A UNIFIED THEORY
OF INHERITED FEATURES

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ABSTRACT

There are two thrusts to this dissertation, one backward-looking, one forward. The first is that HPSG is a better minimalist theory than is attainable for the Principles and Parameters framework, given its programmatic goals and its commitment to move alpha as the central explanatory mechanism. The second is that there should be no artificial dichotomy between the inherited features which participate in unbounded dependencies.

In the introductory chapter, I point out certain fundamental problems relating to the assumption that grammaticality is determined via conditions on movement operations, and provide a sketch of the importance of structure-sharing in HPSG, a theory which makes no appeal to movement. In chapter one, I present the evidence for a second wh-question feature, and extend Johnson and Lappin's treatment to account for the important "Subjacency in Japanese" data.

In chapter two, I indicate certain flaws in Johnson and Lappin's approach, related to the fact that their account is not "head-driven" in having inherited features amalgamated through selecting heads. I suggest that this may be rectified while preserving a unified account of inheritance if LOCAL is retired, allowing full *synsem* structure-sharing between fillers and gaps.

In chapter three, I present a feature amalgamation principle, and a revised NONLOCAL feature principle in order to determine conditions on inheritance. I point out severe difficulties associated with the decision to abandon a unified treatment of NONLOCAL features.

In chapter, four, I present a cross-linguistic treatment of data relating to wh-question sentences in which I demonstrate the advantages of employing alternative repositories for the amalgamation of wh-question features -- rather than a two-level approach in which a wh-feature is reentrant as a syntactic trigger. This offers a natural extension of the J&L account, including a unified explanation of pied-piping and the restricted wh-in situ option in English, and Japanese Subjacency.

In Chapter Five, I review certain difficulties with the account, and suggest that it is necessary to have more generalized lexical binding of SLASH in order to successfully dispense with complementizers. I show that the main claims, that NONLOCAL features are subject to amalgamation by selecting heads, with inheritance via structure-sharing, are sound and provide the basis for further research.

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Introduction

The central innovative claim of this dissertation is that inheritance reduces to a form of structure-sharing between head daughters and mother phrases. NONLOCAL features are those which may be amalgamated by selecting heads, creating the illusion of movement. In this introductory chapter, I note that movement operations are unmotivated in typed feature structure accounts of unbounded dependencies, which employ feature inheritance to handle the relevant facts.

At the same time, the possibility of feature inheritance -- or its analog, feature percolation -- is a severe embarrassment for the Principles and Parameters framework, whose central explanatory mechanism continues to be "move alpha," despite the Minimalist attempts to whittle away at movement operations. Although it will be seen that Head-Driven Phrase Structure Grammar accounts promise to deal with unbounded dependencies more economically than the Principles and Parameters framework accounts, there is no unified theory covering the full inventory of inherited features, which can also handle the fact that lexical heads are apparently able to collect scope-marking features from fillers in certain languages. The approach suggested here has the advantage of handling so-called pied-piping effects without extending the inventory of features.

0. 1 Move alpha versus inheritance

I argue in this dissertation that typed feature structure accounts of unbounded dependencies have significant advantages over derivation-based accounts. In particular, they offer the promise of a more economical treatment of unbounded dependencies, which should be welcome in a minimalist theory of linguistics. The main innovation I propose is that inheritance is uniformly mediated via identity of feature structures between semantic head daughters and mother phrases. In other words, certain feature structures (notably, HEAD feature structures, CONTENT feature structures, and -- I will argue -- NONLOCAL|INHERITED features) are inherited onto mother phrases via structure-sharing with the appropriate head daughters. NONLOCAL is justified in this dissertation not as a feature structure distinct from LOCAL, but as a feature structure whose feature values are subject to amalgamation by selecting heads. In this introductory section, I note that the very possibility of feature inheritance poses a serious threat to derivation-based theories, which rely on movement operations as their central explanatory mechanism.

(i) Move alpha as an unmotivated operation

Koster (1986) developed a non-derivational Government and Binding model which rejected the notion of "move alpha" and the idea of levels connected through this mechanism. Relevant to the Head-Driven Phrase Structure Grammar account proposed in this dissertation, it should be noted that Pollard and Sag (1994) cite Koster in claiming that move alpha might well be regarded as the phlogiston in work carried out in the Principles and Parameters framework.

Koster's basic claim was that conditions on derivations could be re-formulated as conditions on S-Structure representations. In Government and Binding Theory, traces in a chain created by movement are required to be in an appropriately intimate licensing relationship with the moved element itself or an antecedent trace, an observation originating in research carried out by Ross 1967. Researchers in the Principles and Parameters framework now standardly assume that movement requires certain "landing sites" at clausal boundaries, and that the presence of some other element in one of these landing sites will give rise to ungrammaticality. This will rule out examples such as the following:

1. % Which papers do you know where we filed t?

Koster adopts the position that if the grammaticality of a sentence is dependent on the relationship between the links in a chain of traces and the head of the chain -- the displaced element -- then movement is redundant.

Koster argues that putative constraints on movement such as Subjacency are artifacts, citing examples from Reinhart 1975. Indeed, perfectly good counter-examples to the Subjacency condition abound:

2 a. %[Which books] do you know [who] wrote t?

b. [Most of these wierdos], I haven't the slightest idea [where or when] I met t

c. [Mary], I can understand [why] you put up with t, but the others...

d. [All the people at this party], I can tell you [when] you invited.

e. %[Which dog] did you want to know [why] the vicar was so upset at t?

f. [Which sonnets] do you know [when] Shakespeare wrote t?

g. [Which films] do you think he's most likely to ask me [why] I made t?

h. [Which girl] were the police asking everyone [when] they saw last t?

i. [What] don't you know [when] to file t?

Informants, in fact, find the examples in 2 above perfectly acceptable.

A principled way of dealing with this difficulty would be to assume that some feature percolates up the syntactic tree from lexical heads which have unrealized complements, to be discharged (or checked) in construction with an appropriate filler. As the most recent thrust in the Principles and Parameters framework attempts to explain grammaticality in terms of feature-checking, this would appear to be a reasonable suggestion. It should be noted that the feature-percolation mechanism is independently motivated in explaining so-called pied-piping facts related to moved constituents. Writing prior to the development of the Minimalist Program, however, feature-inheritance is not assumed to provide an explanation for the presence of traces in Koster's theory.

The fact that such examples as in 1 and 2 are generally attested to be grammatical by informants can be explained under a non-movement feature-inheritance account by saying that there are in fact no special landing sites of the sort standardly assumed to exist under movement accounts. We might want to reserve the right to say that some informants do not like the relevant feature percolating onto certain syntactic nodes, or that some people simply find a certain example odd because it is difficult to conceive of a context in which it might be expressed. However, there is no need to assume special landing sites required for movement operations.

Even so, the feature-percolation option for explaining the availability of fillers without recourse to movement is unlikely to be adopted by researchers in the Principles and Parameters framework, for reasons which will become clear. Derivation-based accounts which attempt to dispense with movement operations have not seriously threatened the mainstream view, which continues to assume movement as the Principles and Parameters framework's central explanatory mechanism.

(ii) Inherited features in HPSG

As befitting a non-derivational theory, the Head-Driven Phrase Structure Grammar (HPSG) accounts which have developed in recent years employ feature inheritance, rather than traces and chains at S-Structure, in order to handle unbounded dependencies without recourse to a movement mechanism. Binding by displaced constituents (fillers) of traces is mediated through the SLASH feature (either as an attribute of NONLOCAL or of SYNSEM depending on the version of HPSG one is employing), which is passed up the immediate dominance hierarchy in accordance with inheritance constraints applying to phrases in general.

These accounts are able to handle displaced constituents straightforwardly without movement because an appropriate SLASH feature value will arise in constructions in which a complement is not phonologically realized (either by virtue of the presence of a phonologically null "trace" complement which generates the SLASH feature in earlier versions, or via a rule of complement deletion which does the same thing in later versions).

Therefore, the typed feature structure accounts of unbounded dependencies which have developed in recent years, it should be stressed, do not require movement operations in order to give rise to SLASH values, the analog of traces left behind by movement operations. SLASH values appear on every node in an immediate dominance hierarchy in accordance with general principles governing inheritance, rather than only appearing at certain nodes from which it might be surmised that movement has taken place. Thus, HPSG has no problem in accounting for the presence of trace-like structures, even though movement operations are not invoked.

Similarly, HPSG has no difficulty accommodating the grammaticality judgments with regard to 1 and 2 above.

1. % Which papers do you know [where we filed t]?

For example, the left-boundary of the embedded clause in 1 is not expected to constitute a special and necessary landing site for any sort of movement operation, so there is no particular reason to think that this intermediate filler-head construction is likely to be an island for inheritance of non-empty SLASH values. We may wish to reserve the possible explanation that some informants prefer an empty SLASH value at certain syntactic nodes, but -- even if we do -- there is no need to invoke movement, nor any particular reason to imagine that there are special positions that moved elements have to land in on route to a final resting place.

(iii) Minimalism cutting down on movement operations

Beginning with Chomsky 1991, the Minimalist view of syntax gathered steam as the cutting edge in the Principles and Parameters framework. The goal of the Minimalist Program, as is well-known, is to show that syntactic operations are driven by the need to check morphological features. In spite of Koster's suggestions, however, throughout the development of the Minimalist conception of syntax, the notion that feature-checking is carried out via movement operations is never seriously brought into question.

The Minimalist Program is an interesting historical development in this context because, for reasons which are never convincingly explained, move alpha is suddenly -- and in stark contrast to what had previously been assumed in the Principles and Parameters framework -- assumed to be a "costly" operation, with the grammar rejecting derivations which are profligate with regard to its use. So Minimalism takes on as part of its mission the attempt to minimize operations which are unmotivated, while never confronting the possibility that the movement mechanism is itself unmotivated -- even, according to certain researchers, from a theory-internal viewpoint.

Central to the development of the Minimalist view of feature-checking via movement operations was an account by Watanabe (1991, 1992) of certain phenomena in Japanese, which will be referred to henceforth as the "Subjacency in Japanese" data. Watanabe proposed a "two-level" theory of covert movement operations applying to wh-expressions, which suggested that only the first level of movement takes place in the mapping from D-Structure to S-Structure, falling in line with the standardly accepted stipulation (at the time) that only movement to S-Structure is constrained by Subjacency. Watanabe's account became a canonical source for the Minimalists, even though his two-level movement hypothesis was rejected out of hand. His account was given a free Minimalist interpretation in the development of the Minimalist Program so that it came to be assumed that only Watanabe's first level of movement was motivated at all in order to check the features of a [+wh] Complementizer.

The Minimalists saw no reason to assume that this movement operation takes place by S-Structure, this assumption being unhelpful given the aims of the program set out by Chomsky (1991, 1995) -- not to mention the fact that there is absolutely no evidence (in fact, rather surprisingly, there is evidence to the contrary provided in Watanabe 1992) that this is the case, as will be discussed in more detail later. The Minimalists commit themselves to the view that every principle that constrains derivations will apply at the level of Logical Form, or at every step in the derivation. This means that it is not possible for the Minimalists to explain the absence of Subjacency effects under the stipulation that Subjacency does not apply in the mapping from S-Structure to LF.

The Minimalists, then, do not consider the possibility that Watanabe's feature-checking operation is carried out via feature-inheritance, or feature-percolation -- a mechanism which is independently motivated in the theory in order to explain pied-piping facts in languages like English. Thus, although a central theoretical goal of the Minimalist Program is to cut down on unmotivated movement operations, it is never considered a possibility that all movement operations are unmotivated.

(iv) Percolation of features in the P&P

One of the Minimalists' theoretical goals, then, is to demonstrate that syntactic operations are driven by the need to check morphological features, while the possibility that such feature-checking can take place without any movement operations remains unexplored. A complication from this point of view -- particularly in that the Minimalist conception of feature-checking is founded on evidence relating to Japanese -- is that the absence of Subjacency effects in extraction from complex noun phrases in Japanese (as opposed to overt extraction in English, Japanese, and a wide variety of other languages, perhaps all) has historically been explained in terms of large-scale pied-piping, with a wh-feature able to percolate to a containing noun phrase.

3 a. ??Which book did you meet [the man who bought t]?

b. Kimi-wa [**dono hon-o** katta otoko-ni] atta no?

you-top [which book-acc bought man-dat] met Q

"You met the man who bought *which book*?"

c. ??**Dono hon-o** kimi-wa [t katta otoko-ni] atta no?

which book-acc you-top [bought man-dat] met Q

"You met the man who bought *which book*?"

d. [Which girl] met [a man who bought which book]?

Thus, in 3a and 3c, overt extraction from a complex noun phrase yields a significant infelicity, while the in situ option in Japanese (3b) is perfectly grammatical. Similarly, it is standardly accepted that a multiple wh-question in English allows extraction of an in-situ wh-expression from a complex noun phrase, as in 3d. Nishigauchi 1990 employs a feature-percolation mechanism to trigger movement of whole complex noun phrases by LF in what only appears to be extraction from complex noun phrases in Japanese. Nishigauchi argues that, as large-scale pied piping is an option in Japanese, no Subjacency violation is evidenced in extraction from complex noun phrases.

Tancredi 1990, for example, provides arguments against actual covert movement of noun phrases by LF. The Minimalists fall in line with the view that there is no actual covert movement of whole expressions, in favor of a feature-checking mechanism. The difficulty for the Minimalists here is that, given that the feature-percolation mechanism is independently motivated in the theory -- notably in order to explain so-called pied-piping facts in English, where it is assumed that Prepositional Phrases soak up the [+wh] features of their complements for some unexplained reason -- it becomes increasingly unclear why movement operations should be invoked at all in the feature-checking process. In particular, to emphasize the point, why is it not possible to check features via the independently motivated feature-percolation mechanism, rather than via movement operations? If features can check via percolation, we might then ask why it is not possible to take the minimalist step of dispensing with movement operations altogether.

This might well offer a means of explaining the ungrammaticality of overt extraction from complex noun phrases, for example, because morphological features of various sorts must be assumed to exist and to be in need of checking in

Minimalist analyses. There may be some universal constraint or mechanism blocking the presence of the trace feature on certain kinds of complex noun phrases.[1] This is in contrast to earlier treatments in the Principles and Parameters framework, where features are only invoked in an ad hoc manner to account for otherwise inexplicable data.

If a lexical head with an unrealized complement were to give rise to a trace-like feature, for example, we might argue that this could check via the feature-percolation mechanism independently motivated in the theory, in a manner parallel to the HPSG accounts of unbounded dependencies. The possibility of these features being inherited from daughters onto immediately dominating phrases offers a way of accounting for feature-checking without movement of any sort. A grammatical S-Structure representation is one which satisfies the relevant constraints. In setting themselves the sub-goal of reducing movement operations to the minimum, the Minimalists otherwise risk being caught in a trap in which they are forever trying to cut down on movement operations, without ever being able to give them up altogether.

However, to abandon movement in favor of feature-percolation would be to admit that Head-Driven Phrase Structure accounts are fundamentally correct, while having nothing obviously distinctive to offer in competition with HPSG's multi-dimensional characterization of unbounded dependencies. Unsurprisingly, perhaps, Minimalist accounts reflect an interest in explaining the facts without recourse to feature-percolation (Tsai 94, for example).

However, nothing in the Minimalist Program convincingly demonstrates that the Minimalists can really dispense with feature-percolation, or some analog, in order to explain the full range of facts cross-linguistically. Indeed, as suggested, because features play a central role in syntactic operations in the Minimalist Program, the possibility that certain syntactic structures are permeable with regard to certain features becomes more convincing than in earlier days in the development of the Principles and Parameters framework, when feature-percolation was invoked merely to explain certain unexpected phenomena in a more or less ad hoc manner. Concomitantly, the pressure to dispense with unmotivated movement operations altogether becomes greater.

(v) HPSG as a more economical theory

As Head-Driven Phrase Structure Grammar accounts deal with unbounded dependencies via conditions on inheritance and binding of highly articulated feature structures (roughly analogous to feature-percolation and feature-checking, with the notable difference that the Minimalist Program only has unstructured feature bundles), it is an attractive framework in which to deal with the facts without carrying the unnecessary burden of the unmotivated move-alpha mechanism. In particular, as overt and covert extraction are handled via inheritance of distinct feature-structures, there is no reason to expect or prefer the same constraints to apply to these. Thus the absence of Subjacency effects in covert extraction from complex noun phrases in Japanese, not to mention overt movement across structures which are assumed to be filled landing sites in English, does not cause any embarrassment for HPSG accounts.

In this dissertation, I demonstrate that a wide range of puzzling data is explicable on the assumption that inheritance of features participating in unbounded dependencies is mediated via amalgamation of inherited features through selecting heads according to a general defeasible feature amalgamation principle. According to this feature amalgamation principle, heads collect the inherited NONLOCAL features of selected arguments, and feature-inheritance may be given a unified characterization in terms of structure-sharing between mother phrases and the appropriate (semantic) head daughter. As this feature amalgamation principle allows wh-features to be collected as the value of an alternative wh-feature structure, INHER|LQUE, and because lexical exceptions are allowed in the theory, a more natural extension of the theory is possible. It is also possible to handle a wider range of facts more successfully than competing accounts of wh-dependencies, which in fact suffer from some of the same problems as the Minimalist accounts. It is also possible to handle so-called pied-piping phenomena without extending the inventory of features.

0. 2 Structure-sharing and inheritance

As mentioned, the basic claim in this dissertation is that inheritance is a special form of feature structure-sharing between head daughters and mother phrases, with the appearance of movement resulting from the fact that NONLOCAL feature values may be amalgamated by selecting heads. I argue that NONLOCAL is justified as a discrete feature structure containing those features which are subject to amalgamation by selecting heads.

In this introductory section I show in sketch how structure-sharing works in Head-Driven Phrase Structure Grammar. This is preliminary to arguing that conditions on inheritance can be captured most economically by retaining NONLOCAL as a discrete feature structure which is subject to inheritance from semantic head daughters to mother phrases via structure-sharing, similar to conditions on inheritance of the HEAD feature structure, and directly parallel to conditions on inheritance of the CONTENT feature structure.

NONLOCAL features are inherited further than CONTENT, for example, only because NONLOCAL features are amalgamated by lexical heads, while CONTENT features are not. As the most economical account involves reducing inheritance in general to a form of structure-sharing between the head daughter and mother phrase, I suggest in this dissertation that the decision to retire the NONLOCAL attribute gives rise to undesirable complications. I suggest, instead, that LOCAL should be retired as a discrete feature structure, allowing for the possibility of full SYNSEM structure-sharing between fillers and traces.

(i) The structure of signs and the centrality of structure-sharing in HPSG

In HPSG, signs (including words) are assumed to be structured objects possessing at least the two attributes PHON and SYNSEM, corresponding to the phonological, and syntactic and semantic features respectively. PHON is merely glossed as a list of orthographies, as HPSG does not try to say anything about phonology, but the SYNSEM attribute of a word includes a complex of nested feature structures. SYNSEM is assumed throughout the development of HPSG from 1994 to carry at least two kinds of attributes. In Pollard and Sag 1994 (P&S), the canonical source for treatments in the HPSG framework, SYNSEM does in fact have only two attributes, LOCAL and NONLOCAL.

A fundamental question raised in this dissertation relates to the nature of SYNSEM. In other words, I ask a basic question about the nature of words: are we justified in assuming that the information shared between a moved constituent and a related SLASH value is always restricted to LOCAL structure? I will conclude that there is no convincing evidence that this is the case, and that considerable simplifications to the theory are possible if we allow for the possibility of full SYNSEM structure-sharing between fillers and traces.

While I question the motivation for retaining LOCAL as a discrete feature structure, I suggest that NONLOCAL should be retained. NONLOCAL takes as attributes those features whose values may be amalgamated by selecting heads and thus subject to large-scale inheritance.

(a) The LOCAL attribute of SYNSEM

LOCAL -- possessing the attributes CATEGORY, CONTENT, and CONTEXT -- is justified as a discrete feature structure in P&S (94) in that this comprises the minimum information shared between a filler and a trace in an unbounded dependency. In other words, certain information is never shared between a filler and a trace. This excluded information may be treated either as a discrete attribute NONLOCAL, or as independent feature-structures. If either of these courses is taken, a filler is not fully structure-shared with a trace, meaning that a filler is never quite the same thing as the complement specifications which are deleted in order to give rise to the trace.

In P&S (94), the CATEGORY attribute of LOCAL itself carries the two attributes HEAD and SUBCAT. The HEAD value of a sign is its part of speech. For example, the HEAD value for the word "she" is as follows:

4. noun[CASE nom]

The HEAD value reproduced above indicates, rather simply, that the word is a noun and that it is specified for Nominative case. Structure-sharing determines that the HEAD value of a phrase is identified with the head daughter, this latter determined in line with phrase structure constraints (schemas) which license phrases. A sentence or verb phrase, for example, will inherit its HEAD feature from the lexical verbal head via structure-sharing, while arguments and adjuncts will constitute non-head daughters, in accordance with phrase-structure schemas licensing the relevant constructions.

A noun phrase will inherit the HEAD feature of its head in the same way, rather than from specifiers or adjuncts. Similarly, the HEAD feature of a Prepositional Phrase will be identified with the lexical head. This all follows from the Head Feature Principle, which guarantees that the HEAD value of a phrase is structure-shared with that of the head daughter.

5. **Head Feature Principle (from Pollard and Sag 1994)**

The Head value of any headed phrase is structure-shared with the HEAD value of the head daughter.

As there is structure-sharing between subcategorization (valency) specifications carried by a verb, for example, and the arguments it takes, it will only be possible for a noun like "she" to appear in subject positions when there is no conflict between the partial specifications contributed by the verbal head and the noun itself.

6. **SUBCAT specifications for "sees" (from Pollard and Sag 1994, page 29)**

SUBCAT <NP[nom]:[1][3rd, sing], NP[acc]:[2]>

As the phrase structure constraints licensing subject-head phrases require structure-sharing between valency specifications and the realized subject in the phrase, it will not be possible for an NP to appear in subject position if its specifications are incompatible with specifications carried by the verb. Valency specifications carried by verbs, then, can be understood as partially specified information which must be compatible with the SYNSEM structure of the arguments the verb selects. The tag [1] for the first argument (the subject) indicates identity with the index of the NP (further structure-shared in the verb's CONTENT), which is specified as being third person singular by the verb.

It is assumed in later treatments that there are advantages to making valency specifications more distinct.

7. **More distinct SUBCAT specifications for "sees"**

SUBJ <NP[nom]:[1][3rd, sing]>

COMPS <NP[acc]:[2]>

Subjects and complements, for example, can be distinguished by more than just their order in the SUBCAT list. I will, however, occasionally revert to the less distinct SUBCAT list when there is no particular reason to state the valency specifications more distinctly. Either way, the phrase-structure schemas licensing head-complement phrases and head-subject phrases respectively will guarantee that there is structure-sharing between the valency specifications and the actual selected arguments.

Structure-sharing is best understood as the resolution of information coming from different sources. Ungrammaticality will result if a verb and argument bear specifications which are mutually incompatible.

8 a. John sees the problem

b. *The boys sees the problem

c. *The boy sees she

d. *Have studied sees the problem

Thus 8a will be grammatical because there is no incompatibility between the arguments and the selecting verb. Note that the arguments in 8a do not themselves carry information specifying for case. However, in 8b the subject and the verb carry mutually incompatible specifications for number, and in 8c the complement and the verb carry mutually incompatible specifications for case. 8d is ungrammatical because the HEAD value of "have studied" will be incompatible with the requirement that the subject be a noun phrase (a phrase with HEAD feature *noun*, whose valency specifications are saturated). In HPSG, then, agreement facts fall out from structure-sharing, with no need for movement operations.[2]

(b) The CONTENT attribute of LOCAL

6. **SUBCAT specifications for "sees" (from Pollard and Sag 1994)**

SUBCAT <NP[nom]:[1][3rd, sing], NP[acc]:[2]>

The information regarding the index of arguments, tagged as [1] and [2] in the SUBCAT specifications repeated above in 6, is structure-shared in the CONTENT attribute. A word's CONTENT contains information which contributes to the word's semantic interpretation. The CONTENT of a nominal may be either of sort *nonpronoun* (*npro*) or *pronoun* (*pron*). The CONTENT of "she," for example, is a subsort of *pron*, *personal-pronoun* (*ppro*). Thus, the CONTENT of "she" is an object of sort *ppro*, which takes INDEX as one of its attributes. The structure of INDEX can be represented as follows, where INDEX is shown to take three attributes.

9.

PERSON	3rd
NUM	sing
GEND	fem

Thus, we can say that English verbs, like "sees," specify for the PERSON and NUM attribute of the index of their subjects, but not for GEND, there being no gender agreement in English.

The CONTENT value of a phrase is inherited from head daughters in roughly the same way as the HEAD value. CONTENT values, however, are assumed to be inherited from the semantic head via structure-sharing, the important distinction being that the semantic head is identified as the adjunct head in a head-adjunct phrase and as the "syntactic" head otherwise.

10. **Semantics Principle (Second version in Pollard and Sag 1994)**

In a headed phrase, the CONTENT value is token-identical to that of the adjunct daughter if the DTRS value is of sort *head-adj-struc*, and with that of the head daughter otherwise.

Importantly, then, structure-sharing required by the Head Feature Principle and the Semantics Principle determines that HEAD and CONTENT values of the appropriate head daughter are inherited onto mother phrases. I will occasionally refer to these cases as "small-scale inheritance" as distinct from inheritance of features which participate in unbounded dependencies, for which I shall occasionally use the shorthand, "large-scale inheritance." I shall use these terms to emphasize my central claim, that conditions on inheritance of CONTENT and NONLOCAL|INHERITED features are parallel: the "large-scale" nature of NONLOCAL inheritance follows from the fact that selecting lexical heads amalgamate the NONLOCAL feature values of selected arguments.

(ii) Inheritance of NONLOCAL features and the centrality of structure-sharing in HPSG

In P&S (94), and certain influential treatments of unbounded dependencies since then, NONLOCAL contains those features which are subject to inheritance from daughters to mother phrases: REL (the relative clause feature, QUE (the wh-feature) and SLASH (the trace feature). The relationship between fillers and traces, standardly handled via overt movement operations in the Principles and Parameters framework, provides an important example of the role of structure-sharing in the HPSG framework.

(a) Structure-sharing in SLASH

The connection between displaced constituents and what the P&P takes to be "D-Structure" positions is mediated in HPSG through structure-sharing between the LOCAL features partially specified in a COMPS list (as mentioned, an attribute of

CATEGORY containing structures partially specifying for the complements selected by the head) and the LOCAL features of the filler. In P&S, these LOCAL structures appear in SLASH, an attribute of NONLOCAL.

In unified treatments of inherited features, NONLOCAL takes two attributes, INHERITED and TO-BIND. All NONLOCAL features are inherited indiscriminately from daughters to mother phrases in the classical treatment offered in P&S, as set out in the Nonlocal Feature Principle.

11. **The Nonlocal Feature Principle**

For each NONLOCAL feature F, the INHERITED value of F on a mother M is the union of the INHERITED values of F on the daughters minus the value of TO-BIND on the head daughter.

Thus a SLASH value is inherited onto mother phrases from daughters until it can be terminated legitimately at a phrase where the appropriate non-empty SLASH value is licensed on the head daughter. The head-filler phrase structure schema, for example, requires structure-sharing between the terminated SLASH value and the LOCAL features of the filler.

Thus, structure-sharing between the SLASH value and the LOCAL features of the filler guarantees that the LOCAL structure in the inherited SLASH value and the LOCAL structure of the filler are the same object, creating the illusion of movement. Informally, then, a SLASH value, corresponding to a trace, is passed up the immediate dominance hierarchy to the point where it is discharged in construction with a compatible filler, thereby unifying with its LOCAL structure.

In contrast to treatments in the Principles and Parameters framework, as there is LOCAL structure-sharing between the specifications in a COMPS list and the filler, the filler will be successfully assigned the appropriate case without any need to be inserted first into some base- or D-Structure position. As compatibility between displaced constituents and valency specifications is guaranteed via structure-sharing, there is no motivation for any actual movement operation.

Interestingly, as mentioned, because the SLASH value and the LOCAL features of the filler are identical, the filler and the trace are the same thing only as far as their LOCAL structure is concerned. This is justified in terms of parsimony -- only the LOCAL structure is required in SLASH values in order to handle the facts adequately, it is assumed. The end result, in any case, is that the illusion of movement from a "D-Structure" position to some displaced position is successfully created by structure-sharing, at least for the LOCAL structure.

(b) Structure-sharing between arguments and unrealized subjects

This contrasts interestingly with the treatment of raising and equi verbs. Structure-sharing guarantees that the SYNSEM structure of a realized argument is shared with an unrealized subject in raising verb constructions, for example. The relationship between understood subjects and their controllers is handled through token identity of SYNSEM features, guaranteed through subcategorization properties of verbs.

For example, in Pollard and Sag 1994, a subject raising verb like "appear" takes a noun phrase subject, and a sentential complement with an unsaturated SUBJECT valency list element. The unrealized subject is token identical with the actual subject, the controller. This can be seen from the valency features of the verb indicated below:

12. SUBJ <**NP[*synsem*1]**>

COMPS < VP[inf, SUBJ <**NP[*synsem*1]**>>

The SYNSEM features of the phonologically realized subject of a verb like "appear" are imposed as the valency requirement of the complement infinitival verb phrase via structure-sharing, the empty subject of the embedded structure being thus controlled by the phonologically realized subject. In the case of understood subjects, then -- as opposed to the phonologically unrealized complements which are the source of SLASH values – it is assumed that there may possibly be full SYNSEM structure-sharing between the controller and the unrealized subject.

(c) Small-scale inheritance via structure-sharing between mother phrases and selecting head daughters

In any case, there is an important distinction -- emphasized here -- between the early treatments of "large-scale" inheritance, indiscriminately from daughters to mother phrases, and "small-scale" inheritance. As mentioned, the Head Feature Principle guarantees that the HEAD value of a head daughter is inherited onto a mother phrase via structure-sharing. The whole of the HEAD feature structure is inherited according to the Head Feature Principle, repeated as 13 below.

13. The HEAD value of any headed phrase is structure-shared with the HEAD value of the head daughter.

This guarantees that headed phrases are "projections" of their head daughters, as argued in Pollard and Sag 1994, and is therefore broadly analogous to the Principles and Parameters framework's Projection Principle.

Similarly, as mentioned, the Semantics Principle guarantees that the CONTENT of a phrase is inherited from the head daughter in roughly the same way. The Semantic Head of a phrase X is defined as the adjunct daughter if X is a *head-adjunct structure*, and the head daughter otherwise (from Pollard and Yoo's forthcoming paper). This complication is forced because verbs do not select for adjuncts in their valency specifications, meaning that the contribution of the adjunct may not be reflected in the head daughter.

By contrast, adjuncts are assumed to bear selectional specifications for the structures to which they attach, plus specifications for the appropriate CONTENT value, allowing the appropriate CONTENT feature structure to be carried up onto a mother phrase from the adjunct daughter. Thus, parallelism between the two "small-scale" conditions on inheritance -- the Head Feature Principle and the Semantic Principle -- can be preserved by noting that selecting daughters are assumed to be head daughters in certain special cases.

14. **Semantics Principle (Second version in Pollard and Sag 1994)**

In a headed phrase, the CONTENT value is token-identical to that of the adjunct daughter if the DTRS value is of sort *head-adj-struc*, and with that of the head daughter otherwise.

Later versions of the Semantics Principle, repeated above as 14, contain modifications allowing scope-marking features to appear in CONTENT, but the basic idea remains the same. For both the Head Feature Principle and the Semantics Principle, then, inheritance of feature structures onto mother phrases is handled via structure-sharing between the mother phrase and the appropriate head daughter. As far as the Semantics Principle is concerned, the head daughter is determined in terms of the selectional properties of the relevant daughter.

By contrast to adjuncts, Specifiers are not assumed to be heads, even though they bear selectional specifications for the nominal structures to which they attach. Nominals, which comprise the syntactic head (contributing the HEAD feature) in a noun phrase, are also assumed to bear selectional specifications for the Specifiers which attach to them, so inheritance of scope-marking features contributed by Specifiers, for example, can be mediated happily through the conventional head.

However, "large-scale" inheritance in the classical P&S (94) approach is not mediated via structure-sharing between mother phrases and daughters, the lexical head not being a conduit for inherited features under the Nonlocal Feature Principle. This is in contrast to certain treatments in the HPSG framework, sketched below.

(iii) Inheritance through heads

The "head-driven" character of the Head Feature Principle and the Semantics Principle as a means of achieving "small-scale" inheritance is paralleled in later treatments of unbounded dependencies. While NONLOCAL features and the scope-marking QSTORE features were originally assumed to be inherited indiscriminately from daughters to mother phrases in line with the Nonlocal Feature Principle and the Quantifier Inheritance Principle respectively, later treatments have inherited features "amalgamated" or "collected" through selecting heads.

Thus, in Sag (forthcoming), SLASH values are amalgamated by heads from selected arguments, with SLASH features of mother phrases being structure-shared with the syntactic head daughter (parallel to conditions applying to "small-scale" inheritance of HEAD features) in order to ensure that these inherited features are inherited from daughters to mother phrases. Identical conditions apply to QUE, a wh-question feature, and REL, the relative clause feature, to guarantee that they are also passed up onto mother phrases from syntactic head daughters.

The scopal properties of wh-expressions and quantifier phrases, treated in Pollard and Yoo (forthcoming) is determined by retrieval of QSTORE values, which are also passed up from head daughters to mothers in the same way, via collection by selecting heads. However, Pollard and Yoo assume that the semantic head daughter is the appropriate head in the case of QSTORE values, which -- unlike Sag's nonlocal features -- are assumed to be quasi-semantic in nature.

Inheritance of features which participate in unbounded dependencies, then, proceeds in a broadly uniform way across feature-structures, via "collection" or amalgamation by a selecting head which passes features up to mother phrases, thus "head-driven" in the manner of the inheritance conditions applying to HEAD and CONTENT feature structures. However, there is disarray regarding the attributes these feature-structures are assumed to be, and the manner in which they are inherited and terminated.

NONLOCAL is retired as a discrete feature structure in Sag (forthcoming), and Pollard and Yoo (forthcoming). However, QUE, REL, and SLASH are retained as attributes of SYNSEM outside of LOCAL, so that the "nonlocal" nature of these features is retained even as the NONLOCAL attribute is retired as a discrete feature structure. As these features now appear as independent and apparently unrelated attributes of SYNSEM, however, it becomes necessary to state conditions on inheritance and termination independently, unless generalized amalgamation and inheritance principles are stated to cover these nonlocal features. Inheritance conditions, being broadly uniform, suggest that these features may well appear in a discrete feature structure. However, for the sake of convenience, I will refer to the inherited features treated by Sag (forthcoming) as lower-case nonlocal, rather than NONLOCAL.

There are no arguments provided in the relevant literature for retiring the NONLOCAL attribute of SYNSEM. However, the disappearance of NONLOCAL coincides with the emergence of the two complementary treatments of inherited features, Pollard and Yoo (forthcoming), and Sag (forthcoming). The division of labor between these two accounts renders the NONLOCAL feature and the Nonlocal Feature Principle redundant. However, as the NONLOCAL feature becomes redundant at the cost of a possible unified account for the full inventory of inherited features, it is wise to take a close look at these analyses. First, it should be noted that Pollard and Yoo's QSTORE feature is required to be a LOCAL attribute (and therefore excluded from NONLOCAL on fairly commonsense grounds) because of certain theory-internal assumptions about the nature of SLASH values, which remain as yet unexamined.

(a) The QSTORE treatment in Pollard and Yoo (forthcoming)

The central claim in this dissertation is that wh-features and other features whose values are subject to amalgamation by selecting heads should be treated as attributes of a discrete NONLOCAL feature structure, with inheritance mediated via structure-sharing between head daughters and mother phrases. I suggest in this introductory section that the motivation for accounting for the scope-marking characteristics of wh-expressions by moving wh-features out of the NONLOCAL feature structure (which is then retired) is by no means as clear-cut as might appear.

Pollard and Sag 1994, in their canonical set of proposals for treatments in the HPSG framework, suggest that QUE will be a wh-feature and an attribute of NONLOCAL, although no treatment of wh-dependencies is offered in this volume. In fact, Pollard and Yoo (forthcoming) offer an account which suggests that the scopal properties of wh-expressions be handled via the QSTORE attribute of LOCAL. QUE is retained only as a syntactic "trigger" feature required at nodes where wh-features take scope. Kathol 1996 provides a treatment of wh-questions in German which employs essentially the same method.

A significant motivation for handling the scopal characteristics of wh-expressions with recourse to features external to the NONLOCAL attribute is the fact that there is evidence that wh-expressions (as well as quantifier phrases) can take scope lower than their surface position. We will be looking in detail at data from Japanese where an overtly moved wh-expression may take scope in the embedded clause from which it has been displaced. As we require traces, or (equivalently) gaps, to be the source of scope-marking features generated by wh-expressions, we need to assume that SLASH values will contain these scope-marking features so that selecting verbs will be able to collect them, the only link between subcategorizing verbs and fillers being the SLASH value generated by the trace.

SLASH values, as mentioned, are assumed to be LOCAL structures. Thus it seems reasonable to assume that QSTORE -- the feature structure involved in determining the scopal properties of wh-expressions and quantifier phrases, formally a top-level attribute of signs (therefore not contained in SLASH) -- should be an attribute of LOCAL. Once it is allowed that QSTORE is an attribute of LOCAL, it is possible for selecting heads to collect QSTORE values, including wh-QSTOREs, from phonologically vacuous complements ("traces"), via SLASH values which unify with the LOCAL features of fillers.

QSTORE is assumed to be a quasi-semantic "interface" feature distinct from the other nonlocal features on analogy with Cooper's (1975, 1983) rule of storage, and is used to characterize the scope-marking properties of wh-expressions and quantifiers. As QSTORE values are assumed to be LOCAL attributes in later accounts in the HPSG framework (notably the forthcoming treatment by Pollard and Yoo), they can be collected or amalgamated by selecting heads, even from displaced arguments, via the SLASH feature.

However, it should be noted that the impulse to move wh-features out of NONLOCAL has its origin in the assumption that SLASH values mediating the gap-filler relation are necessarily LOCAL structures. It is assumed that if scope-marking wh-features are collected from SLASH values, then these scope-marking features must be attributes of LOCAL. By the same token, it may be reasonably assumed that if the other inherited features are not collected from SLASH, then they must be outside of LOCAL.

However, this only follows if SLASH values are indeed LOCAL structures. It should be mentioned that there is no clear evidence that Pollard and Yoo's QSTORE features are in fact always collected from fillers by selecting verbs in syntactic movement languages like English, for example. In fact, there is evidence from Iraqi Arabic that wh-features are not collected from fillers by selecting verbs. This will be demonstrated in more detail later.

I will go on to suggest that there are a number of good reasons to entertain the possibility that SLASH feature values may actually be SYNSEM feature structures, and that the most natural and straightforward treatment of features which are involved in large-scale inheritance through selecting heads involves retaining NONLOCAL as a discrete feature-structure, the attributes of which may have feature values amalgamated by selecting heads. It will be possible to handle the restrictions on collection of certain features without breaking up the NONLOCAL features because collection may be cancelled for certain features from certain selecting heads. My main suggestion in this regard is that a discrete NONLOCAL feature structure be retained, justified as those features which are subject to amalgamation by selecting heads, but that LOCAL be retired.

