceptible examples:24

(54) a. ?a book [which]_{\{M\mid N\}}_{S/NP} [I will]_{S/V P} [walk]_{V P} [without reading]_{\{V P\mid V P\}}_{V P}/_{N P}

b. ?a book [which]_{\{M\mid N\}}_{S/NP} [I met]_{\{S/NP\}}_{N P} [a]_{N P} [woman]_{N P} [who wrote]_{\{N\mid N\}}_{N P}

However, such examples are only blocked if we make the further assumption that verbs like *walk* cannot type-raise over *VP* adjuncts, to acquire the category *VP*/(VP,VP), and that nouns like *woman* cannot raise over *N* adjuncts, to become *N*/(N,N). If they can acquire these categories, either by active syntactic raising or by lexicalization, then they can compose into the adjunct, allowing the extraction. The fact that adjunct islands exist might therefore seem to suggest that the process of type-raising may be somewhat more restricted than we have so far assumed.25 However, the weakness of these constraints, and their sensitivity to lexical content (including the verb itself and such properties as definiteness in the argument itself) suggests that the origin of constraints on long-range dependencies ultimately lies in semantic coherence properties of the nonstandard constituents that combination into islands creates, as is to some extent implicit in the analyses of islands by Oehlre (1974), Rodman (1976), and Cooper (1982), and explicit in Steedman 1987 (see Hepple 1990 for a dissenting view).

Similarly, although examples like (55a) might make us want to restrict the rule of forward composition somewhat more than we have so far, examples like (55b) show that NPs are not in general islands.

(55) a. #I want a, and you want a, biscuit.

b. I read a novel by, and wrote a play about, the man in the Brooks Brothers shirt.
3.5.2 Preposition-Stranding Asymmetries

In English, unlike many other languages, prepositions “strand,” freely allowing leftward and rightward unbounded extractions, as follows:

\[
\begin{array}{c}
N\backslash N\backslash (S/NP) \quad S/PP \quad PP/NP \quad S/NP \quad \rightarrow^B
\end{array}
\]

(56) (the table) which I put the book on
\[
S/PP \quad PP/NP \quad CONJ \quad S/NP \quad NP^\dagger
\]

(57) (I think) I put the book on, and you placed the pen under, the table

However, such preposition stranding extraction is subject to a number of puzzling restrictions in interaction with heavy NP shift, including certain asymmetries in preposition stranding extraction in English that were first noted by Ross (1967). These asymmetries, to which we turn next, can be accounted for in terms of exactly the same feature-based apparatus introduced above to exceptionally allow subject extraction.

Heavy NP shift, among other “nonperipheral” argument extractions, depends in Steedman 1987 on the involvement of a suitably constrained version of the backward crossed composition rule, \(<B_x, (106d)\) of chapter 2, as in the following derivations:

\[
\begin{array}{c}
S/VP \quad VP/NP \quad VP/VP \quad N P^\dagger \\
\quad VP/NP \quad \rightarrow^B \\
\quad S/NP \quad \rightarrow^B \\
\quad S
\end{array}
\]

(58) I will buy tomorrow an engraving by Rembrandt

\[
\begin{array}{c}
S/VP \quad (VP/PP)/NP \quad VP\backslash (VP/PP) \quad NP^\dagger \\
\quad VP/NP \quad \rightarrow^B \\
\quad S/NP \quad \rightarrow^B \\
\quad S
\end{array}
\]

(59) I will give to Chapman an engraving by Rembrandt

In (58) an adjunct is composed with a transitive verb. In (58) a type-raised argument PP is composed with a ditransitive verb.

Since this is the only fully general way in which both leftward and rightward extraction of nonperipheral arguments is permitted in the present theory, we are committed to the view that everything that can be shifted over must be a type-raised argument or an adjunct.\(^{26}\)

This account of heavy NP shift interacts correctly with the account of preposition stranding outlined above. Compositions identical to those involved in the heavy-shifted sentences (58) and (59) are crucial in the derivation of relative clauses such as the following:

(60) a. an engraving which I will [buy today and sell tomorrow]\(_{VP/NP}\)

b. an engraving which I will [show to Keats and give to Chapman]\(_{VP/NP}\)

The theory correctly prevents both rightward and leftward extraction out of the shifted-over modifier in such examples, whether or not it is subcategorized for. Sentences like the following, which were among those motivating Kuno’s (1973) Clause Nonfinal Incomplete Constituent Constraint (CNICCC), are therefore excluded without stipulation.

(61) a. *a woman who(m) I will [give]\(_{VP/PP/\backslash NP}\) [to]\(_{PP/NP}\)

b. *I will [give]\(_{VP/PP/\backslash NP}\) [to]\(_{PP/NP}\) [an engraving by Rembrandt]\(_{NP}\) this woman.

Like the backward crossed substitution rule (92) of chapter 2, the backward crossed composition rule must include a language-specific restriction, permitting only categories of the form $S\backslash\backslash-$ that is $S$ or (tensed, untensed, etc.) $VP$—to unify with the variable $X$, where $\backslash$ $S$ is defined as in (42) of chapter 2. The rule can provisionally be written as follows:\(^{27}\)

\[
\begin{array}{c}
Y/Z : g \\
X/Y : f \quad \Rightarrow^B_X \\
X/Z : \lambda x f(gx)
\end{array}
\]

where $X = Y = S\backslash\backslash$.

The restriction (which is stronger than the corresponding restriction on backward substitution in rule (77), for reasons that we will come to in sections 3.5.2 and 3.6.4) has the effect of excluding analogous derivations for such ungrammatical examples as the following:\(^{28}\)
(63) *a [curious]_{IN} [by Rembrandt]_{N/N} [engraving]_{N}

The grammar of English PPs is thus far in harmony with the general tendency for leftward and rightward extraction to be symmetrical, in keeping with the Principle of Categorial Government. However, the account of preposition stranding extraction outlined above does not explain an asymmetry in rightward and leftward versions of the construction first noticed by Ross (1967, 139–141).\textsuperscript{29} Whereas leftward extraction is allowed for arguments in non-clause-final position, the corresponding heavy NP shift is prohibited.

(64) a. Which island did you [travel to with Keats, and return from with Chapman]?
   b. *Keats traveled to with Chapman the Isle of Capri.

This is not a blanket restriction against rightward preposition stranding extraction, since (as Ross also noticed) the related right node raising is fine.

(65) Keats traveled to, and Chapman returned from, the Isle of Capri.

This asymmetry appears to pose a problem for the present theory, because under the Principle of Categorial Government, rightward and leftward extractions are predicted to be mostly symmetrical. However, we have already seen one exception, in the case of subject extraction. A similar lexical treatment, again involving the feature LEX, can be applied to this case, as follows.