(b) Retaining NONLOCAL

The central claim of this dissertation is that the NONLOCAL attribute should be retained as a discrete feature structure, subject to inheritance from head daughters to mother phrases in a manner parallel to inheritance of other "small-scale" inherited feature structures. Asymmetry between these features with regard to amalgamation by selecting heads may, for example, be due to the defeasible nature of the collection principle, rather than because certain features appear as attributes of distinct feature structures either inside or outside of LOCAL.

In line with this general claim, I go on to suggest that the decision to treat the nonlocal features, SLASH, REL, and QUE as independent attributes of SYNSEM in Pollard and Yoo (forthcoming) and Sag (forthcoming), rather than unified in a discrete feature structure with scope-marking features, is undermined by two factors.

First, there is negative evidence that nonlocal features are always amalgamated by lexical heads from arguments in the manner suggested in Sag (forthcoming). This suggests that amalgamation of features may be cancelled for the nonlocal features as well as the QSTORE features. Second, there is evidence that nonlocal features are amalgamated from non-syntactic heads, blurring the distinction between the quasi-semantic QSTORE features treated by Pollard and Yoo, and the nonlocal features treated by Sag. In fact, it is impossible to retain the artificial split between the two kinds of inherited features and handle the facts in a straightforward manner.

0.3 Null complementizers and the NONLOCAL Feature Principle

In line with my claim that NONLOCAL should be retained, but subject to the same conditions on inheritance as those applying to CONTENT (in particular) and HEAD feature structures, I outline difficulties with accounts which retain the classical NONLOCAL feature principle by which NONLOCAL feature values are inherited indiscriminately from daughters to mother phrases.

A fundamental problem with the HPSG approach recommended by Pollard and Yoo (forthcoming) relates to syntactic constraints determining the distribution of wh-expressions. These are handled via conditions on inheritance of a second unambiguously "syntactic" wh-feature QUE. As mentioned, QUE is a "nonlocal" attribute of SYNSEM subject to highly restricted, and eccentric, conditions on inheritance under P&Y's account. As will be demonstrated later, a major problem with this approach is that it is subject to some of the same limitations that the Minimalist Program's conception of feature-checking suffers from.

A competing account which is more successful in handling the distribution of wh-expressions across languages is Johnson and Lappin's 1996 treatment which employs two related but distinct NONLOCAL attributes, INHERITED|QUE and INHERITED|LQUE, which may act as alternative repositories for the inheritance of wh-feature values, in order to explicate syntactic constraints on inheritance and binding of scope-marking wh-features.

The main problem with Johnson and Lappin's account follows from the fact that they retain the classical inheritance constraint -- the Nonlocal Feature Principle -- jettisoned by Pollard and Sag, according to which NONLOCAL|INHERITED features are inherited indiscriminately from daughters to mother phrases until they are discharged in construction with an appropriate NONLOCAL|TO-BIND feature, where they are able to terminate legitimately. As NONLOCAL features are not uniformly collected or amalgamated from selected arguments, in the manner of QSTORE values and the nonlocal features treated in P&Y (forthcoming) and Sag (forthcoming), Johnson and Lappin are therefore unable to straightforwardly account for the fact that traces are apparently able to introduce wh-features which can mark scope at a structure lower than the related wh-expression itself.

Even if we allow structure-sharing between a SLASH value and NONLOCAL features, one way or another, there is no obvious reason to believe that gaps (created via a rule of deletion) will give rise to scope-marking features. Unlike Sag (forthcoming) and P&Y (forthcoming), it is not assumed in Johnson and Lappin's account that verbs uniformly collect the inherited features of arguments.

J&L's account depends on the ability of selecting heads to give rise to wh-feature values, as the value of an alternative structure (INHERITED|LQUE), together with the assumption that wh-features will not be inherited from certain non-head phrases (Feature-islands). However, the fact that the classical NONLOCAL Feature Principle does not have inheritance of NONLOCAL features controlled exclusively through heads -- together with the fact that the standard treatment of SLASH excludes NONLOCAL features from SLASH values -- means that certain facts about the scopal nature of wh-expressions do not fall out straightforwardly.

However, I argue that if heads do collect the NONLOCAL|INHERITED features of selected arguments in accordance with a defeasible feature-amalgamation principle, the distinction between syntactic movement languages and non-syntactic movement languages can be seen to hinge on parameterization with regard to whether verbs collect wh-features from deleted complements or not. The fact that selecting verbs amalgamate the wh-features of fillers in certain languages allows fillers straightforwardly to take scope at embedded clausal structures from which they have been extracted. Also, it is possible to present a more natural and more successful account of facts related to the distribution of wh-expressions. At the same time, so-called pied-piping facts may be handled without extending the inventory of features.

This dissertation represents a synthesis of the various treatments which have developed in the HPSG framework, one which allows considerable simplifications, and the preservation of unified conditions on inheritance and binding of features which participate in large-scale inheritance. I retain the NONLOCAL attribute, while proposing a modified NONLOCAL feature principle which identifies the inherited NONLOCAL features of a phrase with the appropriate head daughter.

Footnotes to the introductory chapter

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[1] For example, P&S (94) hypothesize that a null relativizer involved in RC constructions takes an S complement whose INHER | SLASH value contains exactly one member. This form of explanation is fully consistent with the view, strongly offered in this dissertation, that heads (a phonologically null relativizer or a MOD-bearing verbal head, for example) are subject to conditions controlling the inheritance and binding of NONLOCAL features). Further suggestion in this regard are offered in Chapter Five.

[2] Note in particular that, if there is full *synsem* structure-sharing between fillers and SLASH values, this is more like movement in the sense of creating the illusion of movement more fully. There is still no actual movement operation involved or even possible.

Chapter One

The evidence for a second wh-question feature

I argue in this dissertation that heads amalgamate NONLOCAL|INHERITED features carried by their arguments, in line with a general defeasible inheritance principle which allows for lexical exceptions. Inheritance may be controlled through the appropriate head daughter so that inherited features are structure-shared between the head daughter and a mother, somewhat similar to the conditions guaranteeing that the CONTENT feature structure of the appropriate head is carried up to the mother daughter, via structure sharing.

In this chapter I review the evidence for a second wh-feature, noting here that the mechanism by which this feature is introduced in the successful accounts is highly suggestive of the possibility that NONLOCAL feature structures are actually uniformly channeled through selecting lexical heads. To this end, I review the problems posed by various data related to the distribution of wh-expressions, going on to show how HPSG is able to handle these problems, presenting a new solution to Watanabe's famous Subjacency in Japanese data.

1.1 The Principles and Parameters approach to Japanese Subjacency

Foundational to my claims here is the view that typed feature structure accounts of unbounded dependencies handled via feature inheritance are preferable to accounts which appeal to move alpha. In particular, HPSG-based accounts offer more economical (thus, better minimalist) solutions, without the burden of unmotivated movement operations. Part of the reason to question the Principles and Parameters approach is the fact that movement operations taking place overtly and those taking place covertly do not appear to be naturally subject to the same kind of constraints.

This does not pose any particular problem for the Head-Driven Phrase Structure Grammar accounts, because the features which are being inherited in the operations analogous to overt and covert movement are not assumed to be the same in any case. As the features are distinct, there is no particular reason to expect or prefer the constraints applying to inheritance to be uniform. However, as the recent thrust in the Principles and Parameters framework is to require that both covert and overt movement operations are subject to the same constraints, some ancillary explanation is required from researchers in this framework.

In this section, I review further difficulties faced by researchers in the Principles and Parameters framework in dealing with unbounded dependencies. In particular, I note the historical tendency to appeal to feature-percolation mechanisms in dealing with the discrepancies observed regarding overt and covert movement out of a complex noun phrase.

(i) Subjacency as a UG constraint

In the Principles and Parameters (P&P) framework, it is routinely assumed that both wh-clauses and complex noun phrases (CNPs) resist overt extraction of wh-expressions.

15 a. %Which book do you know who wrote?

b. ??Which book do you know the man who wrote?

Both 15a and 15b are assumed (by those working within the P&P framework) to be ungrammatical. In Government and Binding theory (GB), overt movement operations which are assumed for languages like English are also assumed to take place covertly with in-situ wh-expressions and quantifier phrases (QPs). On this view, all languages have all wh-expressions raised by the level of Logical Form (LF). Languages only differ with respect to the level at which they move.

The cost of this generalization is that constraints such as Subjacency appear not to apply to covert movement operations involved in the mapping between S-Structure and LF. Huang's 1982 analysis of Chinese helped propagate the view that, for some unexplained reason, covert movement operations on wh-expressions and QPs taking place in the mapping from S-Structure to LF are free from Subjacency constraints, although subject to the ECP.

16. Ni xiang-xidao [wo weishenme mai shenme]?

You wonder I why buy what

May be: "What is the x such that you wonder why I bought x?

Not: "What is the reason x such that you wonder what I bought for x?"

The presence of a moved adjunct wh-expression to a landing site at the embedded clausal boundary (standardly assumed to be Spec CP in GB analyses) does not apparently prevent the embedded complement wh-expression from moving covertly to the matrix Spec CP in the Chinese example. The stipulation that adjuncts are relatively constrained with regard to LF movement, but that covert movement in general is not constrained by Subjacency, gained widespread acceptance, in spite of the fact that informants do not in general support the view that overt extraction of complements across a filled landing site, parallel to 16, results in any infelicity (and 15a is overwhelmingly judged by informants to be felicitous).

However, there is a tradition of resistance to this view among Japanese linguists. Indeed, many Japanese informants find extraction from wh-clauses, parallel to Huang's example in 16 above, not to be a very natural option at all (although significant numbers do allow it).

17. Kimi-wa [dare-ga nani-o katta ka] shiritai no?

    you-top who-nom what-acc bought Q wonder Q

    "Do you want to know who bought what?"

    %"What do you want to know who bought?"

    %"Who is the person x such that you want to know what x bought?"

The conservative position of Japanese linguists with respect to Subjacency, together with the mixed responses of Japanese informants, means that it is difficult to sustain Huang's hypothesis that LF-movement is free from Subjacency effects, while at the same time bringing into question the matter of treating

Subjacency as a principle of UG. Movement operations in 17 must be assumed to be covert, with no particular reason to imagine that there is covert movement taking place by S-Structure in Japanese in contrast to Chinese, for example. Therefore, it is difficult to apply Huang's hypothesis that only movement to S-Structure is constrained by Subjacency. At the same time, if we explain the difficulty of extraction in 17 in terms of Subjacency, we have no way of explaining why significant numbers of informants find the wide scope readings for the examples perfectly good.

Even so, Subjacency-invoking explanations have historically remained the preference for Japanese linguists. Nishigauchi (1986, 1990), for example, proposed that movement by LF is, in fact, subject to Subjacency in Japanese. The main difficulty here, apart from the fact that significant numbers of informants do not appear to notice Subjacency effects even in extraction from wh-clauses, is to explain why extraction from CNPs is felicitous in Japanese even if we decide we want to rule out wide scope readings for 17.

18. Kimi-wa [**dono konpyuutaa-o** katta otoko ni] aimashita ka?
    you-top which computer-acc bought man-dat met Q
    "You met the man who bought which computer?"

Nishigauchi's solution is to say that Subjacency violations are avoided in most cases of extraction from CNPs because a wh-feature is able to percolate from the wh-expression to the whole of the containing CNP to trigger large-scale pied-piping when covert movement (of the whole CNP) takes place. This feature-percolation mechanism was independently motivated in dealing with so-called pied-piping effects in wh-movement languages like English, so Nishigauchi's solution offered the promise of a principled explanation of the facts relating to covert extraction from CNPs in Japanese. As there is actually no movement out of a CNP, no Subjacency violation is expected.

(ii) Feature-percolation and pied-piping

As mentioned, the feature-percolation reflex is independently motivated in explaining movement of Prepositional Phrases (PPs) with wh-complements in move-wh languages like English.

19. I want to know [to whom] you gave the book t.

It has been standardly assumed in the P&P that the features of the wh-expression percolate to the prepositional maximal projection. The preposition may then be pied-piped with the complement wh-expression when movement takes place. We might, therefore, seek to formulate a theory of feature-percolation to explain why the large-scale option is available in Japanese, but not in English.

20 a. *I want to know [the man from which department] you are going to fire t.

b. Boku-wa kimi-ga dono busho ni iru hito o kaiko shitai ka shiritai.

I-top you-nom which department-dat in person fire want Q want-to-know

"I want to know which department x is such that you want to fire the man from x"

In 20a, the wh-feature apparently fails to percolate to the containing CNP and wh-movement yields an ungrammatical sentence, while the parallel Japanese sentence in 20b is perfect. However, content with salvaging Subjacency in Japanese, Nishigauchi does not develop a theory of feature-percolation. We receive no explanation for the fact that relative clause structures and certain clausal structures deeply embedded in CNPs are apparently permeable to feature-percolation in Japanese, for example. The fact that clausal structures are permeable with regard to wh-feature-percolation naturally raises the question of whether it is possible for wh-expressions to take scope via this feature-percolation process alone, with no resort to unmotivated movement operations. However, Nishigauchi -- writing before the advent of the MP -- naturally does not consider the possibility that his percolating features can check without resort to unmotivated (and problematic: see Tancredi 1990, Von Stechow 1996) movement operations applying to wh-expressions.

(iii) The two-level movement hypothesis

Watanabe's (1991, 1992) theory of invisible operator movement was another enormously influential attempt to attribute constraints on wh-movement in Japanese to Subjacency. Watanabe makes the assumption that Huang's formulation -- that LF-movement is free from Subjacency -- is correct. He offers the central proposal, unsupported by the relevant data (even data selected by Watanabe himself, as will be seen later), that only the initial level of movement, by an invisible operator to trigger a [+wh] Comp, takes place by S-Structure and is therefore subject to Subjacency.

For example, it is standardly assumed in the P&P that "ka" is a complementizer which attaches to clausal structures. Assuming that a "ka dooka" (whether-or-not) CP poses a structural block to movement of the invisible operator, with "dooka" occupying a landing site position in spec CP, right branching, a Subjacency violation is expected in both examples in 21 if we assume that all wh-expressions give rise to associated S-Structure movement operations involving an operator. The grammaticality judgments follow Watanabe 1992:

21. **The Subjacency in Japanese data**

a. ??John-wa [Mary-ga nani-o katta ka dooka] Tom-ni tazuneta no?

J-Top M-Nom what-Acc bought whether Tom-Dat asked Q

"What did John ask Tom whether Mary bought?"

b. John-wa [Mary-ga nani-o katta ka dooka] dare-ni tazuneta no?

J-Top M-Nom what-Acc bought whether who-Dat asked Q

"Who did John ask whether Mary bought what?

It appears that the operator movement expected under Watanabe's analysis from the embedded wh-expression does not take place if there is a wh-expression in the matrix clause, as in 21b.

Watanabe claims that there is a Subjacency violation in 21a because the invisible operator embedded in the "kadooka" CP must move by S-Structure to trigger the [+wh] Comp. By contrast, the invisible operator associated with the higher wh-expression is able to move by S-Structure in 21b. An explanation for the absence of Subjacency effects is available if we assume that the operator need only move if it is forced to do so by the triggering requirements of the [+wh] Comp. On the assumption that only one operator is required to trigger a [+wh] Comp, and wholesale raising of other wh-expressions does not occur until LF, no Subjacency violation is expected in 21b.

(iv) The two-level movement hypothesis and the Minimalist Program

Watanabe's theory of invisible operator movement was foundational in the development of a theory of feature-checking in the Minimalist Program (MP). According to the MP's view, feature-checking is driven by the need to check uninterpretable features. The wh-features of a wh-phrase, it is assumed, are interpretable and so do not need to be checked. Wh-movement is forced by the presence of an uninterpretable [+wh] feature in a Comp, which must be checked by LF. In the case of English, the feature is checked by movement of the whole wh-phrase, before the point in a derivation at which phonological features are deleted, referred to as Spell Out. The only difference with Japanese is that the movement operation involved in feature-checking takes place after Spell Out, and therefore is covert.

Parallelism among languages is, therefore, preserved in the move from Government and Binding theory (GB) to the MP. Under the GB view, all wh-expressions have to move, languages differing only with regard to the level at which they move (these movement operations perhaps subject to different constraints, depending on who you believe). In the MP, all languages have a single operator moving to each [+wh] Comp to check features, with in-situ wh-expressions bound in some way by these operators (see Baker 1970, Aoun and Li 1993, Pesetsky 1987, for example).

Nothing serves to explain the ease of covert extraction from CNPs in Japanese, however. This is problematic because, in the MP, both overt and covert movement operations must be subject to the same constraints. To claim that Subjacency applies only to movement operations which take place by Spell Out would entail the existence of S-Structure or a distinct, non-interface, level of representation, contrary to the Minimalist hypothesis.

Also significant, nothing explains why Japanese is relatively constrained (for some speakers) with regard to post-Spell Out movement of wh-expressions out of wh-clauses, compared to Chinese. Nor is it explained why there appears to be significant dialectal variation with regard to wh-movement out of interrogative clauses in Japanese, including the "ka-dooka" CP. Many informants do not notice any infelicity with regard to Watanabe's famous Subjacency in Japanese examples such as 21a, repeated below, with modified grammaticality judgments to reflect this:

21a. %John-wa [Mary-ga nani-o katta ka dooka] Tom-ni tazuneta no?

J-Top M-Nom what-Acc bought whether Tom-Dat asked Q

"What did John ask Tom whether Mary bought?"

If 21a is truly a Subjacency violation, we would not expect dialectal variation, nor is it clear how the P&P is able to account for the possibility of dialectal variation, if Subjacency is ruled out as the explanation.

1. 2 Problems with the MP

Part of my aim in this dissertation is to demonstrate that typed feature structure accounts which employ feature inheritance rather than movement in order to explicate unbounded dependencies offer a strikingly more natural and straightforward (as well as economical) treatment of the facts than Principles and Parameters accounts. In this section, I review problems relating to the Minimalist conception of feature-checking. In particular, I note that the Minimalist view, that wh-expressions may be bound without checking of an associated feature, is not supported by the facts. By contrast, the HPSG approach suggested here does not suffer from these problems. Indeed, Johnson and Lappin's 1996 suggestion -- that wh-features may be inherited as the value of a second wh-feature structure -- provides a straightforward solution to the difficulties involved.

(i) Iraqi Arabic

Simpson (1994, 1995) points out that the MP's conception of feature-checking is over-restrictive. In Iraqi Arabic, for example, wh-phrases may occur in situ in matrix wh-questions and in non-finite embedded clauses, but are excluded from embedded tensed clauses.

Examples from Wahba (1991), Ouhalla (1996), and Simpson (1995), cited in Johnson and Lappin (1996b):

22 a. Mona shaafat meno?

Mona saw whom?

b. Mona raadat tijbir Su'ad tisa'ad meno?

Mona wanted to force Su'ad to help who

c. *Mona tsawwarit [Ali istara sheno]?

Mona thought Ali bought what

Wh-phrases may be overtly extracted from embedded tensed clauses, even though they may not appear in situ in these environments.

23. **sheno** tsawwarit Mona [Ali ishtara **t**]

what thought Mona Ali bought

What did Mona think Ali bought?

However, a wh-expression in matrix clause does not license a wh-expression in an embedded tensed clause:

24. ***meno** tsawwar [Ali xaraj weyya **meno**]?

who thought Ali left with whom

If the wh-feature on a wh-phrase is interpretable and need not be checked, we have no way of explaining why the multiple question interpretation for 24 is ruled out. Also, if a wh-expression may raise overtly to check features as in 23, what prevents it from raising covertly in 22c, for example?

Simpson proposes a less restrictive notion of licensing to replace feature-checking. All wh-phrases must be licensed by a Q element in Comp by Spell Out. For languages like Iraqi Arabic, Q elements license the presence of wh-phrases within their immediate tense domain. Overt raising is required in 23 so that the wh-phrase in the tensed embedded clause can be in the licensing domain of the Q element in the matrix C at Spell Out.

As Johnson and Lappin (1996b) point out, however, if raising only occurs when required for licensing, then it should not be possible for wh-expressions to move optionally.

25. Meno/i shaafat Mona t/i

    who saw Mona

In fact, there is optional movement in Iraqi Arabic. Simpson's response (cited in J&L 1996b) is that wh-raising of this kind is not forced by wh-licensing, but by the need to check topic-like features on the raised wh-expression. Licensing of the wh-feature of the raised phrase is a side effect of this independently required topic feature-checking process.

However, as J&L (1996b) point out, there is no clear reason to assume that topichood corresponds to a feature which requires checking.[1] Also, it is unclear why the feature can only be checked via movement to the domain of a topic-licensing head. Simpson, in fact, attempts no formal explication of the licensing mechanism, and avoids the question of optional movement altogether. A major difficulty here is the fact that the possibility of optional movement to a topic-feature-checking position undermines certain other arguments presented in

Simpson's dissertation. In particular, Simpson's claim that overt movement to the left-boundary of a "ka" CP in Japanese must be to Spec CP (contra Watanabe, who assumes that Spec is right-branching in Japanese) does not go through straightforwardly. Further, Simpson's neo-Minimalist account is anti-minimalist in requiring a licensing mechanism, as well as covert movement (which is not rendered redundant).

(ii) Covert extraction from CNPs

A further difficulty with the MP's approach to unbounded dependencies is that, although it is motivated by evidence relating to Subjacency in Japanese, there is still no explanation for the fact that covert extraction (of a wh-feature) from CNPs does not give rise to a Subjacency violation, as shown in the examples repeated below as 26 and 27:

26. Kimi-wa [dono konpyuutaa-o katta otoko ni] aimashita ka?
you-top which computer-acc bought man-dat met Q
"You met the man who bought which computer?"

27. ??Which computer did you meet [the man who bought t]?

Simpson's account does not, as mentioned, dispense with the need for feature-checking in Japanese, retaining it in order to deal with data pertaining to overt wh-movement operations (scrambling) which will be discussed later. So we have no explanation for the absence of Subjacency effects in 26, because we do require movement of features out of the CNP to check in the domain of the [+wh] Comp (assumed to be Spec CP by Simpson). Simpson's rather uneconomical Minimalist account therefore requires a licensing mechanism as well as feature-checking, with no formal explication of the mechanisms or constraints involved in either licensing or feature-checking.

1. 3 The MP's attempt to preserve Subjacency while dispensing with feature-percolation

It should be emphasized that feature inheritance as a means of explicating unbounded dependencies is extremely threatening to the whole Principles and Parameters enterprise in that it questions the motivation for move alpha. Of particular relevance here is the traditional appeal to feature-percolation -- the analog of feature inheritance -- in accounting for the absence of Subjacency effects in extraction from complex noun phrases in Japanese. In this section, I argue that Minimalist attempts to dispense with feature-percolation in explaining the data are unconvincing.

Tsai 1994 suggests that the MP is attractive because languages look the same at LF. The only difference between English and Japanese is the point in a derivation at which features are checked. The MP explicitly rejects the distinction between LF and S-Structure movement with respect to constraints. So we have no explanation for contrasts like that between 26 and 27, repeated again below.

26. Kimi-wa [dono konpyuutaa-o katta otoko ni] aimashita ka?
you-top which computer-acc bought man-dat met Q
"You met the man who bought which computer?"

27. ??Which computer did you meet [the man who bought t]?

(i) Tsai's Lexical Courtesy Hypothesis

Tsai's solution is to introduce his Lexical Courtesy Hypothesis (LCH) which says that wh-operators can be introduced into a derivation independently of their associated wh-expressions in the best possible Minimalist case. This means that Tsai assumes that Watanabe's (91, 92) invisible operator features are indeed required to check in [+wh] Comp, but that there is parametrization with respect to the degree of freedom enjoyed by the invisible operator from its associated wh-expression. Chinese is assumed, without any convincing argumentation, to be the perfect Minimalist language, where operators can be inserted directly into the domain of [+wh] Comp to satisfy checking requirements in line with the LCH. Thus, Chinese is completely free from Subjacency effects.

Japanese is a kind of half-and-half language, where operators are free, but have to be put into some spec DP first, again for some unexplained reason. This stipulation appears to allow us to explain why certain CPs are islands, but CNPs are not in Japanese. This form of explanation is extremely attractive from the Minimalist point of view in that it dispenses with the need for feature-percolation as a means of explaining the absence of Subjacency effects in extraction from CNPs in Japanese. As noted earlier, the possibility of feature-percolation is potentially extremely embarrassing for a theory of feature-checking which seeks to dispense with unmotivated movement operations. This is because feature-percolation or its analog feature-inheritance threatens to render movement operations entirely redundant.

To be more precise, feature percolation is a source of potential embarrassment for the Minimalists because retaining it in order to explain Japanese Subjacency violations raises questions about what motivates movement in the feature-checking process.

26. Kimi-wa [dono konpyuutaa-o katta otoko ni] aimashita ka?

you-top which computer-acc bought man-dat met Q

"You met the man who bought which computer?"

In 26, the wh-feature may be taken to percolate through the relative clause to the CNP, rendering the CNP a target for movement. We then have to ask why a CNP should be an island for feature-percolation, forcing the feature to move, even though clausal structures in general are not islands for feature-percolation? In particular, given that a wh-feature has to check in the domain of the [+wh] Comp, why is it not possible for this to happen via feature-percolation rather than via movement?

To emphasize, if the possibility of feature-percolation is acknowledged, it is not clear why we require movement operations at all in explaining feature-checking possibilities in languages which have wh-expressions in situ. As mentioned earlier, the possibility of a feature arising with a deleted complement also offers a way of explaining apparently overt movement without recourse to movement operations, feature percolation (and its analog feature inheritance) being distinct from movement. As the feature arising with a wh-expression and the feature arising with a deleted complement need not be assumed to be the same, there is no need to assume that percolation would be subject to the same constraints in both these cases.

It appears that the possibility of dispensing with all movement operations is available, particularly as feature-checking plays such a central role in the MP.

This is partly welcome from the Minimalist point of view, because the MP seeks to cut movement operations to a minimum. Movement is assumed to be costly, and only derivations with the fewest number of costly movement operations will be tolerated by the grammar.

However, to acknowledge feature-percolation is also potentially disastrous for the Minimalists because movement is the central explanatory mechanism in the MP. An important goal of the theory is to show that syntactic operations are driven by the checking of morphological features. However, it is assumed without question that these feature-checking operations are carried out via movement operations. If the central explanatory mechanism of the theory is brought into question, the MP appears considerably less attractive, particularly in comparison with theories like HPSG which rely on feature-inheritance (analogous to feature-percolation) of highly articulated feature-structures to explicate unbounded dependencies. Therefore, Tsai's solution, which dispenses with feature-percolation by allowing operators to be placed directly into spec of CNPs in a completely ad hoc manner, should be considered with some care, lest it be merely an attempt to banish the specter of feature-percolation.

(ii) Problems with Tsai's analysis

There are at least three very serious problems with Tsai's approach. First, Tsai's arrangements for explaining language differences are completely ad hoc, as just suggested. No convincing arguments are offered to explain the relative freedom of operators from their associated wh-expressions. Second, the considerable dialectal variation with regard to Subjacency-like effects in Japanese is not even noted, let alone addressed. The Lexical Courtesy Hypothesis is introduced entirely in order to salvage Subjacency without recourse to feature-percolation, with no reason to believe that languages would actually be parametrized around his Lexical Courtesy Hypothesis in the manner suggested.

Third, if operators are merely stipulated as being free in CNPs, we would expect islands to be nullified if contained inside a CNP:

27. *Kimi-wa [[John-ga nani-o katta ka dooka] shiritai hito-o] mimashita ka?
    you-top J-nom what-acc bought whether wonder person-acc saw Q
    "You saw the person who wants to know whether John bought what?"

In 27, the "ka dooka" wh-island familiar from Watanabe's 1992 analysis is embedded inside a CNP. If Tsai's approach is correct, we expect the operator associated with "nani" (what) to be insertable directly into spec DP to avoid a Subjacency violation. Such data would provide startling evidence in support of Tsai's general approach. Indeed, we must expect such evidence if we are expected to accept Tsai's hypothesis that operators can be inserted directly into any spec DP in Japanese. However, there is no such evidence forthcoming from Tsai or anyone else, and indeed the relevant informants find examples like 27 distinctly odd.

Further, if operators can just be inserted into any spec DP in Japanese, why may the operator associated with the embedded wh-expression in 27, or 21a repeated below, not simply be inserted into one of the DPs in the matrix clause?

21 a. ??John-wa [Mary-ga nani-o katta ka dooka] Tom-ni tazuneta no?

J-Top M-Nom what-Acc bought whether Tom-Dat asked Q

"What did John ask Tom whether Mary bought?"

The fact that this is not possible suggests that wh-operators are actually tied to their source wh-expressions, for some reason which is not broached in Tsai's account. This follows straightforwardly for a feature-percolation analysis, but not straightforwardly at all from the Lexical Courtesy Hypothesis or the peculiar, apparently dialectically determined, Japanese parametrization of the LCH.

(iii) Feature-percolation allows an economical solution

In the Principles and Parameters framework, feature percolation is independently motivated and nothing in the MP suggests that "pied piping" can be reduced to a movement-type mechanism or the Lexical Courtesy Hypothesis. Nishigauchi's feature-percolation approach would therefore seem to be more promising than Tsai's LCH, opening up the possibility of formulating a theory of feature-percolation driven by the need to check morphological features, for example.

As features play a crucial role in determining grammatical derivations, the notion that wh-features spread to certain larger, permeable structures is plausible and independently motivated, as mentioned. The difficulty for the Minimalist Program regarding Nishigauchi's old account is that there seems no particular reason to believe or assume that relative clauses are permeable with respect to wh-feature-percolation, but that CNPs are not. It appears that we have to assume that CNPs are islands for feature-percolation purely in order to preserve the need for movement.

Now, from 27 repeated below, again for some unexplained reason, "ka dooka" appears to act as a structural block on the mechanism by which wh-features percolate to containing NPs.

27. *Kimi-wa [[John-ga nani-o katta ka dooka] shiritai hito-o] mimashita ka?
you-top J-nom what-acc bought whether wonder person-acc saw Q
"You saw the person who wants to know whether John bought what?"

As now we must assume that both percolation and movement operations are subject to the same structural constraints, we might well wonder whether feature-percolation and movement are in fact one and the same thing. As one or the other of these mechanisms becomes redundant, the most straightforward and economical way of dealing with the facts would be to dispense with one or the other. However, feature percolation will not reduce to movement in the MP.

28. I want to know [to whom] you gave the book t.

For example, in 28 repeated above, the prepositional phrase is standardly assumed to be a target for movement by virtue of the possibility of a [+wh] feature percolating to the prepositional phrase from the complement wh-expression.

29. *I want to know [the man from which department] you are going to fire.

In 29 repeated above, it is standardly assumed that the [+wh] feature is not able to percolate to the whole of the complex noun phrase containing the wh-expression and that the CNP will not be rendered a suitable target for movement as a result.

As the Minimalist Program assumes that wh-expressions will be composed of unstructured feature bundles, the idea that certain structures will be permeable with respect to certain of these features is not unreasonable. It is by no means clear, by contrast, how one could obviate this feature-percolation mechanism, or some analog, in explaining what kind of structures can be moved. If movement operations can be handled via feature-percolation, an independently motivated mechanism, then the corresponding movement operations should be dropped from any minimalist theory which seeks to dispense with unmotivated movement operations.

However, the Minimalist Program is unable to do this because the central explanatory mechanism of the theory is move alpha. More to the point, if feature percolation is allowed in handling the feature-checking processes which drive the grammar, the MP looks unattractive beside Head-Driven Phrase Structure Grammar's multi-dimensional characterization of scope and extraction islands in terms of inheritance and binding of highly articulated feature structures.

The general difficulty the Minimalist Program faces, then, is that it is committed to the task of reducing movement operations to the minimum optimal number, without ever being able to dispense with them altogether. Even in dispensing with some movement operations for in-situ wh-expressions, inconvenient data like the Iraqi Arabic cases above force some independent mechanism to account for ungrammaticality. The Head-Driven Phrase Structure Grammar approach to handling unbounded dependencies through inheritance of features (parallel to feature percolation) makes no appeal to movement operations, thereby allowing us to handle the facts in a simpler and more straightforward way. As there is no need to bear the unmotivated move alpha burden, HPSG is a more economical and, therefore, a better minimalist theory.

1. 4 An HPSG treatment of unbounded dependency data problematic for the Minimalist Program

The Minimalist Program is unable to deal convincingly with data which suggests that wh-features may be inherited from certain embedded structures only in modified form, with strict conditions on binding of such modified features. I will go on to show that conditions on inheritance can be rendered uniform for feature structures like CONTENT and NONLOCAL|INHERITED if a discrete NONLOCAL feature structure is retained, assumed to contain features which are subject to amalgamation by selecting heads.

Johnson and Lappin's 1996 account is particularly suggestive in this respect in that complementizers telescope wh-features as NONLOCAL|INHERITED|LQUE feature values out of complements from which it is not possible to inherit QUE. Although the classical Nonlocal Feature Principle has NONLOCAL features inherited indiscriminately from daughters to mothers, complementizers operate in construction with complements from which certain NONLOCAL features may not be inherited so that the inherited features are structure-shared with those of the head daughter in these cases.

This is particularly relevant because part of the aim of this dissertation is to demonstrate that NONLOCAL feature structures are inherited exclusively from semantic head daughters and that this is possible if lexical heads in general act as conduits for the NONLOCAL features of selected arguments in precisely the way that Johnson and Lappin's telescoping complementizers do. I will go on to show that restricting inheritance through selecting heads allows a more natural and straightforward handling of the data.

In this section, then, I review the Head-Driven Phrase Structure Grammar treatments of wh-dependencies and show how Johnson and Lappin 1996 handle the data which is problematic for the Minimalist Program. I extend the basic treatment suggested by Johnson and Lappin in a straightforward way to account for the famous Subjacency in Japanese data.

(i) Feature inheritance

In the canonical source for HPSG accounts, Pollard and Sag 1994, unbounded dependencies are handled through feature inheritance. Phrases have the attribute NONLOCAL which takes two sorts of feature values, INHERITED and TO-BIND. P&S (94) have three types of INHERITED features, (i) SLASH, (ii) QUE, and (iii) REL corresponding to a displaced constituent, a wh-question feature, and a wh-relative clause feature respectively. Once lexically introduced, INHERITED features are passed from daughters to mothers in accordance with the NONLOCAL Feature Principle repeated below as 30.

30. For each NONLOCAL feature F, the INHERITED value of F on a mother M is the union of the INHERITED values of F on the daughters minus the value of TO-BIND on the head daughter.

The TO-BIND feature is introduced by an immediate dominance schema which licenses its presence on the head daughter of a head-filler phrase, and on nominal structures in construction with functional heads required in P&S's (94) treatment of relative clauses.

(ii) The QSTORE approach

Two distinct analyses have developed to handle unbounded dependencies involving wh-expressions. Pollard and Yoo (forthcoming) retire the NONLOCAL feature principle and retain QUE only as a syntactic trigger which is required on non-head daughters of wh-clauses in certain languages, like English. Instead P&Y (forthcoming) have QSTORE as a LOCAL attribute, and POOL and RETRIEVED as top-level attributes of signs. Quantifiers are collected in POOL, the union of the QSTORE values of selected arguments. The QSTORE value of a sign is the POOL value minus the elements in RETRIEVED. QUE is required on leftmost daughters in languages like English in order to license a non-empty RETRIEVED value containing interrogative QSTORE values. By this mechanism, for a given sign, we have a record of the scope-marking features inherited from arguments, the features bound, and the features made available for inheritance onto a higher level of structure.

QSTORE, then, is a kind of semantic-syntactic "interface" feature lexically introduced with reference to the CONTENT of wh-expressions and quantified NPs and passed up through semantic head daughters. RETRIEVED operators appear in QUANTS, an attribute of CONTENT, where they are assumed to take scope. Retrieved operators are assumed to appear in CONTENT where they are interpreted, as scope can only be semantically interpreted in CONTENT.

QSTORE is assumed to be an interface feature by P&Y (96) on analogy with Cooper's (75, 83) rule of storage. The mechanism involves defining a feature value for a quantified NP as stored, inheriting it at successive mother nodes of a feature structure, and then discharging it to obtain a scoped interpretation of the quantificational expression.[2]

The most fundamental difficulty with P&Y's approach relevant to the present discussion is the fact that QSTOREs are uniformly inherited from fillers through selecting verbal heads, and not from non-head daughters. Therefore, it is by no means a simple matter to handle data from Iraqi Arabic where there is a distinction between ungrammatical sentences which have wh-expressions in situ in embedded tensed clauses, and grammatical sentences which have the wh-expression as a filler outside the embedded tensed clause. If the relevant feature is inherited through the selecting verbal head in both cases, it is not immediately obvious how this distinction can be captured. In particular, it is not clear how QUE may be employed as a syntactic trigger in order to account for the facts.

A further difficulty is the fact that Watanabe's Subjacency in Japanese examples are not salvaged by moving the wh-expression out of a "ka-dooka" clause. Watanabe 1992 appeals to a reconstruction mechanism, whereby scrambled wh-expressions are interpreted in situ. This suggests that P&Y's syntactic trigger QUE is also amalgamated through selecting heads, contrary to P&Y's analysis. In fact, P&Y's approach -- with syntactic constraints handled in terms of constraints on inheritance of QUE (as a wh-syntactic trigger), parallel to Watanabe's null operator -- is subject to some of the same problems faced by the MP, as will be shown in detail later. By contrast, these facts fall out rather naturally under the approach I go on to suggest, employing J&L's two wh-features, QUE and LQUE.

Further, syntactic constraints may not be handled in a uniform way under the QSTORE approach. Kathol's 1996 treatment of partial movement constructions in German (in the spirit of P&Y), for example, handles constraints on inheritance by appealing to a lexical rule to introduce an expletive SLASH feature (rather than a constraint on QSTORE inheritance or, more straightforwardly, a constraint applying to wh-filler-head structures such that the appropriate SLASH value need not be terminated), and stipulating that this may not be extracted from clauses.

(iii) The classical NFP approach

In Johnson and Lappin 1996, constraints on inheritance are explicitly stated in the theory, and their mechanism for handling partial movement is fully developed to apply cross-linguistically without recourse to unmotivated lexical rules. Therefore, I adopt the treatment of complementizers in Johnson and Lappin (1996a and b). Following this, Japanese "ka" can be given the provisional characterization as follows (from J&L 1996b):

31 a. SUBCAT <S[INHER|QUE: X]> (X is not null)

b. NONLOCAL|TO-BIND|QUE: X

The complementizer takes a sentential complement with the INHER|QUE value X, which unifies with the complementizer's own TO-BIND|QUE value. This means that any INHER|QUE features inherited onto the sentential complement will be terminated in line with the NFP. There are indeed certain Japanese speakers who do not like wh-expressions to take scope out of "ka" CPs.

Johnson and Lappin 1996 assume that certain structures are F(eature)-islands. This means that certain features may not be inherited from certain structures. Thus S[fin] is an F-island for QUE in Iraqi Arabic, meaning simply that INHER|QUE may not be inherited from S[fin]. In this spirit and in common with Johnson (pc), I assume for the moment that the so-called Subjacency problem in Japanese can be explained by assuming that CP[yes/no], with head complementizer "ka-dooka", is an F-island for QUE. The Subjacency in Japanese data is repeated below as 32 a and 32 b.

32 a. ??John-wa [Mary-ga nani-o katta ka dooka] Tom-ni tazuneta no?

J-Top M-Nom what-Acc bought whether Tom-Dat asked Q

"What did John ask Tom whether Mary bought?"

b. John-wa [Mary-ga nani-o katta ka dooka] dare-ni tazuneta no?

J-Top M-Nom what-Acc bought whether who-Dat asked Q

"Who did John ask whether Mary bought what?

(The "no" particle is an informal alternative to "ka")

In 32a, because CP[yes/no] is an F-island for QUE, there is no possibility of terminating QUE legitimately at the matrix CP.

However, we have no explanation whatever for the felicity of 32b. Johnson (pc) suggests that this fact can be handled by recourse to an "update" function which applies to feature values to the effect that the QUE value of one daughter wh-expression can be updated as the union of the QUE values of its sister and its own QUE value. While this provides a straightforward solution to the problem, it is ad hoc. I suggest a solution more in keeping with J&L's general treatment of unbounded depencies in terms of parametrized and universal constraints on feature inheritance.

(iv) Iraqi Arabic

33. *Mona tsawwarit [Ali istara sheno]

    Mona thought Ali bought what

    "What did Mona think Ali bought?"

34. Sh-tawwarit Mona [Ali gabal meno]

    wh-QP-thought Mona Ali met who

    "Who did Mona think Ali met?"

In Iraqi Arabic, S[fin] is an F-island for QUE but a phonologically null complementizer can attach to S[fin] in order to extract the QUE value as LQUE, which may be inherited from the CP.

35. **Phonologically null, non-binding complementizer in IA**

    SUBCAT <S[fin, INHER|QUE: X]>

    NONLOCAL| INHER|LQUE: X

The value of INHER|QUE on the sentential complement unifies with the INHER|LQUE on the complementizer. Thus, although QUE will not be able to escape the S[fin] F-island, the value of LQUE inherited from the complementizer is identical to the QUE value stranded on the F-island. Thus, the relevant wh-feature value may be telescoped out of the island through a selecting head as the value of LQUE. A phonologically realized complementizer "sh-" which takes S[INHER|LQUE: X] as its complement is then required to bind the LQUE feature value which is inherited via the empty complementizer whose SUBCAT and NONLOCAL features are indicated in 35.

36. **sh- complementizer which binds extracted INHER|LQUE**

SUBCAT <S[INHER|LQUE: X]>

NONLOCAL|TOBIND|LQUE:X

37.

[CP[INHER|LQUE{}][C[TOBIND|LQUE{1}] sh-]

[S[fin,INHER|LQUE{1}] tsawwarit Mona

[CP[INHER|LQUE{1}][C[INHER|**LQUE{1}**] C]

[S[fin,INHER|**QUE{1}**] Ali gabal [NP[INHER|QUE{1}] meno]]]]]

= 34 (from J & L)

The LQUE value originating with the complementizer in 35 is carried up to the matrix S[fin], and we require the overt complementizer "sh-" to terminate this legitimately, there being no null LQUE-binding complementizer in Iraqi Arabic. As can be seen in the specifications for 36, the TO-BIND|LQUE value of the binding complementizer unifies with that of the INHER|LQUE on the sentential complement.

33. *Mona tsawwarit [Ali istara sheno]

Mona thought Ali bought what

"What did Mona think Ali bought?"

34. Sh-tawwarit Mona [Ali gabal meno]

wh-QP-thought Mona Ali met who

"Who did Mona think Ali met?"

This accounts for the contrast between 33 and 34. In 33 there is no overt complementizer to bind LQUE, while in 34 there is. If a null complementizer is like 31, for example, it does not allow binding of LQUE, there being no possibly non-empty TO-BIND|LQUE value.

31 a. SUBCAT <S[INHER|QUE: X]> (X is not null)

b. NONLOCAL|TO-BIND|QUE: X

(v) German

38. **Was1** glaubst du **was2** Hans meint **mit wem** Johann gesprochen hat?

wh-QP believe you wh-QP Hans says with whom Johann spoken has

With whom do you believe Hans says Johann has spoken?

In German, "was" complementizers may have either a non-empty TO-

BIND|LQUE or an INHER|LQUE feature, unified with the LQUE value of its complement. The null complementizer either carries TO-BIND or passes up the INHER|QUE value of its wh-expression complement as INHER|LQUE. As only null complementizers may generate INHER|LQUE in the first place, the dependence of the "was" complementizer on the presence of a lower partial movement structure is captured. Filler-gap CPs are assumed to be universally QUE islands for the Nonlocal Feature Principle, in order to prevent the same value being inherited in both INHER|QUE and INHER|LQUE if the null complementizer's TO-BIND value is empty. Thus there is considerable optionality with respect to a complementizer's function. In 38, the embedded wh-CP "was2" passes up the LQUE value which would otherwise be stranded on its S[fin, LQUE] complement, inherited from the most deeply-embedded CP. The higher "was1" then binds LQUE inherited onto the complement S. It is required, then, that the complementizer has two very distinct functions, with a non-empty TOBIND value if its INHER|LQUE is empty and vice-versa.

(vi) Japanese

39. John-ga ikimasita ka

    John-nom went Q

    "Did John go?"

It can be seen in 39 that the complementizer "ka" need not bind a wh-expression and may work in construction with S to give a yes/no interpretation instead. As the value of INHER|QUE is treated in HPSG as a set of *npros*, generated with reference to the CONTENT of a wh-expression, it would take considerable innovation to argue that the TOBIND|QUE value of "ka" in 39 is non-empty. Kathol 1996 offers a treatment of yes/no complementizers which does not assume any inheritance of wh-scope-marking features of any kind. We might assume, then, that "ka" may have an empty TOBIND|(L)QUE value, and may bind the complement S directly as a yes-no complementizer, when its TOBIND|(L)QUE value is empty. If this is the case, the specifications for "ka" should be modified simply by dropping the condition that X is not null.

40 a. SUBCAT <S[INHER|QUE: X]>

b. NONLOCAL|TO-BIND|QUE: X

This will suffice for those speakers who prefer not to allow wh-expressions to take scope out of CPs with "ka" heads. In other words, we require neither that INHER|QUE of S be non-vacuous, nor that the TOBIND value be non-vacuous. Now, a treatment of the so-called Subjacency data along the lines adopted for German and Iraqi Arabic might propose that a "ka-dooka" CP is an F-island for QUE, as suggested by Johnson, but that QUE values may escape from such islands as LQUE values.

41. **ka-dooka**

SUBCAT <S[INHER|**QUE: X**]>

NONLOCAL|INHER|QUE{}

LQUE: X

TO-BIND|QUE{}

LQUE{}

41 gives specifications for "ka-dooka" C in which the impossibility of binding of any wh-features, but the possibility of inheritance of LQUE, is made explicit. The lexical specifications ensure that the TO-BIND value for "ka-dooka" is empty, forcing a yes/no interpretation in line with the suggestions above that a Q-complementizer with an empty TO-BIND value for wh-features will be interpreted as a yes/no complementizer.

However, the LQUE value of the complementizer unifies with the QUE value of its complement S. A potential problem here is that both QUE: X and LQUE: X will be inherited onto CP[yesno], but only LQUE may be inherited from it, "ka-dooka" clauses being stipulated as F-islands. This is in unfavorable contrast to Johnson and Lappin's treatment of Iraqi Arabic, for example, where S[fin] is the F-island, rather than the complementizer being the F-island, so QUE is not inherited onto the CP whose null complementizer head gives rise to INHER|LQUE. However, this problem will be ironed out later in any case.

As we now allow the possibility of giving rise to an INHER|LQUE feature value, it makes sense to allow some way of binding it. There do not seem to be any overt complementizer candidates, like in Iraqi Arabic, for example, which can be employed to bind LQUE by carrying a possibly non-empty TO-

BIND|LQUE value. Furthermore, the ungrammaticality of the "Subjacency" examples, repeated below as 42, suggests that "ka" does not allow such binding, either.

42. ??Kimi-wa [John-ga nani-o katta ka-dooka] shiritagatte-imasu ka

you-top J-nom what-acc bought Q-yes/no want-to-know Q

"What do you want to know whether or not John bought?"

When there is no wh-expression in the matrix clause, extraction from the "ka-dooka" island yields an infelicity for speakers of Watanabe's dialect. However, when there is a wh-expression in matrix clause, it appears that such binding becomes possible, as in the example repeated below as 43.

43. John-wa [Mary-ga nani-o katta ka dooka] dare-ni tazunemashita ka?

J-Top M-Nom what-Acc bought whether who-Dat asked Q

"Who did John ask whether Mary bought what?

The straightforward solution in the spirit of Johnson and Lappin 1996 would be to suggest that a "ka" complementizer does in fact allow such binding when there is a non-empty TO-BIND|QUE value on the complementizer. In line, then, with Johnson and Lappin's general treatment, I suggest the revised specifications for "ka".

44. **Revised specifications for "ka"**

SUBCAT <S[INHER|QUE: X, INHER|LQUE: Y]>

TO-BIND|QUE: X, LQUE: Y

condition: if X is vacuous, so is Y

The specifications for "ka" in 44 allows the complementizer to have a non-vacuous TOBIND value for LQUE only if there is also a non-vacuous TOBIND value for QUE. Thus the grammaticality of examples like 43 and the ungrammmaticality of examples like 42 are correctly predicted in line with J&L's general treatment of unbounded dependencies, without recourse to unmotivated solutions of the type proposed by Johnson.

Simply the fact that NPs are not QUE-islands takes care of the fact that in situ wh-expressions may take scope out of CNPs in a wide variety of languages including English, Chinese, and Japanese. As dependencies between displaced constituents and "traces" or "gaps" are handled by a completely different feature (SLASH) than dependencies between wh-expressions and positions at which they take scope (QUE and LQUE), it is not particularly desirable to try to make conditions on inheritance uniform for these in an HPSG account.

As mentioned, the MP has no clear explanation for why overt movement and covert movement operations are subject to different constraints. One might suggest, for example, that certain CNPs are universally SLASH islands, while awaiting evidence to the contrary. However, neither GB nor the MP have any way of making this claim, even. In GB, it is necessary to stipulate that movement operations are subject to different constraints depending on the level at which they move. In the MP, a further mechanism is required -- in addition to movement and feature-percolation -- in order to preserve Subjacency as a principle of UG constraining movement operations in general. Even then, troublesome data such as the facts from Iraqi Arabic require an independent explanation. I will return to this point in Chapter Four. The HPSG approach, by contrast, allows the theory to impose constraints governing the inheritance of particular features, which yield a natural, multi-dimensional characterization of scope and extraction islands. Subjacency is desirably reduced to status as an artifact, and there is no need for movement operations of any kind.

Footnotes to Chapter One

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[1] But see my suggestions regarding Hungarian in Chapter Five.

[2] Inheritance and binding of wh-question feature values in QUE and LQUE is no less analogous to storage than P&Y's QSTORE approach, with no reason to imagine that a NONLOCAL wh-feature may not be a semantic feature which directly determines the scope of associated wh-expressions. A unified treatment of NONLOCAL features might assume that certain of the inherited features are semantic in character (in marking scope, for instance) and certain others are syntactic (in handling the filler-gap relation, for instance). A unified treatment is justified because both syntactic and semantic features are subject to amalgamation by selecting heads, and subject to the same general conditions on inheritance. Wh-question features are clear candidates for being considered semantic features, inherited through the semantic head daughter and introduced via structure-sharing with CONTENT of wh-expressions. I will present evidence in Chapter Three that REL features may also be inherited through semantic heads, contra Sag (forthcoming).

A principled account of NONLOCAL features might seek to constrain inheritance of syntactic features through the syntactic head. However, I present evidence in Chapter Three that SLASH may also be inherited through semantic daughters, so a neat explanation along these lines is not obviously available. Indeed, Hukari and Levine (95) present convincing arguments against treating adverbial gaps via a mechanism fundamentally different from those suggested for argument extraction. Whether this entails that SLASH must be inherited through semantic heads remains to be seen.

Similarly, the question of adverbial extraction of wh-question features (Huang's famous Chinese data, cited earlier in this chapter, for example) awaits further research.

Chapter Two

Head-Driven Inheritance

There is evidence that certain functional heads may act as a conduit for a second wh-question feature, unified with the wh-question feature value of complements. I claim in this dissertation that a wider range of facts may be handled in a more natural way if selecting heads always amalgamate NONLOCAL feature values of arguments, parallel to collection of QSTORE values and other nonlocal features by selecting heads in Pollard and Yoo (forthcoming) and Sag (forthcoming). I propose that NONLOCAL should be retained as a discrete feature structure containing those features which are subject to amalgamation by selecting heads.

I argue that J & L's account requires NONLOCAL features to be uniformly collected through selecting heads -- rendering all non-heads F(eature)-islands -- in order to account for evidence that wh-features can be generated by traces. If NONLOCAL is retained as a discrete feature structure containing all those features which are subject to amalgamation by selecting heads, in order to preserve a unified treatment of inherited features, SLASH values must in fact be SYNSEM structures rather than LOCAL. I suggest, therefore, that NONLOCAL be retained, and LOCAL be retired.

2.1 Problems with J&L (96) and the proposed solution

A modification of Johnson and Lappin's treatment of wh-dependencies, with inheritance uniformly mediated through selecting heads in line with a defeasible feature amalgamation principle, allows a unified account of inherited features which handles a wider range of facts in a more natural way. In particular, it is possible to account for embedded scope for fillers, and so-called pied-piping facts without extending the inventory of features to an unmotivated syntactic trigger feature.

To this end, I argue that, while J & L's 1996 account of wh-dependencies is highly suggestive of the solution I intend to propose, lexical heads should be assumed to collect or amalgamate the NONLOCAL features of selected arguments in order to handle the full range of facts, this mechanism allowing inheritance to be viewed as a special but straightforward case of feature structure-sharing, parallel to conditions on inheritance of CONTENT feature structures. This would bring conditions on inheritance broadly in line with the "head-driven" treatment of inherited features in Pollard and Yoo (forthcoming) and Sag (forthcoming), with two important distinctions: A distinct feature-structure housing features subject to amalgamation should be retained, with a defeasible feature amalgamation principle allowing wh-question values to be inherited through selecting heads as either of two related but distinct wh-question feature values.

I first present arguments to suggest that Johnson and Lappin's classical account of inheritance in accordance with the Nonlocal Feature Principle does not straightforwardly handle so-called pied-piping facts, nor does it straightforwardly allow traces (phonologically vacuous complements) or gaps (SLASH values generated by rule of complement deletion) to give rise to scope-marking features like INHER|QUE.

(i) Pied-piping

There are at least two serious problems with the account contained in Johnson and Lappin 1996. First, nothing in their account explains so-called pied-piping facts. These are standardly handled in the P&P with recourse to constraints on feature-percolation, a mechanism directly analogous to feature-inheritance. We would like, therefore, to have pied-piping facts fall out in line with general conditions on inheritance. It is damaging to our multi-dimensional theory of feature inheritance if we extend our inventory of features by introducing a syntactic trigger which does nothing other than handle pied-piping. There is no account in HPSG which allows pied-piping in wh-questions to be handled without recourse to a syntactic trigger feature, introduced in an ad hoc manner, and redundant in multiple wh-questions.

45. I want to know [from which department] you bought the book.

To account for examples like the one above, repeated as 45, it is standardly assumed in the Principles and Parameters framework that a wh-feature may percolate to the whole of the prepositional phrase (PP) in order to render it [+wh] and, therefore, a suitable target for movement. As the Minimalist Program has no obvious way of dispensing with feature-percolation of this sort, one question the Minimalists have to face is why it is not possible for the [+wh] features of a comp to check via feature-percolation if it is possible for a PP to inherit wh-features and thereby become a wh-expression.

46. *I want to know [a man from which department] you intend to fire.

In order to explain the contrast between 45 and 46, it has to be stipulated that wh-features can percolate no further than containing PPs. This will determine that the moved expression in 46 will not be a suitable wh-expression and therefore will not be an appropriate target for movement.

One might also note that many informants find 47 perfectly acceptable.

47. %I want to know [the manager of which department] you intend to hire.

It appears that it is in fact possible for the required wh-features to be percolated onto an NP in certain cases, but not in others (possibly connected with the fact that the PP in 47 is an optional complement).

J&L's (96) account assumes the following specifications for their phonologically null wh-complementizer Q in languages like English.

48

a. SUBCAT<[LOC1, **INHER|QUE:X**], S[fin, INHER|SLASH{1}, (INHER|QUE:Y)]>

b. NONLOCAL|**TO-BIND|QUE:Z**

(Conditions are imposed to ensure that the non-optional X is a subset of Z and Z is a subset of (X union Y))

However, as J&L do not assume F-islands or the availability of a second cross-linguistically attested wh-question feature (LQUE in J&L 96) for languages like English, nothing predicts the (rather severe) ungrammaticality of 46. While the assumption that PPs are F-islands would readily explain the ungrammaticality of 46, a difficulty arises with examples like 49.

49 a. %I want to know [which papers by which students] you intend to read.

b. I want to know [which book] John gave to [a man from which department].

From 49 we can see that there is evidence that wh-features may in fact be inherited from PPs under certain conditions (with the natural hypothesis in line with J&L 96's general approach being that the wh-features will be inherited as LQUE feature values).

While 49a is judged to be somewhat odd by many informants, there seems no reason to question 49b. Indeed, the standard approach in the Principles and Parameters framework proceeds on the assumption that such examples are fully acceptable. An explanation for these facts in line with the earlier explanations for German and Iraqi Arabic might suppose that PPs and Relative Clauses etc are F-islands for QUE, while a null complementizer may subcategorize for such structures in order to give rise to LQUE. This would force new specifications for the wh-complementizer in English:

50.

a. SUBCAT<[LOC1, INHER|QUE:X, (LQUE:Y)], S[fin, INHER|SLASH{1}, (INHER|QUE:Z, LQUE:W)]>

b. NONLOCAL|TO-BIND|QUE:A, LQUE:B

condition: A is a subset of (X union Z)

B is a subset of (Y union W)

X is non-empty and a subset of A

Bracketing in SUBCAT specifications here indicates the optionally vacuous values. As the fact that a non-empty INHER|QUE value is required on the filler is specified in the conditions, bracketing will be dropped henceforth. We require a non-empty INHER|QUE: X on the filler to be a subset of A, the TO-BIND|QUE value of the complementizer. A forms a subset of the union of the INHER|QUE values of the complements. B, the complementizer's TO-BIND|LQUE value, forms a subset of the union of the INHER|LQUE values of the complements. This would allow LQUE inherited from PP in 49a and 49b (whether from a filler or S) to be legitimately terminated with the phonologically empty complementizer Q's TO-BIND feature.

In order to accommodate those informants who do not like embedded wh-expressions on left-peripheral daughters of wh-clauses, we could simply provide the alternative specifications in 51a and 51b, which differ from 50a and 50b only in that LQUE on a filler may not be bound:

51.

a. SUBCAT<[LOC1, INHER|QUE:X],

S[fin, INHER|SLASH{1}, INHER|QUE:Z, LQUE:W]>

b. NONLOCAL|TO-BIND|QUE:A, LQUE:Y

condition: A is a subset of the union of X and Z

Y is a subset of W

X is non-empty and a subset of A

These alternative specifications will guarantee that only the INHER|QUE features on the left-peripheral daughter may be bound with the null complementizer. If wh-question features are inherited from PPs onto containing NPs as the value of a second wh-question feature, these may not be bound on fillers for certain speakers.

This kind of solution supposes that the possibility of a non-empty TO-BIND|LQUE value is dependent on the availability of a non-empty INHER|QUE value contributed by the filler and bound by the phonologically empty complementizer. The conditions may be captured in terms of dependence between the two wh-question features (somewhat similar to the conditions proposed earlier for Japanese) with no need to resort to an ad hoc "syntactic" trigger feature.

(ii) The evidence for NONLOCAL structure-sharing in SLASH

However, even if this kind of solution is accepted (with its undesirable proliferation of F-islands and null complementizers)[1], there is evidence that the Nonlocal Feature Principle as it stands is inadequate. The second problem, then, for Johnson and Lappin's account is that Takahashi 1993 provides evidence that, in Japanese, a wh-complement may take scope at a clausal boundary even if its surface position is outside this clause.

52. John-wa [Mary-ga **nani-o** tabeta ka] siritagatte imasu **ka**?

    J-top M-nom what-acc ate Q want-to-know Q

    either: Does John want to know what Mary ate?

    or: What does John want to know whether Mary ate?

53. **Nani-o** John-wa [Mary-ga **t** tabeta ka] siritagatte imasu **ka**?

    what-acc J-top M-non ate Q want-to-know Q

    What does John want to know whether Mary ate?

54. **Nani-o** John-wa [Mary-ga **t** tabeta ka] siritagatte imasu

    what-acc John-nom Mary-nom bought

    John wants to know what Mary bought

In 52, where there is a matrix "ka" complementizer, it is possible for the embedded wh-expression to take either embedded or wide scope. As we expect the QUE feature of the wh-expression to be inherited onto immediately dominating structures under the Nonlocal Feature Principle, this does not pose any problem for Johnson and Lappin's classical account.

55. **ka**

SUBCAT <S[**INHER|QUE: X**, INHER|LQUE: Y]>

TOBIND|QUE: Z, LQUE: Y

condition: **Z is a subset of X**

if Z is vacuous, so is Y

We simply assume that Takahashi's dialect of Japanese is one which allows wh-expressions to take scope out of a "ka" CP, this being possible to handle under the modified specifications for "ka" in 55, where the value of TO-BIND|QUE on the Q complementizer is a subset of the corresponding INHERITED|QUE features on the S complement, and possibly empty. There does not seem to be any evidence that INHER|LQUE may take scope out of "ka" clauses.

52. John-wa [Mary-ga nani-o tabeta ka] siritagatte imasu ka?

J-top M-nom what-acc ate Q want-to-know Q

either: Does John want to know what Mary ate?

or: What does John want to know whether Mary ate?

In accordance with 55, the INHER|QUE feature originating with the embedded wh-expression in 52 repeated above may either be bound by the embedded "ka" complementizer or inherited onto the matrix clause to be bound by the matrix "ka" complementizer

53. Nani-o John-wa [Mary-ga t tabeta ka] siritagatte imasu ka?

what-acc J-top M-non ate Q want-to-know Q

What does John want to know whether Mary ate?

In 53, where the embedded wh-expression from 52 now has a surface position as a filler at a clause marked by a "ka" complementizer, only the wide scope reading is available. This is also what would be expected under Johnson and Lappin's account, because we expect the QUE feature of the filler to be inherited directly from the filler onto the matrix filler-head structure under the Nonlocal Feature Principle and not inherited through a selecting head from traces.

In 54 repeated below, however, where there is no matrix "ka" complementizer, the only reading available gives the narrow scope interpretation for the wh-expression. Given that the Nonlocal Feature Principle has NONLOCAL features inherited indiscriminately (not exclusively through selecting heads) from daughters to mother phrases, it should not be possible for the narrow scope reading given in 54 for the wh-expression which occupies the filler position.

54. Nani-o John-wa [Mary-ga t tabeta ka] siritagatte imasu

what-acc John-nom Mary-nom bought

John wants to know what Mary bought

The Nonlocal Feature Principle is repeated below as 56:

56. For each NONLOCAL feature F, the INHERITED value of F on a mother M is the union of the INHERITED values of F on the daughters minus the value of TO-BIND on the head daughter.

As the NFP only allows for features to be inherited from daughters onto phrases, we would not expect the filler wh-expression in 54 to be able to take narrow scope, because we expect the INHER|QUE feature to be inherited from the wh-expression in filler position directly onto the mother phrase, and not mediated through collection by selecting heads as with QSTORE values in Pollard and Yoo (forthcoming), for example.

To be more precise, we do not expect the filler wh-expression in 54 to be able to take narrow scope, even though there is no matrix "ka" complementizer to bind it on the matrix clause and thereby allow a wide scope reading as in 52, because we do not expect NONLOCAL features to be shared between fillers and SLASH values, these latter being LOCAL structures. Heads are not assumed to always act as the conduit for NONLOCAL features in J&L (96). We can see in 54, however, that the extracted wh-phrase "nani-o" has its scope-marking wh-feature bound by the embedded "ka" complementizer.

Johnson (pc) suggests that while Takahashi 1993 provides no formal explication of the difference between scrambling and syntactic movement, the data can be handled by assuming that a given wh-lexical item can be the "source" of only one NONLOCAL|INHERITED|QUE feature. Universal Grammar permits either an extracted element or a SLASH source to bear the intrinsic INHER|QUE feature. However, for languages like English, the extracted wh-expression always bears intrinsic INHER|QUE.

There are two difficulties with this kind of account. First, as the standard treatment of a null complement "trace" or a gap generated by rule of deletion dictates that a SLASH value will be structure-shared only with the LOCAL features of a filler, it is not clear why a "trace" or gap should also be the source of NONLOCAL features like INHER|QUE, which are clearly outside the LOCAL attribute. We should only expect these SLASH values to be the source of NONLOCAL features if NONLOCAL is inside LOCAL and therefore capable of being structure-shared in SLASH values.

This contrasts unfavorably with Pollard and Yoo's account of the scopal nature of wh- and quantifier-expressions, because they assume QSTORE to be an attribute of LOCAL and therefore collected by selecting heads via SLASH values.

54. Nani-o John-wa [Mary-ga t tabeta ka] siritagatte imasu

what-acc John-nom Mary-nom bought

John wants to know what Mary bought

Thus, the facts (at least pertaining to 54) would appear to receive a solution in principle in Pollard and Yoo's account, but not -- as things stand -- in Johnson and Lappin's account.

The second problem with Johnson's suggestions is that, as J&L do not have amalgamation of NONLOCAL features by selecting heads in the general case, we would not expect a SLASH value which originates via a rule of deletion to have its NONLOCAL features collected by a selecting verb in any case, even if NONLOCAL features are contained in SLASH values. The fact that certain NONLOCAL features are amalgamated from fillers via SLASH values may be taken as evidence that this mechanism should be generalized, and not restricted to certain functional heads which telescope features out of certain islands.

2. 2 A unified account with NONLOCAL structure-shared in SLASH values

J&L 96's account employing two related but distinct wh-question features, QUE and LQUE, successfully handles a wider range of data than the competing theories, offering the promise of allowing pied-piping facts to be handled without extending the inventory of features. There is evidence, however, that wh-features are structure-shared in SLASH values, and that lexical heads collect the inherited features of selected arguments. In order to accommodate the facts, it is possible to find some way to move just the scope-marking features into LOCAL, as in P&Y(forthcoming). However, this compromises our unified treatment of inherited features.

Another solution explored here is to retain NONLOCAL as a discrete feature structure and the basic form of the NFP (somewhat modified), while retiring LOCAL. LOCAL is justified as a discrete feature structure housing just those features shared between fillers and traces. Retaining NONLOCAL (justified as containing those features subject to amalgamation by selecting heads), while allowing NONLOCAL structure-sharing in SLASH values renders LOCAL vacuous in any case. There do not appear to be any serious objections to having full SYNSEM structure-sharing between fillers and traces, while it seems to allow certain straightforward simplifications to the theory. The solution proposed, then, is to retain NONLOCAL and the basic form of the NFP, with a feature-amalgamation principle which allows lexical heads to collect the NONLOCAL|INHERITED features of selected arguments so that inheritance is mediated via selecting heads.

(i) Generating SLASH values, and the amalgamation of inherited features in P&Y (forthcoming) and Sag (forthcoming)

Historically there are two ways of accounting for traces or gaps in HPSG. In the unrevised treatment of SLASH sources, in Pollard and Sag 1994, a verb imposes its LOCAL feature structure on a phonologically vacuous complement (referred to here as "trace"), and this LOCAL feature structure is required to be structure-shared with the LOCAL features of fillers.

57. **"trace" as it appears in the lexicon (from P&S 94)**

PHONOLOGY < >

SYNSEM|LOCAL [1]

NONLOCAL|INHERITED|SLASH{[1]}

The LOCAL structure imposed by the verb -- tagged [1] -- appears as the SLASH value generated by the "trace", which is required by constraints applying to head-filler phrases to be structure-shared with the LOCAL features of the filler.

(a) Pollard and Yoo's amalgamation of QSTORE values from selected arguments

Pollard and Yoo's forthcoming account, for example, retains this classical treatment of "traces", constraining a lexical head to "collect" all the QSTORE (scope-marking feature) values of its "selected arguments" as its POOL value (roughly analogous to INHERITED features). As a "trace" will constitute a selected argument, QSTORE values structure-shared in the LOCAL structure of a "trace" will be collected by selecting verbs. Phrases with sentence-like CONTENT are stipulated as candidate nodes for possessing a non-empty RETRIEVED (roughly analagous to TO-BIND) value. The QSTORE value of a sign is the set of unretrieved values, the difference between the POOL and RETRIEVED values.

The selected arguments relevant to QSTORE are stipulated in P&Y(forthcoming) as those which are selected via the SUBJ, COMPS, SPR, or MOD feature. This means that verbs, for example, are subject to a constraint which requires them to collect the QSTORE values of subjects and complements, while nominal heads collect the QSTORE values of Specifiers, and adjuncts collect the QSTORE values of the structures which they select via the MOD and COMPS feature. As mentioned, "traces" (selected via the COMPS feature by verbs) are retained to allow verbal heads to collect QSTORE values from fillers via structure-sharing between the LOCAL features of the "trace" and the filler.

54. Nani-o John-wa [Mary-ga t tabeta ka] siritagatte imasu
    what-acc John-nom Mary-nom bought
    John wants to know what Mary bought

The extracted wh-expression in Takahashi's example repeated above will have its QSTORE value successfully collected by the embedded verb via this mechanism, which may allow the wh-phrase to take narrow scope. So P&Y (forthcoming) would appear to have a basis for predicting Takahashi's (93) example 54.

(b) Sag's amalgamation of nonlocal features from ARG-STR elements

Sag (forthcoming) adopts an approach in the spirit of the revised version in P&S (94) to the effect that a missing element in a trace-filler dependency will be a *synsem* value deleted from a COMPS list, just the LOCAL structure of which is introduced as the verbal head's SLASH value, via lexical rule. The Complement Extraction Lexical Rule (CELR) in P&S (94) operates as follows:

58. **The CELR**

SUBCAT <...,3,...>

COMPS <...3[**LOC1**],...> =>

INHER|SLASH 2

SUBCAT<...4[LOC1,INHER|SLASH{**1**}],...>

COMPS <... ...>

INHER|SLASH {**1**} union 2

As can be seen, an element from COMPS is deleted from the list, and the LOCAL structure of this element is added to a SLASH set. SLASH is passed up the immediate dominance hierarchy until TO-BIND {1} -- licensed on the matrix S in filler-head constructions -- discharges it by unifying its value with the LOCAL value of a filler. The rule of complement deletion is accompanied by a modification of the corresponding element in SUBCAT, which can be understood in this case simply as a list of the valency feature elements carried by a lexical head, and essentially identical to Sag's ARGUMENT-STRUCTURE.

In Sag (forthcoming), inheritance of SLASH is handled by a "collection" or amalgamation mechanism somewhat similar to the one employed by P&Y (96) for QSTORE. Heads amalgamate the nonlocal features (REL, SLASH, and QUE) carried by elements in their ARGUMENT-STRUCTURE (the sum of the valency features) list rather than in the more specific SUBJ and COMPS list. For Sag (forthcoming) when an element in a COMPS list is deleted in the operation of his CELR, the associated ARGUMENT-STRUCTURE (ARG-STR) element is modified to type gap(-*synsem*) by lexical rule, similar to the modification of the SUBCAT list member in the classical CELR indicated above. This rule requires that the LOCAL structure of the modified ARG-STR element is shared with the single member of its SLASH set, as in the classical CELR.

The verb therefore amalgamates this SLASH value, in line with uniform constraints on amalgamation of these features by selecting heads. SLASH features of a mother phrase are structure-shared with the syntactic head daughter (the daughter whose HEAD feature is structure-shared with the mother phrase). As heads collect SLASH features, the work of the Nonlocal Feature Principle may handled in a more "head-driven" manner, via structure-sharing between head daughters and mother phrases.

Also, because heads only amalgamate REL, SLASH, and QUE of arguments, and because these nonlocal (attributes of SYNSEM) features will not appear in the LOCAL structure in ARG-STR after the operation of the CELR, we have a principled way of ruling out verbal amalgamation of a filler's REL, SLASH, and QUE features. Interestingly, while the syntactic trigger feature, QUE, is subject to an idiosyncratic inheritance constraint reminiscent of the classical Nonlocal Feature Principle in P&Y (forthcoming), Sag (forthcoming) assumes that all the nonlocal features will be inherited via the amalgamation mechanism and structure-sharing between mother phrases and syntactic head daughters.

(ii) The proposed solution: retain NONLOCAL and employ feature-amalgamation to control inheritance of features through lexical heads

I will demonstrate that J&L's treatment of complementizers which control inheritance of two distinct wh-features in conjuction with F-islands suggests a unified account of feature-inheritance controlled through heads which has advantages over P&Y(forthcoming) and Sag(forthcoming). As J&L employ two distinct wh-question feature structures to act as alternate repositories for the relevant feature values, it is possible to handle pied-piping facts without extending the inventory of features to a syntactic trigger feature, while a wider range of facts can be made to fall out in terms of general conditions on inheritance.

A defeasible feature amalgamation principle offers the possibility of heads controlling inheritance of wh-features as either QUE or LQUE, in accordance with parametric variations between languages. This will be seen to offer a more natural and wider coverage of the relevant data than the competing theories, which have to rely on a "syntactic trigger" mechanism, introducing some of the same problems faced by the Minimalists' feature-checking mechanism.

2.3 Questioning the status of SLASH values

With a view to proposing a unified theory of NONLOCAL feature inheritance, on the assumption that selecting heads amalgamate the NONLOCAL features of arguments in line with a defeasible feature amalgamation principle, I question the view that SLASH values are LOCAL structures which exclude NONLOCAL features, and are therefore distinct from SYNSEM.

A major problem for J&L regarding Takahashi's (93) data is that elements in a SLASH set are standardly assumed to be LOCAL structures, and INHER|QUE is a NONLOCAL feature in J&L's (96) account. The fact that a rule of deletion (the CELR), generating an INHER|SLASH feature on a verbal head, simultaneously generates the NONLOCAL|INHER|QUE features of the related filler strongly suggests that these wh-features are actually structure-shared in SLASH. As J&L assume the CELR mechanism is correct[2] and that traces do not exist, this is powerful evidence that inheritance of NONLOCAL features is controlled through heads in the manner of Pollard and Yoo (forthcoming) and Sag (forthcoming), suggesting that all non-heads are F-islands for NONLOCAL features.

If heads collect NONLOCAL|INHERITED features of arguments in accordance with a defeasible general inheritance principle, broadly parallel to the mechanism driving collection of features in P&Y and Sag, then we have the basis for a unified treatment of inherited features such that the NONLOCAL|INHERITED features of a mother is shared with the appropriate head daughter. As this is the central claim of this dissertation, I must indicate how it is possible for heads to collect the NONLOCAL features of certain selected arguments while retaining the NONLOCAL feature structure in a unified treatment of inherited features.

Accommodating Takahashi's data while retaining NONLOCAL as a unified feature structure means that SLASH values contain NONLOCAL information. Therefore, SLASH values are actually structure-shared with the SYNSEM structure of fillers rather than the LOCAL structure of fillers. Recall that LOCAL is justified as a discrete feature structure as those features shared between a filler and a trace. If all SYNSEM features are shared between a filler and a trace, there is no justification for LOCAL as a discrete feature structure. I will argue that NONLOCAL is justified as a discrete feature structure containing those features which are amalgamated by selecting heads and thus subject to "large-scale" inheritance. It is therefore desirable to retire LOCAL, rather than NONLOCAL as suggested in P&Y (forthcoming) and Sag (forthcoming).

It is not possible to employ the phonologically vacuous complement "trace" and at the same time straightforwardly have structure-sharing of SYNSEM feature structures between fillers and SLASH values appearing in "trace." However, a rule of deletion which deletes SYNSEM structure from a COMPS list and enters it directly into SLASH is not subject to this difficulty.

(i) Phonologically null complements ("traces")

As mentioned, the phonologically vacuous complement ("trace") in P&S (94) is lexically specified as having structure-sharing between its LOCAL features, specified by a selecting verb for its complement, and its SLASH value. This can be seen in the specifications repeated below as 59:

59. SYNSEM features of "trace" in P&S (94)

LOCAL [1]

NONLOCAL |INHER|SLASH {[1]}

QUE {}

As indicated above, early versions of HPSG assume that QUE of "trace" will be empty. As Takahashi's evidence requires heads to collect NONLOCAL|INHERITED|QUE feature values via SLASH, and as certain heads are assumed to specify for NONLOCAL features in J&L(96), a straightforward way of allowing verbal heads to inherit QUE from fillers would be to have SLASH values structure-shared with the full SYNSEM features of fillers. One way to achieve this would be to have full SYNSEM structure-sharing between deleted COMPS specifications and fillers, mediated via the SLASH feature.

Significantly, a rule of deletion could simply delete a *synsem* structure from a COMPS list and enter it unmodified into a SLASH set, the most straightforward and natural option, it should be admitted. However, such a simple option is not available if a phonologically vacuous complementizer is employed.

Consider the COMPS list for the Japanese verb "tabeta" (ate), with unresolved specifications for NONLOCAL features:

60. COMPS <*synsem*[1]|LOCAL[2]|CAT|HEAD noun[CASE acc]

NONLOC[3]|**INHER|QUE:X**

SLASH:Y>

60 allows, but does not commit us to, a non-empty value for INHER|QUE, X being a possibly empty set. If the verb takes a phonologically vacuous complement, the SLASH value of the complement must unify with the SLASH value of the element in the COMPS list.

61. **speculative *synsem* specifications for "trace" (Japanese)**

LOCAL[2]

NONLOC|INHER|QUE:**X**

SLASH {*synsem*[1]|**LOCAL[2]**

NONLOCAL|INHER|QUE:X

SLASH:Y}

TO-BIND|QUE {}

SLASH {}

61 attempts (for expository purposes) to provide lexical specifications for "trace" such that its SLASH value is not merely structure-shared with the LOCAL features specified for the verb's complement, but rather with the full SYNSEM structure of the relevant specification in the COMPS list of the verbal head. In other words, we require the element in the COMPS list to be entered as the appropriate member of the trace's SLASH set. The specifications impose the constraint that any INHER|QUE features associated with the complement will be structure-shared with the INHER|QUE value of the "trace". We might hope that this would allow INHER|QUE to be successfully introduced by a "trace" if it were possible for the NONLOCAL features of the appropriate filler to unify with the NONLOCAL features of the "trace" complement.

In order for this approach to work, of course, a modification of the HEAD-FILLER SCHEMA in P&S (94) would be required:

62. **OLD HEAD-FILLER SCHEMA**

X--> [LOCAL[1], S[fin, INHER|SLASH {[1],...}, TO-BIND|SLASH {[1]}]

63. **NEW HEAD-FILLER SCHEMA**

X--> [SYNSEM[1], S[fin, INHER|SLASH {[1],...}, TO-BIND|SLASH{[1]}]

The only difference between 62 and 63 is that the latter imposes structure-sharing between SYNSEM features of a filler and the member of the SLASH set bound on the head phrase.