The argument of the English preposition category is restricted to arguments compatible with a negative value on an attribute that I will call \( \pm SHIFT \), thus:\textsuperscript{30}

(66) on := PP/NP\(_{\text{SHIFT}}\) : \( \lambda x.o'x \)

We then further restrict the heavy-shifting backward crossing composition rule so that it only permits heavy shift of arguments that are compatible with the feature \( +SHIFT \), replacing the earlier version (62) by the following.\textsuperscript{31}

(67) Backward crossed composition (<B_>)
    \[ Y/Z_{\text{SHIFT}} : g \backslash X/Y : f \Rightarrow_B X/Z_{\text{SHIFT}} : \lambda x.f(gx) \]
    where \( X = Y = S \backslash S \)

We assume that (as in the case of the attribute LEX) both the relative pronoun category and most subcategorized arguments are left unspecified on this attribute, and that all NPs are (at least in the absence of intonational indicators) similarly unspecified. It follows that most leftward and rightward extractions that were allowed under the less restricted rule are still permitted. However, Ross’s observation noted at (64b) (repeated here) is captured.

(68) *Keats [traveled to]_{VP/NP\_SHIFT} [with Chapman]_{VP/VP} the Isle of Capri.

The preposition category (66) still excludes a little too much, because the new crossed composition rule prevents any assembly at all of constituents like travel to with Keats, thereby excluding leftward extractions like (64a), Which island did you travel to with Keats and return from with Chapman? These examples require English to have a second instance of the preposition category, restricted in a fashion similar to English extractable subjects using the familiar feature \(-LEX\).

(69) on := PP/VP/\_\_ lex : \( \lambda x.o'x \)

This category allows the backward crossed composition rule to apply, but the result inherits the feature \(-LEX\), allowing (64a), but continuing to exclude (64b), both repeated here.

(70) a. Which island did you [travel to with Keats, and return from with Chapman]?_{VP/VP\_\_ lex} [the Isle of Capri]._{N_P/\_ lex}
   b. *Keats will [travel to with Chapman]_{VP/VP/\_\_ lex} [the Isle of Capri]._{N_P/\_ lex}

We are also in a position to capture the fact that, in most dialects, dative bare NP arguments of ditransitives cannot undergo heavy NP shift, as evidenced by the failure of the following example to convey a statement about giving a policeman a flower:

(71) *I gave a flower that very heavy policeman.

Verbs like give must have the category that would result from composing into a stranded preposition, namely the following:

(72) give := (VP/VP)/NP\_\_ SHIFT

The same assumption predicts the following asymmetry between “multiple heavy NP shift” involving this verb and the other give:
(73)  a.  *I gave today a very heavy policeman an extremely pretty flower.
    b.  ?I gave today a very pretty flower to an extremely heavy policeman.
    c.  I gave today to a policeman an extremely pretty flower.

The unacceptability of (73a) was noticed as an unsolved problem for CCG by Blevins (1993). 33

This last assumption solves a difficulty that has long plagued categorial approaches using wrap rules, without invoking the Freezing Principle (Culicover and Wexler 1977; Baker 1977; Bach 1980; see discussion in Larson 1988). 34

As in the case of subject extraction, such asymmetries are rare in comparison with the overwhelming tendency for constraints on rightward and leftward movement to be parallel. It therefore seems appropriate to handle them via specialized lexical categories and minor features on argument terms. (The fact that many languages forbid preposition stranding, and must therefore lack prepositional categories like (66) and (69), lends support to this assumption. One possibility is that such languages have a raised category PP1/NP for their prepositions.) 35

It follows that the claim by Oehrle (1991, 419–420) that “talked to about legumes cannot be of type [(S\NP)/NP], since it cannot combine with an NP to its right,” and his conclusion that “any adequate analysis of leftward extraction in terms of syntactic composition leads to complications of the conditions under which conjunction is possible,” are unduly pessimistic, as are the related claims by Oehrle (1991) and by Ivan Sag in 1993 public lectures for the inevitability of a GPSG/HPSG-like analysis of extraction. On the contrary, such examples are entirely compatible with CCG and its core assumption of the Principle of Categorial Government. 36

3.5.3 The Subject Condition
Extraction out of subjects seems to be disallowed, even when there is no Subjacency violation (as there is for sentential subjects), and when similar extractions out of nonsubjects are allowed, as in the following example:

(74)  a.  a man-who(m) I read a book about
    b.  *a man who(m) a book about astonished me

This fact was among those that motivated Chomsky (1973, 108–112, 1977, 112–113) to propose the Subject Condition.

Under present assumptions, such extractions are blocked only by stipulation, because the condition on the backward crossed composition rule (67) prevents composition into NP. (Although some kind of restriction was needed to prevent (63), the weaker condition that I chose for the backward substitution rule (92) of chapter 2 would have done that without excluding (75).)

(75)  ... whom a book about astonished me

\[
\begin{array}{c}
(N\backslash N)/(S/NP) \quad NP/NP \quad S\backslash NP \\
\Rightarrow \text{\textit{S/NP}} \\
\end{array}
\]

The corresponding rightward extractions are excluded by the same stipulation. 37

(76)  *A book about astonished me and a novel by amused you, the man in the iron mask.

We will see later that other combinatory rules can in fact enable extractions from within subjects and that the Subject Condition does not hold in general.

3.6 Parasitic Gaps and the Anti-C-Command Condition

3.6.1 Parasitic Gaps in Adjuncts
The backward crossing substitution rule (92) of chapter 2, repeated here, allows the famous relative clause below, which is parallel to the earlier right-node-raising example (93) in chapter 2.

(77)  Backward crossed substitution (<S_x>)

\[
Y/Z : g \quad (X/Y)/Z : f \Rightarrow S_x \quad X/Z : \lambda x.f(x)(gx)
\]

where \(X = S'\$\)

(78)  Articles which I will file without reading

\[
\begin{array}{c}
(N\backslash N)/(S/NP) \quad S/VP \quad VP/NP \quad (VP/VP)/VP_{\text{ling}} \quad VP_{\text{ling}}/NP \\
\Rightarrow \text{\textit{S/VP}} \\
\Rightarrow \text{\textit{S/NP}} \\
\end{array}
\]

\[
(N\backslash N) \Rightarrow \text{\textit{S}}
\]

\[
(N\backslash N) \Rightarrow \text{\textit{S}}
\]

(79)  articles which I will file without reading

\[
\begin{array}{c}
(N\backslash N)/(S/NP) \quad S/VP \quad VP/NP \quad (VP/VP)/VP_{\text{ling}} \quad VP_{\text{ling}}/NP \\
\Rightarrow \text{\textit{S}} \\
\Rightarrow \text{\textit{S}} \\
\end{array}
\]

\[
(N\backslash N) \Rightarrow \text{\textit{S}}
\]

\[
(N\backslash N) \Rightarrow \text{\textit{S}}
\]
(As usual, VP is an abbreviation for the predicate category.)

It is easy to see that “stacked” parasitic gaps, as in the following multiply ambiguous examples, are accepted as well:

(79)  
  a. articles which I will file without reading in order to evaluate
  b. articles which I will file without reading in order to evaluate
     before burning

Examples like (80) also require the backward crossing substitution rule (77), and provide further evidence both for the mechanism for extracting non peripheral arguments exemplified in the earlier examples of heavy NP shift (58) and (59), and for the existence in the grammar of constituents like throw in the trash \(vP/np\), derived by composing the (raised) PP with the verb by the backward crossing composition rule.