The problem with such a solution is that there is actually no straightforward way to make specifications for "trace" like those in 61 work. In a head-comps phrase, the SYNSEM structure of a complement unifies with the SYNSEM specifications for COMPS in the head daughter.

64. **hd-comp-ph** (from Sag(forthcoming))

COMPS <>

HD-DTR [COMPS <[1],....[n]>]

NON-HD-DTRS <[SYNSEM[1],...,[SYNSEM[n]]>

If this happens, then the unresolved specifications for a verb which takes a trace complement would unify with the SYNSEM structure of the "trace" itself. As the whole point of having a "trace" is so that it can carry a non-empty SLASH value, if an element in COMPS unifies with an element in SLASH of a trace, this would also have to carry the non-empty SLASH value. If this were carried up the immediate dominance hierarchy to be terminated in line with the new head-filler schema suggested in 63, the only way it would be possible for this SLASH value to terminate legitimately would be if the filler were also the source of an appropriate non-empty SLASH value. This would have the effect of rendering it impossible to ever legitimately terminate SLASH.

One solution to this problem might be to have some mechanism such that just the NONLOCAL features of the *synsem* object inside a SLASH value should not unify with the appropriate filler. However, as this amounts to saying that a trace and a filler are not the same object, being distinct with regard to their NONLOCAL structure, restricting structure-sharing to LOCAL features, in the manner achieved via the specifications for SLASH repeated as 65 below, delivers the same result.

65. **SYNSEM features of "trace" in P&S (94)**

LOCAL [1]

NONLOCAL |INHER|SLASH {[1]}

QUE {}

The specifications for "trace" in 65 successfully ensure that structure-sharing between fillers and "traces" is restricted to LOCAL structure. An intuitively odd result of this, is that fillers and "traces" are different objects with respect to their full SYNSEM features. In other words, a filler is not actually an extracted complement in the full sense.[3]

(ii) A rule of deletion

While the decision to exclude NONLOCAL features from SLASH values is forced by the decision to employ a phonologically null complementizer in order to generate non-empty SLASH values, there is no such requirement regarding the CELR. A rule of deletion, as suggested, can simply enter the deleted complement specifications in the SLASH set. This can work because, while employing "trace" requires that the SYNSEM features of the phonologically unrealized complement must contain a non-empty SLASH value, a deleted COMPS list element which is placed in a SLASH set need not.

(iii) Why moving the inherited features into LOCAL is not an option in a unified account of inheritance

Another simple solution to the problem of how SLASH values are able to contain NONLOCAL information would be to make NONLOCAL internal to LOCAL in line with P&Y's (96) treatment of QSTOREs. Technically, this would pose no problem. However, to do so would render LOCAL vacuous in any case in a unified treatment of inherited features. As the justification for LOCAL depends on the existence of NONLOCAL features which are not structure-shared between fillers and traces, the fact that NONLOCAL features are in fact structure-shared between fillers and traces seems to argue that LOCAL should be retired.

It should be noted first that P&S (94) bases the decision to make SLASH a set of LOCAL structures on the assumption that this is the smallest structure required to account for the facts. INHER|REL is assumed to be a set of referential indices, and QUE is assumed to be a set of nominal-objects (*npros*) because this is the only information that needs to be kept track of.

Data like Takahashi's (93) examples from Japanese suggest that formerly NONLOCAL features also have to be kept track of, with verbs collecting these features from fillers. Thus, the argument from parsimony for restricting SLASH values to LOCAL structures is undermined, at least for a unified theory of NONLOCAL features of the kind presented here. Therefore, a unified treatment of those features subject to amalgamation is only available if NONLOCAL information is also contained in SLASH values. This can be handled adequately by assuming that SLASH members are *synsem* objects, which entails that LOCAL be retired.

2. 4 Lack of evidence in favor of separating the wh-features from the other inherited features

If NONLOCAL information is contained in SLASH values, one objection to a unified theory of NONLOCAL features involving feature amalgamation by selecting heads is the fact that feature amalgamation does not proceed uniformly for all these features. However, if a defeasible feature amalgamation mechanism is adopted, just the fact that SLASH or REL or QUE features are not amalgamated from complement traces (or gaps) by selecting verbs via the SLASH feature does not constitute evidence that these features are not structure-shared in SLASH values.[4]

Johnson (pc) suggests that, although his constraint (which forces SLASH values to be an optional source of INHER|QUE) is a rule of UG, we need a further constraint to cancel this for so-called "syntactic movement" languages like English. It is possible to retain NONLOCAL as a discrete feature structure and accommodate Johnson's suggestions by saying that syntactic movement languages like English, where movement of wh-expressions always marks scope, are subject to the non-UG constraint that verbs will amalgamate the INHERITED|SLASH features of complements in general, but not if they are deleted. This can be handled straightforwardly if we assume that a defeasible feature amalgamation principle allows us to cancel collection of wh-features from deleted complements in line with parametric variation. It will be seen that this kind of condition is necessary to account for the full range of data from Iraqi Arabic.

Thus, deletion of complements will not prevent verbal heads collecting their complements' INHER|QUE features in the general case, in line with the evidence presented by Takahashi (93), but may do so in languages which have so called syntactic movement of wh-expressions. If feature-amalgamation is defeasible in this manner, in line with parametric variation, the case for treating the interface features in a distinct feature-structure from the nonlocal features is weakened.[5]

(i) Simplifying the CELR

A considerable simplification to the CELR is available if SLASH values are structure-shared with deleted COMPS elements. One should note that, historically, there is a complication regarding the identification of the *synsem* object in the ARG-STR (or SUBCAT) list of a verbal head which has undergone the CELR.

The structure of this object is normally determined through structure-sharing with the corresponding structure in the COMPS list. If the CELR does not take effect, the element in COMPS will be the resolution of information coming from two sources, the *synsem* object specified by the verbal head as its complement and the SYNSEM features of the complement NP. This is guaranteed by constraints applying to head-comp phrases, repeated below as 66.

66. **hd-comp-ph (from Sag(forthcoming))**

COMPS <>

HD-DTR [COMPS <[1],....[n]>]

NON-HD-DTRS <[SYNSEM[1],...,[SYNSEM[n]]>

However, in the application of the CELR, the relevant *synsem* object is deleted by lexical rule and only the LOCAL features survive in the SLASH set. In other words, if the member of a SLASH set is a LOCAL structure, we no longer have a straightforward way of determining what the complement is, or used to be. In fact, the CELR rule of *synsem*-deletion is historically always accompanied by an additional mechanism which allows the identity of the associated element in an ARG-ST (or SUBCAT) list to be determined. This can be seen in the form of the CELR repeated below as 67.

67. **The CELR**

SUBCAT <...,3,...>

COMPS <...3[**LOC1**],...> =>

INHER|SLASH2

SUBCAT<...4[**LOC1**,INHER|SLASH{1}],...>

COMPS <... ...>

INHER|SLASH {**1**} union 2

Although the filler will be LOCAL structure-shared with the SLASH value, we need the CELR to provide some means of identifying the SYNSEM structure of the deleted complement. A simple example reveals why this is important.

68. Who did you expect to come?

Retaining P&S's (94) "trace" means that we have a head-comp phrase with a head "expect" and two complements, one the "trace" and the other the infinitival VP with an unsaturated SUBJ list, structure-shared with the first complement, the phonologically vacuous complement "trace". This is guaranteed through the valency specifications for the verb "expect," indicated below.

69. SUBJ <[1]>

COMPS < **[2]**, VP[inf, SUBJ <**[2]**>]>

SUBCAT/ARG-STR <[1], **[2]**, VP[inf, SUBJ <**[2]**>] >

The valency specifications for the verb in conjunction with the relevant well-formedness constraints applying to Head-Subject Constructions and Head-Complement Constructions will impose the requirement that [1] and [2] unify with the SYNSEM features of appropriate argument NPs.

A possible objection to the classical P&S (94) treatment of "trace" outlined above might be that, although we can guarantee that the first complement *synsem* object is token-identical with the SUBJ element corresponding to the unexpressed subject, this *synsem* object is necessarily distinct from the SYNSEM features of the filler, the trace but not the filler being the source of a non-empty INHER|SLASH value. One might first ask why we should expect these to share LOCAL features, yet be distinct with respect to their full SYNSEM features.

As a displaced argument[6], we might well expect the SYNSEM features of the filler to be identical to the *synsem* object in the ARG-STR/SUBCAT list. These intuitions are strengthened when considering the CELR, a lexical rule introduced in order to accommodate evidence that "trace" does not exist. As the creation of a "gap" involves deleting a *synsem* element from a COMPS list, we now lose a straightforward way of determining what the corresponding element in an ARG-STR/SUBCAT list might be.

The version of the CELR introduced in P&S (94) involves removing a *synsem* element from a COMPS list and putting its LOCAL features in INHER|SLASH. At the same time, the rule forces the requirement that the SUBCAT list be modified so that all occurrences of the *synsem* object deleted from COMPS are replaced with an object which is exactly the same except that it bears the additional specification for INHER|SLASH such that the SLASH value is token identical to its own LOCAL value.

This basic mechanism is retained in Sag (forthcoming), so the deletion of a *synsem* object from a COMPS list is accompanied by a modification of the corresponding ARG-STR element to type gap(-*synsem*). The CELR is required to replicate the *synsem* value of "trace" as one of the *synsem* values in its ARG-STR list, only because we are not otherwise able to identify what this element might be. This is because there is only LOCAL structure-sharing between the ARG-STR element and the member of the SLASH list. If we have full *synsem*-structure-sharing, this modification is not required and the rule can be simplified. If a member of a SLASH set is the *synsem* object deleted from the COMPS list, then the lexical specifications will constrain this to be structure-shared with the corresponding element in the ARG-STR list, this remaining unmodified, and conditions on termination of SLASH will determine that there is structure-sharing between this object and the SYNSEM features of the filler.

A further simplification may be proposed, because there is no need to make reference to the ARG-STR/SUBCAT list at all in a rule of deletion if there is full SYNSEM structure-sharing between fillers and complements which have been deleted in the mechanism by which a SLASH value is generated. If [2] in 69 is deleted and entered into a SLASH set, structure-sharing between this SLASH set member and the unexpressed subject in the complement VP[inf] will be preserved straightforwardly. If this then unifies with a filler, the unexpressed subject will be controlled by the filler, which is now a displaced complement in an intuitively fuller sense.

69a SUBJ <[1]>

COMPS < [**2**], VP[inf, SUBJ <[**2**]>]>

69a SUBJ <[1]>

COMPS < VP[inf, SUBJ <[**2**]>]>

NONLOCAL|INHER|SLASH {[**2**]}

69a and 69b indicates the output of the CELR on 69 on the assumption that deleted complements are entered directly into SLASH. Even though the first complement has been deleted, there is still structure-sharing between the member of the SLASH set and the controlled subject. These values will unify with an appropriate filler in accordance with conditions on termination of SLASH values I propose above.

70. John, I expect to come.

In 70, the full SYNSEM structure of the filler "John" will be shared in the infinitival VP complement. If a CELR rule of deletion places deleted *synsem* objects directly into SLASH, this can be achieved straightforwardly without any modification of an ARG-STR/SUBCAT list.

(ii) Summing up

While there is strong evidence that inheritance of wh-features is "head-driven" via amalgamation through heads, the argument for retiring NONLOCAL in order to preserve LOCAL is less than conclusive. I suggest, instead, that NONLOCAL be retained in order to arrive at a unified treatment of amalgamated features, and that LOCAL be retired instead. This allows considerable simplifications.

The most straightforward and natural rule of deletion in generating a non-empty SLASH value involves entering a deleted COMPS element directly into SLASH. The motivation for retaining NONLOCAL is that it allows us to reach a unified condition on inheritance for those features which are subject to amalgamation by selecting heads. The apparent lack of uniformity with regard to amalgamation may, for example, be a function of the fact that feature amalgamation may be cancelled for certain features from certain arguments.

I go on to state this principle, and point out evidence that feature amalgamation has to be defeasible in any case in the competing treatments of amalgamated features. I also provide evidence that restricting nonlocal structure-sharing to mother phrases and syntactic head daughters fails to account for the full range of facts, again suggesting that the amalgamated features are subject to a unified constraint determining inheritance via structure-sharing between semantic head daughters and mother phrases.

Footnotes to Chapter Two

[1] This point is taken up again in Chapter Five.
[2] Personal communication
[3] I emphasize that having full SYNSEM-structure-sharing between fillers and deleted complements makes the relation between the two more like movement in the sense that structure-sharing is more complete. There is still no actual movement operation, and the relation is still mediated via feature inheritance.
[4] I will show, in Chapter Five, that facts from Hungarian clearly demonstrate that it is not possible that the scope-marking features of fillers are always amalgamated from selected arguments in precisely the way P&Y suggest.
[5] As will be seen later, evidence from Hungarian, as well as Hindi and Iraqi Arabic, indicates the need for a mechanism to allow scope-marking features to be amalgamated directly from fillers, and not via the COMPS feature.
[6] In the sense of being displaced from its expected argument position (to which it is linked via feature inheritance), without invoking movement operations in any way.

Chapter Three

A defeasible feature amalgamation principle

Collection (or amalgamation) of inherited features -- very much in the spirit of Pollard &Yoo (forthcoming) and Sag (forthcoming) – allows inheritance to be seen as a form of structure-sharing between head daughter and mother phrase. The evidence suggests that there are two related but distinct wh-question features. If a discrete NONLOCAL feature structure is retained it is possible to formulate a unified theory of inherited features, which is able to handle pied-piping without resort to an ad hoc syntactic trigger feature, as well as embedded scope for wh-fillers. It offers a better coverage of facts related to wh-questions than P&Y (forthcoming), allowing a more natural extension of the treatment in J&L.

In this section, I suggest a general condition on amalgamation of NONLOCAL|INHERITED features, parallel to the constraints governing collection of features in P&Y (forthcoming). This means that inheritance can be mediated through the appropriate head daughter, allowing Takahashi's data to be handled straightforwardly while retaining the basic form of the Nonlocal Feature Principle.

(i) Collection of QSTORE values cancelled for non-thematic arguments in P&Y (forthcoming)

A unified account of inheritance is available if we assume along with Sag (forthcoming) and P&Y (forthcoming) that inherited features are in fact amalgamated from the appropriate selected arguments by selecting heads, with inheritance controlled through the semantic head daughter (as in P&Y). As inheritance is mediated through the semantic head, all non-heads become F-islands. It will be demonstrated in the next chapter that this allows a wider range of data to be handled succesfully in a more natural way.

Non-heads may safely be rendered F-islands because we assume all selecting heads to be amalgamating the NONLOCAL|INHERITED features of selected arguments according to a general defeasible feature amalgamation principle. This borrows from P&Y's (forthcoming) well-formedness constraint for lexical signs.

71. **P&Y's (forthcoming) collection constraint for lexical heads**

For a lexical head, the POOL is the union of the QSTOREs of all selected arguments, defined as either

(i) thematic elements selected via the SUBJ or COMPS feature

(ii) elements selected via the SPR feature, or

(iii) elements selected via the MOD feature

In general, I retain the definition of selected arguments above, and the straightforward constraint that every selecting head amalgamates the NONLOCAL|INHERITED features of its selected arguments. However, some comments are required with regard to the distinction between thematic arguments and non-thematic arguments indicated in (i) above.

A thematic argument is one which fills a role in the CONTENT of the lexical head which selects it. For example, in a sentence like 72, there are uncontroversially assumed to be two thematic arguments, the subject and the object.

72. John kicked the ball

The CONTENT value of a verb like "kick" may be understood as encoding a relation between subject and object. This is normally expressed as follows:

73. RELN kick

KICKER [1]

KICKED [2]

The tags [1] and [2] indicate the appropriate argument's index. Clearly, both subject and object fill roles in the CONTENT of the verb "kick." The index of the subject fills the role of the kicker, and the index of the object fills the role of the kicked. Therefore, in P&Y's QSTORE account, the verbal head "kick" will collect the QSTORE values of these thematic arguments as its own POOL (inherited interface features) value.

However, consider certain sentences where verbs take infinitival clause complements. Cases of structure-sharing between syntactic arguments and unexpressed subjects open up the possibility of verbal heads collecting the QSTORE values of unexpressed subjects. This is because unexpressed subjects appear as unsaturated valency specifications of verbal heads in embedded VP[inf] clauses.

As we have structure-sharing between the INDEX of thematic arguments in CONTENT and elements in the valency specifications SUBJ and COMPS, unrealized subjects will fill roles in CONTENT and will therefore constitute thematic arguments of verbs which take unrealized subjects.

74. Mary thinks John kicked the ball

For sentences like 74, it may be assumed that the matrix verb takes two thematic arguments. In other words, both the subject and the S[fin] complement fill roles in the CONTENT of the head verb. This contrasts with sentences like 75, where it is assumed that the syntactic subject fills no role in the CONTENT of the main verb.

75. A unicorn appears to be approaching

The subject raising verb "appears" is assumed to take the valency features below:

76. SUBJ <[**2**]>

COMPS <VP[inf, SUBJ <[**2**]>]:[1]>

The verb takes a syntactic subject and an infinitival complement, the unexpressed subject of which is structure-shared with the syntactic subject, indicated by the tag [2]. The CONTENT of the infinitival VP is tagged [1]. The CONTENT of the verb "appear" is characterized as in 77:

77. appear

SOA-ARG [1]

The CONTENT value of the clausal complement tagged [1] fills a role in the CONTENT of "appear," but the index of the syntactic subject does not, the verb possessing only a single thematic argument.

74. Mary thinks John kicked the ball

This contrasts with examples like 74, repeated above, where the syntactic subject clearly fills a role in the CONTENT of the main verb.

78 a. **Valency features of "think"**

SUBJ<NP[nom]:[1]>

COMPS<S[fin]:[2]>

b. **CONTENT of "think"**

RELN think

THINKER [1]

SOA-ARG [2]

The INDEX of the subject NP is tagged [1], and the CONTENT of the clausal complement is tagged [2]. The specifications for the CONTENT value of the verb indicate that the index of the subject fills a role in the CONTENT of the verb, the index of the subject NP unifying with the index in CONTENT. Thus, the subject fills a role in the CONTENT of verbs like "think," but not in the CONTENT of verbs like "appear," there being a "thinker" in the content of "think," but no "appearer" in the CONTENT of "appear."

This distinction is of crucial importance in P&Y's QSTORE account because it prevents the collection of QSTORE values from the same source by independent verbal heads in examples like 75.

75. A unicorn appears to be approaching

As the realized subject of "appear" does not fill a role in the verb's CONTENT, "appear" does not collect QSTORE values from it. This follows from the stipulation that only thematic arguments will have QSTORE values collected from them by lexical heads (condition (i) in P&Y's constraints determining QSTORE collection).

However, this same NP does fill a role in the CONTENT of the embedded verb "approaching," which is required to collect the QSTORE values of its unexpressed subject as its own POOL value. Therefore, restricting QSTORE collection to thematic arguments means that QSTORE values are only collected from the source argument by a single verbal head -- the lexical head in the embedded VP[fin] -- in examples like 75, even though the same subject is structure-shared in both the matrix and the embedded clause. This is a neat solution to the problem of restricting collection of QSTORE values in accordance with semantic principles.

(ii) Reservations regarding the conditions on collection of QSTORE in P&Y (forthcoming)

One should note, then, that the feature-collection mechanism is assumed to be cancelled from non-thematic arguments in P&Y's account, presumably in line with some principle of UG to that effect. Collection of QSTORE values is also successfully restricted in the case of equi verbs, where structure-sharing between complements and unrealized subjects of embedded infinitival VPs is restricted to INDEX values.

79. **LOCAL features for "persuade"**

a. **Valency features:**

SUBJ <NP:[1]>

COMPS <NP[2]: [4], VP[inf, SUBJ<NP:[4]>]: [3]>

b. **CONTENT features**

RELATION persuade

PERSUADER [1]

PERSUADEE [4]

SOA-ARG [3]

The equi verb "persuade" has semantic role assignment for all subcategorized elements. This is in contrast to raising verbs like "believe," for example, which always fail to assign a semantic role to one of their syntactic dependents.

80. **LOCAL features for "believe"**

a. **Valency features:**

SUBJ <NP: [1]>

COMPS <[2]: [4], VP[inf, SUBJ<NP[2]:[4]>]:[3]>

b. **CONTENT features**

RELATION believe

BELIEVER [1]

SOA-ARG [3]

Both "persuade" and "believe" take two complements, with structure-sharing between the first complement and the unexpressed subject of the VP complement. However, in the case of the equi verb, structure-sharing between the controlling first complement and the unexpressed subject does not extend to SYNSEM values. As the unexpressed subject is not fully *synsem* structure-shared with the unexpressed complement of an equi verb, there is no possibility of the embedded verb collecting QSTORE values from an unexpressed subject source.

Similarly, while we expect the head verb in the embedded VP to collect the QSTORE value in the case of raising verb constructions, these latter will also be well-behaved with regard to P&Y's collection mechanism because the first complement is not assigned a semantic role in the rasing verb's CONTENT (as can be seen from the absence of the tag [4] in 80b above).

81. [Who] do you believe t to be arriving?

In 81, therefore, while the LOCAL value of the the wh-expression is structure-shared in the phonologically empty complement in P&Y's account, and in the SUBJ list of the VP[inf] complement, the embedded infinitival verbal head will collect QSTORE values from its SUBJ list argument, but the raising verb does not collect QSTORE values from its COMPS list argument.

Similarly, the equi verb "persuade" causes no problems because, while the NP complement will have its index filling a role in the CONTENT values of both the main equi verb itself and the embedded VP[inf], there is no possibility of the dependent verb collecting QSTORE values from wh-expressions or quantifier phrases.

82. [Which unicorn] did you persuade t to leave?

In 82, the QSTORE value of the wh-filler is expected to be structure-shared in the LOCAL value of the SLASH value generated with the unrealized complement, allowing the QSTORE value of the wh-filler to be collected by the main verb "persuade". However, as the *synsem* value of the wh-expression is not structure-shared in the SUBJ specifications for the head of the embedded VP[inf], there is no associated collection of QSTORE values.

Thus, limits are elegantly imposed on the collection of QSTORE features under the assumption that they collected only from selected thematic arguments. However, there is evidence that the scope-marking features are not always collected in accordance with precisely these constraints.

Johnson's (pc), as mentioned earlier, suggests that there may be parametric variation such that "syntactic movement" languages like English do not permit wh-features to be inherited from SLASH sources. This is not reflected in P&Y's treatment.

83. Who wondered [which movies] which critics reviewed t?

For example in 83, P&Y (forthcoming) assume that the QSTORE value of the filler "which movies" is collected by the embedded verbal head "reviewed" along with QSTORE value of the embedded subject "which critics." This is in line with P&Y's conditions on QSTORE collection, repeated as 84 below, according to which verbal heads will collect the QSTORE values of thematic arguments selected via the SUBJ and COMPS feature.

84. **P&Y's (forthcoming) collection constraint for lexical heads**

For a lexical head, the POOL is the union of the QSTOREs of all selected arguments, defined as either

(i) thematic elements selected via the SUBJ or COMPS feature

(ii) elements selected via the SPR feature, or

(iii) elements selected via the MOD feature

In line with (i), the QSTORE value shared between the filler and the phonologically vacuous complement "trace" will be collected by the verbal head, the "trace" being selected via the COMPS feature.

Thus, P&Y's treatment assumes that the QSTORE values of fillers are always collected by selecting heads via structure-sharing in SLASH. This is concomitant with their unified treatment of the scopal nature of wh-expressions and quantifier phrases, which all give rise to QSTORE values which need to be retrieved at a clausal node. However, as syntactic movement languages require wh-fillers to mark scope, there is no empirical evidence that the QSTORE value of a filler is actually collected through the selecting verbal head.

Indeed, P&Y require their Syntactic Licensing Constraint on Wh-Retrieval (for English-like syntactic wh-movement languages) to ensure that left peripheral wh-daughters may not take embedded scope.

85. **Syntactic Licensing Constraint on Wh-Retrieval (for "English-like" syntactic wh-movement languages)**

a. At any node, retrieval, if any, of wh-operators must include the members of the left peripheral daughter's QUE value.

b. At any filler-head node, if the filler has a nonempty QUE value, then its member must belong to the node's RETRIEVED value.

The constraint in 85 above requires that the same reentrant wh-feature value in QUE must be present on the left peripheral daughter of a node at which wh-QSTORE values are retrieved.

This "two-level" mechanism (P&Y invoke Watanabe's 1993 hypothesis, treated earlier in relation to certain intractible problems faced by the Minimalist Program) requires all wh-expressions to simultaneously give rise to the same operator-like feature value twice, in both QSTORE and in QUE, generating redundancy in multiple wh-questions (which P&Y acknowledge as being undesirable). This is in contrast to QPs, which do not have a second "syntactic trigger" feature associated with them.

(a) English

P&Y's method of determining the scope of wh-expressions and QPs means that they have no other means of amalgamating the QSTORE values of a filler into that of a filler-head construction, but this does not entail that this is the only option, nor does it provide empirical evidence that wh-features must always be amalgamated via SLASH. The classical treatment of NONLOCAL features contained in J&L 1996, outlined earlier, allows the NONLOCAL|INHERITED features of fillers to be inherited directly onto head-filler phrases without the mediation of a selecting verbal head. Also, if we assume that lexical heads are subject to a defeasible condition whereby they collect the inherited features of arguments, this does not require us to force all languages to have all inherited scope-marking features collected from fillers by selecting verbs.

J&L's (96) account of syntactic movement languages like English has a phonologically vacuous complementizer which takes both a filler and a SLASH-bearing sentential structure as its complements. SUBCAT specifications are indicated below in 86:

86. SUBCAT<[1, INHER|QUE:X],

S[fin, INHER|SLASH{1}, INHER|QUE:Y]>

If we assume a general principle according to which lexical heads amalgamate inherited features of arguments (as required in dealing with Takahashi's 1993 data, for example), we would expect the null complementizer to amalgamate the INHER|QUE features of the filler. We can then rule out the possibility of wh-features taking scope at a node lower than that marked by the filler in "syntactic movement" languages so long as we assume that collection of wh-features from SLASH sources is parametrically defeasible. In other words, "syntactic movement" languages like English may well not have wh-features collected from SLASH sources like deleted COMPS or unrealized subjects. This would be in line with a general rule of UG preventing the collection of the same inherited feature from the same argument by more than a single selecting head. It will be seen that such a condition is required in order to handle the full range of facts related to wh-question sentences.

(b) Iraqi Arabic

The possibility of wh-features not being inherited from SLASH sources in certain cases is important in explaining the examples from Iraqi Arabic mentioned earlier as being problematic for the Minimalist Program. The relevant examples are repeated below as 87:

87 a. Mona shaafat meno?

Mona saw whom?

b. Mona raadat tijbir Su'ad tisa'ad meno?

Mona wanted to force Su'ad to help who

c. *Mona tsawwarit [Ali istara **sheno**]?

Mona thought Ali bought what

As pointed out in the first chapter of this dissertation, wh-expressions may not appear embedded in finite clauses, as seen from the contrast between 87a and 87c, repeated above, although they may be appear embedded in infinitival structures as in 87b.

88. **sheno** tsawwarit Mona [Ali ishtara **t**]

what thought Mona Ali bought

What did Mona think Ali bought?

However, wh-expressions may be overtly extracted from these environments, as shown in the example repeated above as 88. Johnson and Lappin 1996 are able to account for these facts because INHER|QUE is inherited in accordance with the Nonlocal Feature Principle, whereby INHER|QUE will be inherited indiscriminately from daughters onto mother phrases. S[fin] is assumed to be an F-island for QUE, so it will not be possible for the QUE feature in 87c to escape the island to take the required wide scope.

J&L assume that the null complementizer in Iraqi Arabic takes alternative lexical specifications so it can take a simple S[fin] complement (like Japanese or Chinese) or two complements, a filler and a SLASH-bearing S[fin] (like English). This suggests that Iraqi Arabic has "syntactic movement" out of S[fin] parallel to English. Employing null complementizers in this way allows for the possibility that a null complementizer amalgamates the wh-features of its filler complement, if a feature collection or amalgamation approach is adopted, so long as it is also assumed that feature-amalgamation from SLASH sources may be cancelled in order to avoid feature-amalgamation of the same feature from the same source argument by two independent heads.

However, P&Y have no way of disallowing collection of QSTORE values from "traces" because they have no null complementizer which may amalgamate the QSTORE values of fillers, and they have no other mechanism by which the QSTORE features of fillers may be amaglamated into filler-head structures. The only straightforward option P&Y have for explaining the distinction between examples like 87c and 88 is their "syntactic trigger" mechanism, by which the reentrant operator in QUE is required to appear on left peripheral daughters. Certainly, there is a left peripheral wh-daughter in 88, but not in the S[fin]-embedded example 87c.

P&Y handle so-called "pied-piping" facts in English by restricting the inheritance of QUE to prepositions from complements, and nominals from specifiers.

89. **Constraint on Interrogative Pied Piping (for English)**

In a headed phrase,

a. if the HEAD value is of sort preposition, the QUE value is inherited from the complement daughter's QUE.

b. otherwise, the QUE value is inherited only from the specifier daughter's QUE.

P&Y do not indicate how their syntactic trigger mechanism might be employed to handle facts like those from IA. Partial movement in German is handled in Kathol 1996 via a lexical rule by which expletive SLASH values may be generated by verbs which subcategorize for S[QUE]. Therefore, it is necessary to assume that QUE is inherited onto S from left-daughters in German. However, there is no reason to imagine the availability of expletive SLASH in explaining the IA cases above, where there is no partial movement.

P&Y might stipulate that S[fin] is an island for QUE, so that the syntactic trigger may be inherited freely onto clausal structures in general (as in Kathol's 1996 treatment of German, for example), but not if it is embedded in S[fin]. This would mean that inheritance of QUE would be far less restricted in Iraqi Arabic than English or German, with no obvious reason to explain why this would be the case.

However, even if such a solution were desirable, it is actually not available, because there is evidence that wh-expressions which are embedded in S[fin] still give rise to severe ungrammaticality even if there is a wh-expression in the matrix clause.

90. *meno tsawwar [Ali xaraj weyya meno]?
    who thought Ali left with whom

The availability of a wh-expression as the left peripheral daughter does not salvage a sentence with an S[fin]-embedded wh-expression from ungrammaticality. However, if QUE is required as a syntactic trigger in Iraqi Arabic, we would expect retrieval of the QSTORE value generated by the embedded wh-expression in 90. The fact that 90 is ungrammatical strongly suggests that simply employing QUE as a reentrant "syntactic trigger" may not account for the full range of facts in Iraqi Arabic. As the "two level" syntactic trigger solution has much in common with (and invokes) the Watanabe-inspired Minimalist solution, it is not surprising that P&Y run into similar problems dealing with the same data the MP is unable to explain.

If a syntactic trigger -- a feature value reentrant as QUE -- does not determine the ungrammaticality and grammaticality respectively of examples like 87c and 88, this also provides evidence that features of fillers are not amalgamated through the selecting verbal head in Iraqi Arabic, because we do not otherwise expect there to be any difference between the two examples:

87 c. *Mona tsawwarit [Ali istara **sheno**]?

Mona thought Ali bought what

88. **sheno** tsawwarit Mona [Ali ishtara t]

what thought Mona Ali bought

What did Mona think Ali bought?

In P&Y's (forthcoming) account, we expect both the QSTORE value of the embedded wh-expression in 87c and the QSTORE value of the filler in 88 to be collected through the selecting verbal head. However, the ungrammaticality of 87c and the grammaticality of 88 remains unexplained because we would expect there to be no difference between the two sentences if the QSTORE value is inherited along the same path in both cases, and if syntactic triggers do not play a part. Thus, the two-level hypothesis does not help to explain the difference between 87c and 88.

These facts provide strong evidence that wh-features of SLASH sources are not amalgamated through selecting verbal heads in languages like Iraqi Arabic, even if they are in Japanese. If the wh-features of a filler are not amalgamated onto the clausal structure with the selecting verbal head as a conduit, then S[fin] may be viewed as a QUE-island in Iraqi Arabic, as suggested in Johnson and Lappin (96). The Iraqi Arabic data provides evidence that P&Y's conditions on inheritance of scope-marking features are not adequate, and that feature-collection may be defeasible along parametrically determined lines, with an alternative means of amalgamating wh-features of fillers onto clausal structures.[1]

In particular, these facts provide evidence that a true "syntactic movement" language may not have wh-features collected from deleted complements by selecting verbal heads. Such a conclusion weakens the case for treating the scope-marking features of both QPs and wh-expressions as undifferentiated QSTORE feature values, both subject to precisely the same conditions on collection. P&Y's account has distinct conditions applying to retrieval of these two QSTORE types (wh-QSTOREs requiring a syntactic trigger). The possibility of distinct conditions on feature collection provides an alternative solution. Indeed, this possibility provides clues for explaining why some languages (like English) allow wide scope for quantifier phrase objects, while others (like Japanese) do not, a question not addressed in P&Y.

Aoun and Li 1993, for example, cite Hoji's 1985 evidence that QPs may not be given ambiguous readings in Japanese unless scrambling takes place.

91 a. Dareka-ga daremo-o semeta

someone-nom everyone-acc criticized

"Someone criticized everyone" (unambiguous)

b. Dareka-o daremo-ga semeta

someone-acc everyone-nom criticized

"Someone, everyone criticized" (ambiguous)

Pollard and Yoo assume that ambiguous readings for sentences involving QPs results when more than one QSTORE value appears in QUANTS at a given node. It appears from 91b that the scope-marking feature of a filler may allow wide-scope in a filler-head construction in Japanese. However, there is no evidence that the verb is able to collect the QSTORE value of its complement QP in 91a. Pollard and Yoo do not address evidence of this sort, but it appears that collection of scope-marking features may be cancelled for verbal heads from deleted complements, with amalgamation of the scope-marking features of fillers onto clausal structures being carried out by different means.[2]

Crucially, if feature amalgamation is defeasible along lines determined by principles of UG and parametric variation, the motivation for treating the nonlocal features in a feature structure distinct from the LOCAL attribute QSTORE is severely weakened. This is because a large part of the motivation for treating QSTORE and nonlocal features in distinct feature structures is the fact that it is possible to collect (LOCAL) QSTORE values, but not the nonlocal feature values, via SLASH. If we are not required to treat these two types of inherited features as attributes of distinct feature structures, it opens up the possibility of a unified account, with all the amalgamated features in a discrete feature structure, while retiring LOCAL.

(iii) Controlling feature collection while retaining the basic form of the NFP

In this section, as mentioned, I aim to show how the basic form of the Nonlocal Feature Principle may be retained while adopting a defeasible feature-collection mechanism in the spirit of P&Y (forthcoming) and Sag (forthcoming) in order to guarantee that the INHERITED features on a mother phrase may be identified with those on the appropriate head daughter.

92. Defeasible Feature Amalgamation Principle (FAP)

For each NONLOCAL feature F, the INHERITED value of F on a lexical head H is the union of the INHERITED values of F on the selected arguments.

I borrow from the definition of selected arguments in P&Y (forthcoming) as:

(i) elements selected via the SUBJ or COMPS feature

(ii) elements selected via the SPR feature, or

(iii) elements selected via the MOD feature

The FAP is intended to be identical to P&Y's collection constraint, the only difference being that a discrete NONLOCAL feature structure is retained and the constraint is extended to all NONLOCAL|INHERITED features, with the provision that collection may be cancelled for certain features from certain heads in line with principles of UG or parametric variation.

Thus, in line with the FAP, the INHER|QUE value of a verb will be the union of the INHER|QUE features of its arguments. To fall in line with Sag's (forthcoming) condition on amalgamation of SLASH values, it may be assumed that collection of INHER|SLASH is cancelled from deleted complements by UG. I will go on to offer comments relating to SLASH inheritance through adjunct heads.

Assume that "syntactic movement" languages like English have collection of INHER|QUE cancelled from deleted complements and unrealized subjects. INHER|REL need not be assumed to be amalgamated from subjects at all or from deleted complements, but will be amalgamated from non-clausal complements by phonologically null complementizers which participate in relative clause constructions. This will account for the parallelism in English between relative clauses and wh-clauses, where an INHER|QUE or INHER|REL feature is constrained to appear on a pre-posed expression in order to be legitimately terminated.

In order to guarantee inheritance through the appropriate head in the manner of P&Y's account, we assume that the NONLOCAL|INHERITED feature structure of a mother phrase will be structure-shared with the semantic head daughter, retaining the classical definition of a semantic head as the adjunct daughter in a head-adjunct structure, and the head daughter otherwise. This formulation borrows from P&Y in that inheritance is assumed to be through selecting heads, but differs radically from that proposed in P&Y in that token-identity of the full NONLOCAL|INHERITED feature-structure is assumed between mother and semantic head daughter. The limiting of quantifier inheritance to the semantic head daughter in P&Y is guaranteed by the following constraint:

93.. In a headed phrase, the POOL value is token-identical with the QSTORE value of the semantic head daughter.

As P&Y's treatment of QSTOREs involves allowing POOL values to appear in a RETRIEVED list at an appropriately licensed clausal node, with only the unretrieved values being entered into QSTORE at that node, QSTORE values which appear in RETRIEVED of a semantic head daughter will not be inherited into the QSTORE value of a mother phrase. Therefore, there is structure-sharing between mother phrases and semantic head daughters with regard to the POOL value of the mother phrase and the QSTORE value of the head daughter.

By contrast, but in a similar spirit, this proposal suggests that there is full NONLOCAL|IHERITED structure-sharing between semantic head daughters and mother phrases.[3] The only exception to this is in case a non-empty TO-BIND feature value appears on the syntactic head daughter, in which case those feature values shared between TO-BIND and INHERITED will not be inherited onto the mother. Consider the Nonlocal Feature Principle (NFP) reproduced below:

94. **The Nonlocal Feature Principle (from P&S 94)**

For each NONLOCAL feature F, the INHERITED value of F on a mother M is the union of the INHERITED values of F on the daughters minus the value of TO-BIND on the head daughter.

The NFP guarantees that the INHERITED features on daughters are inherited onto a mother node, except where an INHERITED feature value appears in TO-BIND of the head daughter. As the present proposal suggests that all NONLOCAL features will be inherited through semantic heads, the NFP must be revised so that inheritance is a case of structure-sharing between NONLOCAL|INHERITED features of a semantic head daughter, and the NONLOCAL|INHERITED features of a mother. In order to preserve the basic form of the classical NFP, this will be subject to the exception that feature values which appear in NONLOCAL|TO-BIND of a syntactic head will not appear in INHERITED of the mother phrase.

95. **Revised Nonlocal Feature Principle**

For each NONLOCAL feature F, the NONLOCAL|INHERITED value of F on a mother M is the NONLOCAL|INHERITED features F of the semantic head daughter minus the value of NONLOCAL|TO-BIND on the syntactic head daughter.

Thus, the FAP may be understood as handling the job of channeling the inherited features of arguments through lexical heads, so that the Nonlocal Feature Principle may now refer to the inherited features of the semantic head daughter, and ignore the non-head daughters.

INHERITED|SLASH values will continue to be terminated in head-filler constructions in which a non-empty TO-BIND|SLASH value appears on the head daughter, this constituting both the syntactic and semantic head in these constructions. N' selected via the MOD feature by a phonologically null relativizer constitutes the syntactic head in a head-adjunct phrase formed between the N' and a relative clause RP. INHER|REL values amalgamated by the relativizer from a preposed complement are inherited onto the RP and terminated with TO-BIND|REL licensed on the syntactic head N' in accordance with the Revised NFP. Conditions on inheritance and binding of (L)QUE will be dealt with in more detail in the following chapter.

3. 1 SLASH

As suggested above, there is evidence that a general constraint requiring selecting lexical heads to collect (or, equivalently, amalgamate) the scope-marking features of all (thematic) arguments, as suggested by Pollard and Yoo, may be too broad. A defeasible condition -- implied by P&Y's account -- on amalgamation of inherited features through selecting heads allows collection of wh-features from deleted complements to be cancelled, offering a means of handling the Iraqi Arabic data which is problematic for both Pollard and Yoo's account and the Minimalist Program.

By contrast, Sag (forthcoming) requires lexical heads to amalgamate the nonlocal feature SLASH from ARGUMENT-STRUCTURE elements, with structure-sharing between mother phrases and head daughters, rather than semantic head daughters as in Pollard and Yoo's (forthcoming) QSTORE account, in order to allow SLASH to be inherited. This is concomitant with the view that QSTOREs are quasi-semantic, while the other inherited features are syntactic. Sag's SLASH Inheritance Principle (SLIP) has structure-sharing between the SLASH value of a mother phrase and the syntactic head daughter, while Pollard and Yoo have structure-sharing between the POOL value of a mother phrase and the QSTORE value of the semantic head daughter. However, while P&Y's collection mechanism for scope-marking features appears to be too general, there is evidence that Sag's mechanism for inheritance of SLASH may be too narrow (in blocking inheritance of SLASH from all adjuncts).

I stress, then, that there is a fundamental difference between the treatment of NONLOCAL inheritance offered here and the treatment in P&Y (forthcoming) and Sag (forthcoming). In line with the basic aim of formulating a unified theory of inherited features, I have inheritance of NONLOCAL features unified through the selecting (semantic) head daughter, as laid out in the Revised Nonlocal Feature Principle.

95. **Revised Nonlocal Feature Principle**

For each NONLOCAL feature F, the NONLOCAL|INHERITED value of F on a mother M is the NONLOCAL|INHERITED features F of the semantic head daughter minus the value of NONLOCAL|TO-BIND on the syntactic head daughter.

(i) Problems with controlling SLASH-inheritance through syntactic head daughters

There is evidence that a general principle blocking SLASH inheritance from adjuncts, as under the SLIP in Sag's (forthcoming) account, may be too restrictive.

96.

a. Who are you going to write the paper [with t]?

b. Which tree did you eat the picnic [under t]?

c. Which subject did that idiot decide to talk in horribly tedious detail [about t] this time?

d. That's the bastard I lost my job [because of t]

e. Which days are you going to attend the festival [on t]?

f. What time did she leave the party [at t] ?

g. What the hell did you kick the cat [for t]?

h. John, I'll be able to do a better job [without t]

(from P&S 1994)

i. That's the symphony that Schubert died [without finishing t]

j. Which room does Julius teach his class [in t]?

k. Who did you go to Girona [in order to meet t]? (Hegarty 1990)

l. What kind of wagon did they use to ride to school [in t]?

m. How many of the book reports did the teacher smile [after reading t]?

n. This is the blanket that Rebecca refuses to sleep [without t]

Sag limits structure-sharing of SLASH values to mother phrases and head daughters under SLIP. It is extremely difficult to argue that all the bracketed phrases in 96 a-n above form arguments of verbs. At the same times, none of these phrases form the syntactic head daughter of VPs. However, SLASH values appear to be inheritable from all of these phrases. It is still not clear what advantages there are to preserving the strictly "syntactic inheritance" of SLASH in some way distinct from the inheritance of scope-marking features.

In all of the HPSG approaches treated here, lexical heads can only act as channels for inherited features of phrases which they select via some feature or other. As adjuncts are assumed to select syntactic structures via the MOD feature, in line with the FAP, the straightforward solution is to have structure-sharing of inherited SLASH values between mother phrases and semantic heads, as suggested in the revised NFP and FAP, repeated below as 97 and 98.

97. **Revised Nonlocal Feature Principle**

For each NONLOCAL feature F, the NONLOCAL|INHERITED value of F on a mother M is the NONLOCAL|INHERITED features F of the semantic head daughter minus the value of NONLOCAL|TO-BIND on the syntactic head daughter.

98. **Defeasible Feature Amalgamation Principle (FAP)**

For each NONLOCAL feature F, the INHERITED value of F on a lexical head H is the union of the INHERITED values of F on the selected arguments.

We assume that adjunct-heads will amalgamate the features of their selected arguments in line with the FAP.

The treatment of SLASH as a "syntactic" feature which is not inherited from adjunct daughters would appear to be too restrictive. As SLASH inheritance appears to be mediated through selecting head daughters in the same way as QSTORE inheritance, and as QSTORE feature amalgamation appears to be subject to cancellation in a manner similar to that limiting inheritance of SLASH, it is not clear what the motivation is for treating (the LOCAL attribute) QSTORE and (the SYNSEM attribute) SLASH as attributes of distinct feature structures. This opens up the possibility of a unified theory of NONLOCAL feature inheritance, while allowing NONLOCAL features to be amalgamated via the SLASH feature in certain cases.

3.2 QUE and REL

The central claim of this dissertation is that a unified theory of inherited features -- whereby inheritance is a form of structure-sharing between mother phrases and semantic head daughters -- is available if feature amalgamation may be cancelled for certain heads from certain arguments. In connection with this, I look at evidence which suggests that Sag's uniform constraints on inheritance of QUE and REL -- through syntactic heads -- suffers from the same kind of problems as the identical conditions assumed for SLASH. However, the adoption of a defeasible feature amalgamation principle, with inheritance mediated through the selecting head daughter, offers the promise of a successful solution to the array of problems.

(i) QUE

As suggested earlier, inheritance of the syntactic trigger feature QUE is subject to severe restrictions. P&Y suggest that the constraint governing inheritance of QUE is independent from the SLASH Inheritance Principle, and therefore QUE is not subject to "head-driven" inheritance in the manner suggested by Sag. Sag (forthcoming) has both the SLASH Inheritance Principle (SLIP) and the Wh-Inheritance Principle (WHIP) identify the inherited features of a mother phrase with the (syntactic) head daughter. Therefore, REL, QUE, and SLASH values will not be expected to be inherited from adjunct daughters.

(a) P&Y's pied piping constraint

As mentioned, P&Y (forthcoming) assume QUE will be propagated in accordance with the following constraint:

99. **Constraint on Interrogative Pied Piping (for English)**

In a headed phrase,

(a) if the HEAD value is of sort preposition, the QUE value is inherited from the complement daughter's QUE.

(b) otherwise, the QUE value is inherited only from the specifier daughter's QUE.

Interestingly, then, inheritance of the syntactic trigger feature is not assumed to be head-driven via structure-sharing between head daughters and mother phrases in P&Y, in contrast to their treatment of the QSTORE feature, where there is structure-sharing between the POOL value of a mother phrase and the QSTORE value of a semantic head daughter. Instead, there is structure-sharing between mother phrases and complements in one case (PPs), and mother phrases and specifiers (NPs) in the other. Thus, the constraint applying to inheritance of QUE reverts to the classic form of the Nonlocal Feature Principle, albeit in highly restricted form.

Note that that there is no evidence that the constraint governing inheritance of QUE may not be unified with that governing SLASH and REL, nor are any arguments offered to explain why these constraints should not be unified. If QUE values are amalgamated by a restricted set of heads (prepositions and nominals) from a restricted set of arguments (specifiers for nominals, and complements for prepositions) in accordance with the FAP, then there is no reason why inheritance may not be viewed as a case of structure-sharing between mother phrases and head daughters.

(b) Sag's typing constraints

In fact, Sag (forthcoming) does assume that QUE is amalgamated by heads and passed up via structure-sharing. This is guaranteed by having heads amalgamate the QUE and REL features of their arguments, in a manner identical to conditions on amalgamation of SLASH, and pass up these features via structure-sharing. Inheritance is governed by the Wh-Inheritance Principle (WHIP), whereby the REL and QUE feature of a mother phrase is structure-shared with the head daughter. As mentioned, WHIP and SLIP are identical in constraining the inherited feature to be structure-shared between mother phrases and syntactic head daughter.

In Sag's analysis of relative clauses in English, constraint satisfaction applying to clausal structures guarantees termination of both QUE and REL. Clauses in general are subject to the constraint that they have empty QUE and REL values. This approach to termination of QUE faces difficulties in accommodating evidence related to German presented in Kathol 1996 (to be treated in the next chapter) which strongly suggests that QUE is in fact inherited onto clausal structures. Similarly, it is not clear how it is possible for wh-expressions to appear as arguments of verbs at all in English if the QUE value of a clause is required to be the empty set. In order to preserve such a condition, it appears that verbs in English do not in fact amalgamate the syntactic trigger QUE feature.

(ii) REL

Sag's treatment of relative clauses in terms of constraint satisfaction is a departure from earlier HPSG treatments. P&S (94) note that the data indicates that finite or non-finite clauses (with a realized subject) in English require the value of INHER|REL to be the empty set.

100

a. *Here is the student [Kim likes whom].

b. *Here's the student [Dana met whose sister].

c. *Here is the student to claim who was unpopular would be ridiculous.

d. *The elegant parties, [for us to be invited to one of which] was a privelege, had usually been held at Delmonico's.

e. The elegant parties, [to be invited to one of which] was a privelege, had usually been held at Delmonico's.

The solution proposed in P&S (94) in the spirit of the classical NFP is to employ an empty complementizer which guarantees that the appropriate REL feature will appear on a pre-posed complement of the complementizer:

101. **CAT value for the null relativizer in P&S (94)**

a. HEAD|MOD N'|TO-BIND|REL {[**1**]}

b. SUBCAT <[[**2**], INHER|REL {[**1**]}],
S[fin, unmarked, INHER|SLASH {[**2**]}]>

The empty complementizer bears a MOD feature for a nominal structure with an unsaturated SPR feature. It takes two complements, one a preposed expression with a non-empty INHER|REL value, structure-shared with the TO-BIND|REL value of the N', the other a sentential construction with a non-empty SLASH value, structure-shared with the LOCAL features of the filler.

As the filler has to be the source of the appropriate REL feature, the ungrammaticality of examples 100a and 100 b above is predicted. As there is no appropriate REL-bearing pre-posed daughter in 100a and 100 b, we expect ungrammaticality. However, 100 c and d remain unexplained.

100 c. *Here is the student [to claim who was unpopular] would be ridiculous.

d. *The elegant parties, [for us to be invited to one of which] was a privelege, had usually been held at Delmonico's.

In both these cases, the appropriate REL feature is expected to be inherited onto the pre-posed expression. The fact that it appears not to be inheritable from these positions suggests that clausal structures with realized subjects are REL islands for some reason.

(iii) Sag's typing constraints and REL termination

Sag dispenses with null complementizers by allowing verbal heads to take a MOD feature for nominals to which they attach. Sag's means of accommodating the fact that clausal structures appear to be REL islands is to impose the constraint that clausal structures may not bear a non-empty REL value. Thus, if a VP[inf] with a realized subject (taken as a complement by "for") is defined as a clause, but a VP[inf] with no realized subject is not, the distinction between 100 c and d, repeated below, can be captured.

100 c. The elegant parties, [to be invited to one of which] was a privelege, had usually been held at Delmonico's.

d *The elegant parties, [for us to be invited to one of which] was a privelege, had usually been held at Delmonico's.

(iv) Supporting evidence that inheritance of REL is mediated through syntactic head daughters

As noted, under Sag's approach, we expect the REL value of a mother phrase to be identified with the syntactic head daughter but not the adjunct head daughter, in accordance with the Wh-Inheritance Principle (WHIP). This will allow a VP[inf] as the left daughter of a relative clause in examples like 100 c, above.

101 a. ?? The one woman performing [with whom] I had hitherto considered t an idle fantasy, was actually sitting beside me at the piano.

b. *We stared in horror at the blasted oak, to sleeping [under which] we had been looking forward desperately t all week.

c. *The whole subject, to speak in excruciating detail [on which] I had been preparing t for so many months, suddenly appeared dry and lifeless.

d. *This miserable nonentity, to give up my job [for whom] I had previously considered t unthinkable, stood gloating before me.

e. *The single day of the year to be alive [on which] was a pleasure stretched out before us.

f. *I glanced around anxiously for the most feared section chief, to leave [before whom] we considered t tantamount to a letter of resignation.

g. *To our great surprise, the guests of honour, to leave [without greeting whom] we had considered t to be an act of unconscionable discourtesy, were actually lying intoxicated on the floor.

Informants' reactions to examples 101 a-g suggest that adjunct-head VPs are REL islands. Given this data, then, it would appear that the characterization of REL as a "syntactically" inherited feature (through the syntactic head) may be sustainable. .

3. 3 Contrasts between QUE and REL inheritance in English

My main proposal in this dissertation is that a unified treatment of NONLOCAL features may be preserved if we assume a defeasible feature amalgamation principle, allowing amalgamation of certain features to be cancelled from certain heads, with inherited features structure-shared between mother phrases and semantic head daughters. I will go on to suggest how pied-piping facts may be explicated in terms of general conditions on inheritance, without assuming a further syntactic trigger feature. To this end, I present evidence that conditions on inheritance of REL in English are in fact different from those governing inheritance of QUE, offering evidence that REL may in fact be inherited from semantic heads.

(i) QUE as a trigger feature subject to inheritance conditions distinct from SLASH and REL

As I intend to concentrate on explicating conditions on termination of wh-features, a few comments are in order on the restrictions governing pied-piping in English. The main point is that, while both SLASH and REL appear to be inheritable from adjuncts, compromising the "syntactic" status of these features, the QUE feature does seem to be structure-shared between syntactic head daughters and mother phrases.

102

a. ?Which department do you most like [the workers from t]?

b. That's one department [the workers from which] I thoroughly enjoy persecuting t.

c. *I want to know [the workers from which department] you like to persecute t.

In line with the various treatments in the literature, we may assume that the PP is either an adjunct (as in P&Y) or an optional complement (as Sag treats certain PPs). In 102a, there is a SLASH value extracted from the complex NP. In 102b there is a REL value embedded in the complex NP which forms the filler in a relative clause construction. In 102c, there is a wh-expression embedded in the NP on the filler in a wh-clause.

SLASH extraction from the CNP is somewhat infelicitous, while wh-pied piping is severely ungrammatical. By contrast, the relative clause interpretation for 102b is perfectly grammatical. This contrasts with the following examples:

103

a. %[Which store] did you fire [the manager of t]?

b. That's one store [the manager of which] I actually enjoy persecuting t.

c. %I want to know [the manager of which department] you intend to hire.

As noted earlier, PP-embedded wh-expressions are generally tolerated more readily in syntactic trigger environments when paired with certain nominals, as in 103c. One straightforward way of capturing this distinction is to say that certain PPs appear as the optional complements of certain nominals, but as adjuncts in other constructions.

For example, Sag (forthcoming) has "picture" take an optional PP-(of) complement. The intuition that nominal complements allow extraction of SLASH, but nominal adjuncts do not, would appear to be sustainable.

104.

a. Which girl did you take [pictures of t]?

b. ??Which department did you fire [the workers from t]?

c. Which store did you fire [the manager of t]?

It does indeed appear easier to extract SLASH from NPs with optional PP complements than in the cases where it is suggested there is an adjunct phrase embedded in the NP. Indeed, as mentioned earlier, a persistent problem for the Principles and Parameters framework is the fact that certain CNPs do not allow overt extraction:

105. ??Which computer did you meet [the man who bought t]?

Compared to extraction from relative clauses, extraction from complement clauses is significantly improved.

106. Which car do you believe [the claim (that) Mary bought t]?

Facts related to the availability of QUE as a syntactic trigger might also fall out from the adjunct-complement distinction, as in the example repeated below as 107.

107.*I want to know [the workers from which department] you like to persecute t.

107, repeated above, suggests that the "syntactic" trigger QUE is not available on the pre-posed expression. As mentioned, in P&Y (forthcoming), this is explained by assuming that only NPs inherit QUE from specifiers, and prepositions inherit QUE from complements. Sag (forthcoming) generalizes his amalgamation mechanism to QUE, assuming that clauses must be QUE {} as well as REL{}. This might then explain the distinction between the following pairs, repeated below as 108 and 109.

108. %I want to know [the manager of which department] you intend to fire.

109. *I want to know [the workers from which department] you like to persecute.

If 108 has the wh-expression as the complement of "manager", we expect the nominal to amalgamate its QUE value under Sag's approach (perhaps subject to some dialectal variation). In 109, if the wh-expression is in an adjunct PP, we do not expect amalgamation of QUE under Sag's approach. However, this does nothing to explain how wh-expressions may appear as the complements of verbs in Sag's account, even though we require the QUE value of clausal structures to be the empty set, unless we assume that verbs fail to amalgamate QUE.

In line with this suggestion, we might propose an "LQUE-right" hypothesis for the unified account suggested in this dissertation such that, in English, heads which take a pre-posed argument via the MOD feature amalgamate the INHER|QUE values of just this argument in INHER|QUE, and all other INHER|QUE values in INHER|LQUE. Verbs amalgamate the INHER|QUE values of all arguments in INHER|LQUE, as suggested by Sag's condition that clauses be QUE {}. Thus, all wh-features inherited through verbal projections will be in INHER|LQUE.

This will be sufficient to guarantee that an INHER|QUE value may only survive on pre-posed expressions in wh-clauses, amalgamated from specifiers by nominals, and from complements by prepositional phrases which do not have a pre-posed argument. If a non-empty INHER|QUE value is required on a pre-posed expression in order to satisfy constraints applying to wh-clauses, then pied piping may be handled in terms of the interdependencies between the two wh-question features, without extending the inventory of features.[4] This will be set out in more detail in the next chapter.

(ii) Artificial split between NONLOCAL and QSTORE

In the example repeated below as 110, it appears that there are in fact no constraints blocking inheritance of REL from adjuncts which take pre-posed N' via the MOD feature.

110. That's one department [the workers from which] I thoroughly enjoy persecuting t.

This is in contrast to conditions governing the inheritance of QUE, as illustrated in the example repeated below as 111:

111. *I want to know [the workers from which department] you like to persecute t.

Clearly, contrary to Sag's claims, the inheritance conditions determining the distribution of QUE and REL are different. If there are no constraints preventing inheritance of REL from adjunct head daughters which bear the MOD feature for N', we expect REL to appear not only in specifiers, with heads amalgamating the REL values of specifiers, but also at arbitrary depths of adjunct-embedding in NPs.

112.

a. Lord Archole resolved to publicly condemn every Labour lawmaker [whose counterpart in the Shadow Cabinet] Red Ken did t.

b. Mrs Willis wagged her finger at the boy [whose cousin's boyfriend's mother's dog] had so offended the vicar.

c. I decided to offer my services to the young lady [whose mother's escort's ribald humour] was causing such a commotion t.

Clearly, a REL feature may be amalgamated from specifiers by nominals. However, it also appears that it may be inherited from adjunct daughters onto NPs:

113.

a. This is the only class [every student in which] I can name t.

b. Try and name another city in the region [every family in the suburbs of which] has a color TV and a mobile phone.

c. These are the kind of men [the good women behind the success of whom] eventually get traded in for new models.

d. Mr Thomas commented to his travelling companion that this was not the only town in the country [the panhandlers on the corner of the main thoroughfare of which] have PhDs.

e. This is, after all, the otherwise pleasant village [goading the pets of the residents of which] you consider your sacred duty.

f. My humble dream is to finally inspect a school [even the desks of the pupils at which] we need not be horrified to look at t.

From the examples, 112 and 113, it is clear that REL is tolerated not only in specifier positions, but also at deep PP-embeddings in CNPs. This is in contrast to the facts relating to QUE as a syntactic trigger in wh-clauses.

114

a. Tell me [whose counterpart in the Shadow Cabinet] Red Ken intends to publicly condemn t.

b. I want you to know [whose cousin's boyfriend's dog] offended the vicar.

c. Please advise me [whose mother's escort's ribald humour] is likely to be the cause of most embarrassment.

QUE on a specifier of a preposed NP is fine, as can be seen from the examples in 114.

115.

a. *Tell me [every student in which class] you can name t.

b. *Tell me [every family in the suburbs of which city] has a colour TV and a mobile phone.

c. *I want to know [the good women behind the success of which men] will eventually get traded in for a new model.

d. *I want to know [the panhandlers on the corner of the main thoroughfare of which town] do not have PhDs.

e. *I want to know [goading the pets of the residents of which town] your mother considers her sacred duty.

f. *Tell me [the desks of the pupils at which school] you cleaned.

However, QUE embedded in preposed NPs gives rise to severe ungrammaticality. Nothing in Sag's (forthcoming) account predicts these contrasts.

(iii) Rejecting the artificial split between scope-marking features and NONLOCAL

The fact that Sag's forthcoming account is not able to handle these cases is important. Pollard and Yoo (forthcoming) offer the following example in part to illustrate how QSTORE values are inherited through semantic heads:

116. [Some person [from every city]] hates it.

In 116, the preposition "from" collects the QSTORE values of the nominal it selects via the MOD feature and the NP it selects via the COMPS feature as its own POOL value. QSTORE values are licensed to be retrieved at the clausal level, allowing the QSTOREs of the quantifier phrases to appear together in QUANTS, thereby licensing the required wide scope reading for the PP-embedded quantifier.

As QSTOREs are inherited through the semantic head, the QSTORE value of the subject NP is the QSTORE value of the preposition "from."

117. That's the city [some person [from which]] Bill humiliated at the conference t

last week.

There is no reason to believe that the basic structure of the pre-posed NP in the relative clause in 117 is any different from the subject NP in 116. If the PP is indeed an adjunct, as the evidence seems to suggest, then it is no longer possible to argue that REL is inherited via structure-sharing between mother phrases and syntactic head daughters, the PP being a semantic head, but not bearing the HEAD feature for the NP. This strongly suggests that the split between the scope-marking inherited features in LOCAL and the nonlocal features in SYNSEM is an artificial one. This is a problem for both Sag's approach and P&Y's approach because it seriously complicates any attempt to provide an account of the facts, where an account becomes straightforwardly available under the assumption that all the inherited features are subject to a unified condition on inheritance, via the semantic head daughter.

Even if some mechanism is found to allow the REL value in the adjunct PP to be inherited onto the nominal phrase from a syntactic HEAD-bearing daughter, it is not clear why we should not entertain the same kind of mechanism to account for inheritance of QSTORE features as well, as in 116. This strongly suggests that the distinction between semantic inheritance and syntactic inheritance for the features treated here is artificial.

It is preferable to retain NONLOCAL as a discrete feature structure. As the artificial split between scope-marking features and other inherited features is the main reason to retain LOCAL as a discrete feature structure, the solution is to retire LOCAL, to allow SLASH values to unify with full SYNSEM structure. NONLOCAL is then justified not in opposition to LOCAL, which does not exist, but as those features which are subject to amalgamation by selecting heads. As a discrete NONLOCAL feature structure is retained, unified conditions on inheritance and binding should also be retained.

Footnotes to Chapter Three

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[1] In Chapter Five, I will suggest how this may be done without complementizers.
[2] The facts for non-wh QPs are somewhat problematic for accounts which resort to the classical NFP, because of the difficulty of avoiding a proliferation of binding complementizers.
[3] In Chapter Five, I suggest that it is necessary to generalize structure-sharing to full NONLOCAL features (with modified structure) to account for the full range of facts.
[4] It may be objected that this is a rather powerful and arbitrary device. However, it is fully in line with the basic view offered here that feature-amalgamation (as well as feature-inheritance, via structure-sharing) is strongly "head-driven" in the sense that heads may be subject to non-default conditions governing and controlling the amalgamation of NONLOCAL features. This view receives strong support from data related to Hungarian referred to later. It remains to be seen whether the full range of facts may be handled without recourse to such an hypothesis.

Chapter Four

Applying the FAP and revised NFP

In this chapter, I illustrate how feature amalgamation allows a natural extension of Johnson and Lappin's 1996 account while handling embedded scope for wh-fillers in Japanese, and pied-piping facts in wh-movement languages. I assume the Defeasible Feature Amalgamation Principle, and the Revised Nonlocal Feature Principle (both of which are repeated below as 118 and 119) in order to ensure that the features of selected arguments will be amalgamated by the appropriate head daughter (in accordance with the defeasible FAP), and that these inherited features will be propagated onto mother phrases from the semantic head daughter, unless bound in construction with the appropriate TO-BIND value on the syntactic head daughter (by the revised NFP).

118. **Defeasible Feature Amalgamation Principle (FAP)**

For each NONLOCAL feature F, the INHERITED value of F on a lexical head H is the union of the INHERITED values of F on the selected arguments.

119. **Revised Nonlocal Feature Principle**

For each NONLOCAL feature F, the NONLOCAL|INHERITED value of F on a mother M is the NONLOCAL|INHERITED features F of the semantic head daughter minus the value of NONLOCAL|TO-BIND on the syntactic head daughter.

Thus, a lexical head will collect the NONLOCAL|INHERITED features of its selected arguments (unless this collection mechanism is cancelled for any given feature from any given selected argument) and these NONLOCAL|INHERITED features will be structure-shared between a mother phrase and the semantic head daughter, unless subtracted in construction with a TO-BIND value on the syntactic head daughter.

(i) **Head-complement phrases**

In a head-complement phrase, the NONLOCAL|INHERITED features of the mother phrase will be structure-shared with the NONLOCAL|INHERITED features of the head daughter. A verbal head, for example, will amalgamate the NONLOCAL|INHERITED|QUE values of both the complement and the realized subject.

We assume that the NONLOC|INHER|SLASH value of complements is amalgamated by selecting heads. There does not appear to be evidence, however, that the INHER|SLASH values of subjects is amalgamated by lexical verbal heads in English (see, for example, Sells 1984, Farkas et al 1983, Jacobson 1984, all cited in P&S 1994). There appears to be no evidence either that the NONLOC|INHER|REL value of subjects is amalgamated by verbs. Thus, we might hypothesize that neither REL nor SLASH is amalgamated by heads from subjects in English.

(ii) Head-adjunct phrases

As adjuncts are not selected by verbs in HPSG, verbs will not amalgamate the NONLOC|INHER features of adjuncts. However, in a head-adjunct phrase, the NONLOC|INHER features of the mother will be structure-shared with the NONLOC|INHER features of the semantic daughter, the adjunct daughter (in accordance with the revised NFP).

As lexical adjunct heads select their arguments via the MOD feature and COMPS feature, as in Pollard and Yoo (forthcoming), it may be assumed that they amalgamate the NONLOC|INHER features of the phrases which they take via the MOD feature, as well as their complements. This means that NONLOC|INHER features collected by a head-selecting adjunct will be carried up onto a head-adjunct phrase, unless discharged in conjunction with an appropriate TO-BIND feature value on a syntactic head daughter.

(iii) Specifier-head phrases

As the notion of selected arguments is extended to the SPR feature (as in P&Y), we assume that nominal heads collect the NONLOC|INHER features of their specifiers, rather than the other way around. Therefore, a specifier-head phrase will be NONLOC|INHER structure-shared with the head daughter. We assume that nominal heads universally amalgamate the INHER|QUE feature values of specifiers as a subset of their INHER|QUE value, rather than in INHER|LQUE.

The head phrase of a specifier-head phrase may itself be a head-adjunct phrase, as in the example repeated below as 120:

120. That's the city [some person [from which]] Bill humiliated t at the conference last week.

In this case, "from" will be required to bear a MOD feature for the nominal which it selects as its pre-posed argument, and will therefore amalgamate the NONLOC|INHER features of the noun head, as well as any complements, as in the treatment of amalgamated features in P&Y.

4.1 Japanese

In Japanese, we assume no parametrized modifications with respect to amalgamation of INHER|QUE, meaning that lexical heads collect the union of the INHER|QUE features of their selected arguments as their own INHER|QUE value. However, we do assume that exceptional lexical specifications are possible. As will become clear, this will be sufficient to handle the full range of data, including the famous Subjacency in Japanese facts.

First, consider -- once more -- the data which suggests that the wh-features of a filler are able to take embedded scope, repeated below as 121 and 122.

121. John-wa [Mary-ga nani-o tabeta ka] siritagatte imasu ka?
J-top M-nom what-acc ate Q want-to-know Q
either: Does John want to know what Mary ate?
or: What does John want to know whether Mary ate?

122. Nani-o John-wa [Mary-ga t tabeta ka] siritagatte imasu
what-acc John-nom Mary-nom bought
John wants to know what Mary bought

As mentioned before, in Takahashi's dialect, a wh-expression may take scope out of a "ka" CP, as indicated by the ambiguity of 121 (although there appears to be considerable dialectal variation with regard to the readiness with which informants allow scope out of "ka" CPs in Japanese). The important detail, however, is that the wh-filler may take embedded scope inside the "ka" CP.

(iii) Feature amalgamation through verbal heads

As we expect lexical heads to amalgamate the INHER|QUE features of their selected arguments under the FAP, we now have no problem explaining the embedded scope reading for 122:

123. **Amalgamation of INHER|QUE under the FAP for verbs like "tabeta" (ate)**

a. SUBJ<[3]LOCAL|NP[nom]
NONLOCAL|INHER|**QUE:X>**
COMPS<[1]LOCAL|[2]NP[acc]
NONLOCAL|**QUE:Y>**

b. NONLOCAL|INHER|QUE:Z
TO-BIND|QUE{}

Z is the union of the INHER|QUE values of selected arguments (output of FAP), therefore **Z = (X union Y)**

123a indicates the valency specifications for the verb "tabeta." The unresolved values for INHER|QUE of the subject NP and object NP are given as X and Y, possibly empty sets. The INHER|QUE value of the verb is the union of the INHER|QUE values of its selected arguments, as indicated in 123b. As we do not assume that amalgamation of INHER|QUE is cancelled for deleted COMPS list elements for "non-syntactic movement" languages like Japanese, it follows straightforwardly that the INHER|QUE features of a complement will continue to be amalgamated by the selecting head verb even if the SYNSEM value [1] is deleted from COMPS and appears in INHER|SLASH instead.

This follows because the INHER|QUE value of a filler will be structure-shared with the INHER|QUE value of the deleted complement, via SLASH. As argued earlier, in a unified treatment of NONLOCAL features, evidence that NONLOCAL features are collected by lexical heads entails that SLASH values will be SYNSEM structures: moving NONLOCAL feature structures into LOCAL renders the LOCAL attribute vacuous in any case.

122. Nani-o John-wa [Mary-ga t tabeta ka] siritagatte imasu

what-acc John-nom Mary-nom bought

John wants to know what Mary bought

In 122, repeated above, the verb will amalgamate the INHER|QUE value of the wh-filler, and this will be carried up onto the embedded clause via the NFP, repeated below:

Revised Nonlocal Feature Principle

For each NONLOCAL feature F, the NONLOCAL|INHERITED value of F on a mother M is the NONLOCAL|INHERITED features F of the semantic head daughter minus the value of NONLOCAL|TO-BIND on the syntactic head daughter.

We might assume that the embedded head verb will constitute the semantic head in a subject-head phrase if a verb undergoes the CELR (where we assume here that the full *synsem* specifications for the complement may be deleted from the COMPS list and entered into the verb's SLASH value). Therefore, the NONLOC|INHER|QUE features on the embedded clause will be structure-shared with the verbal head, the TO-BIND|QUE value of verbs being empty in Japanese, as indicated in 123. Thus, the NONLOC|INHER|QUE values of both the subject (in this case empty, the subject not being a wh-expression) and the deleted complement (non-empty, the filler being a wh-expression) will be in the NONLOC|INHER|QUE value of the embedded subject-head phrase.

Now recall the specifications proposed for the "ka" complementizer in chapter 1, repeated below as 124:

124. **ka**

SUBCAT <S[**INHER|QUE: X**, INHER|LQUE: Y]>

TOBIND|QUE: X, LQUE: Y

condition: if X is vacuous, so is Y

We must assume that Takahashi's dialect allows extraction of wh-expressions from "ka" clauses. We modify the specifications in 124 so as to allow for this possibility:

125. SUBCAT <S[INHER|QUE: X, INHER|LQUE: Y]>

TOBIND|QUE: A, LQUE: Y

Condition: **A is a subset of X**, if A is vacuous, so is Y

The output of the FAP will require the INHER|QUE and INHER|LQUE features of selected arguments to be amalgamated by the complementizer "ka". Thus, INHER|QUE:X and INHER|LQUE:Y will be amalgamated by the complementizer, the only complement of which is the S in its valency specifications list:

126. **output of FAP on 125**

SUBCAT <S[INHER|QUE: X, INHER|LQUE: Y]>

INHER|QUE: X, LQUE: Y

TOBIND|QUE: A, LQUE: Y

Condition: A is a subset of X, if A is vacuous, so is Y

As the specifications for "ka" allow any of the INHER|QUE values of the complement S to appear as the TO-BIND value of the complementizer itself, INHER|QUE features may be terminated with the complementizer, in accordance with the revised NFP, or may be inherited onto the CP. There does not seem to be any kind of evidence to suggest that INHER|LQUE may be extracted from a "ka" clause.

Revised Nonlocal Feature Principle

For each NONLOCAL feature F, the NONLOCAL|INHERITED value of F on a mother M is the NONLOCAL|INHERITED features F of the semantic head daughter minus the value of NONLOCAL|TO-BIND on the syntactic head daughter.

In line with the Revised NFP, repeated above, the

NONLOCAL|INHERITED|QUE value on the mother CP will be the value of INHER|QUE on the semantic head (also the syntactic head in this case), minus the TO-BIND|QUE value on the syntactic head. As the lexical "ka" head forms both the syntactic and the semantic head in a complement-head phrase forming a "ka" CP, and as it carries exceptional specifications licensing it to bear a non-empty TO-BIND value, we expect inheritance and termination to be mediated through the same head.

122. Nani-o John-wa [Mary-ga t tabeta ka] siritagatte imasu
what-acc John-nom Mary-nom bought
John wants to know what Mary bought

As, in 122 repeated above, the INHER|QUE features of the filler appear on the complement S, via feature amalgamation through the verbal head, we expect it to be possible to get the embedded scope reading for the wh-filler. As there is no TO-BIND-bearing "ka" complementizer on the matrix clause, we also expect this to be the only possible reading.

(ii) Advantages of assuming complementizers for Japanese

Under the present approach, "ka" is assumed to be a phonologically realized complementizer which bears exceptional specifications for TO-BIND|QUE and TO-BIND|LQUE. On this assumption, the possibility of dialectal variation with respect to these specifications (which responses of informants suggests to be the case) is not implausible. To be more precise, it appears that some informants allow extraction of wh-expressions from "ka" CPs far more readily than others, while some informants allow a wh-expression to take scope out of a "ka" CP even when there is another wh-expression taking scope there (in other words, a "Subjacency" violation which is not universally attested). This can be seen in the data repeated below as 127:

127. Kimi-wa [dare-ga nani-o katta ka] shiritai no?
you-top who-nom what-acc bought Q wonder Q
"Do you want to know who bought what?"
%"What do you want to know who bought?"
%"Who is the person x such that you want to know what x bought?"

Such facts cause severe problems for any analysis, such as that presented by Tsai 94, that a UG Subjacency principle constrains wh-movement in Japanese.

Furthermore, Pollard and Yoo (forthcoming) do not assume complementizers, stipulating instead that QSTORE values may only be retrieved at sentence-like nodes, so the variation with regard to speaker's judgments receives no obvious explanation. The assumption that "ka" is a TO-BIND bearing complementizer, which is expected to bear exceptional specifications regarding binding of wh-expressions, offers a straightforward explanation for dialectal variation.

One might add that there appears to be considerable dialectal variation with regard to the so-called "Subjaceny in Japanese" data, with many speakers allowing extraction from "ka-dooka" CPs without any difficulty. In a complementizer analysis such as the one suggested here, those speakers who allow extraction from "ka-dooka" CPs simply have non-exceptional specifications for the complementizer head, with INHER|QUE of complement S being amalgamated straightforwardly as INHER|QUE rather than INHER|LQUE for the "Subjacency" informants. The fact that there is dialectal variation presents a difficulty for the Minimalist Program, which follows Watanabe 1992 in assuming that "dooka" forces a Subjacency violation by sitting in a potential landing site for movement operations.

(iii) "ka-dooka" complementizers revisited

Specifications for the complementizer "ka-dooka" are repeated below as 128:

128. **ka-dooka**

a. SUBCAT <S[INHER|QUE: X]>

b. NONLOCAL|INHER|**QUE{}**

LQUE: X

TO-BIND|QUE{}

LQUE{}

The "ka-dooka" complementizer does not carry exceptional specifications for TO-BIND, these being empty for both QUE and LQUE, forcing the yes/no interpretation for "ka-dooka" clauses. However, it does carry exceptional specifications for INHER|QUE and INHER|LQUE values, at least for those speakers who do not like wh-expressions embedded in a "ka-dooka" CP. For these speakers, the INHER|QUE of the complementizer is specified as being empty, but the value of INHER|LQUE of the complementizer unifies with the INHER|QUE value of its complement S.

The output of the FAP on "ka-dooka" would otherwise dictate that the INHER|QUE value of the complement S (the only selected argument in this case) is amalgamated by the "ka-dooka" complementizer head. As "ka-dooka" carries exceptional specifications for INHER|QUE and INHER|LQUE for certain speakers, however, the complementizer will not amalgamate the INHER|QUE value of its complement as its own INHER|QUE value, but as its INHER|LQUE value instead.

This now irons out a problem with the earlier solution to Watanabe's "Subjacency in Japanese" problem. In the earlier treatment, the classical Nonlocal Feature Principle had the INHER|QUE features of the sentential complement inherited onto the "ka-dooka" CP, the "ka-dooka" CP being the F-island for QUE, not the complement S (this latter possibility being unsustainable given that wh-expressions generally take scope easily out of declarative clauses etc.). In order for the wh-feature values inherited from the sentential complement to be inherited onto higher levels of structure from the "ka-dooka" CP in the alternative repository LQUE, it was necessary to have the INHER|QUE feature value of the sentential complement unify with the INHER|LQUE feature value of the "ka-dooka" complementizer head. This meant that "ka-dooka" CPs could only be assumed to be F-islands for INHER|QUE at the cost of having the same wh-feature value in both INHER|QUE and INHER|LQUE at the "ka-dooka" CP. Thus, there was no way of avoiding having the same feature value in both of the alternative repositories at the same node.

This is clearly undesirable. A large part of the attraction of having two dependent wh-question feature structures is that feature values may be inherited in either one or the other. This will become clearer in the treatment of pied-piping, where the relevant facts fall out naturally from general conditions on inheritance, with no need for an unmotivated syntactic trigger feature to be introduced in an ad hoc manner. However, if the same wh-feature appears in both QUE and LQUE, the proposed function of the alternative repositories is compromised.