(80) articles which I will \(vP/np\) [without reading] \(vP/vP/vP/vP/np\)

The theory moreover captures the fact that extraction obeys exactly the same Subjacency and ECP-related constraints within the adjunct as it does everywhere else, despite the claim to the contrary by von Stechow (1990, 458), as the following examples reveal:

(81)  
  a. articles which I will \(s/vP\) [file] \(vP/np\) [without believing
     that you will read] \(vP/vP/vP/vP/np\)
  b. *articles which I will \(s/vP\) [file] \(vP/np\) * [without believing
     that will please you] \(vP/vP/vP/vP/np\)
  c. articles which I will \(s/vP\) [file] \(vP/np\) [without believing
     will please you] \(vP/vP/vP/vP/np/Lex\)
  d. *articles which I will \(s/vP\) * [file without reading the
     name of the person who wrote] \(vP/vP/vP/vP/np\)

(Related examples involving the “adjunct effect” on subject extraction discussed in section 3.4.4 seem to show the same pattern, a fact that supports the earlier analysis of such subjects as rightward \(-Lex\) arguments.) No invocation of empty operators, complex chain formation, and the ECP, of the kind proposed in Chomsky 1986a, is required to explain this result.

The substitution rule involved in the above derivation is distinct from the backward crossed composition rule that mediates heavy NP shift. It can therefore remain free of any restriction relevant to rightward move-

ment, so that the grammar continues to accept the earlier right-node-raising example (93) of chapter 2. We therefore resolve a problem that arises in the published HPSG analysis of rightward parasitic dependencies. Pollard and Sag (1994, 115) appear to regard such rightward dependencies as involving heavy NP shift, and regard heavy NP shift as not being mediated by the same mechanism as \(wh\)-movement. This leaves them without an analysis of the construction, which they correctly identify as related to right node raising.

For the same reason, rightward-extracting parasitic dependencies can remain insensitive to preposition stranding, unlike Heavy Shift. Kayne (1994, 74) notes the following example, which is parallel to (95) in chapter 2:

(82) John listened to, without immediately recognizing, his favorite
    Beethoven sonata.

### 3.6.2 Parasitic Gaps in Complements

There is another kind of parasitic gap in English, in which both of the dependencies involve arguments of the same functor, rather than an argument and an adjunct. These constructions are somewhat less acceptable than the ones in the previous section and have something of the feel of an island violation. The following is one of the better examples:

(83) a man who(m) I persuaded every friend of to vote for

The grammar will allow the example if we include one more of the four types of substitution rules permitted by the Principles of Directional Consistency and Inheritance, namely the forward noncrossing version (107a) in chapter 2.

(84) Forward substitution (>S)

\[
(X/Y)/Z \quad Y/Z \Rightarrow _S \quad X/Z
\]

where \(X = S/\$

The symbol \(S/\$\) in the restriction is as usual a shorthand for \(S\) and (tensed, untensed, etc.) \(VP\). I will assume that \(every\) friend \(of\) is \(NP/NP_{-shift}\), by composition into the preposition category (66), so that \(persuade\) can compose into it. The rule (84) then permits the following derivation:
Persuade every friend of can therefore combine with to vote for by the forward rule, as shown above.

The category VP/NP-shift of persuade every friend of to vote for again inherits from the stranded preposition the feature -SHIFT. This feature interacts with backward crossed substitution to prohibit heavy NP shift (but not right node raising). We therefore correctly predict an interaction with the heavy-NP-shift construction (cf. (82)).

(86) a. a man whom I will persuade every friend of to vote for next Saturday
   b. I will persuade every friend of to vote for, and promise every enemy of to betray, the man in the grey flannel suit.
   c. *I will persuade every friend of to vote for next Saturday, the man in the grey flannel suit.

An analysis similar to (85) is available for the following sort of example, as the reader can verify:

(87) a man who(m) I told every friend of that I would support

However, the present analysis does not allow coordinate sentences like the following, related to examples first noted by Morrill (1988):

(88) a. ?Who(m) did you persuade [every friend of]_{NP/NP} to vote for,_{VP_{TO}/NP} and [every enemy of]_{NP/NP} to ignore?_{VP_{TO}/NP}
   b. ?Who(m) did you tell [every friend of]_{NP/NP} that you would vote for,_{VP_{TO}/NP} and [every enemy of]_{NP/NP} that you would ignore?_{VP_{TO}/NP}

If such examples are to be allowed, they seem to require that NP/NP and VP_{TO}/NP, etc., be replaced by functions into raised NP\uparrow, VP\uparrow_{TO}, etc.

Since constituents like persuade/tell every friend of bear the same category as persuade/tell, it might appear at this point that the grammar would permit the following much less acceptable examples:

(89) a. *a man whom I [persuaded]_{VP/VP_{TO}/NP} to like_{VP/VP_{TO}/NP}
   b. *a man whom I [persuaded]_{VP/VP_{TO}/NP} to believe that I like_{VP/VP_{TO}/NP}
   c. *a man whom I [told]_{VP/S'/NP} that I liked_{VP/S'/NP}

Engdahl (1983, 24) accepts (89b) and (89c), and has suggested that the difference between them and (89a) is parallel to the constraints on possible coreference of pronouns and bound anaphors. Others have rejected them all, and have suggested that they should be excluded by a stronger “Anti-c-command Condition,” forbidding one gap to c-command another in a parasitic construction (see Taraldsen 1979 and discussion in Chomsky 1982, 40–48).

The examples (90a–d) also suggest that some such constraint applies. The first three are rejected by just about everyone. The fourth, more borderline example (90d) is permitted by both of the proposed constraints, and is tolerated by Engdahl and by Chomsky (1982), but cf. Chomsky 1981). Sag (1983), and Contreras (1984) reject it.

(90) a. *a man whom I will [show]_{VP/PP}/NP to [to]_{PP/NP}
   b. *a man whom I will [show]_{VP/NP}/NP [a picture of]_{NP/NP}
   c. *a man whom I will [talk]_{VP/PP}/PP to [to]_{PP/NP} [about]_{PP/NP}
   d. ?a man whom I will [show] a picture of_{VP/PP}/NP to [to]_{PP/NP}

The stronger of the two conditions is already imposed on the grammar by Condition C of the binding theory example (32) of chapter 2. This condition is precisely an Anti-c-command condition that all interpretations of lexical and derivational categories must conform to. Examples (89) and (90a–c) are therefore already excluded by the binding theory, whereas (90d) is allowed.41 This claim depends crucially on the preservation of the obliqueness hierarchy in the interpretation of verbs, and the lexical wrapping analysis of the categories for verbs like persuade and show given in (57) and (38) in chapter 2.

The exclusion of (90c) crucially depends upon the treatment of the nonpredicative preposition to as an identity function (cf. (25) in chapter 2). We therefore predict increased acceptability, comparable to (90d), for examples in which the commanding PP is predicative, such as ?a man whom I will talk about to.
An example will show how the binding theory acts in these cases. We saw at (57) of chapter 2 that persuades has the following category in the lexicon: \[\lambda z.\lambda p.\lambda v.\text{persuade}'(p(\text{and'}z))zv\]

(91) persuades := ((S\NP)/(VP to))/NP

The category of to like is the following, obtained via composition of the complementizer and the bare infinitival:

(92) to like := VP to/NP : \lambda z.\lambda w.\text{like}'zw

When the forward substitution rule combines them, the following category results:

(93) *persuades to like := (S\NP)/NP :

\[\lambda u.\lambda v.\text{persuade}'(\text{like'}u(\text{and'}u))uv\]

However, the variable \(u\) c-commands an instance of itself that is not bound in a pro-term in the predicate-argument structure. The category therefore violates Condition C. Moreover, no combinatorial rule whatsoever can overcome this condition, since no combinatory rule can introduce a pro-term or anything else into a predicate-argument structure, under the Principle of Combinatory Transparency.

In fact, Condition C is violated twice over by this example and example (89b), since in both cases the variable \(u\) is also bound under definition (31) of chapter 2 to the variable in a c-commanding pro-term \(\text{and'}u\). Example (89c) has only a single violation of this comparatively weak condition, since it does not involve control. This may explain its somewhat greater acceptability.

By contrast, after composing into every friend of, the constituent persuades every friend of might have a category something like the following:

(94) ((S\NP)/(VP to))/NP-shift

\[\lambda z.\lambda p.\lambda y.\text{persuade}'(p(\text{and'}(\text{every'}(\text{friend'}z))))(\text{every'}(\text{friend'}z))y\]

This category can combine with to like by forward substitution to yield the following category, because \(z\) does not c-command any instance of itself in the predicate-argument structure:

(95) (S\NP)/NP-shift

\[\lambda z.\lambda w.\text{persuade}'(\text{like'}z(\text{and'}(\text{every'}(\text{friend'}z))))(\text{every'}(\text{friend'}z))w\]

Derivation (85) thus yields a legal predicate-argument structure, and no additional stipulation is required to exclude the undesirable examples. We continue to escape any need to complicate the notion of "government" by a distinction between "antecedent" and "head" varieties, or to draw the associated distinction between A and A positions, or to introduce additional "locality principles" beyond those implicit in the domain of locality defined by the lexical categories, or distinctions between varieties of empty category and/or operator, again contrary to claims by von Stechow (1990).

It is clear at this point that examples like the following are also ruled out by Condition C and the status of the PP as argument rather than adjunct hypothesized in the discussion of (96) of chapter 2:

(96) *Which authors did you file under?

The same argument suggests once again that all PPs, even those that would normally be thought of as modifiers rather than as subcategorized, are in fact arguments whose interpretation is more oblique than others.

3.6.3 Subjects and Adjunct Parasitic Gaps

Engdahl (1983, (54)–(56)) points out that subjects do not in general support parasitic dependencies, offering examples similar to the following:

(97) a. *a man who [painted](S\NP)/NP [a picture of](NP)/NP

b. *a man who [remembered](S\NP)/(VP to) [talking to](VP to)/NP

c. *a man who [remembered](S\NP)/(S)[ that John talked to](NP)

Chomsky (1982, 1986a, 55) ascribes the unacceptability of such examples to the Anti-c-command Condition. However, as Koster (1987, 346) points out, these and many other examples involving subjects are considerably worse than the earlier examples involving violations of this comparatively weak condition. I noted in Steedman 1987 that in CCG all three examples are excluded by universal Principles of Directional Consistency and Inheritance, without further stipulation or reference to c-command, or binding theory. There is no possible combinatory rule, whether corresponding to S or any other combinator, that will permit (97a–c). All such putative rules would violate the Principle of Directional Inheritance, by equating /NP with \NP. The examples are excluded on grounds of incompatibility in direction of government, still without stipulating an autonomous Empty Category Principle.
As Engdahl (1983) points out, extracted subjects can take part in parasitic constructions. She gives the following examples:

(98) a. the Caesar whom Brutus will imply \( t \) was no good while ostensibly praising \( t_p \)
   b. a man who everyone who meets \( t_p \) admires \( t \)
   c. a man who you said John’s criticism of \( t_p \) would make us think \( t \) was stupid

((98a) has a nonsubject gap parasitic on an embedded subject gap. (98b) has a nonsubject gap inside a subject that appears to be parasitic upon a nonsubject gap. (98c) has one that appears to be parasitic on an embedded subject gap.)

Unlike the earlier cases, examples like (98a) are allowed by the present theory, because the subject-extracted predicate \( \text{imply was no good} \) can be built by directly combining the special subject-extracting category \( (VP/\text{NP}_{-\text{LEX}})/(S/NP) \) of the verb (see (33)) with the complement predicate category \( S/NP \). The resulting category \( VP/\text{NP}_{-\text{LEX}} \) and the adjunct function \( \text{while ostensibly praising} \) of category \( (VP/VP)/NP \) (built by the forward composition rule) are of the appropriate form and linear order for the familiar backward instance of the substitution rule to apply, thus:\n
(99) \[
\begin{array}{c|c|c|c|c|c|c}
(\text{N\textbackslash N})/(S/NP) & S/VP & \text{imply} & \text{was no good} & \text{while praising} \\
\rightarrow & (VP/\text{NP}_{-\text{LEX}})/(S/NP) & S/NP & (VP/VP)/NP \\
\rightarrow & VP/\text{NP}_{-\text{LEX}} & \rightarrow & cS_x \\
\rightarrow & VP/\text{NP}_{-\text{LEX}} & \rightarrow & S/NP_{-\text{LEX}} \\
\rightarrow & N\textbackslash N \\
\end{array}
\]

This analysis provides additional evidence that extractable subjects are rightward \( NP \) arguments of bare complement verbs like \( \text{imply} \). If they were leftward arguments, like true subjects, no analysis at all would be permitted under the present theory, because it would require a combinatorial rule violating the Principle of Directional Inheritance. (Again, related examples involving the “adjunct effect” on subject extraction discussed in section 3.4.4, such as \( \text{a man whom Brutus will imply that in his opinion is no good, while ostensibly praising}, \) seem to show a similar effect and provide further support for the earlier analysis of such subjects as rightward \(-LEX\) arguments.)

Finally, it follows from this analysis, unlike the earlier one, that rightward movement out of this parasitic construction will be forbidden, like rightward movement of a single embedded extractable subject.

(100) \#Brutus implied was no good while ostensibly praising the man in the Brooks Brothers shirt.

It also follows that the related ill-formed sentence (101), in which the subject gap is not embedded, is (like other examples relating to nominative island constraints) prevented by the directionality of the argument of the predicate category \( S/NP \).

(101) \#a man \[\text{who}]_{(\text{N\textbackslash N})/(S/NP)} \text{[was absolutely useless]}_{S/NP} \text{[despite Brutus extravagantly praising]}_{(S/S)/NP}

The omnivorous VP-adjunct category appears here as \( S/S \) to make the point that \( \text{even if the adverbial were an S adjunct}, \) it still could not combine. The point here is that the impossibility of this combination is not language specific. The Principle of Directional Inheritance means not only that there is no instance in English of substitution that will equate the arguments of a forward-combining and a backward-combining function, but also that no such instances are permitted in Universal Grammar, because the \( NP \) arguments have different directionality.

A similar asymmetry holds for parasitic subject gaps in phrases like \( \text{burn t without realizing t_p was valuable} \). These would be allowed on the assumption that the embedded subject gap gives rise to \( (VP/VP)/NP_{-\text{LEX}} \). But a nonembedded subject gap in the adjunct is impossible, not only because it would require slash-crossing forward composition in English, but also because the Principle of Directional Inheritance means that no instance of substitution that could combine the result is permitted by Universal Grammar.