Now, however, as the revised NFP dictates that the inherited wh-features of a mother phrase be identified with the inherited wh-features of the semantic daughter, the non-head (complement S) daughter in a "ka-dooka" CP is rendered an F-island for inherited features, meaning that the INHER|QUE features on the complement S will not be inherited onto the "ka-dooka" CP, although the INHER|LQUE features of the lexical head, the complementizer "ka-dooka", will be. The revised NFP, then, has the desirable effect of ruling out the possibility of the same feature value being inherited from both head and non-head daughters, inherited features being identified with a single head daughter. This will be seen to be of crucial importance in extending the explanatory power of J&L 96's account of wh-question sentences in a natural and straightforward way.

(a) Wh-features of fillers inherited through "ka-dooka" clauses

The obvious question, given that the present approach to Takahashi's data requires wh-features of fillers to be inherited through selecting heads, is what happens if these features are inherited through a "ka-dooka" clause, which is only allowed to give up these features as INHER|LQUE? This is rather a crucial question because we assume that a non-"syntactic movement" language like Japanese does not have amalgamation of INHER|QUE cancelled from complement specifications in the application of the CELR. This rather commits us to the prediction that there will be no difference in inheriting INHER|LQUE values from a "ka-dooka" CP whether the lexical source of the wh-question feature is a filler or a complement.

As mentioned earlier, Pollard and Sag's unified treatment of scope for wh-expressions and quantifier phrases suffers from the difficulty that all languages -- whether "syntactic movement" or non-"syntactic movement" are required to have wh-QSTORE features inherited through the verbs which select fillers via the SLASH feature. This means that there should be no difference between a sentence which has wh-QSTORE values collected from a wh-complement, and one which has the appropriate values collected from a wh-filler via the SLASH feature. As argued earlier, this introduces problems in dealing with facts from Iraqi Arabic (for example, ungrammatical wh-clauses where there is apparently a candidate syntactic trigger expression as the non-head left-peripheral daughter) which are also problematic for the Minimalist Program given their restrictive conception of feature-checking.

This is no accident, as hinted earlier, because both the Minimalists' and Pollard and Yoo's (forthcoming) mechanism for dealing with the scopal properties of wh-expressions invoke Watanabe's (1991, 1992) two-level movement hypothesis. In Pollard and Yoo's case, successful retrieval of a QSTORE feature value corresponds informally to Watanabe's movement by LF, unconstrained by

Subjacency. Watanabe's initial level of movement by S-Structure of an invisible operator corresponds informally to inheritance of a reentrant "syntactic trigger" QUE feature, as employed in P&Y.

As argued earlier, both the Minimalist conception of feature-checking and Pollard and Yoo's "syntactic trigger" mechanism fail to account for the Iraqi Arabic data successfully treated by Johnson and Lappin 1996, where wh-features are inherited as feature values of either QUE or LQUE. The Iraqi Arabic data is particularly problematic for P&Y's account because both QSTORE collection from a filler and QSTORE collection from a complement have to proceed through the selecting verbal head. To have a mechanism which allows the wh-features of fillers to be amalgamated onto a clausal structure by some other means than through the selecting verbal head implies a condition by which QSTORE collection via the SLASH feature is annulled for syntactic movement languages. As mentioned, one of the central claims of this dissertation is that the possibility that feature collection is defeasible weakens the case for treating scope-marking features of quantifier phrases and wh-expressions in a feature structure distinct from the other inherited features. Furthermore, P&Y do not actually have an alternative mechanism which allows the scope-marking features of fillers to be amalgamated onto clausal structures.

To emphasize, both the Minimalist conception of feature-checking and P&Y's (forthcoming) QSTORE account invoke Watanabe's famous and influential two-level movement account. Now, if a "ka-dooka" CP poses a syntactic barrier to invisible feature-movement for Watanabe, it might be predicted that overt movement of a wh-expression out of such an environment will lead to a marked improvement. This is in important contrast to the account suggested here, which

-- unlike Pollard and Yoo (forthcoming) -- in no way invokes Watanabe's two-level movement hypothesis in motivating a syntactic trigger mechanism. Rather, the relevant facts are handled in terms of interdependence between the two wh-question features, with no need to introduce an ad hoc syntactic trigger. The relevant data is repeated below as 129:

129. a. ??Kimi-wa [John-ga nani-o katta ka-dooka] shiritagatte-imasu ka
you-top J-nom what-acc bought Q-yes/no want-to-know Q
"What do you want to know whether or not John bought?"

b. John-wa [Mary-ga nani-o katta ka dooka] dare-ni tazunemashita ka?
J-Top M-Nom what-Acc bought whether who-Dat asked Q
"Who did John ask whether Mary bought what?

As pointed out earlier, Watanabe's account appeals to the contrast between 129a and 129b above. Where there is a wh-expression inside the "ka-dooka" CP, it is expected that there will be a degree of infelicity because the Spec of CP is assumed to be filled in some way (by "dooka"), giving rise to a Subjacency violation. Certain (by no means all) Japanese speakers do indeed attest to the ungrammaticality of 129a. At the same time, those speakers who do not like 129a note an improvement when there is a wh-expression in the matrix clause as in 129b. Watanabe's solution is that a single invisible operator is required to move to Spec of a [+wh] CP by S-Structure. As this requirement may be handled by the invisible operator of the wh-expression in the matrix clause in 129b, no Subjacency violation is expected.

As Watanabe's account is commited to the notion that "ka-dooka" CPs pose a barrier to his invisible operator movement, we might well expect a significant improvement if a "ka-dooka" CP-embedded wh-expression itself is overtly moved out of the "ka-dooka" CP. If a wh-expression is itself moved out of a "ka-dooka" CP by S-Structure, there appears no particular reason not to expect that the associated invisible operator also would be able to move felicitously to its target Spec CP, perhaps at some point in the derivation, on the way to Spell-Out, after the wh-expression itself is outside of the "ka-dooka" CP.

In any case, if evidence is provided that there is an improvement when a wh-expression is overtly moved out of a "ka-dooka" CP, this would strongly support the view that there is a single operator moved to a [+wh] CP and that this particular movement operation is sensitive to "ka-dooka" islands.

129 a. ??Kimi-wa [John-ga nani-o katta ka-dooka] shiritagatte-imasu ka
you-top J-nom what-acc bought Q-yes/no want-to-know Q
"What do you want to know whether or not John bought?"

In 129a, the familiar wh-expression is embedded in a "ka-dooka" CP, with the expected ungrammaticality. In 129b, there is a wh-expression in the matrix clause. It is assumed that the invisible operator associated with the wh-expression outside the "ka-dooka" clause is able to move to Spec of the [+wh] CP.

129 b. John-wa [Mary-ga nani-o katta ka dooka] dare-ni tazunemashita ka?
J-Top M-Nom what-Acc bought whether who-Dat asked Q
"Who did John ask whether Mary bought what?

A rather simple and obvious test related to Watanabe's hypothesis would be to have the wh-expression in 129a itself scrambled out of the "ka-dooka" CP, perhaps allowing the associated operator to escape the "ka-dooka".

129 b. ??Nani-o kimi-wa [John-ga t katta ka-dooka] shiritagatte-imasu ka

what-acc you-top J-nom bought Q-yes/no want-to-know Q

"What do you want to know whether or not John bought?"

In fact, informants do not acknowledge any improvement if a wh-expression is moved out of a "ka-dooka" clause. This supports the view put forward in this dissertation that non-syntactic movement languages like Japanese do not have feature-amalgamation cancelled from complements in the application of the CELR, with this possibility being sustainable if deleted COMPS specifications may appear in SLASH. If the selecting verb "katta" amalgamates the INHER|QUE features of the filler wh-expression by the FAP, these will be inherited onto the embedded clause via structure-sharing in line with the revised NFP and amalgamated by the "ka-dooka" complementizer head in line with the exceptional INHER|QUE/LQUE specifications it carries.

128. ka-dooka

a. SUBCAT <S[INHER|QUE: X]>

b. NONLOCAL|INHER|QUE{}

LQUE: X

TO-BIND|QUE{}

LQUE{}

As the "ka-dooka" complementizer amalgamates the INHER|QUE feature value of its complement S as its own INHER|LQUE feature value, this will be structure-shared with the "ka-dooka" CP by the revised NFP and amalgamated by the matrix verb "shiritagatte-imasu" in line with the FAP. This is because lexical heads amalgamate the NONLOC|INHER features of their arguments. As the "ka-dooka" CP constitutes one of the matrix verb's selected arguments, the INHER|LQUE features carried by the CP will be amalgamated by the matrix verb. As this feature value will be carried onto the matrix S, as set out in the revised NFP, the matrix "ka" complementizer will not have a non-empty TO-BIND|QUE, even though there is a non-empty TO-BIND|LQUE. Specifications for "ka" are repeated below as 131:

131. **ka**

a. SUBCAT <S[INHER|QUE: X, INHER|LQUE: Y]>

b. TO-BIND|QUE: A, LQUE: Y

condition: A is a subset of X, if A is vacuous, so is Y

The specifications for "ka" repeated above make explicit the condition that a non-empty TO-BIND|LQUE value is only tolerated if there is a non-empty TO-BIND|QUE value.

129 b. John-wa [Mary-ga nani-o katta ka dooka] dare-ni tazunemashita ka?

J-Top M-Nom what-Acc bought whether who-Dat asked Q

"Who did John ask whether Mary bought what?

This explains the contrast with 129b, where the matrix verb amalgamates the INHER|QUE value of its argument wh-expression, "dare-ni." This means that there will be a non-empty TO-BIND|QUE value on the "ka" complementizer, allowing the INHER|LQUE value amalgamated from the "ka-dooka" clause to be felicitously terminated as well. We therefore expect the same degree of ungrammaticality in extraction from "ka-dooka" clauses if the wh-expression is a filler as if it is a complement. As suggested, this prediction is borne out by the informants' responses.

(b) Further problems for the Minimalists with Watanabe's (1992) account

As suggested above, a rather straightforward and obvious test which Watanabe could have carried out would have been to see if grammaticality judgments improve when a wh-expression is overtly moved[1] out of a "ka-dooka" CP. If this were the case, it might be possible to argue that the invisible wh-operator associated with the overtly moved wh-expression is able to detach from its source after the wh-expression has moved out of the CP barrier, so that the operator can move to its Spec CP target without incurring a Subjacency violation.

In fact, Watanabe (1992) does not include evidence of this kind, and -- as I have shown -- informants do not support any such hypothesis. The fact that such evidence is lacking is actually rather important given the development of the Minimalist Program. As mentioned, the Minimalists do not assume that feature-checking must take place by S-Structure. It should be possible for the wh-expression to move, checking whatever features are required to be checked in the scrambling process (all movement operations being driven by the need to check features under Minimalism) by Spell-Out, and for the wh-features generated with the wh-expression to check once the wh-expression is safely outside of the "ka-dooka" CP. Thus, the Minimalists are required to explain why there is no improvement in examples like 130 over examples like 129 a.

129 a. ??Kimi-wa [John-ga nani-o katta ka-dooka] shiritagatte-imasu ka

you-top J-nom what-acc bought Q-yes/no want-to-know Q

"What do you want to know whether or not John bought?"

130. ??Nani-o kimi-wa [John-ga t katta ka-dooka] shiritagatte-imasu ka

what-acc you-top J-nom bought Q-yes/no want-to-know Q

"What do you want to know whether or not John bought?"

As hinted earlier, Watanabe's (92) account is extraordinary in not only failing to address this question, but in actually providing evidence against his central hypothesis that invisible operator movement must take place by S-Structure in order to explain an example like 129a as a Subjacency violation.

For example, Watanabe (92) presents comparative deletion constructions (Kikuchi 1987) as a possible case of putative S-Structure movement.

132. John-ga [Mary-ga e yonda yori(mo)] takusan-no hon-o yonda

J-nom M-nom read than many-gen book-acc read

"John read more books than Mary read"

133.

*Paul-ga [NP t yonda hito]-ni atta yori(mo) John-ga takusan-no hon-o yonda

P-nom read person-dat met than J-nom many-gen book-acc read

"John read more books than Paul met [a man who read t]"

In searching for evidence that invisible operator movement is subject to island constraints, Watanabe invokes evidence related to comparative deletion constructions in Japanese which reveals that CNPs are strong barriers to putative invisible operator movement by S-Structure arising in these cases. The gap in 133 is assumed to be the source of an invisible operator which is required to move out of the CNP. This kind of covert movement operation (with a comparative deletion gap inside a CNP) is acknowledged as giving rise to severe ungrammaticality.

However, we already know that wh-expressions in Japanese can occur completely felicitously inside CNPs. Evidence for this is repeated below as 134:

134. Kimi-wa [dono konpyuutaa-o katta otoko ni] aimashita ka?

you-top which computer-acc bought man-dat met Q

"You met the man who bought which computer?"

As Watanabe's invisible operator account must have an invisible operator originating with the wh-expression embedded in the CNP in 134, repeated above, we have no clear correspondence between the putative invisible operator movement by S-Structure in 133, and the putative invisible operator movement by S-Structure in 134.

Watanabe (92) appears, in fact, to be providing evidence to undermine his central claim that the first level of his hypothesized two levels of movement takes place by S-Structure. Interesting in this regard are his comments on scrambling, standardly assumed to take place by S-Structure in the GB framework which constituted the mainstream at the time.

135. ??Ano hon-o [John-ga [t katta hito]-o sagashite-iru rashii

that book-acc John-nom bought person-acc looking-for seem

"That book, it seems that John is looking for the person who bought t"

Overt movement out of a CNP gives rise to the same kind of infelicity acknowledged by English speakers. However, movement out of a "ka" CP is relatively felicitous.

136.

?Dono hon-o [Mary-ga [John-ga toshokan-kara t karidashita ka] shiritagatte-iru

which book-acc Mary-nom John-nom library-from checked out Q wants-to-know

"Mary wants to know which book John checked out from the library"

Watanabe cites Saito (1989) in claiming that, although the example in 136 is marginal (contra Takahashi 1993), the embedded scope reading for the scrambled wh-expression is actually rather easy to get. Watanabe acknowledges Saito's scrambling reconstruction observation. Saito points out that it appears to be somehow possible to put scrambled elements back into the base positions from which they have been displaced at S-Structure in languages like Japanese, unlike languages like English. This is precisely the point taken up by Takahashi, who notes that there is non-syntactic movement in Japanese, as opposed to English.

In including examples like 135, where an NP is moved out of a containing CNP, Watanabe entirely fails to indicate any clear correspondence between overt S-Structure movement and his own putative S-Structure movement of an invisible operator originating with wh-expressions. Hardly surprisingly, perhaps, the MP does not burden itself with Watanabe's stipulation that such movement operations take place by S-Structure, as this seems to be based on no evidence whatever.

However, more seriously, Watanabe entirely fails to even address the question of where such operator movement starts from in examples like 130.

130. ??Nani-o kimi-wa [John-ga t katta ka-dooka] shiritagatte-imasu ka
what-acc you-top J-nom bought Q-yes/no want-to-know Q
"What do you want to know whether or not John bought?"

Is it from the extracted NP itself, which may find itself outside of "ka-dooka" clauses as suggested earlier, with the possibility of avoiding "Subjacency" violations? Or is it from the base-generated positions to which the scrambled phrase is reconstructed, as suggested by Saito? While Watanabe does not comment on this point, his reference to Saito's observation appears to indicate that he assumes that invisible operator movement always proceeds from the position to which moved expressions are reconstructed. If invisible operator movement does start out from the position to which wh-expressions are reconstructed, then we indeed do not expect evidence to support the view that Japanese "Subjacency" violations may be avoided via scrambling. This is what the evidence in fact indicates. The account I provide gives a formal explanation of these facts.

By contrast, nothing in Watanabe's account, Saito's account, Takahashi's account, or the Minimalist Program in general, suggests a formal treatment of feature-checking from scrambled phrases which have been reconstructed or, indeed, of the reconstruction phenomenon itself. Indeed, the whole question of scrambling receives no explanation in the MP, beyond the suggestion that some feature must be found in order to drive the scrambling process. While, as suggested earlier, an explanation along these lines is readily available – an inherited feature is collected from fillers – appeal to feature inheritance suggests that movement should be dropped as the central explanatory mechanism.

c. Problems for Pollard and Yoo (forthcoming) with Watanabe's account

As mentioned, P&Y (forthcoming) invokes Watanabe's two-level movement hypothesis in justifying the syntactic trigger mechanism by which the same wh-feature value appears in both QSTORE and QUE. A serious difficulty for P&Y is that certain examples from Iraqi Arabic receive no obvious explanation: S[fin]-embedded wh-expressions are not allowed, even where there is a candidate syntactic trigger wh-expression in the matrix clause. The facts from Iraqi Arabic suggest, as argued throughout this dissertation, that wh-question feature values may appear in either of two interdependent wh-question feature structures, rather than in both QUE and QSTORE.

I have demonstrated that the full range of facts related to "Subjacency in Japanese" receive a straightforward and natural explanation if it is assumed that complementizers may carry exceptional specifications for inheritance and binding of wh-expressions. In particular, the phenomenon that scrambled expressions may be reconstructed -- to borrow from Saito's (89) informal observation -- receives a formal treatment in my account.

As mentioned, P&Y have inheritance of QUE proceed in line with highly idiosyncratic conditions, distinct from the conditions governing inheritance of QSTOREs and the other inherited features in SYNSEM, reminiscent of the classical NFP by which NONLOCAL features are inherited indiscriminately from daughters to mothers rather than through selecting heads. A problem for P&Y here relates to the fact that employing a syntactic trigger QUE to explain the ungrammaticality of examples like 129a would have to assume that this feature may not be inherited from a "ka-dooka" CP.

129 a. ??Kimi-wa John-ga nani-o katta ka-dooka shiritagatte-imasu ka

you-top J-nom what-acc bought Q-yes/no want-to-know Q

"What do you want to know whether or not John bought?"

If the reentrant wh-feature in QUE is prevented from appearing in the appropriate position at the matrix clause because "ka-dooka" CPs are islands, for example, we could use this as the basis for explaining the improvement in 129b.

129 b. John-wa [Mary-ga nani-o katta ka dooka] dare-ni tazunemashita ka?

J-Top M-Nom what-Acc bought whether who-Dat asked Q

"Who did John ask whether Mary bought what?

We might argue that the wh-expression in the matrix clause is in an appropriate licensing relationship with the wh-clause in 129b, perhaps because the syntactic trigger is required to be inherited onto a wh-clause in Japanese. The problem for P&Y is that their syntactic trigger account seems to predict the grammaticality of examples like 130, where the "ka-dooka" CP would not seem to necessarily pose an island for inheritance of QUE given their idiosyncratic conditions on inheritance of QUE.

130. ??Nani-o kimi-wa [John-ga t katta ka-dooka] shiritagatte-imasu ka

what-acc you-top J-nom bought Q-yes/no want-to-know Q

"What do you want to know whether or not John bought?"

However, the data -- not to mention the fact that Watanabe (92) invokes Saito's (89) observation that scrambled expressions may be freely reconstructed to their base-generated positions -- suggests that the syntactic trigger feature QUE is also collected from fillers through selecting heads, in line with Sag's (forthcoming) account which has all the "nonlocal" features inherited in accordance with identical constraints.

P&Y (forthcoming) does not, in fact, offer a solution to problems such as Watanabe's "Subjacency in Japanese" and offers no solution to the difficulties raised by the Iraqi Arabic data presented earlier. They do not address the question of why the syntactic trigger appears to be collected from fillers through verbs in languages like Japanese, while they assume it is not in English. They have no explanation for the considerable dialectal variation with regard to the apparent function of complementizers in Japanese.

By contrast, all these facts receive a straightforward and natural explanation on the assumption that wh-question feature values may be inherited in either of two wh-question feature structures, with complementizers bearing exceptional specifications with regard to inheritance and binding of these features. On the assumption that there is parametric variation with respect to the ability of verbs to amalgamate INHER|QUE of fillers, I provide an explanation of pied piping in English in which the facts fall out in line with general conditions on inheritance, with no need to invoke an unmotivated syntactic trigger feature.

4. 2 English

I suggest here that NONLOC|INHER features may be amalgamated through selecting heads, with the possibility of verbs collecting the INHER|QUE features of deleted complements via the SLASH feature. The decision to employ a Q complementizer which takes a filler as one of its complements opens up the undesirable possibility of the same QUE feature being amalgamated from a single wh-expression by both the selecting verb (via the SLASH feature) and the selecting complementizer (via the COMPS feature). P&Y (forthcoming) propose solving the problem of QSTORE values being collected from argument wh-expressions or quantifier phrases by more than one selecting verb by cancelling collection of QSTOREs from non-thematic arguments. However, this does not offer the promise of explaining the full range of facts pertaining to the distribution of wh-expressions. The general solution appears to be a principle of UG preventing a NONLOCAL|INHERITED value being amalgamated via structure-sharing from the same argument by more than a single lexical head.[2]

(i) The Subject Extraction Lexical Rule

In this dissertation, I propose a defeasible feature amalgamation principle which allows for cancellation of feature amalgamation for certain selecting heads from certain arguments. The suggestion here is that a straightforward way of preventing an INHER|QUE feature from being amalgamated from the same wh-expression by two selecting heads is to allow cancellation of amalgamation from deleted complements in so-called "syntactic movement" languages like English.

An important consideration with respect to employing a Q complementizer to carry a possibly non-empty TO-BIND value for a given feature is the operation of the Subject Extraction Lexical Rule (SELR) discussed in P&S (94).

As mentioned before, the Complement Extraction Lexical Rule (CELR) only allows SLASH values to arise with complements. This is achieved via a deletion-insertion mechanism such that just the LOCAL value of the deleted complement is inserted as the SLASH value of the verb whose complement is deleted. I have argued that there are advantages to be gained by allowing the deleted SYNSEM structure to be entered directly as the SLASH value of the verb.

The assumption that complements but not subjects may delete provides an explanation for so-called "that-trace" effects.

137 a. Who did you say [t left]?

b. *Who did you say that [t left]?

c. Who did you say that [Mary likes t]

The above examples indicate that English does not allow "that" to appear before a subject gap. If subjects may delete freely and give rise to a SLASH value in the same way as complements, then there would be no straightforward way of characterizing the difference between the embedded clauses in 137b and 137c. In both of these examples, if a SUBJ list element may delete and give rise to a SLASH value, the embedded clause would have a non-empty SLASH value, and an empty SUBJ list.

If, however, it is not possible for an element in SUBJ to delete, it follows that verbs like "say" may take a VP with an unsaturated SUBJ list. The SLASH value which is required to terminate with the wh-filler in 137a and 137b is generated, then, not by the embedded verb via subject deletion, but by some different mechanism. Thus, we introduce a lexical rule (the SELR) which allows a verb which takes a VP[SUBJ<[1]:LOCAL[2]>] complement to give rise to SLASH {[2]}. We could, of course, accommodate the view that SLASH values are SYNSEM structures with a simpler rule such that a verb which takes a VP[SUBJ<[1]>] complement gives rise in the general case to SLASH {[1]}.

We may then suggest possible ways in which the presence of "that" on the embedded VP interferes with the operation of the SELR. P&S do not elucidate on this, but one might speculate that "that" complementizers do not take complements with unsaturated SUBJ lists. Alternatively, it may be the case that "that" may only amalgamate the INHER|SLASH value of complements, and may not itself undergo the SELR, for some reason. In any case, the hypothesis that "that" interferes with the SELR in some way or other is based on the assumption that SUBJ list elements may not delete and give rise to a non-empty SLASH value.

Important in this regard is the way in which certain complementizer heads (in contrast, perhaps, to "that") do allow the operation of the SELR. As mentioned before, (phonologically) null relativizers employed in P&S (94) are assumed to take two complements, a filler with LOCAL value [1], and a sentential structure bearing a non-empty INHER|SLASH {[1]} value. The non-empty TO-BIND|SLASH {[1]} value required in order to terminate the non-empty INHER|SLASH {[1]} value on the complement S is carried by the null relativizer head.

In the operation of the SELR, the complementizer, in the manner of a verb which takes an S complement, is allowed to take a VP with an unsaturated SUBJ list, the single *synsem* object contained in which has LOCAL value [1]. In the same way as a verb taking a VP[SUBJ <[2]:LOCAL[1]>], the complementizer head itself would then give rise to the appropriate INHER|SLASH {[1]} value which would be discharged by the non-empty TO-BIND|SLASH value also carried by the complementizer head, in line with the classical NFP. The SELR, then, allows complementizers to treat VPs with unrealized subjects as sentential structures which give rise to non-empty INHER|SLASH values, and the subjects of such VPs as fillers.

(ii) Syntactic wh-movement

A wh-subject need not take scope at a subject-head phrase, unlike a wh-filler at a filler-head phrase.

138 a. Who thinks who left early?

b. *Who thinks who Mary likes?

c. Who knows who left early? (ambiguous)

d. Who knows who Mary likes? (unambiguous)

e. We think (that) John, Mary likes t?

As can be seen from 138a above, a wh-subject in an embedded clause may take scope at a higher wh-clause. As the subcategorization properties of "think" do not allow embedded scope, this is the only reading available for 138a. However, there is a clear contrast between 138 a, where the wh-expression in the embedded clause is a subject, and 138 b, where the wh-expression in the embedded clause is a filler. In the latter construction, it is impossible for the wh-filler to take scope at the higher wh-clause, giving rise to a severe ungrammaticality.

The same kind of contrast can be seen in 138c and 138d, where a wh-subject in an embedded clause may take scope at the higher wh-clause, but the wh-filler in an embedded clause may not. The facts for subject-head phrases fall out naturally under Johnson and Lappin's (96) HPSG-based treatment of wh-questions. We expect wh-expressions to appear in subject position in sentences in general, licensed by the usual schema licensing subject-head phrases, independent of a wh-binding Q complementizer. Under the subject-head licensing schema, we expect the INHER|QUE features of the wh-subject to be inherited onto higher levels of structure, without any requirement that the INHER|QUE features on the subject be discharged by a TO-BIND|QUE feature carried by the complementizer, because there will be no TO-BIND-bearing complementizer necessary in these constructions.

However, we expect fillers, also, to appear in phrases licensed by the usual phrase-structure schema (for filler-head constructions), independent of the wh-binding Q complementizer. Nothing appears to be ruling this out in the grammatical 138e, for example.

138 e. We think (that) John, Mary likes t?

If this is allowed, we would expect the INHER|QUE features on the wh-filler in 138b, for example, to be inherited onto higher levels of structure in the same way as the INHER|QUE features of the wh-subject in 138a. So we have no explanation for the contrast between the grammatical 138a and the severely ungrammatical 138b. However, Johnson's (pc) suggestion that there is a principle of UG which determines that INHER|QUE will only be inherited from fillers in syntactic movement languages like English, and not from traces or gaps offers a straightforward solution.

If we employ the defeasible FAP, and the revised NFP which has inheritance treated as a special case of structure-sharing between selecting daughters and mother phrases, blocking amalgamation of INHER|QUE features from deleted complements by selecting verbal heads means that there is no way that wh-features of a filler can be amalgamated onto a clausal structure unless this occurs in construction with the Q complementizer employed in J&L (96). The revised NFP ignores the non-head daughter in a filler-head construction, and only looks at the semantic head daughter, which does not have the INHER|QUE features of the filler amalgamated onto it. Thus, the fact that amalgamation of INHER|QUE values is blocked for verbal heads from deleted complements, but not from subjects in general, may account for the fact that wh-subjects may take scope higher than their surface positions, but not non-subject wh-fillers.

Consider, once again, the specifications for the phonologically null complementizer employed by J&L (96) for syntactic movement languages like English, repeated below as 139:

139 a. SUBCAT<[[1], INHER|QUE:X], S[fin, INHER|SLASH{[1]},
INHER|QUE:Y]>

b. NONLOCAL|TO-BIND|QUE:Z

Conditions are imposed on the specifications for the Q complementizer to guarantee that the non-vacuous X, the INHER|QUE value of the filler, is a subset of Z, the wh-features bound by the complementizer, and that Z is a subset of (X union Y), where Y is the union of all the INHER|QUE values inherited onto the clausal complement of Q. This means that we require a non-empty value for X and that it must be bound in Z, but that any non-empty values in Y may, but need not be bound in Z.

If the Q complementizer amalgamates the INHER|QUE features of its selected arguments in line with the defeasible FAP, we expect the INHER|QUE features of both its pre-posed argument and its sentential argument to be amalgamated onto the complementizer head, where they may be bound in line with the revised NFP, which is parallel to the classical NFP but with inheritance uniformly mediated through the selecting head. However, the fact that inheritance is uniformly mediated through the selecting head means that the only way for the wh-features of a filler to be amalgamated onto a clausal structure, if amalgamation is cancelled for deleted complements, is via amalgamation through the Q complementizer. As this is the case, we predict that the wh-feature value of a realized subject -- which can be amalgamated through verbal heads -- in a head-subject phrase may take scope higher than the clausal structures in which they appear, but that the wh-feature value of a filler -- which may only be amalgamated through the complementizer, which requires the wh-feature value of the left-most daughter to be bound -- may not be inherited onto higher levels of structure. This accounts for the kind of contrast pointed out in 138 a and b above.

138 a. Who thinks who left early?

b. *Who thinks who Mary likes?

Thus, there are straightforward advantages to assuming that NONLOCAL features are amalgamated uniformly through selecting heads, in this case the possibility of desirably blocking amalgamation of the wh-features of a filler onto a clausal structure in the absence of a Q complementizer.[3]

(iii) Feature amalgamation in English

I have presented arguments that NONLOC|INHER features are collected by selecting heads in line with a defeasible feature amalgamation principle. The evidence from "Subjacency in Japanese", I suggest, indicates that wh-feature values may be inherited in a second wh-question feature structure, characterized here as INHER|LQUE, in accordance with exceptional specifications for INHER|QUE and INHER|LQUE carried by a yes-no complementizer.

I assume an "LQUE-right" condition in order to allow so-called pied-piping facts to be handled in terms of dependencies between the two wh-question features, without recourse to an unmotivated syntactic trigger feature. Verbal heads are subject to a parametrically determined constraint such that the union of the INHER|QUE values of the selected arguments are amalgamated as a subset of the verbal head's INHER|LQUE value. This has the effect of rendering empty the INHER|QUE value of a verbal head. I also assume a constraint such that a head which takes a pre-posed argument via the MOD feature amalgamates the

INHER|QUE values of just this argument, and all other INHER|QUE values in INHER|LQUE.

Defeasible Feature Amalgamation Principle (FAP)

For each NONLOCAL feature F, the INHERITED value of F on a lexical head H is the union of the INHERITED values of F on the selected arguments.

The FAP, repeated above determines that a verb will continue to amalgamate the INHER|LQUE values of its arguments in its own INHER|LQUE value. Because English is subject to the parametrically determined condition that a verb will amalgamate the union of the INHER|QUE features of its arguments as a subset of its own INHER|LQUE value, the value of INHER|QUE for a verbal head will be the empty set, and its INHER|LQUE value will be the union of the INHER|QUE and INHER|LQUE values of its arguments. These features will be carried onto clausal structures in line with the Revised NFP, repeated below.

Revised Nonlocal Feature Principle

For each NONLOCAL feature F, the NONLOCAL|INHERITED value of F on a mother M is the NONLOCAL|INHERITED features F of the semantic head daughter minus the value of NONLOCAL|TO-BIND on the syntactic head daughter.

For an adjunct head which takes a pre-posed argument via the MOD feature, the INHER|QUE feature values of its post-posed arguments forms a subset of its own INHER|LQUE value. Therefore, a MOD-bearing lexical head of an adjunct phrase does not amalgamate any of the INHER|QUE values of its other arguments into its own INHER|QUE value, but does amalgamate the INHER|QUE feature values of the pre-posed structure it selects via the MOD feature into its own INHER|QUE value as expected under the FAP.

I assume that infinitival complementizers such as "to" and "for" treated in Sag (forthcoming) will also be subject to the constraint applying to verbal heads that INHER|QUE values of arguments will be amalgamated as INHER|LQUE values. Sag assumes that complementizers which take verbal complements share the VFORM head features with their complements. Thus, a VFORM complementizer like "for" will amalgamate the INHER|QUE features of selected arguments as a subset of its INHER|LQUE value. I suggest this as the reason for contrasts of the sort found in the following examples, on the assumption that the pre-posed constituent in wh-clauses is required to bear a non-empty INHER|QUE value (in this account, due to the subcategorization properties of Q complementizers):

140 a. *I wonder [for whom to leave early] would cause the most problems.

b. *I wonder [to criticise whom] would cause most problems.

c. I wonder [who] would cause most problems.

As a verbal head is required to amalgamate the INHER|QUE features of its arguments as a subset of its own INHER|LQUE value, to be added to any INHER|LQUE values amalgamated from its arguments, adverbial heads which select pre-posed VPs via the MOD feature will amalgamate only INHER|LQUE features in English, as the INHER|QUE values of the adverbial head's post-posed arguments will be amalgamated by constraint as a subset of the head's INHER|LQUE value. This successfully captures Sag's (forthcoming) suggestion that clauses are QUE {}.[4] However, an adverbial head which selects N' via the MOD feature will amalgamate the INHER|QUE values of its complements into its own INHER|LQUE value, but will amalgamate the INHER|QUE value of the structure it selects via the MOD feature into its own INHER|QUE value.

141. Who always drinks milk?

In the absence of the TO-BIND-bearing Q complementizer, to illustrate, the wh-expression "who" may appear as the subject daughter in a subject-head phrase. If this happens, we expect the verbal head to amalgamate the INHER|QUE value of the subject wh-expression as a subset of its own INHER|LQUE value. In the absence of any other wh-expressions, the INHER|QUE value of the wh-expression is the INHER|LQUE value of the verbal head.

The adverbial expression "always" may be assumed (in common with Sag's forthcoming account) to select a VP (subject-unsaturated) via the MOD feature. Thus, the adverbial head amalgamates the INHER|LQUE features of its selected argument in line with the FAP. The head-adjunct VP with an unsaturated SUBJ list is NONLOC|INHER-structure shared with the adjunct daughter, in line with the revised NFP, which says that the NONLOC|INHER features of a mother phrase are structure shared with the NONLOC|INHER features of the semantic daughter in the absence of TO-BIND features. Similarly, the subject-head phrase will be NONLOC|INHER- structure shared with the head-adjunct daughter, which constitutes the semantic head daughter according to the

Semantics Principle.

Thus, we expect the INHER|QUE value of the clausal structure in 141 above to be the empty set, in the absence of the Q complementizer, verbs only amalgamating wh-features as INHER|LQUE.

142. Who thinks who always drinks milk?

In example 142, above, we expect the matrix verb to be able to amalgamate the INHER|LQUE value of the embedded clause as a subset of its own INHER|LQUE value. However, we assume special conditions for binding of wh-expressions at the clausal level. While verbs are subject to a parametrically determined constraint whereby wh-features are amalgamated as INHER|LQUE values, it is not assumed (in this account) that there are exceptional specifications for verbal heads in English with regard to TO-BIND|(L)QUE. This means that, while a subject-head phrase with a wh-subject will be able to give up its INHER|LQUE features for amalgamation by a selecting verb, this particular configuration will not allow binding of wh-features. For that, we require the phonologically null Q complementizer.

(iv) Phonologically null binding complementizers

The specifications for the Q complementizer employed for syntactic movement languages like English and Iraqi Arabic in J&L (96) is as follows, repeated below as 143:

143. a. SUBCAT< [[1], INHER|QUE:X],

S[fin, INHER|SLASH{[1]}, INHER|QUE:Y]>

b. NONLOCAL|TO-BIND|QUE:Z

Condition: X is a subset of Z, and (Z minus X) is a subset of Y

X is non-empty

The complementizer takes a clausal structure as the second element in its SUBCAT list. On analogy with P&S's (94) treatment of null relativizers, in the application of the Subject Extraction Lexical Rule we expect the complementizer to be able to also take a VP[fin, SUBJ <[1]>] as a complement, giving rise to an INHER|SLASH{[1]} value.

As we expect wh-question feature amalgamation from deleted complements to be cancelled in syntactic movement languages like English, where we assume that there will be distinct conditions for amalgamation of wh-question features onto clausal structures, it must also be assumed that there is no wh-feature amalgamation from unrealized subjects which are the source of a SLASH feature, as in the operation of the SELR.

141. Who always drinks milk?

Thus, the wh-question features of the extracted subject forming the pre-posed complement in a wh-clause like 141 repeated above may be safely amalgamated by the complementizer with no possibility of wh-question features being amalgamated by both a complementizer and a verb from the same selected argument.

From 143, above, under the FAP we expect the complementizer to amalgamate all the INHER|QUE features of selected arguments, both the filler and the sentential complement. The straightforward assumption is that null complementizers amalgamate the INHER|QUE features of fillers as their own INHER|QUE value, and the INHER|LQUE features of the sentential complement as INHER|LQUE. Therefore, we modify the specifications for the Q complementizer as follows:

144 a. SUBCAT< [[1], INHER|QUE:X],

S[fin, INHER|SLASH{[1]}, INHER|LQUE:Y]>

b. NONLOCAL|TO-BIND|QUE:X

LQUE: Z

INHER|QUE:X

LQUE: Y

Condition: Z is a subset of Y

X is non-empty

The revised specifications require a non-empty INHER|QUE value on the pre-posed complement. The INHER|QUE value of this complement is amalgamated as the INHER|QUE value of the complementizer (by the FAP), and the INHER|LQUE value of the sentential complement is amalgamated as the INHER|LQUE value of the complementizer.

145. I want to know [which girl] spoke to [a man from which department]?

In the grammatical 145 above, we expect the CNP-embedded preposition to amalgamate the wh-question features of its post-posed complement NP as a subset of its INHER|LQUE value, given parametrically determined constraints on feature-amalgamation applying in English.

The non-empty wh-feature value carried by the embedded-complement CNP will therefore be the INHER|LQUE value amalgamated by the preposition from its complement, under the revised NFP. We expect the preposition "to" to amalgamate the INHER|LQUE features of the complement CNP straightforwardly in accordance with the FAP, it being neither verbal, nor MOD-bearing. We expect "speak" to amalgamate the wh-question features of its PP complement as a subset of its INHER|LQUE value. Therefore, we expect the INHER|LQUE value carried by the VP[fin] taken as a complement by the Q complementizer to be the INHER|QUE value originally contributed by the embedded wh-NP "which department".

If "which girl" appears as the subject of the embedded clause in a subject-head phrase, we also expect it to be impossible for the clausal structure to satisfy the subcategorization requirements of the matrix verb "want to know" because a verb, in this account, amalgamates the INHER|QUE value of its subject argument as a subset of its INHER|LQUE value. As verbs are not expected to bear non-empty TO-BIND values, we need the Q complementizer to perform this binding function.

The complementizer takes a pre-posed complement with a non-empty INHER|QUE value. The filler must, of course, be compatible with the non-empty SLASH value generated as output of the SELR in construction with the unrealized subject. We have already indicated that nominals will continue to collect the INHER|QUE values of specifiers as expected under the FAP.

144 a. SUBCAT< [[1], INHER|QUE:X],

S[fin, INHER|SLASH{[1]}, INHER|LQUE:Y]>

b. NONLOCAL|TO-BIND|**QUE:X, LQUE: Z**

INHER|QUE:X, LQUE: Y

Condition: Z is a subset of Y, X is non-empty

From 144, repeated above, it can be seen that the complementizer binds the INHER|QUE value of the filler, and may bind the INHER|LQUE value amalgamated from the sentential complement. We therefore predict the grammaticality of examples where there is a non-empty INHER|QUE value on the filler complement of a wh-binding Q complementizer, even with wh-expressions adjunct-embedded in sentential complements of the complementizer, as in 145, repeated below:

145. I want to know [which girl] spoke to [a man from which department]?

However, we also predict ungrammaticality if a wh-expression is adjunct-embedded in a filler CNP, because adjunct heads with pre-posed arguments selected via the MOD feature amalgamate the INHER|QUE values of post-posed arguments as INHER|LQUE values. However, prepositions with no pre-posed arguments will amalgamate INHER|QUE values as expected under the FAP:

146 a. *I want to know [a man from which department] spoke to [which girl]

146 b. I want to know [to whom] you gave the book t.