(102) (Who(m) did you) \#[meet]_{VP/NP} \text{[before]}_{(VP/VP)/S} \text{[left7]}_{S/NP}

3.6.4 Subjects and Complement Parasitic Gaps

Engdahl’s second variety of subject parasitics, exemplified in (98b), repeated here, is an example of a subject extraction that is usually regarded as parasitic, because in isolation it would violate the Subject Condition (cf. (75)).

(103) a man who(m) every boy who meets admires
Such examples are accepted as follows, using the backward substitution rule: \(^47\)

\[
(104) \quad \text{who(m) every boy who meets admires}\]
\[
\begin{array}{c}
(\text{N}\text{\textbackslash N})/(\text{S}/\text{NP}) \\
\text{NP}/\text{N} \\
\text{N} \\
\text{N}(\text{N}\text{\textbackslash N}) \\
\text{S}(\text{S}/\text{NP}) \\
\text{NP}/\text{NP} \\
\text{S}/\text{NP} \\
\text{N}\text{\textbackslash N}
\end{array}
\]

Because the rule that is involved is backward crossed substitution, and because we carefully chose a weaker restriction on this rule than on backward crossed composition, \((62)\), this construction allows extraction out of subjects. It is therefore predicted by the above analysis and by the Principle of Categorial Government that rightward movement out of such constructions should also be allowed. Provided that the conditions for heaviness are met, this rather surprising prediction seems to be borne out, for \((105a)\) is much better than the related simple subject extraction \((105b)\) \(\text{(cf. (76))}^{48}\)

\[
(105) \quad a. \quad \text{Everyone who meets admires, and everyone who sees remembers, that fascinating woman who chairs the Parking Space Committee.}
\]

\[
b. \quad \text{Everyone who meets admires sincerity, and everyone who sees remembers the Alamo, that fascinating woman who chairs the Parking Space Committee.}
\]

Because extracted embedded subjects correspond to rightward arguments, the theory predicts that embedded subjects should be able to take part in parasitic dependencies into complements, and they can, when the embedded subject gap is in the complement (albeit at the cost of an island violation of the same kind that we encountered in \((104)\)):

\[
(106) \quad \text{a man who(m) [every woman who meets] NP/NP [thinks is no good]}/(\text{S}/\text{NP})/\text{NP}_{-\text{LEX}}
\]

Engdahl's third type of subject parasitic gap, exemplified in \((98c)\), \textit{a man who you said John's criticism of would make us think was stupid}, which has a subject gap as the second member of the pair, is closely related to the last example, for the finite verb phrase \textit{would make us think was stupid} bears the category \((\text{S}/\text{NP})/\text{NP}_{-\text{LEX}}\). However, if an extracted embedded subject is the first gap, then it is correctly predicted not to take part in parasitic constructions of this kind.

\[
(107) \quad \text{a man who(m) you must [know]}/(\text{VP}/\text{NP}_{-\text{LEX}})/(\text{S}/\text{NP}) \quad \text{[thinks Harry likes]}/(\text{S}/\text{NP})/\text{NP}
\]

The reason once again is that the subject-extracting category does not match any of the substitution rules. \(^49\)

Finally, as in the case of the backward substitution rule, but again unlike ordinary parasitic gaps, embedded subject parasitics cannot rightward move, because of the \(-L E X\) feature that the lexicon imposes upon extractable subjects.

\[
(108) \quad \text{[Everyone who meets thinks is no good]}/(\text{S}/\text{NP}_{-\text{LEX}}) \quad \text{and [everyone who listens to realizes is utterly mad]}/(\text{S}/\text{NP}_{-\text{LEX}}) \quad \text{[that man who chairs the Parking Space Committee]}/(\text{NP}_{\text{LEX}}^\text{NP})
\]

The following example \((\text{Chomsky 1986a, (123)})\) is also acceptable on the reading where the adjunct modifies the telling, on the assumption that such adverbials can be rightward adjuncts \(\text{VP}_{\text{TO}}/\text{VP}_{\text{TO}}:\)

\[
(109) \quad \text{Which papers did John decide [before reading]}/(\text{VP}_{\text{TO}}/\text{VP}_{\text{TO}})/\text{NP} \quad \text{[to tell his secretary were unavailable]}/(\text{VP}_{\text{TO}}/\text{NP}_{-\text{LEX}})
\]

On the other hand, the next example does not seem to be acceptable, contra Chomsky \((1986a, \text{ (122b), cf. Steedman 1987):})\)

\[
(110) \quad \text{a man who [whenever I meet]}/(\text{S}/\text{NP}) \quad \text{[looks old]}/(\text{S}/\text{NP})
\]

This example is in present terms ruled out at the level of Universal Grammar, again because under the Principle of Directional Inheritance, no syntactic combinatory rule is allowed to equate two arguments of different directionality. However, the gaps do not stand in a c-command relation, and hence the example \((\text{which is discussed further in Steedman 1987})\) is potentially allowed by GB.

Chomsky \((1986a)\) argues that \((110)\) is in fact grammatical, noting that it seems better than \textit{a man who looks old whenever I meet}. However, \((110)\) is much worse than the corresponding object construction, which is accepted by the present grammar, as in the following example: \(^50\)

\[
(111) \quad \text{a man who, [whenever I meet,]}/(\text{S}/\text{NP}) \quad \text{[I insult]}/(\text{S}/\text{NP})
\]
It is also no better than the corresponding Across-the-Board Condition—violating example *a man who(m) I met and looked old, which is generally regarded as ungrammatical, and which the present grammar rejects for the same reason as (110) (see chapter 2 for remarks on Williams’s 1978 Across-the-Board Condition). It seems reasonable to exclude it.

By contrast, the following example, related to (123b) in Chomsky 1986a, which is identical except that the subject gap is embedded, is correctly predicted to be better on the present theory of subject extraction:

(112) ?a man who [whenever I meet]$_{S/NP=LEX}$[I think looks old]$_{S/NP=LEX}$

These are fine judgments, but if they are correct, then Engdahl’s (1985) generalization, to the effect that an “empty subject” of a tensed S can license a parasitic gap only when it is embedded in a bare complement, still stands. It emerges as a direct consequence of the lexically specified directionality of the subject in an SVO language, the analysis of extracted subjects as “reanalyzed” “antecedent-governed” objects, and the universal constraint embodied in the Principle of Directional Inheritance. It does not arise from the same source as the other weaker restrictions on parasitic gaps that have been used to argue for the Anti-c-command Condition, which in present terms arise from Condition C of the binding theory.

3.6.5 Parasitic Dependencies in Dutch

Because Dutch is a predominantly verb-final language, it possesses a number of constructions, discussed by Bennis (1986) and Koster (1987), that exhibit a pattern of parasitic gapping that is virtually the mirror image of the pattern in English. The dependencies in question are mediated by the rule >S$_x$, (107b) of chapter 2, and thus offer some confirmation that the degrees of freedom that the theory allows are fully exploited in other languages.\(^ {51}\)

Dutch has two kinds of relative pronoun. The relative pronoun die/dat is essentially like English who(m)that. The relative pronoun waar is much more restricted and can only be used to relativize the complement er of a very limited class of postpositions, such as op, voor, and over, which can take such complements. Many of these postpositions also act as normal prepositions, as illustrated in the following examples:

(113) a. Jan heeft op Marie/*Marie op gerekend.
    Jan has on Marie/Marie on counted
    ‘Jan counted on Marie.’

b. Jan heeft *op er/er op gerekend.
    Jan has on there/there on counted
    ‘Jan counted thereon.’

Dutch, like most languages but unlike English, does not allow preposition stranding. However, it does allow this small class of postpositions to strand. It therefore exhibits the following pattern:  \(^ {52}\)

(114) a. *de arts die hij op heeft gerekend
    the doctor that he on t has counted
    ‘the doctor that he counted on’

b. de arts waar hij op heeft gerekend
    the doctor where he t on has counted
    ‘the doctor whereon he counted’

The following sentence exemplifies what is usually assumed to be the unmarked or canonical argument order in Dutch (although we shall see that there is a question about this assumption):

(115) Hij heeft deze boeken zonder “Onder professoren”
    He has these books without “Under Professors”
    te lezen weggezet.
    reading away-put
    ‘He put away these books without reading “Onder professoren”’.

Both kinds of relative pronoun in Dutch can govern parasitic gaps. The following example from Bennis is the Dutch mirror image to the familiar file without reading examples in English.

(116) Welke boeken heb je [zonder te lezen]$_{VP/VP=LEX}$
    Which books have you t without t reading
    [weggezet?]$_{VP=LEX}$
    away-put
    ‘Which books did you put away without reading?’

That is, the parasitic gap lies in a (preverbal) tenseless adjunct. The rule involved is the following mirror image of the English <S$_x$ rule:
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(117) *Dutch forward crossed substitution (>Sx)
   \( (X/Y)/Z \ Y \ Z \rightarrow S \ X \ Z \)

where \( X = S \backslash S \)

(The symbol \( S \backslash S \) schematizes (tensed, untensed, etc.) \( S, S \backslash NP \) in the usual way.)

The same rule allows parasitic waar relatives also. Let us distinguish the argument er of postpositions, as an \( NP_{er} \). The postpositions are then \( PP \backslash NP_{er} \), and the adjunct parasitic gap in (118), taken from Bennis 1986, 50, is allowed, as the corresponding sentence is in English. (Traces are again added in the transliteration for the reader's guidance.)

(118) Waar heb je [na twee jaar over nagedacht
What have you after two years t\(_{er}\) about thought
\( te \) hebben\( (VP/VP) \backslash NP_{er} \) [een oplossing voor gevonden?]\( VP \backslash NP_{er} \)

having a solution t\(_{er}\) to found?

'What have you found a solution to after having thought about for two years?'

A surprising but correct prediction immediately follows from this analysis. We have noted at a number of points that in general in English, parasitic dependencies may occur in rightward movement constructions, as well as leftward movement. This possibility arises in English because it is a VO language, and because composites like file without reading have the category \( VP/\overline{NP} \), like any transitive verb, and like any transitive verb, can combine to the right with an object, as in (93) in chapter 2. However, Dutch is an OV language. Composites like zonder lezen weggezetten have the category \( VP/\overline{NP} \), like all Dutch transitive verbs. It follows that this construction cannot take part in rightward-moving constructions. (In fact, any kind of rightward movement is extremely rare in Dutch.) Instead, we correctly predict that these parasitic composites, like any Dutch transitive verb, should happily combine with an object immediately to their left, as in the following example:

(119) Jan heef deze boeken [zonder te lezen]\((VP/VP)\backslash NP\)

Jan has these books without reading
\( \text{[weggezet]}_{VP, NP} \)

away-put.

'These books, Jan put away without reading'

This sentence is automatically disallowed under the present theory, without further stipulation, for the same reason as its English gloss.

The above phenomenon, which in terms of the traditional assumption about canonical word order exemplified in 115 would appear to involve a parasitic gap without a real gap, is noted by Bennis (1986, 54–70), who deals with the example at length within a GB framework, and who also notes the resemblance between this construction, which could properly be called "left node raising" and English right node raising. It is according to his approach virtually a forced move to assume that all of these constructions involve a process of "scrambling" from an underlying subject-adjunct-object-verb order (p. 59). The relevant examples (116), (119), and (120) translate in trace notation as follows, contrary to the assumptions implicit in the claim that 115 is the canonical form:

(120) *Jan heeft [zonder te lezen]\((VP/VP)\backslash NP\) [deze boeken
Jan has without reading these books
\( \text{weggezet.]}_{VP} \)

away-put.

'Jan put away these books without reading'

We also predict the impossibility of the following:

(121) a. Which books have you without \( t \) reading \( t \) away-put
b. Jan has these books without \( t \) reading \( t \) away-put
c. *Jan has without \( t \) reading these books away-put

Bennis’s analysis, which bears a strong spiritual resemblance to the present one, is forced in GB terms by the fact that traces in what is usually thought of as the canonical positions, as in Which books have you without \( t \) reading away-put? would threaten to violate the Anti-c-command Condition, which, as we will see, applies as firmly in Dutch as it does in English. However, Bennis’s analysis requires the further assumption that scrambled NPs are in a noncanonical A-position, in order to bring sentences like (119) under the generalization that a parasitic gap must be governed by an antecedent in A-position (p. 63), whilst continuing to exclude (120).

While I have noted the strong affinities between Bennis’s analysis and my own, the present analysis captures the same generalization without invoking an A/\( \overline{A} \) distinction in position or type of government,
purely by the projection of subcategorization from the verbs via the combinatory rules.

The same substitution rule also potentially permits parasitic gaps in Dutch complements.\footnote{benniss} However, examples like the following, which the rule would otherwise allow, are according to Bennis ungrammatical:

\begin{align*}
(122) & \text{ *Dit is de man die ik verteld \text{VP,} S \text{NP (dat Hendrik}} \\
     & \text{This is the man who I told that Harry} \\
     & \text{zou bezoeken.)} S \text{NP} \\
     & \text{would visit} \\
     & \text{This is the man whom I told that Harry would visit.'}
\end{align*}

As Bennis points out, the unacceptability of this sentence, which would otherwise be allowed by \( >S_x \), is an instance of the Anti-c-command Condition. It is therefore ruled out, like the corresponding English sentence, without further stipulation by the present version of Condition C of the binding theory.

### 3.6.6 Postscript

Since English seems to include the forward substitution rule \( >S \), (84), as well as the backward crossing rule \( <S_x \), (77), one might expect Dutch, given its tendency to be the mirror image of English, to include the only one of the four substitution rules that has not been used so far, \( <S \). It appears not to. Dutch is not a perfect mirror of English, because its verbs govern sentential complements to the right. English complement parasitic gaps require a different rule from adjunct parasitic gaps, but, as we have seen, both types are in Dutch mediated by a single rule. To find a use for \( <S \) we shall undoubtedly have to turn to a “real” SOV language, like Korean or Japanese, in which sentential complements are governed to the left and relative markers are on the right of the clause. Since such languages potentially permit parasitic gaps on the pattern of (85), the prediction is that sooner or later one will be found that uses the \( <S \) rule, and that such parasitic constructions will also be subject to the effects of Condition C.