In 146 b, the preposition amalgamates the INHER|QUE value of its complement as INHER|QUE, as expected under the FAP. However, it is standardly assumed, and informants confirm, that examples where the wh-expression is embedded in an adjunct phrase inside a pre-posed CNP, as in 146a above, are ungrammatical. Indeed, as mentioned earlier, many informants do not notice an improvement even if there is a wh-specifier on the filler.

147. %I want to know [which man from which department] spoke to [that girl]

The ungrammaticality of 146a is predicted under Pollard and Yoo's (forthcoming) approach because their syntactic trigger feature QUE is only inherited from specifier daughters to mothers, and from complements to PPs. This is also predicted under Sag's approach, where QUE is amalgamated by nominals from specifiers, and by prepositions from complements, but is not structure-shared between adjunct daughters and mother phrases.

However, these accounts do not predict that significant numbers of informants find examples like 147 above ungrammatical.

144 a. SUBCAT< [[1], INHER|QUE:X],

S[fin, INHER|SLASH{[1]}, INHER|LQUE:Y]>

b. NONLOCAL|TO-BIND|**QUE:X, LQUE: Z**

INHER|QUE:X, LQUE: Y

Condition: Z is a subset of Y, X is non-empty

This, however, follows straightforwardly from the specifications for the Q complementizer repeated above, because the complementizer only amalgamates and binds the INHER|QUE value of the filler, while we expect adjunct heads (in the examples treated here, the adjunct "from" bears a MOD feature for N') to amalgamate the wh-features of their complements as INHER|LQUE.

Therefore, in 147 repeated below, the INHER|QUE and INHER|LQUE features of the filler NP will be contributed by the adjunct daughter in a head-adjunct phrase.

147. %I want to know [which man from which department] spoke to [that girl]

These features will be structure-shared with an adjunct lexical head which amalgamates the INHER|QUE and INHER|LQUE features of the N' it modifies, but amalgamates the INHER|QUE features of its own complement as a subset of its INHER|LQUE value, in line with the simple parametrized modifications of the FAP suggested here.

Speakers who find 147 ungrammatical have the wh-features of the adjunct-embedded wh-expression as the INHER|LQUE value of the filler NP, but their specifications for the Q complementizer means that INHER|LQUE values of a filler complement of a Q complementizer are ignored, and may be neither amalgamated nor bound. Speakers who note an improvement in 147 in comparison with 146a, both repeated below, simply have slightly different specifications for the Q complementizer.

146 a. *I want to know [a man from which department] spoke to [which girl]

147. %I want to know [which man from which department] spoke to [that girl]

148 a. SUBCAT<[[1], **INHER|QUE: X, LQUE: A**],

S[fin, INHER|SLASH{[1]}, INHER|LQUE: Y]>

b. NONLOCAL|TO-BIND| QUE:X, LQUE: Z

INHER| **QUE:X, LQUE: (A union Y)**

Condition: Z is a subset of (A unionY)

X is non-empty

These slightly different specifications allow the INHER|LQUE features of the filler to be amalgamated and bound, the possibility of dialectal variation with regard to such specifications for binding complementizers suggesting parallels with the discrepancies among judgments offered by various speakers of Japanese.

(v) The in-situ option in English

It is often noted that wh-question sentences which do not have any syntactic movement are not entirely ruled out in English.

149. The man from which department left early?

Where there is contrastive stress on the wh-expression embedded in the subject NP, indicating surprise at something which has just been said, for example, the in-situ option is a normal (albeit severely restricted) conversational strategy in English. Therefore, while wh-clauses with all wh-expressions in situ are relatively restricted in the contexts they may be used, they are perfectly interpretable, and give rise to a relatively mild infelicity when used in the improper context. The challenge is to explain why there is a degree of infelicity in the wider range of question possibilities.

Under the Q complementizer approach put forward so far, such examples should be completely ungrammatical, as the T0-BIND-bearing complementizer requires a non-empty INHER|QUE value to be amalgamated from the first complement. However, recall that the phonologically realized complementizer "ka" in Japanese does not impose the requirement that its complement S carries a non-empty INHER|QUE or non-empty TO-BIND|QUE value, with a yes-no interpretation arising in case no wh-expression is bound there. Specifications for "ka" are repeated below as 150:

150. a. SUBCAT <S[INHER|QUE: X, INHER|LQUE: Y]>

b. TO-BIND|QUE: A, LQUE: Y

A is a subset of X

condition: if A is vacuous, so is Y

The specifications for "ka" above do not commit us to a non-empty TO-BIND|QUE value or non-empty TO-BIND|LQUE value. The INHER|QUE :X and LQUE: Y amalgamated from its argument by the complementizer may be empty.

When a "ka" complementizer does not bind any wh-features in either TO-BIND|QUE or TO-BIND|LQUE, a yes-no interpretation is forced.

151. John ga ikimashita ka?

J-nom went Q

"Did John go?"

As mentioned in Chapter One, Kathol 1996 suggests that yes/no complementizers have a kind of Q-operator parallel to a retrieved wh-QSTORE value in QUANTS, and that this takes scope directly over the clausal structure it subcategorizes for. We therefore assume that the "ka" complementizer either has a non-empty TO-BIND|QUE value, or it binds clauses directly as a yes-no complementizer in the way Kathol suggests.[5]

A complication here is that the relatively mild "Subjacency in Japanese" violations are also salvaged in contrastive stress or echo contexts, just as the in-situ option is available in English.

152. ??Kimi-wa John-ga nani-o katta ka-dooka shiritagatte-imasu ka

you-top J-nom what-acc bought Q-yes/no want-to-know Q

"What do you want to know whether or not John bought?"

In the example above repeated as 152, we have the standard Japanese Subjacency violation from Watanabe's (92) analysis. Informants routinely accept such sentences in echo contexts of the following sort:

153. **Statement:**

John-wa [kimi-ga *ichijiku*-o katta ka-dooka] shiritagatte-imasu yo

J-top you-nom figs-acc bought Q-yes/no want-to-knowemphatic

"John wants to know whether you bought figs"

Response:

John-wa [watashi-ga *nani*-o katta ka-dooka] shiritagatte-imasu ka?

J-top you-nom what-acc bought Q-yes/no want-to-know Q

"John wants to know whether I bought *what*"

This kind of evidence might suggest that the ungrammaticality of the Subjacency in Japanese data does not in fact follow from a special condition requiring a TO-BIND|LQUE value to be empty on a "ka" complementizer if the TO-BIND|QUE value is empty. Rather, the dependence of a non-empty TO-BIND|LQUE value on a non-empty TO-BIND|QUE value would appear to follow from a universal principle governing fully-acceptable wh-clauses.

154. *I want to know [a man from which department] spoke to [which girl]

The subcategorization requirements of the matrix verb in the example repeated as 154 above make it impossible to salvage the example with contrastive stress in the kind of echo context sketched for the Japanese Subjacency example. This is because the matrix verb subcategorizes for fully acceptable question clauses. However, CNP-embedded wh-expressions are not barred in general in echo-question contexts:

155. **Statement:**

Bill said [a man from the Sociology Department] is coming this afternoon

Response:

Bill said [a man from *which department*] is coming this afternoon?

Rather than adopting a syntactic triggering mechanism of the sort suggested by Cheng 1991, then, we propose that pied-piping facts follow from dependencies between the two wh-question features. This may account for the oddness of both the Japanese Subjacency data and the in-situ English strategy in the general case, while providing the basis of an explanation for why such examples are salvaged in certain contexts: echo context questions (plausibly) do not have to satisfy the conditions on fully-acceptable semantic wh-questions.

We might then modify the specifications for the null Q complementizer by simply removing the condition that the filler carry a non-empty INHER|QUE value. As the null Q complementizer is employed specifically to amalgamate and bind (L)QUE features, however, we might assume a condition requiring either the INHER|QUE value of the pre-posed complement, or the INHER|LQUE value of the clausal complement to be non-empty.

156 a. SUBCAT<[[1], INHER|QUE:X],

S[fin, INHER|SLASH{[1]}, INHER|LQUE:Y]>

b. NONLOCAL|TO-BIND|QUE:X, LQUE: Z

INHER| QUE:X, LQUE: Y

Condition: Z is a subset of Y, either X or Y is non-empty

We also assume that a universal condition requires a wh-clause to have a non-empty TO-BIND|QUE value. As this may only be amalgamated from a filler in English, the effect is the same as requiring the INHER|QUE value of the filler to be non-empty in a syntactic wh-clause. However, it also allows us to hypothesize that the option where the TO-BIND|LQUE, but not the TO-BIND|QUE, value of the wh-clause is non-empty is not entirely ruled out in certain restricted contexts.

Much work in the Principles and Parameters framework has focussed on the question of why so-called D(iscourse)-linked examples appear to allow wh-expressions a freer range of distribution. The hypothesis in Pesetsky 1987, for example, is that wh-expressions may take scope without movement, so long as they may be bound unselectively by a C-commanding +[Q] Comp. Indeed, the distinction between D-linked and non-D-linked examples is a semantic one, determined with regard to whether the range of possible answers is contextually restricted. It is not clear why such a distinction should be captured via a strictly syntactic trigger feature.

Furthermore, it is not clear how the Minimalist Program can account for the possibility of Japanese Subjacency cases being salvaged in certain cases without any checking of features at all. The Minimalists might attempt to explain the salvaged Subjacency example in 153 above by saying that no feature needs to check in D-linked cases. However, if no feature-checking is required at all in D-linked echo contexts it is not clear how wh-expressions are able to successfully be assigned scope in order to give rise to acceptable wh-question sentences in those restricted contexts which do not appear to require fully-acceptable wh-clauses. In particular, if wh-expressions may be unselectively bound without feature-checking, what is forcing feature-checking in the first place?

By contrast, the solution proposed here provides a unified explanation for both wh-clauses in English which have all wh-expressions in situ, and the famous Subjacency in Japanese data. In both mildly infelicitous cases, we may claim that a TO-BIND|LQUE value is non-empty, but the TO-BIND|QUE value is empty. This means that the relevant wh-expression is able to successfully be assigned scope, but the clause does not constitute a fully-acceptable wh-clause.

Note that the assumption of parametric variation, such that certain languages obey an "LQUE-right" condition in amalgamating the wh-features of arguments, allows a non-empty TO-BIND|QUE value to function somewhat in the manner of the syntactic trigger feature QUE in P&Y's treatment of QSTOREs, without extending the inventory of features. At the same time, the possibility of non-empty TO-BIND|LQUE values allows a principled explanation for examples which are salvaged in certain restricted contexts. Neither of these straightforward solutions is available in J&L's 1996 account, in which NONLOCAL|INHER features are inherited indiscriminately from daughters to mother phrases. It will be seen that generalizing F-islands to all non-head daughters in the manner proposed allows a natural and straightforward solution for a wide range of data which is problematic under J&L's account.

4. 3 German

An apparent difficulty for this account relates to the suggestion that languages with systematic displacement of at least one wh-expression have verbs amalgamate the wh-features of all their arguments as INHER|LQUE values. The revised NFP guarantees that these amalgamated values will be structure-shared at the clausal level. In Johnson and Lappin's 1996 account of German, however, the null complementizer may bear TO-BIND values, or may optionally give rise to INHER|LQUE values. The phonologically realized complementizer "was" may carry non-empty TO-BIND|LQUE values, allowing unbound INHER|LQUE values to be inherited onto higher levels of structure.

157. Was1 glaubst du was2 Hans meint [mit wem Johann gesprochen hat]?

wh-QP believe you wh-QP Hans says with whom Johann spoken has

"With whom do you believe Hans says Johann has spoken?"

In the example repeated above as 157, J&L's embedded wh-CP "was2" passes up the LQUE value of its S[LQUE] complement, inherited from the most deeply embedded CP. The higher "was1" then binds LQUE inherited onto the complement S.

However, as German has the pied-piping phenomenon, (in order to account for which Kathol 1996 assumes P&Y's QUE solution in extended form), it is desirable under my account for verbs to amalgamate wh-features as INHER|LQUE values in order to restrict the availability of non-empty INHER|QUE values, as in English. This would give rise to the presence of INHER|LQUE values on clauses with embedded wh-expressions, for example.

This means there would be nothing to prevent expletive wh-markers (non-null complementizers) from taking a subject-head S[fin, INHER|LQUE]. Such S[fin] complements are expected to bear the INHER|LQUE values of complement wh-expressions, for example, so it should be possible for the "was" complementizer to bind the INHER|LQUE value carried by the S[fin] in 158.

158. *Was Lisa was gesehen hat?

Wh-comp Lisa what seen has

"What did Lisa see"

This is clearly undesirable, as German is well known to require at least partial movement of at least one wh-expression. This is handled effectively in J&L (96) because non-empty INHER|LQUE values may only originate with the phonologically null complementizer, which takes a wh-filler with a non-empty INHER|QUE feature value and an S[fin,(INHER|QUE)] as its complements. The phonologically non-vacuous complementizer "was", by contrast, takes an S[fin, INHER|LQUE], so it will be restricted to positions above the null wh-complementizer, because a non-empty INHER|LQUE value may not arise independently of the null complementizer. This guarantees the partial movement condition for wh-expressions in German.

(i) Telescoping via INHER|QUE rather than INHER|LQUE

The solution to this apparent problem, while preserving the explanation of pied piping effects in terms of general conditions on inheritance, with no need to extend the inventory of features, is to say that partial movement "wh-clauses" actually allow the possibility of having INHER|QUE values amalgamated by certain "bridge" selecting heads. Consider the specifications suggested for binding complementizers in English, repeated as 159 below:

159. a. SUBCAT<[[1], **INHER|QUE:X**],

S[fin, INHER|SLASH{[1]}, INHER|LQUE:Y]>

b. NONLOCAL|**TO-BIND| QUE:X**, LQUE: Z

INHER| QUE:X, LQUE: Y

Condition: Z is a subset of Y, either X or Y is non-empty

By UG: wh-question clauses require a non-empty TO-BIND|QUE value

Note that we now assume that the requirement that a wh-expression appears to the left of a syntactic wh-clause in English is forced by a principle of UG to the effect that only a clause with a non-empty TO-BIND|QUE value constitutes a true wh-clause. For any wh-expressions to be bound at a fully-fledged wh-clause, at least the non-empty INHER|QUE value of the pre-posed wh-expression must be bound. The TO-BIND|LQUE value of the complementizer may be non-empty in principle, even in the absence of a non-empty TO-BIND|QUE value, but we expect this only to be possible in severely restricted contexts in which the interrogative clause is not a true syntactic question: echo and quiz contexts, for example.

A difficulty with J&L's (96) account of partial movement in German relates to the fact that null complementizers may optionally give rise to non-empty INHER|LQUE values. Their complementizer is expected to take INHER|QUE-bearing complements, and carry a possibly non-empty TO-BIND|QUE value as in the specifications for the English null complementizer.

160. Wer weis [wem Lisa **was** gegeben hat].

who knows who-dat Lisa what given has

"Who knows to whom Lisa gave what?"

who is the person x such that x knows to whom Lisa gave what

who is the person x and what is the thing y such that x knows to whom Lisa gave y

In the above example (from Kathol 1996), the wh-expression in complement of the embedded clause may take scope at either the embedded CP, or the higher CP. Kathol suggests that the selectional properties of the matrix verb (glossed as "know") prevent the partially-moved wh-expression from taking wider scope.

We might assume under J&L's account that unbound INHER|QUE values on the embedded CP are inherited as INHER|QUE values in order to be bound successfully with the higher wh-CP, as the null complementizer takes a preposed wh-phrase with a QUE feature and S[(QUE)]. However, this is not a viable option because it is necessary to stipulate that filler-gap CPs are QUE islands.

157. Was1 glaubst du was2 Hans meint [[mit wem] [Johann gesprochen hat]]?

wh-QP believe you wh-QP Hans says with whom Johann spoken has

"With whom do you believe Hans says Johann has spoken?"

Otherwise the (unbound) INHER|QUE value on the filler in 157 will be inherited out of the filler-gap CP along with the INHER|LQUE value which is also required to arise there in order to license the presence of the "was" complementizer higher up. The inheritance of wh-question features as INHER|LQUE values must be contingent on the INHER|QUE value of the pre-posed wh-expression not being bound. We would otherwise introduce the undesirable possibility of the same wh-question feature value being bound at different clauses.

However, it appears from 160 that wh-expressions may take scope out of null complementizer CPs even when the pre-posed wh-expression's features are bound. If these CPs are QUE-islands, it appears that the wh-question feature values of the embedded wh-expression in 160 must also be inherited from the CP as INHER|LQUE. This suggests that J&L need the null complementizer to be able to bind LQUE values, as well as QUE values in order to account for 160. If INHER|LQUE arises with the embedded clause in 160, it is not clear how one may employ a TO-BIND|LQUE-bearing complementizer and at the same time guarantee that a partially moved wh-expression will be among the wh-expressions which take scope with it.

A straightforward way of handling the facts in line with the approach suggested here, however, is to simply allow the TO-BIND|QUE value of the null complementizer to be a subset of the INHER|QUE value of the pre-posed wh-expression, therefore possibly empty even if the INHER|QUE value of the pre-posed expression is non-empty.[6]

161. a. SUBCAT<[[1], **INHER|QUE:X**],

S[fin, INHER|SLASH{[1]}, INHER|LQUE:Y]>

b. NONLOCAL|**TO-BIND| QUE:W**, LQUE: Z

INHER| QUE:X, LQUE: Y

Condition: Z is a subset of Y, **W is a subset of X**

either X or Y is non-empty

By UG: wh-question clauses require a non-empty TO-BIND|QUE value

As we expect the complementizer to amalgamate the INHER|QUE value of its first "filler" complement, and the INHER|LQUE value of the S[fin] complement, we also expect any features unbound on the lexical head to be inherited onto the CP, in line with the revised NFP. This means that a very simple and natural modification to the specifications determining binding of wh-expressions in English opens up the possibility of a non-empty INHER|QUE value being carried by the CP. As partial movement constructions appear in child language in English (see Crain and Thornton 1990, for example), it may well be that many children have the specifications in 161, while the setting that any non-empty INHER|QUE value carried by the filler must be bound is fixed later. Alternatively, it may be that the specifications for the null complementizer are the same in English as in 161, and that telescoping is blocked in English because all verbs which take clausal complements specify for INHER|QUE{}.

We are assuming that a verb amalgamates the union of INHER|QUE and INHER|LQUE values of its arguments as its own INHER|LQUE value in syntactic movement languages like English. If this is the case, the only non-empty INHER|QUE value at a CP with a null Q complementizer head will be that contributed by the filler complement of the complementizer in case the specifications of the complementizer allow the TO-BIND value to be vacuous.

(ii) Non-standard amalgamation of INHER|QUE values from complement clauses by "bridge verbs"

An important consideration here is the fact that, in German, certain verbs which take clausal complements do not allow complements which have the outward form of wh-clauses (this observation in Kathol 1996).

162 a. ?**Mit wem** ist es schade [dass Lisa gesprochen hat]?

with whom is it regrettable that Lisa talked has

"Who is it regrettable that Lisa talked to?"

b. ***Was** ist es schade [**mit wem** Lisa gesprochen hat]?

what is it regrettable with whom Lisa talked has

The matrix verb in 162 does not allow the partial movement option, although it does allow overt extraction. Kathol's suggestion is that the syntactic trigger feature QUE is not allowed on clausal complements for certain non-bridge verbs. In order to make this work, Kathol assumes that Pollard and Yoo's (forthcoming) conditions on inheritance of the syntactic trigger QUE is too restrictive, and that QUE must be visible to verbs which subcategorize for clausal structures with wh-expressions in left-peripheral positions. Therefore, it is necessary to amalgamate

QUE onto clausal structures from left-daughters. As mentioned earlier, Kathol 1996 then makes recourse to a lexical rule which allows those exceptional verbs which may take S[QUE] to give rise to an expletive SLASH value, the CONT value of which is structure shared with the syntactic trigger QUE feature which appears on the complement clause.

Kathol's ban on non-bridge verbs selecting QUE-bearing clauses could be handled straightforwardly in the present account by saying that non-bridge verbs which take clausal complements subcategorize for S[INHER|QUE {}] in syntactic movement languages. This may be the case for all verbs which take clausal complements in English, allowing the specifications for the null complementizer in German to suffice for English as well.

These non-bridge verbs do not amalgamate any INHER|QUE values from clausal complements, because their complements are specified as INHER|QUE {}. This, however, suggests the possibility that certain exceptional "bridge" verbs may take complements with a non-empty INHER|QUE value and, also exceptionally, may amalgamate the INHER|QUE value of just their wh-CP (with null Q complementizer or "was" heads) complements as their own INHER|QUE value.

(iii) The "was" complementizer selects S[INHER|QUE]

If certain exceptional "bridge" verbs do, indeed, amalgamate the INHER|QUE values of just these clausal complements as INHER|QUE values, then these INHER|QUE values will be structure-shared at the clausal level, in line with the revised NFP. This then opens up the possibility that the phonologically overt complementizer "was" actually subcategorizes for an S[fin] complement with a non-empty INHER|QUE value, rather than a non-empty INHER|LQUE value:

163. **"was" complementizer**

a. SUBCAT <S[fin, INHER|QUE: X, LQUE: Y]

b. NONLOCAL|TO-BIND|QUE:Z, LQUE: W

condition: X is non-empty, Z is a subset of X, W is a subset of Y, if Z is empty, so is W

I take examples from Kathol 1996 to indicate how the two complementizers suggested for German can account for the full range of data.

(iv) Accounting for the data in German

164. [Wen] hat Lisa gesehen?

who has Lisa seen

"Who did Lisa see?"

In the straightforward example above, the null complementizer operates to both amalgamate and bind the INHER|QUE value of the pre-posed wh-expression. There will be no need for an unmotivated syntactic trigger feature, employed in Kathol 1996. The presence of the required INHER|QUE value on the pre-posed wh-expression falls out in line with general conditions on amalgamation of wh-feature values, as in English.

A non-empty INHER|QUE value is required on a pre-posed wh-expression in order to satisfy the principle that only a clause with a non-empty TO-BIND|QUE value is a fully-acceptable wh-clause. As verbs are expected to amalgamate all wh-features in their INHER|LQUE value, only arguments whose wh-features are not amalgamated through the verb -- displaced complements and unrealized subjects -- will provide the required INHER|QUE value.

161. a. SUBCAT<[[1], **INHER|QUE:X**],

S[fin, INHER|SLASH{[1]}, INHER|LQUE:Y]>

b. NONLOCAL|**TO-BIND| QUE:W**, LQUE: Z

INHER| QUE:X, LQUE: Y

Condition: Z is a subset of Y, **W is a subset of X**

either X or Y is non-empty

By UG: wh-question clauses require a non-empty TO-BIND|QUE value

The null complementizer in German, specifications for which are repeated above, differs from the null complementizer in English, if at all, only in that the TO-BIND|QUE value may be empty as well as the TO-BIND|LQUE value. Nothing prevents it from binding the INHER|QUE values of pre-posed wh-expressions. Unless it does so, the clause will not constitute a fully acceptable interrogative clause, and it will not satisfy the subcategorization requirements of verbs which take interrogative clauses.[7]

164. [Wen] hat Lisa gesehen?

who has Lisa seen

"Who did Lisa see?"

Thus, we have no difficulty accounting for the grammaticality of examples which allow an INHER|QUE-bearing wh-expression to be the first complement of the null complementizer, as in 164 repeated above.

(a) Echo question contexts

165. ??Lisa hat wen gesehen?

Lisa has who-acc seen

According to Kathol 1996, the in-situ option in German is severely restricted with regard to the kind of contexts in which it is acceptable, as in English. Kathol assumes along with P&Y (forthcoming) that the oddness of such examples may be accounted for in terms of the absence of a syntactic trigger QUE feature on the left-daughter of a clause at which wh-QSTOREs are retrieved. The difference between P&Y's account and Kathol's account is that, in the latter, the QUE feature appears at the clausal level if it is available on left-daughters of clauses.

In P&Y (forthcoming) it is assumed that wh-QSTORE values may not be retrieved at all in non-triggering environments. However, the evidence relating to echo-question contexts and the special examination contexts mentioned by

Kathol suggest that wh-features may successfully take scope in at least certain restricted circumstances, in which it is not necessary for the clause to fully satisfy the requirements of being a wh-clause.

The null complementizer account with a TO-BIND|QUE-bearing complementizer, adopted under my approach, depends crucially on the possibility of subjects behaving like fillers in the operation of the Subject Extraction Lexical Rule. The null complementizer, therefore, should be able to take not only a wh-subject with a non-empty INHER|QUE value, but also a non-wh-subject, as in the example above. The specifications for the null complementizer, recall, no longer require a non-empty INHER|QUE value on the first complement. The INHER|LQUE value of the VP complement will be amalgamated as the INHER|LQUE value of the null complementizer, as expected, and this will be bindable under the specifications, repeated below:

161. a. SUBCAT<[[1], INHER|QUE:X],

S[fin, INHER|SLASH{[1]}, **INHER|LQUE:Y**]>

b. NONLOCAL|TO-BIND| QUE:W, **LQUE: Z**

INHER| QUE:X, LQUE: Y

Condition: **Z is a subset of Y**, W is a subset of X

either X or Y is non-empty

By UG: wh-question clauses require a non-empty TO-BIND|QUE value

In the account suggested here, a non-empty TO-BIND|QUE value on a null complementizer head does not allow a fully acceptable wh-clause interpretation. This accounts for the oddness of examples in English where all wh-expressions are in situ. The same explanation extends to the German case repeated below:

165. ??Lisa hat wen gesehen?

Lisa has who-acc seen

"Lisa saw whom?"

However, nothing in principle prevents the TO-BIND|LQUE value of a Q complementizer from being non-empty even if the TO-BIND|QUE value is empty. It will simply not allow a fully-acceptable wh-clause interpretation. Even so, the relevant wh-question feature value is successfully assigned scope, and the structure is acceptable in certain contexts.

However, as Pollard and Yoo (forthcoming) and Kathol (1996) require a non-empty syntactic trigger QUE value to license retrieval of QSTORE values at all, it is unclear precisely how they will account for the possibility of in-situ wh-expressions in certain restricted contexts. Under my account, we do expect INHER|LQUE values to be bindable in general, allowing the echo-context in-situ wh-expression in 165 above. However, in order to satisfy constraints applying to real wh-clauses, we require a non-empty TO-BIND|QUE value.

To emphasize, the facts fall out from dependencies between the two wh-question features, with no need to introduce an ad hoc syntactic feature, subject to idiosyncratic conditions on inheritance, which does nothing other than account for pied-piping cases, and which is left dangling with nothing to do in multiple wh-question sentences, for. example. Therefore, it is possible to handle the facts without reference to an unmotivated syntactic trigger feature value reentrant with the scope-marking wh-feature values.

(b) Fully acceptable wh-clauses

166. *Hans fragte sich [dass Lisa wen gesehen hat].

Hans asked self that Lisa who seen has

The complementizer "dass" is not expected to be able to carry exceptional non-empty TO-BIND|(L)QUE values and so does not have the potential for binding the wh-features of a complement S[fin] clause and so it is not possible for subcategorization properties of the matrix verb to be satisfied. Even if it were possible for "dass" to bind wh-question features, the fact that the embedded verb is expected to amalgamate the wh-question features of its complement as INHER|LQUE would not allow the subcategorization requirements of the matrix verb to be satisfied. So we have no need to make reference to an unmotivated reentrant syntactic trigger feature. The need for a non-empty TO-BIND|QUE value at a fully-acceptable wh-clause will be sufficient to handle the facts.

167. Wer hat behauptet [dass Lisa was gesehen hat]?

who has claimed that Lisa what seen has

"Who claimed that Lisa saw what?"

In the grammatical 167, the complementizer "dass" is able to amalgamate the INHER|LQUE value amalgamated onto the embedded S[fin] complement. If "dass" shares the VFORM features of its clausal complement (as Sag suggests), we might expect it to amalgamate all wh-question features of complements as INHER|LQUE, as is the normal case with verbs in wh-movement languages under this account. Similarly, as "dass" takes clausal complements, we might expect it to specify for INHER|QUE{}, as suggested. The matrix verb amalgamates the INHER|LQUE value from the "dass" CP, and the presence of a left-peripheral wh-expression means that the matrix CP may have a non-empty TO-BIND|QUE value, under the operation of the SELR, satisfying the requirement that the matrix CP is a fully acceptable wh-clause.

168. Wer weis [wem Lisa was gegeben hat].

who knows who-dat Lisa what given has

Who knows to whom Lisa gave what?"

who is the person x such that x knows to whom Lisa gave what

who is the person x and what is the thing y such that x knows to whom Lisa gave y

Kathol 1996 accounts for the possible ambiguity of the example repeated above as 168 by saying that QSTORE values may be retrieved at a clausal node at which there is a non-empty QUE value. As there is a wh-expression filler at the lower clause and in subject position at the matrix clause, it is possible for the embedded complement wh-expression to take embedded or matrix scope. The impossibility of wide scope for the wh-filler at the embedded clause is explained in terms of the selectional requirements of the matrix verb.

The specifications for the null Q complementizer suggested here allow INHER|LQUE values (amalgamated by the complementizer from a complement S) to be bound with the TO-BIND|QUE feature of the complementizer or remain unbound and be amalgamated by selecting verbs from the CP. There will be a further null complementizer on the matrix clause to bind any INHER|LQUE features amalgamated from the clausal complement. As in Kathol 1996, we might say that the selectional requirements of the matrix verb forces the wh-feature of the filler on the embedded clause to be bound. Alternatively, we might say that "know" takes an INHER|QUE {} complement, as expected for unexceptional non-bridge verbs. Kathol needs the matrix verb in 168 (somewhat surprisingly) to select interrogative complements because it would otherwise allow the possibility of it giving rise to an expletive SLASH value, the clausal complement clearly bearing a non-empty QUE value. Verbs which take S[QUE] in Kathol's account generate expletive SLASH.

By contrast, the impossibility of wide scope for the wh-filler on the complement clause falls out under the approach I am suggesting, without any comment, because the matrix verb will be assumed to be an unexceptional non-bridge verb.

169. *Ich will wissen [ob Lisa mit wem geredet hat].

I want to know whether Lisa with who talked has

"I want to know if Lisa has spoken with whom"

I assume here that a yes/no complementizer carries an empty TO-BIND|(L)QUE specification, so it will not be possible for the embedded wh-expression in 169 to take scope at the embedded clause.

170. **Wer** weis [ob Lisa **was** gesehen hat]?

who knows whether Lisa what seen has

"Who knows whether Lisa saw what?"

As there is an appropriate INHER|LQUE value amalgamated by successive selecting heads from the wh-expression in complement of the embedded clause in 170, the null complementizer in the matrix clause is able to bind INHER|LQUE values amalgamated from its clausal complement. The presence of an appropriate pre-posed wh-expression at the matrix clause guarantees that the example constitutes a wh-clause of unrestricted acceptability.

171. *Was ist es schade [mit wem Lisa gesprochen hat]?

what is it regrettable with whom Lisa talked has

"Who is it regrettable that Lisa talked to?"

As suggested, the non-bridge verb in the matrix clause will only amalgamate the INHER|LQUE features of its clausal complement into its INHER|LQUE value. This follows, for example, if the verb takes S[INHER|QUE {}] complements. Therefore, in 171, the unbound INHER|QUE features amalgamated by the null complementizer on the embedded clause may not be amalgamated from the CP by the non-bridge matrix verb. As the "was" complementizer takes an S[fin, INHER|QUE], we predict the example will be ungrammatical.

172. Was glaubst du, [mit wem Lisa meint, [dass Jakob gesprochen hat]]?

what believe you with whom Lisa thinks that Jakob spoke has

"Who do you believe that Lisa thinks that Jakob talked with?"

The null complementizer for German takes the wh-[PP, INHER|QUE:X] "mit wem" and the S[fin, INHER|SLASH], and allows the INHER|QUE:X value to remain unbound in accordance with the specifications repeated below:

161. a. SUBCAT<[[1], **INHER|QUE:X**],

S[fin, INHER|SLASH{[1]}, INHER|LQUE:Y]>

b. NONLOCAL|TO-BIND| **QUE:W**, LQUE: Z

INHER| QUE:X, LQUE: Y

Condition: Z is a subset of Y, **W is a subset of X**

In the above example 172, we expect the TO-BIND|QUE value carried by the complementizer to be the empty set, the matrix verb not taking interrogative clauses. This means that a non-empty INHER|QUE value must be inherited onto the CP in line with the revised NFP. We assume that bridge verbs are exceptional in allowing the INHER|QUE value of wh-CP complements to be amalgamated as their own INHER|QUE value. This will be structure-shared at the matrix S[fin] in line with the revised NFP, licensing the presence of the "was" complementizer.

163. **"was" complementizer**

a. SUBCAT <S[fin, INHER|QUE: X, LQUE: Y]

b. NONLOCAL|TO-BIND|QUE:Z, LQUE: W

X is non-empty, Z is a subset of X, W is a subset of Y, if Z is empty, so is W

The "was" complementizer, repeated above, is then able to take the S[fin, INHER|QUE] complement in 172, and successfully bind the non-empty INHER|QUE value.

172. Was glaubst du, [mit wem Lisa meint, [das Jakob gesprochen hat]]?
what believe you with whom Lisa thinks that Jakob spoke has
"Who do you believe that Lisa thinks that Jakob talked with?"

173. Was glaubst du, [was Lisa meint, [mit wem Jakob gesprochen hat]]?
what believe you what Lisa thinks with whom Jakob spoke has
"Who do you believe that Lisa thinks that Jakob talked with?"

The only difference with 173 above will be that the null complementizer will be present at the most embedded clause, where it will allow the non-empty INHER|QUE value of its wh-complement to remain unbound, and subsequently amalgamated by the intermediate bridge verb. The "was" complementizer is therefore able to take the intermediate S[fin, INHER|QUE], and allow its INHER|QUE value to remain unbound, to be amalgamated by the matrix verb.

174. *Was glaubst du, [mit wem Lisa meint, [was Jakob gesprochen hat]]?

what believe you with whom Lisa thinks what Jakob talked has

It will not be possible for a "was" complementizer to appear lower than a partial movement structure, because we do not expect any non-empty INHER|QUE values on such clausal structures in order to satisfy its subcategorization requirements. We therefore successfully capture the dependence of "was" complementizers on lower partial movement structures.

175. Was glaubst du [wem Lisa was gegeben hat]?

what believe you who-dat Lisa what given has

"Who do you think Lisa gave what?"

The fact that there is a partial movement structure on the embedded clause in 175 means that a non-empty INHER|QUE value may be amalgamated by the matrix bridge verb, allowing the "was" complementizer to take the matrix S[fin, INHER|QUE]. We allow null complementizers to leave amalgamated INHER|LQUE values unbound, in accordance with the specifications for both English and German, so these may be amalgamated as INHER|LQUE values, as expected, by the bridge verb. We expect the "was" complementizer to be able to bind INHER|LQUE values, in accordance with the specifications given, so long as there is a non-empty TO-BIND|QUE value.

176. Was glaubt wer [wem Lisa die Bucher gegeben hat]?

what believes who who-dat Lisa what given has

"Who thinks that Lisa gave the books to whom?"

Similarly, we expect the partial movement structure in the embedded clause in 176 to allow an unbound INHER|QUE value which may be amalgamated as INHER|QUE by the matrix bridge verb. The wh-question feature value of the subject wh-expression which appears after the matrix verb is amalgamated by the verb as INHER|LQUE, as verbs in general are expected to amalgamate the wh-features of arguments. The fact that bridge verbs may amalgamate the INHER|QUE values of complement wh-CPs as INHER|QUE, however, means that the selectional requirements of the matrix "was" complementizer are satisfied, and both the INHER|QUE value and the INHER|LQUE value of the matrix S[fin] may be successfully bound in accordance with the specifications for "was".

(v) Advantages over Kathol 1996

Kathol makes reference to two notions of interrogative clauses, one defined in terms of the partial movement configuration with a wh-expression to the left of a clause, the other with wh-QSTORE values actually retrieved, and therefore bound. Under the treatment suggested here, the distinction falls out naturally in terms of whether a wh-complementizer carries a non-empty TO-BIND|(L)QUE value. The fact that certain verbs in German are unable to take partial movement structures can be handled perfectly adequately by saying that their complements must be INHER|QUE {}.

In both Kathol 1996 and the account suggested here, it is possible for scope-marking features to be telescoped out of clauses which bear a non-empty QUE specification. In Kathol's account, this is handled in an ad hoc manner by extending P&Y's conditions on inheritance of the syntactic trigger feature QUE to whole clauses from left-peripheral elements, as a precondition on the operation of a lexical rule. By contrast, the availability of a non-empty INHER|QUE value on a partial movement structure falls out naturally and straightforwardly under the account here by making a single adjustment to the binding conditions applying to a null complementizer in English.

Kathol introduces a lexical rule forcing certain verbs to give rise to an expletive SLASH value. The wh-QSTORE value is reentrant for a third time, therefore, as the CONT value of the expletive SLASH. No principled explanation is offered for why the generation of this expletive SLASH value should be dependent on the availability of a feature value which is otherwise required to allow QSTORE values to be retrieved. The mechanism is introduced purely to preserve the condition that the syntactic trigger feature is available on left-most daughters at clauses at which wh-expressions take scope. By contrast, in my account, exceptional "bridge" verbs carry exceptional specifications allowing them to amalgamate the INHER|QUE values of their wh-CP complements. INHER|QUE values eventually take scope directly in an appropriate TO-BIND|QUE value, with no need for an expletive SLASH value to extend the domain of the reentrant syntactic trigger feature.

In Kathol 1996, clauses are stipulated as being islands to expletive SLASH values. No arguments are given for this. The same facts are handled in this approach by saying that "bridge" verbs only amalgamate the INHER|QUE values of wh-CPs. Another possibility is that non-wh-complementizers, like "dass" take S[INHER|QUE{}], as expected for VFORM lexical heads under the present approach.

177. *Was glaubst du, [dass Lisa meint, [mit wem Jakob gesprochen hat]]?
what believe you that Lisa thinks with whom Jakob talked has
"Who do you believe that Lisa thinks that Jakob talked to? "

As an unexceptional VFORM complementizer "dass" is not expected to amalgamate the INHER|QUE value of its complement S, because it may not take S[INHER|QUE: X], where X is non-empty. This is what is expected in the general case for VFORM lexical heads in movement languages like German. It may be possible, then, to drop the stipulation that "bridge" verbs only amalgamate the INHER|QUE values of wh-CPs.

Under Kathol's approach, the requirement for a licensing QUE feature value, reentrant with a wh-expression, generates considerable redundancy in multiple wh-questions. It fails to offer a principled explanation for the acceptability of in-situ wh-questions in restricted contexts. By contrast, my account explains the facts by requiring a non-empty TO-BIND|QUE value in fully acceptable wh-clauses. As this feature value becomes available in line with general conditions on inheritance, with a single feature value appearing in either INHER|QUE or INHER|LQUE, there is no redundancy involved.