Unfortunately, it is hard to verify this prediction. Many SOV languages (including Korean and Japanese) permit null anaphora, raising the possibility that other mechanisms might mediate long-range dependencies in the relevant examples.

The theory of grammar that is proposed here can be understood in terms of the traditional “T” or “Y” diagram shown in figure 1, in which each module of the theory is illustrated with a representative element involved in one of the two analyses of the simple transitive sentence Anna married Manny, example (8) of chapter 1. Lexical entries pair a syntactic category specifying valency and directionality with an interpretation or logical form in the logician’s sense of that term. Ordered multisets or strings of such categories are projected by the combinatory rules onto derived objects or constituents in the present extended sense of that term, which also pair syntactic categories with interpretations.\footnote{benniss}

Both in the case of lexical items and in the case of derived objects, the syntactic category is, strictly speaking, redundant, since it is by assumption entirely predictable from (1) the type of the interpretation, (2) \( \tilde{X} \) theory, and (3) a parametric description of the language as to position of heads and the like. In effect, the CG category “compiles out” this information, in the sense that it represents explicitly information that could be derived.\footnote{benniss}

Lexical entries and derived constituents in this sense of the term directly capture the notion of constituency that is relevant not only to relativization but also to coordination and (following the argument in Steedman 1991a) phrasal intonation. Such derivations therefore combine the wh-movement function of S-Structure with certain functions that have hitherto been regarded as peculiar to coordination and intonation and that have usually been relegated to other, more surface-related modules of grammar. It is at this level that syntactic constraints on long-range dependency such as the Fixed Subject Constraint or That-Trace effects emerge without the invocation of empty categories or the ECP. Derivations do not exhibit the relation of command that is relevant
should be on this and almost any other account. The fact that in some dialects (including my own) these sentences are better with singular agreement (and that there are no equivalent sentences with *themselves*) suggests that we are dealing with a nonanaphor related to the other.

19. I am assuming that the extracting argument is in addition in both cases marked for a _LEX_ argument, so that neither construction permits heavy NP shift, as in _I assure you to be as sane as the next man who stands accused of this horrible crime_. If either _croire_ or _assure_ (or both) can in fact support this construction, then the analysis is still valid on the assumption that the extracting argument, like most arguments, is unmarked on the feature _LEX_. It seems difficult to get clear judgments on the question, and dialects may vary. In any case, the existence of such unrestricted verbs in SVO languages is predicted, and as we saw it offers an explanation for the conspiracy among subject extraction, subject inversion, and linking of subject negative polarity items in Italian and Spanish.

20. The problems that this construction raises for theories involving D-Structure, because of its combination of lexical predication and unboundedness, are discussed by Chomsky (1981, 309-310, 1995, 188).

21. Jacobson points out that the analysis has antecedents in unpublished work by Gazdar, and in Chomsky 1977.

22. Further categories for _easy_ (which could as usual be combined in the parser with those in (48)) are needed to capture the related sentences _It is easy for us to... please John_ and _John is easy for us to... please_. See Jacobson 1992b for discussion.

23. If the possibility mentioned in footnote 19 concerning examples like (ia) is correct, and we therefore assume the extractable NP complement in (40) to be unmarked on the feature _LEX_, then we predict that sentences like (ib) would be no worse. Again, the judgments are unclear.

(i) a. _I assure you to be well formed_ example in this footnote.
   b. _This example is impossible to confidently assure you to be well formed._

24. The low acceptability of extraction out of preposed adjuncts in English—which are presumably forward adjuncts—in examples like (ia) _an article which without reading I will go to bed_, seems to arise because such preposing marks the resulting clause as topicalized, and therefore incompatible with any further extraction, as shown in (ib). (See note 16.)

(i) a. _*a book which S/(S/S/NP) [without reading] STRONG/IS/NP [I will go to bed]_
   b. _*a book which John, I gave_

25. We might for example be tempted to further restrict the polymorphic type T in the raised category.

26. It follows once again that infinitival VPs in sentences like the following must be arguments of "exceptional case-marking" verbs like _consider._

(i) a. _I consider this novel to be poorly written._
   b. _I consider to be well written the novel about the man in the grey flannel suit._

That is to say that a "small clause" analysis of these phenomena at the level of syntax appears to be incompatible with the present theory. See Stowell 1983 and Hoeksema 1991 for arguments against such analyses.

27. The restriction differs from the corresponding one given in earlier papers.

28. It follows that we predict that other languages with related lexicons may allow noun phrases on this pattern.

29. Oehrle 1991 offers a different categorial analysis. Ivan Sag, in an invited address to the Sixth Conference of the European Chapter of the Association for Computational Linguistics, Utrecht, April 1993, and at the LSA/ASL workshop held in conjunction with the 1993 LSA summer school in Columbus, Ohio, included this problem in a list of similar extraction asymmetries that he described as lacking solutions within CCG. Although a version of the account of subject extraction offered here was already in circulation in a number of places, including Hupke 1990, Ross’s phenomenon had not then been satisfactorily treated. The present section is therefore offered in response to Oehrle’s and Sag’s claims.

30. Although in present terms the device of associating a shiftable argument with the attribute _SHIFT_ is a stipulation, it is likely ultimately to turn out to be grounded in discourse-information-structural distinctions, an idea that is implicit in the related HPSP analysis, which calls a similar attribute ±_TOPIC_. In view of the tendency of heavy-shifted items to be accompanied by H* pitch accents, and assuming the account of the association of intonation and discourse information proposed in Steedman 1991a, Prevost and Steedman 1994, and Prevost 1995, _RHEME_ might be another appropriate name for this attribute.

31. This is again reminiscent of Hepple’s 1990, 32 proposal (following Barry et al. 1991) to restrict rules using “modalities” like ∆. A feature-based account of the restriction was proposed for HPSP by Ivan Sag in 1993 public lectures in Utrecht and Columbus, Ohio.

32. The fact that two stranding categories have been stipulated in order to capture the facts of English suggests that some other language might include either one alone and exhibit only leftward or rightward preposition stranding. I am grateful to Mark Hepple for help with this analysis.

33. I have changed Blevins’s example to eliminate an irrelevant effect of proper names inhibiting rightward extraction noted by Abbott (1976). Blevins does not comment on the increased acceptability of (73b,c), or the relation to the well-known idiosyncrasy of this particular class of verbs shown in (71).

34. The fact that verbs like _promise_, which also take “dative” bare NPs, seem according to some speakers to be reluctant to allow heavy NP shift (Bach
1979, 1980) suggests that in those speakers' dialects they bear the category (VP/VP)/NP-shift.

35. Not surprisingly, many of the above phenomena appear to be strikingly paralleled in the "stranding" characteristic of certain nonisland NPs like the following:

(i) the woman whom I saw a picture of

For example, fragments like a picture of resemble stranding prepositions in allowing right node raising but prohibiting Heavy Shift:

(ii) a. an author whom I [gave a novel by to Keats, and sold a book about to Chapman]

b. *Keats saw a picture of last Sunday, the Isle of Capri.

One way to capture these facts is to assume that nouns like picture optionally subcategorize for of PPs, so that if they compose with the stranding PP category, they become NP/NP-shift.

36. Oehrle's analysis is couched in terms of an ↑ operator, but as he points out, there is the closest possible relation between this extension of the Lambek calculus and the GPSG/HPGS extension of context-free phrase structure grammar via the SLASH store. (See Gazdar 1981 on the nonequivalence of CG and GPSG slash notations.)

37. This particular example is also ruled out by the interaction of preposition stranding and rightward movement discussed in section 3.4, which may explain why it is even worse than the leftward case.

38. I continue to defer discussion of exactly what is wrong with *authors whom I will file under, but (as noted earlier) the fact that the PP here is not an island, as evidenced by the possibility of Which author did you file "Ulysses" under?, suggests that the preposition bears the category PP/NP, rather than (VP/VP)/NP, and that it cannot therefore give rise to any analysis parallel to (78).

39. It is not entirely clear what examples Von Stechow has in mind to support his claim that the combinatory theory "doesn't restrict the occurrences of a parasitic gap enough" with respect to extraction site, but he appears to be thinking of sentences like these, which are adapted from Chomsky 1986a, 57–58.

40. The annotation "??" on an example means that there is disagreement in the literature concerning its grammaticality.

41. The suggestion that the Anti-c-command Condition on parasitic gaps should be captured at the level of interpretation goes back at least to Sag 1983. The interpretation of the Anti-c-command Condition as a special case of Condition C was proposed in Chomsky 1982 (and opposed in Chomsky 1986a), and has been more recently revived by Koster (1987, 356–358).

42. Again, note the wrapping relation between the predicate-argument struc-

ture of the result and the syntactic category. Agreement is omitted for brevity, but see examples following (57) in chapter 2.

43. Here and at a few other points in this chapter, trace notation is used for reader support. There are of course no traces in the theory. Nor is there any theoretical distinction between parasitic dependencies and "normal" ones.

44. This analysis again differs slightly from my earlier proposals, because of the new analysis of subject extraction. Besides the feature-value —LEX, it will be recalled from the discussion of subject extraction (33) that the NP argument of the constituent imply was no good also bears the agreement feature 3S, distinguished for the person and number of the extracted subject. The (non-subject) argument of the adjunct while ostensibly praising is not marked on either feature. It is therefore free to combine, and the substitution rule ensures that the argument Z of the function that it produces bears both values. (The Principle of Combinatory Transparency and the unification-based assumption concerning rules ensure for all combinatory rules that the features on an argument in the result must unite the feature-value pairs on the corresponding argument(s) in its input functions.) This detail is omitted in the present derivation.

45. Like all clashes of ±LEX categories, such examples are only weakly excluded, unlike rightward movement of a matrix subject. In earlier work I took the view that this example was actually grammatical.

46. Of course, relatives that in GB terms coindex a PRO with a trace, like ... who t was absolutely useless despite PRO1 extravagantly praising Brutus, are accepted by the present grammar. However, these examples do not involve rules related to S at all and should not be classified as parasitic gaps.

47. The analysis assumes that an island is overcome by type-raising boy over its adjunct. The sentence does indeed have the feel of an island violation, unlike the related a man whom every friend of despises. As we saw in connection with examples like (54), ?a book which I will walk without reading, the possibility of such exceptions is sensitive to content in mysterious ways, so it is not surprising that some examples related to the above, such as ?a boy who the brother of admires, are even worse.

48. Because crossed composition is not involved, rightward movement out of PP is comparably acceptable in related parasitic examples like the following:

(i) My picture of amused (*Harry), and my novel about infuriated (*Louise), that fascinating woman who chairs the Parking Space Committee.

49. Again, this example is much too bad for its exclusion to be merely attributed to the violation of Condition C. For the same reason, the example provides some support for choosing the present subject-extracting category, embodying Gazdar's analysis, rather than the alternative proposed in Steedman 1987.
50. The example is not too good, but this is because of the general low acceptability of any kind of preposing in relative clauses, remarked on in note 24.

51. The following data are taken from van Riemtjik 1978 and Bennis 1986, esp. 44, and all judgements of acceptability for the Dutch examples are taken from them, while the English judgements are my own.

52. Trace notation is used for ease of reading. (wh-traces are of course not part of the theory.) The example supports the idea that Dutch approximates a mirror image of English, for English also possesses these postpositions in words like thereon/whereon and thereoff/whereoff, although the orthography does not give them the status of independent words. And of course they do not strand, unlike most prepositions:

(i) He knows whereof he speaks.

(ii) He knows where he speaks of.

The point is academic for English, since the postposition has no independent existence, presumably for this very reason. However, it is worth noting that in both languages this is another occasion on which asymmetries in extraction possibilities are determined by direction of lexical government and the consequent involvement of different combinatorial rules, just as in the case of subject extraction.

53. Again, the Dutch judgement is Bennis's, and the English judgement is my own.

54. Bennis (1986, 45) offers the following er-type complement parasitic gap as a well formed case (again, traces are provided for reader guidance in the transliteration).

(i) Dit is het artikel waar ik over zei
    This is the article which I about said
    dat Hendrik een reactie op moest schrijven.
    that Harry a reaction to should write
  "This is the article which I said that Harry should write a reply to of."

I have found it quite hard to get native speakers to accept such examples in either language, and I myself reject the English version. There is, as is usual with PPs, some uncertainty concerning the categories and the obliqueness ordering in the interpretations. It therefore remains unclear whether the present fragments allow such examples syntactically, and if so whether they are independently ruled out by Condition C.

Chapter 4

1. See Szabolcsi 1992a for a discussion of the relation between combinatorial projection and the Projection Principle of GB. At the level of predicate-argument structure, combinatorial rules are somewhat reminiscent of an extremely restricted class of "generalized" transformations, in that they are "double-based" (Chomsky 1957). (In this respect there is a close family resemblance to the operations of Tree-Adjoining Grammars—see Frank and Kroch 1995.) However, they are quite unlike transformations in that they are predicated over syntactic types, and not over surface trees.

2. It would be a great mistake not to compile out this information, both from a processing point of view and in terms of maintaining comprehensibility in the presentation of the theory. Technically redundant though it may be, it has to be used on a great many occasions.

3. It is also reminiscent of the notion of "structured meaning" in the work of Cresswell 1973 and von Stechow (1990).

4. The reallocation of grammatical responsibilities across modules that is proposed here is therefore quite distinct from another reorganization that has been proposed by Pesetsky (1995, chap. 6), which attempts to relate coordination and binding to a "cascade" module, distinct from the "layered" syntactic domain of wh-movement.

5. Such a theory could presumably be expressed within the logic of interpretation itself, perhaps using multimodal type-structural approaches of the kind pioneered by van Benthem (1986, 1991), Moortgat (1988), Hepple (1990), H. Hendriks, (1993) P. Hendriks (1995) and Morrill (1994, 1995). However, it is worth noting that an explicitly representationalist theory, involving an autonomous psychologically real predicate-argument structure, remains distinctly plausible. The only obvious source for the innate knowledge that the child must bring to language learning has always been some kind of prelinguistic conceptual representation, which may well be identical to some form of predicate-argument structure (see Chomsky 1965, 56–59; Pinker 1979).