4. 4 Iraqi Arabic

(i) Non-amalgamation of INHER|LQUE values from arguments in IA

As mentioned earlier, Iraqi Arabic (IA) does not systematically require movement of wh-expressions, as can be seen from the examples offered previously, repeated as 178.

178 a. Mona shaafat meno?

Mona saw whom?

b. Mona raadat tijbir Su'ad tisa'ad meno?

Mona wanted to force Su'ad to help who

c. *Mona tsawwarit [Ali istara sheno]?

Mona thought Ali bought what

We might assume that feature amalgamation proceeds straightforwardly as in Japanese, as expected under the FAP. Verbs amalgamate the INHER|QUE feature values of their arguments as a subset of their own INHER|QUE values, adjuncts amalgamate the INHER|QUE values of their arguments in unmodified form, and so on. We have to assume a Japanese-like complementizer C (phonologically null) which takes an S complement and carries a non-empty TO-BIND|QUE specification, as in Johnson and Lappin 1996.

In order to account for the fact that INHER|LQUE values may not be bound at the clausal level in the general case, as suggested in J&L 96, we may simply assume that the phonologically null binding complementizer in Iraqi Arabic has INHER|LQUE {}.

179. Phonologically null binding complementizer in IA

a. SUBCAT <S[fin, INHER|QUE:X]>

b. NONLOC|INHER|QUE: X (by FAP)

LQUE {}

TO-BIND|QUE: X

LQUE {}

We assume that the phonologically null binding complementizer in IA does not amalgamate INHER|LQUE values from S[fin] complements. The exceptional binding complementizer amalgamates and binds all the INHER|QUE values carried by clausal complements. We further assume that verbs which subcategorize for S[fin] amalgamate the INHER|QUE values of their complements as their own INHER|LQUE value, in the way that verbs in general amalgamate the wh-features of their arguments in English, and fail to amalgamate INHER|LQUE values of their complements at all (as will be demonstrated). As both verbs and complementizers fail to amalgamate INHER|LQUE values of their arguments, we might propose that amalgamation of INHER|LQUE is cancelled in IA. As the conditions for binding wh-expressions at the clausal level in IA does not allow INHER|LQUE to be bound with the phonologically null complementizer, we predict the ungrammaticality of 178 c:

178 c. *Mona tsawwarit [Ali istara **sheno**]?

Mona thought Ali bought what

Furthermore, we straightforwardly predict that INHER|LQUE values will not be bindable even if there is a wh-expression in matrix clause:

179. ***meno** tsawwar [Ali xaraj weyya **meno**]?

who thought Ali left with whom

The fact that the presence of a wh-expression in matrix clause does not lead to an improvement may be explained as attributable to the impossibility of null complementizers amalgamating INHER|LQUE values from their S[fin] complements. This contrasts with P&Y's (forthcoming) account in which the presence of a wh-expression in the matrix clause might naturally be assumed to provide the necessary QUE value to act as a syntactic trigger so that the QSTORE value contributed by the embedded wh-expression in 179 can be successfully retrieved. P&Y's account, then, does not appear to straightforwardly predict the severe ungrammaticality of 179.

180. sheno tsawwarit Mona [Ali ishtara t]

what thought Mona Ali bought

"What did Mona think Ali bought?"

The fact that overt movement is allowed out of S[fin] clauses suggests that amalgamation of INHER|QUE by verbs is cancelled for deleted complements. We might assume a phonologically null complementizer may take a pre-posed wh-filler, as suggested in J&L 1996. The complementizer allows amalgamation of the INHER|QUE value of the filler, as in English and German.

181 a. sh-tsawwarit Mona [Ali gabal meno]

wh-QP-thought Mona Ali met who

"Who did Mona think Ali met?"

b. sh-'urfut Mona [Ali gabal meno]

wh-QP-knew Mona Ali met who

"Who did Mona know that Ali met?"

*"Mona knew who Ali met"

We assume that the phonologically-realized complementizer "sh-" takes an S[fin, INHER|LQUE:X] where non-empty X is required to be bound as the TO-BIND|QUE value of the complementizer. This simply requires exceptional specifications governing amalgamation of INHER|QUE.

182. **"sh-"**

a. SUBCAT <S[fin, INHER|LQUE:X]>

b. NONLOC|INHER|QUE: X, LQUE {}

TO-BIND|QUE: X, LQUE {}

condition: X is non-empty

This means that neither of the binding complementizers in IA allow amalgamation of INHER|LQUE. The fact that the "sh-" complementizer defines scope for wh-expressions, as in 181 b, follows from the condition that X be non-empty.

183. sh-tsawwarit Mona [**meno1** rada Ali ysa'ad **meno2**]

wh-QP-thought Mona who wanted Ali to help who

"Mona thought who wanted to help whom?"

for which <x1, x2> Mona thought x1 wanted Ali to help x2

In 183, INHER|QUE values are amalgamated as expected under the FAP by the relevant lexical heads so that the embedded S[fin] bears an INHER|QUE value which is the union of the INHER|QUE values of the two wh-expressions. The matrix verb, however, amalgamates these as INHER|LQUE values, requiring the "sh-" complementizer to amalgamate these as INHER|QUE values to allow binding in accordance with the specifications in 182.

184. *sh-i'tiqdit Mona [**meno1** tsawwar [Ali sa'ad **meno2**]]

wh-QP-believed Mona who thought Ali helped who

"Mona believed that who thought Ali helped whom?"

for which <x1, x2> Mona believed x1 thought Ali helped x2

In 184, however, although the INHER|QUE value of the most deeply-embedded wh-expression may be amalgamated by the intermediate verb as its INHER|LQUE value, we are assuming that lexical heads in IA do not amalgamate the INHER|LQUE values of their arguments. Therefore, the matrix verb will not amalgamate the INHER|LQUE value of the intermediate clause, and it will not be possible to discharge the INHER|QUE value of meno2 with the wh-QP on the matrix clause. The facts fall out straightforwardly on the assumption that verbs which select S[fin] collect the INHER|QUE value of these complements as an

INHER|LQUE value, while lexical heads in IA do not amalgamate the INHER|LQUE values of selected arguments. There is no need for null complementizers to pass up INHER|LQUE values, nor is there any need to assume F-islands.

(ii) Ouhalla 1996

Ouhalla 1996 offers some interesting suggestions to account for IA data which is problematic for the Minimalist Program. Ouhalla argues that there are at least two kinds of wh-pronouns in UG, those which may be bound from an antecedent position outside S[fin] and those which may not. As a wh-expression in IA requires a local antecedent in the minimal finite clause in which it occurs, it is not possible for a wh-expression to take scope out of an S[fin]. Ouhalla argues forcefully, therefore, that there is no evidence for covert movement of any kind associated with wh-expressions.

The approach suggested here perfectly captures Ouhalla's suggestion that wh-expressions in IA be bound in S[fin] domains, with no need for movement operations. However, it is unclear how Ouhalla can extend his approach to also account for Subjacency in Japanese data, where it appears that the MP needs to invoke operator movement to carry out feature-checking. Wh-expressions in Japanese may be bound outside of S[fin] minimal domains in general, so it is unclear how a Minimalist account can handle the infelicity of wh-expressions which occur inside of "ka-dooka" clauses without any kind of movement or feature-percolation mechanism.

181 a. **sh**-tsawwarit Mona [Ali gabal meno]

wh-QP-thought Mona Ali met who

"Who did Mona think Ali met?"

Interestingly, Ouhalla explains the possibility of wh-expressions taking scope out of an S[fin], as in 181a, by following Aoun and Li's 1993 suggestion that a Q-morpheme performs a linking operation between the wh-expression and its antecedent position. In order for this to work, the Q-morpheme "sh-" is base-generated in Comp of the embedded clause in 181a, and moves to the matrix Comp to perform the linking function. Ouhalla's non-movement account uneconomically fails to dispense with movement operations in IA. Also, it is unclear from his account exactly how the Q-morpheme manages to perform the linking function required to extend the domain in which the wh-expression may be bound.

By contrast, the account suggested here explains exactly how the binding domain of the wh-expression is extended in the presence of the "sh-" complementizer. Only "sh-", which carries exceptional specifications allowing INHER|LQUE values of the S[fin] complement to be amalgamated as INHER|QUE values, is able to successfully bind INHER|LQUE: X values amalgamated by a verb which takes an S[fin, INHER|QUE: X] complement. Furthermore, the facts are handled without recourse to movement operations of any sort.

(ii) Extraction from CNPs in IA

Unlike Japanese and Chinese, languages like Iraqi Arabic and Hindi do not allow in situ wh-expressions to take scope out of CNPs, as can be seen from examples like 185, below:

185. * 'Urfut Mona [il-bint illi istarat **seno**]?

knew Mona the-girl who bought what

"Mona knew the girl who bought what?"

As we expect lexical heads which take S[fin] complements to amalgamate the INHER|QUE features of their complements as INHER|LQUE values, the ungrammaticality of 185 follows directly if we assume the presence of phonologically null complementizers in relative clause constructions.

For example, Lappin 1996 and Gregory and Lappin 1997 employ a null complementizer R which takes three alternative feature specifications in English.

186.

(i) Wh-phrase RC's:

a. SUBCAT <[2], INHER|REL {[1]}], S[fin, INHER|SLASH {[2]}>

b. NONLOCAL|TO-BIND|SLASH {[2]}

(ii) That-RC's:

a. SUBCAT <[2]:[CONTENT *relpron*], S[fin, INHER|SLASH {[2]}>

b. NONLOCAL|TO-BIND|SLASH {[2]}

c. INHER|REL {[1]}

(iii) Bare-RC's:

a. SUBCAT < S[fin, INHER|SLASH {[2]}>

b. NONLOCAL|TO-BIND|SLASH {[2]}

c. INHER|REL {[1]}

As the relativizer is the syntactic head in an RC construction, the SLASH value carried by the S[fin] complement will continue to be successfully bound under the approach I am proposing here, with the revised NFP. The difference is that the relativizer is now the conduit for the INHER|SLASH value of its complement S[fin], as well as bearing the TO-BIND|SLASH value which will prevent INHER|SLASH from being inherited onto the RC.

Similarly, the relativizer will amalgamate the INHER|REL values of its first complement in Wh-phrase RC constructions, meaning that a non-empty INHER|REL feature will be inherited through the relativizer in each of the cases above. This will be successfully bound in construction with a TO-BIND|REL-bearing nominal in a head-adjunct phrase with a nominal head and RC[MOD N'] adjunct daughter because the nominal will constitute the syntactic head, meaning that INHER|REL carried through the semantic head daughter will terminate in accordance with the revised NFP.

Revised Nonlocal Feature Principle

For each NONLOCAL feature F, the NONLOCAL|INHERITED value of F on a mother M is the NONLOCAL|INHERITED features F of the semantic head daughter minus the value of NONLOCAL|TO-BIND on the syntactic head daughter.

Assuming the presence of a relativizer in IA also, as in 186 (i) above, for example, we might well expect it to amalgamate the INHER|QUE value of its S[fin] complement as an INHER|LQUE value.

185. *'Urfut Mona [il-bint illi istarat seno]?

knew Mona the-girl who bought what

"Mona knew the girl who bought what?"

Although we expect this INHER|LQUE value to be carried onto the NP in accordance with the revised NFP, we do not expect lexical heads to amalgamate the INHER|LQUE values of arguments in IA, so this will go completely unamalgamated by the matrix verb in 185. As lexical heads do not amalgamate the INHER|LQUE values of arguments in IA at all, we also predict that the presence of a "sh-" complementizer will not salvage sentences with a wh-expression embedded in a CNP, as in 187.

187. *Sh-'urfut Mona [il-bint illi istarat seno]?

Wh-QP-knew Mona the-girl who bought what

"Mona knew the girl who bought what?"

Ouhalla 1996 stipulates that it is not possible for the moved Q-morpheme to be base-generated in relative clauses. In the account suggested here, the ungrammaticality of 187 follows directly from the fact that lexical heads which take S[fin] complements amalgamate their INHER|QUE values as INHER|LQUE values, plus the fact that lexical heads do not amalgamate the INHER|LQUE values of selected arguments in IA. The full range of facts falls out from these two simple assumptions with no need to invoke the kind of movement operations which Ouhalla attempts, unsuccessfully, to dispense with.

Footnotes to Chapter Four

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[1] Watanabe's GB account obviously assumes movement.
[2] The same general issue is explored in Chapter Five, but without relying on phonetically empty complementizers.
[3] Although this is (admittedly) at the undesirable cost of generating radically different structure for the following grammatical sentences:

(a) John left.
(b) Who left?

However, I make suggestions in connection with this in Chapter Five.
[4] With the important distinction that QUE is not here assumed to be a syntactic inherited feature. Rather, it is a semantic, scope-marking, feature. Pied-piping facts fall out with respect to interdependence between QUE and LQUE.
[5] This means, incidentally, that "ka" may be regarded as a true Q complementizer.
[6] It would, of course, be possible to have a mechanism by which an INHER | LQUE value is telescoped, as suggested in J&L (96). However, as mentioned, it is not clear why LQUE is generated with an unbound QUE value, and the pied-piping solution suggested here is unnecessarily forfeited if this option is taken. We would then require an otherwise unmotivated syntactic trigger feature.
[7] Thus, we need not assume that percolation of a wh-feature onto a clause requires it to be a wh-clause. Rather, a fully acceptable interrogative wh-clause is determined by the presence of a bound QUE value. There is no reason to believe that selecting verbs require a further syntactic reflex.

Chapter Five

Problems and Suggestions

Given the centrality of structure-sharing in HPSG, the possibility that this mechanism drives inheritance is a natural hypothesis if inherited features are amalgamated by selecting heads. Conflicting evidence -- from Japanese on one hand and Iraqi Arabic on the other -- suggests that scope-marking wh-question features may be amalgamated from fillers either directly by heads which select fillers as complements or by verbs from unrealized complements whose structure survives in SLASH. The account suggested so far restricts feature-amalgamation by way of a rather natural mechanism which has collection of wh-question features cancelled from unrealized complements in syntactic movement languages. Under the modifications suggested it is possible to handle embedded scope for fillers in languages like Japanese, and account for so-called pied-piping facts without extending the inventory of features. In this chapter I address certain objections to the account provided so far and note difficulties which arise in attempting to handle data from other languages. I suggest how to dispose with empty complementizers and conclude that the main claims made in this dissertation are sound.

5. 1 Complementizers

An obvious objection to the account provided so far is that it relies heavily on complementizers which bear the TO-BIND|(L)QUE feature. All languages are required to have complementizers which allow wh-question features to terminate, Japanese being somewhat exceptional in having phonologically non-empty complementizers of this sort. It should be admitted that this is problematic, not least because there is evidence against empty complementizers. It appears, for example, that verbs may bear a MOD feature for nominals to which they attach, strongly suggesting that there are no null relativizers in relative clause constructions (see Kim 94, for example). Sag's account of English relative clauses in English has no need for empty relativizers of any description. As the complementizer account for wh-question clauses borrows from Pollard and Sag (94)'s account of empty relativizers, evidence that such relativizers do not exist has to be taken seriously.

Even so, the account of Japanese provides important clues as to how – in our head-driven grammar -- heads may carry rich, non-default specifications which impose conditions on NONLOCAL feature amalgamation and binding. Complementizers are employed in this dissertation as a way of showing how wh-question features may be amalgamated onto clausal structures and take scope there. In particular, the complementizer account allows the wh-question features of fillers to be amalgamated onto clausal structures directly by a selecting complementizer head rather than via the SLASH feature amalgamated by a selecting verbal head. It should be stressed that evidence from Iraqi Arabic (and Hindi, treated below) strongly suggests that an alternative mechanism of this kind is necessary. It should also be noted in this regard that P&Y's account as it stands does not allow the scope-marking features of fillers to be amalgamated directly from fillers.

An important point in defense of the use of complementizers is the fact that it is vital to at least provide a formal account of the facts in order to make a meaningful contribution to linguistic theory. P&S quote Chomsky (1957:5) in stressing the importance of formalizing one's claims. Chomsky emphasizes that precise and clear formalization "can play an important role, both negative and positive, in the process of discovery itself. By pushing a precise but inadequate formulation to an unacceptable conclusion, we can often expose the exact source of this inadequacy and, consequently, gain a deeper understanding of the linguistic data." Chomsky unequivocally rejects the view that linguistic theory need not be formalized. He notes that "obscure and intuition-bound notions can neither lead to absurd conclusions nor provide new and correct ones, and hence they fail to be useful in two important respects. I think that some of those linguists who have questioned the value of precise and technical development of linguistic theory have failed to recognize the productive potential in the method of rigorously stating a proposed theory and applying it strictly to linguistic material with no attempt to avoid unacceptable conclusions by *ad hoc* adjustments or loose formulation." I will claim that a critical look at the account provided here reveals that the innovative suggestions made in this dissertation are sound and that the research provides clues regarding how to solve apparent problems, serving as a foundation for further, highly promising research.

(i) Hindi

Hindi is similar to Iraqi Arabic in that wh-expressions may not generally take scope out of S[fin]. The examples below are from Mahajan 1990, Srivastav 1991, and Simpson 1994.

188. Raam-ne Mohan-ko **kise** dekhne ke liye kayaa

   Ram-erg Mohan-erg whom to-see for told

   "Ram told Mohan to look at *whom*?"

189. *Raam-ne kahaa [ki **kon** aayaa he]

   Ram-erg said who has come

   "Ram said that *who* has come?"

190. **Kon** Raam-ne kahaa [ki t aayaa he]

   who Ram-erg said has come

   "Who did Ram say has come?"

As in IA, it is not possible for a wh-expression to appear embedded in an S[fin] complement of a non-interrogative verb, as illustrated in 189. However, it is possible to overtly extract wh-expressions from these environments. The F-island approach adopted by J&L (96) provides a principled explanation for such facts. If S[fin] is a QUE-island, we do not expect the wh-question feature to be inheritable from the embedded clause in 189, accounting for the ungrammaticality of the example. In 190, it might be supposed that a TO-BIND|QUE complementizer takes a pre-posed wh-filler and S[SLASH] complement, as in

English. In order to account for 188, we might assume that a phonologically empty TO-BIND|QUE complementizer is available to take S[fin, QUE].

191. ***Kon** Raam-ne kahaa [ki **kis-ko** t maaregaa]

who Ram-erg say t who will hit

"*Who* did Ram say will hit *who*?"

Such an account is able to explain the ungrammaticality of 191 because the wh-question features of the S[fin]-embedded wh-expression will not be inherited from the F-island. Under the modifications I suggest, verbs fail to amalgamate the INHER|QUE features of S[fin] complements in certain languages, while Q complementizers amalgamate the INHER|QUE features of fillers which they take as pre-posed complements.

Examples such as 191 pose severe difficulties for Pollard and Yoo's account because it provides evidence that scope-marking features are not amalgamated through verbal heads via the COMPS feature while P&Y suggest no other mechanism to allow amalgamation of scope-marking features from fillers. The presence of a matrix wh-filler is expected to provide an appropriate triggering environment for QSTOREs under P&Y's account.

As mentioned earlier, Simpson 1995 suggests that movement is forced in examples like 190 because wh-expressions have to be in an appropriate licensing relation with a +Q Comp.

190. **Kon** Raam-ne kahaa [ki t aayaa he]

who Ram-erg said has come

"Who did Ram say has come?"

By the same token, 192 is not salvaged under Simpson's account because the S[fin]-embedded wh-expression is not appropriately licensed.

192. ***Kon** Raam-ne kahaa [ki **kis-ko** t maaregaa]

who Ram-erg say t who will hit

"*Who* did Ram say will hit *who*?"

Simpson's licensing account, then, offers a simple solution where one does not straightforwardly exist under P&Y's approach. It might be imagined, then, that Simpson's licensing account is equivalent to -- or even superior to -- the kind of approach suggested in this dissertation, which modifies the basic mechanism employed by J&L (96). It is extremely important, then, to point out that the account suggested here does indeed assume some form of licensing mechanism for wh-expressions. The difference between my account and Simpson (95) is the fact that mine provides a formal explication of the licensing mechanism involved, whereas Simpson does not. Therefore, Simpson's account does not meet the standard set in Chomsky (57) quoted earlier.

This point may be illustrated using the following data taken from Simpson (95):

193. Raam-ne Mohan-se puuchaa [ki kis-ne kyaa kese thiik kiyaa]

Ram-erg Mohan asked who-erg what how fixed

"Ram asked Mohan who fixed what how"

NOT: What did Ram ask Mohan who fixed how

194.

??Kon sii tiim/i Raam-ne puuchaa [ki kis-ko/k Mohan soctaa he ki t/i t/k haraa degii]

which team Ram-erg asked who Mohan thinks will defeat

"Which team/i did Ram ask who/k Mohan thought t/i would defeat t/k?"

Simpson (95) points out an important distinction between 193 and 194. In the latter, a coherent interpretation is available with the matrix filler being directly questioned. Simpson notes that example 194 is not fully acceptable because of constraints on overt movement out of wh-clauses. However, example 193 is impossible on the attempted wide scope reading for one of the embedded wh-expressions.

Note that the facts are straightforwardly predictable and explicable under the inheritance account presented here. As the wh-question features are not amalgamated from S[fin], it is not possible for any of the S[fin]-embedded wh-expressions to take wide scope. Even so, we do expect wh-question features amalgamated from the filler to be bound with the appropriate TO-BIND CP in 194. The infelicity of the example may be explained in terms of constraints on inheritance of SLASH.

However, Simpson needs to resort to an ancillary explanation for the unavailability of wide scope readings for 193. Simpson acknowledges that nothing prevents the embedded wh-expressions in 193 from being licensed, so it is not clear what prevents the wide scope interpretation. Simpson speculates that Relativized Minimality (Rizzi 90) constrains the in situ wh-expressions from being bound from a remote +Q Comp. However, it is damaging to Simpson's account to make this ad hoc appeal to Relativized Minimality because it does nothing more than stipulate that a wh-expression may not take scope at +Q CP which is not able to license it.

The explanation given in this dissertation is that wh-expressions are licensed via a mechanism by which features arising with wh-expressions are required to be bound and thereby directly take scope. Simpson (who does not dispense with feature-checking in his neo-Minimalist account) fails, by contrast, to explain the facts without recourse to ad hoc adjustments precisely because he does not attempt to provide a formal explication of the licensing mechanism. The suggestion made in this dissertation, that scope-marking wh-question features are not amalgamated from S[fin] in languages like IA and Hindi, allows a straightforward explanation of the facts concerning the licensing conditions on wh-phrases without recourse to any ancillary explanations.

However, my approach has significant advantages over the J&L (96) approach in dealing with languages like Hindi. It is in fact possible for wh-expressions to take scope out of S[fin] clauses in case an element homophonous with the Hindi word for "what" appears before the verb which selects the S[fin] clause in which the wh-expression is embedded.

195. Raam-ne **kyaa** socaa [ki kon aayaa he]

Ram-erg kyaa think who has come

"Who does Ram think has come?"

In J&L (96), the expletive nature of uninterpreted wh-elements of this kind is handled by treating them as complementizers. Complementizers allow wh-question features to be bound (or telescoped out of certain environments), but do not generate any wh-question features of their own, which serves to explain their expletive nature. This kind of treatment is relatively unproblematic in the case of Iraqi Arabic, where the expletive wh-element may be taken to attach to clausal structures, but the candidate complementizer in Hindi appears between the subject and the verb. Under J&L (96)'s approach, we might imagine that a null complementizer allows INHER|QUE features stranded on an S[fin] F-island to be telescoped out of this environment as INHER|LQUE, with "kyaa" serving to bind these features, taking a VP[SUBJ <[1]>, LQUE] and a pre-posed complement NP[1]. Alternatively, under the feature-amalgamation approach suggested here, we might say that verbs amalgamate INHER|QUE features of S[fin] complements in INHER|LQUE while the TO-BIND|QUE complementizer "kyaa" takes a VP[SUBJ <[1]>, LQUE] and a pre-posed complement NP[1] while amalgamating the LQUE features of its complement S in its own INHER|QUE. This would mean that the "kyaa" complementizer would act something like the null Q complementizer in English in the output of the SELR.

Even so, there seems no clear evidence in favor of treating pre-verbal "kyaa" as a complementizer just as there is no clear evidence that the pre-verbal element "sh-" in Iraqi Arabic is a complementizer head which selects S as its complement. Indeed, the treatment of such elements as complementizers is radically at odds (cross-theoretically) with other accounts.

In Kathol's 1996 account of partial movement in German, for example, the expletive nature of "was" is captured by treating it as a wh-filler which does not have QSTORE values amalgamated by a verb and which fills no thematic role in a verb's CONTENT. Van Riemsdijk 1983 originally proposed that the expletive wh-expression in German is base-generated in Spec of matrix CP, forming a chain with the wh-expression in the embedded CP. McDaniel 1989 follows this basic approach in accounting for partial movement in languages like Romani. Dayal 1994 assumes that the expletive wh-expression in Hindi is base-generated as a pre-posed argument, with the finite clause treated as a syntactic adjunct coindexed with the preverbal object. Horvath 1997 borrows indirectly from Dayal 94 and assumes that expletive wh-expressions involved in partial movement in Hungarian are moved arguments of verbs which are able to license these elements when there is a wh-feature on the clausal complement.

Indeed, if verbs may amalgamate the NONLOCAL features of their complements, subject to non-default conditions applying to certain heads, alternative treatments of "kyaa" are available, more in keeping with the standard approaches. The element "kyaa" might indeed be assumed to be a wh-expression, for example. In Hindi, verbs which take S[fin, QUE] complements might, for example, require a pre-posed wh-complement "kyaa," which does not fill a thematic role in the CONTENT of the verb and which does not have wh-question features amalgamated by the verb.

Such a condition would account for examples such as 195, where there is a wh-expression in the complement S[fin].

195. Raam-ne **kyaa** socaa [ki kon aayaa he]

Ram-erg kyaa think who has come

"Who does Ram think has come?"

In other words, amalgamation of wh-question features from an S[fin] complement is conditional on the appearance of "kyaa" before the verb. Note that if the wh-phrase occurs in situ in a tensed clause separated from the matrix by other tensed clauses, all of the intervening tensed clauses must also contain "kyaa".

196.

Raam-ne **kyaa** socaa [ki Ravii-ne **kyaa** kahaa [ki kon saa aadmii aayaa thaa]]?

Ram-erg QP thought that Ravii-erg QP said which man came

"Which man did Ram think that Ravi said came?"

Such a condition follows straightforwardly if verbs in Hindi require the expletive preverbal "kyaa" in order to amalgamate INHER|QUE from the complement S[fin]. Such an account is possible if we assume a feature amalgamation principle subject to non-default conditions, but it is not clear how such a straightforward condition could be captured under the classical NFP.

197. *Raam-ne socaa [ki Ravii-ne **kyaa** kahaa [ki kon saa aadmii aayaa thaa]]?

Ram-erg thought that Ravii-erg QP said which man came

198. *Raam-ne **kyaa** socaa [ki Ravii-ne kahaa [ki kon saa aadmii aayaa thaa]]?

Ram-erg QP thought that Ravii-erg said which man came

As expected, the absence of the expletive prefix "kyaa" on the matrix verb in 197 and the intermediate verb in 198 does not allow the wh-question features to be amalgamated by the verb and ungrammaticality results.

199.

*Raam-ne [us aadmii-ko jis-ko ravii-ne kyaa ciiz dii] baazaar jaate dekhaa

Ram-erg that man who Ravi-erg what thing gave market going saw

"Ram saw [the man who Ravi gave what] going to the market?"

The impossibility of extraction of QUE from CNPs may be handled under the same general assumption, if heads (a null relativizer or a verbal head which bears the MOD feature) are subject to non-default conditions governing the inheritance of NONLOCAL features. In this case, we may assume that the head (whichever it is) may not amalgamate wh-features.

200.

*Raam-ne socaa ki [[yah baat [ki Mohan-ne kis-ko maaraa] galat he

Ram-erg thought this fact Mohan-erg who hit is wrong

"Ram thinks that the fact that Mohan hit whom is wrong?"

The same general explanation applies in cases where the S[fin] appears as the complement of a nominal as in 200 above, under the assumption that heads fail to amalgamate the wh-features of S[fin].

Conditions on feature amalgamation allow the inventory of complementizers to be reduced. In fact, the account suggested here, which allows heads to specify conditions applying to feature amalgamation and binding, is committed to phonologically null complementizers for only two reasons. Complementizers provide a convenient means of binding features, and allow the NONLOCAL features of fillers to be amalgamated. If some other effective means of accomplishing these two things is found, phonologically null complementizers may be abandoned.

5. 2 Giving up empty complementizers

Hungarian provides extremely important data in this regard. In fact, Hungarian presents serious challenges to both the HPSG approaches presented here, but the data strongly suggests solutions which allow empty complementizers to be dispensed with under the assumption that heads may be subject to non-default conditions on inheritance and binding, with NONLOCAL inheritance via structure-sharing.

(i) Non-empty complementizers

A general problem faced by an account which assumes complementizers is the fact that there is a danger of proliferation. This is particularly problematic where non-empty complementizers clearly exist, but do not have the function one requires. As has been suggested, the phonetically realized Japanese Q complementizer may plausibly be assumed to carry specifications allowing binding of wh-features. However, the candidate for non-empty complementizer in Hindi clearly does not function purely as a Q complementizer.

201. Kis-ko raam-ne socaa [**ki** siitaa-ne t dekhaa thaa]

Who Ram thought that Sita seen be-past

"Who did Ram think that Sita had seen?"

Mahajan (1990) glosses the element "ki" in 201 as a complementizer "that". However, it appears on a CP complement of "thought" so it may clearly not be characterized as a Q complementizer. Even so, it appears to be possible for the complementizer to appear on interrogative clauses as well.

202. Raam-ne puuchaa [**ki** mohan-ne kis-ko dekhaa]

Ram-erg asked Mohan-erg kis-ko saw

"Ram asked who Mohan saw?"

The presence of the complementizer in 202 either means that the non-Q complementizer is required to optionally fulfil this function, or that we have multiple embeddings of complementizers in the embedded clause.

This kind of approach becomes particularly problematic in dealing with evidence from Hungarian.

203. Peternel gondolom **hogy** Janos nagyobb

Peter I-think that John taller

"I think that John is taller than Peter"

In the example (from De Mey and Maracz 1986), there is an element "hogy" -- standardly treated as a complementizer -- which appears at a non-interrogative clause. Interestingly, in cases of so-called long wh/focus movement in Hungarian (Maracz 1987), it appears that the complementizer is obligatory.

204. Kit gondolsz **hogy** Janos latott

Who-acc think that John-nom saw

"Who do you think that John saw?"

Again the non-empty complementizer appears at a non-interrogative clause, but appears to perform some function with regard to a complement clause with a non-empty SLASH feature. One may speculate that Hungarian verbs do not take bare S[SLASH] for some reason. However, "hogy" may also appear (optionally) at embedded clauses in partial movement constructions.

205. Mit gondolsz (**hogy**) Janos kit latott

what-acc think that John-nom who saw

"What do you think that John saw?"

In 205 (Maracz 87), the contentful wh-expression "kit" is taken to be in wh-focus/movement position, and the expletive "mit" marks its scope. Under the complementizer approaches suggested so far, we require a complementizer to generate the appropriate wh-feature (either QUE or LQUE) so that it can be terminated with a further complementizer on the matrix. As "hogy" is optional, it clearly does not have this function, and rather forces us to assume complementizer-embeddings in the case "hogy" is present.

Even more problematic than complementizer proliferation, however, is the fact that it is difficult to see how a complementizer embedded in a partial movement clause could have the function we require. As can be seen from 205, movement/focus positions are strictly pre-verbal and the relevant expressions may appear to the right of subjects. This is not the preferred configuration for a complementizer approach.

A further difficulty attested by Horvath 1997 is that Hungarian scope-markers are not characterized by some default case, but manifest the full variety of cases available in argument positions in Hungarian. As these expressions take the same form as wh-arguments taken by the relevant verbs, the natural assumption is that they are actually wh-expressions rather than complementizers.

206 a. **Mire** szamitasz, hogy **mit** fognak mondani a gyerekek?

What-al count that what-acc will say the kids

"What do you expect the kids will say?"

b. **Mire** szamitasz?

What-al count

"What do you expect (count on)?"

Horvath assumes that the scope-marking expression in 206a is base-generated with the matrix verb in conjunction with a clause which is able to bear a wh-feature (suggestively) by feature-percolation. The fact that this mechanism allows the partially moved wh-expression to take wide scope means that the [+wh] embedded clause will not necessarily constitute an interrogative clause.

This mechanism is parallel to Kathol's account of partial movement in German, where the bridge verb is able to generate a SLASH value by lexical rule, in conjunction with an S[QUE] complement. As the P&Y/Kathol solution makes no appeal to complementizers, it might well be that this is the most promising way to go.

5. 3 Hungarian and the P&Y/Kathol account

It should first be acknowledged that the mechanism by which certain verbs are able to give rise to an appropriately case-marked SLASH element by lexical rule in conjunction with certain complements is consistent with Horvath's approach and provides a straightforward explanation for the different case markings available on the scope-markers.[1] However, certain difficulties are raised by data (to be presented) which strongly suggests that an alternative means is required to amalgamate the NONLOCAL features of fillers (without complementizers). The same data strongly suggests that TO-BIND features are also structure-shared through head projections, indicating that NONLOCAL inheritance may indeed be handled via structure-sharing. Given these facts, one may suggest a means of accounting for the facts in a unified theory of NONLOCAL features via feature amalgamation through verbs, dispensing with complementizers. It will be seen that the suggestions offered have clear advantages over the P&Y/Kathol accounts.

One difficulty faced by the Kathol approach is that bridge verbs in Hungarian do not appear to generate their SLASH feature in conjunction with an S complement which has a syntactic trigger feature on the left daughter.

205. <u>Mit</u> gondolsz (**hogy**) Janos <u>kit</u> latott

what-acc think that John-nom who saw

"What do you think that John saw?"

As can be seen from 205, repeated above, the contentful wh-expression may be embedded in a "hogy"-CP, and may appear to the right of the subject. Whatever means is employed to percolate the syntactic trigger feature to whatever position required by the bridge verb to generate the appropriate SLASH value, the mechanism appears to be far less restricted than Kathol (and P&Y) suggests. As inheritance of this feature is less restricted than expected for a syntactic trigger feature, this naturally poses the question of why we may not simply assume this to be a scope-marking semantic feature which may remain unbound if it appears on wh-expressions in focus positions.

A second major difficulty for the P&Y/Kathol account is the fact that Hungarian provides strong evidence that scope-marking features must be amalgamated directly from fillers by some mechanism.

207. **Kit** gondolsz hogy Vili mondta hogy latta Janost

Who-acc you-think that Bill-nom said that **t** saw John-acc

"Who do you think that Bill said saw John?"

In 207 (from De Mey & Maracz 86), there is a wh-filler "kit" in the matrix clause. However, it does not inherit its case from the unrealized subject to which we expect it to be related. This evidence does indeed suggest that Hungarian verbs are subject to non-default conditions on amalgamation of NONLOCAL features. In this case it appears that a verb which takes a CP[SLASH{NP[nom]}] may not amalgamate this feature but may generate SLASH{NP[acc]} instead. We might argue that the non-default conditions on amalgamation of NONLOCAL features is fully in line with Kathol's suggestions regarding lexical rules involving the generation of SLASH values.[2]

However, a severe general problem for the P&Y/Kathol account is that it is clear that in 207 we do not have LOCAL structure-sharing between the filler and the subject. Therefore, we do not expect the most deeply-embedded verb to collect the scope-marking features of the filler via structure-sharing in the SUBJ feature, unless some ad hoc arrangement is found to ensure this. This is severely problematic, because P&Y's account provides no other means of amalgamating the QSTORE feature of the filler, and therefore predicts the ungrammaticality of the example.

207. **Kit** gondolsz hogy Vili mondta hogy latta Janost

Who-acc you-think that Bill-nom said that **t** saw John-acc

"Who do you think that Bill said saw John?"

As 207 is grammatical, we must find some other means of amalgamating the wh-features of the filler. This is particularly pressing, as the complementizer approach appears doomed to failure in explaining the facts from Hungarian.

(i) Wh-feature amalgamation via TO-BIND|SLASH

The obvious solution to the problem of amalgamating the wh-features of fillers onto clausal structure by some other means than via the SUBJ or COMPS feature is to do it via SLASH. In 207, we might assume that there will be INDEX-sharing between the element in SUBJ and the filler, but not LOCAL- (or SYNSEM-) sharing.[3] This can be guaranteed via the appropriate lexical rule governing the amalgamation of SLASH. However, as we must expect the embedded verb to generate the appropriately case-marked SLASH value, we might well suppose that the wh-features will be contained in this SLASH value as it unifies with the filler. If verbs which take clausal complements may amalgamate wh-features from SLASH values, this provides a solution to the problem. Indeed, there appears to be no other possible way that these verbs can amalgamate the NONLOCAL features of fillers.[4]

The problem with such a solution is that multiple clausal-embeddings such as in 207 will create the undesirable possibility of both higher verbs collecting the wh-features of the filler. The obvious solution to this difficulty is to have wh-features amalgamated from bound SLASH values in syntactic movement languages like Hungarian. As the filler is bound on only the matrix clause in 207, this desirably restricts feature amalgamation to the matrix verb. This is entirely in keeping with the view in this dissertation that heads may be subject to non-default conditions on amalgamation and binding of NONLOCAL features. It also seems to be the only possible means of allowing amalgamation of wh-features directly from fillers without complementizers, while the evidence from Hungarian, Iraqi Arabic, and Hindi indicate that such a mechanism is necessary.[5]

The problem with this kind of straightforward and highly natural solution is that lexical binding of SLASH is not assumed in the general case. Termination of SLASH is accomplished by constraints applying to certain phrases (head-filler phrases have SUBJECT-saturated SLASH-bearing heads in English, apparently a somewhat different condition is required for Hungarian). Although heads participating in so-called "tough"-constructions and certain focus constructions in English are assumed to bear TO-BIND|SLASH in P&S, this is not assumed to be the case for verbs which have SLASH terminate in their clauses.

However, the evidence very strongly suggests that this is precisely what is necessary in order to allow amalgamation of certain NONLOCAL features from fillers. As there seems no way to compromise on this, we must assume that verbs may in fact bear TO-BIND|SLASH containing values they amalgamate.[6] The problem which now arises is that, given both the classical and modified form of the NFP presented here, if a verb binds SLASH no record of this is carried up the head projection in order to allow a properly licensed head-filler phrase. This entails that TO-BIND|SLASH values are also carried up head projections so that a filler XP[1] may be licensed to the left of TO-BIND|SLASH {[1]} phrase. As the NFP, modified in this dissertation in order to allow feature amalgamation, would then require NONLOC|SLASH to be inherited via structure-sharing of both INHERITED and TO-BIND features, one may well wonder if in fact the structure of NONLOCAL should be modified to allow full NONLOCAL structure-sharing between heads and mother phrases, bringing it fully in line with the conditions applying to inheritance of CONTENT and HEAD features.[7]

(ii) Hungarian without empty complementizers

Assuming that verbal heads may carry TO-BIND|SLASH values and that the licensing conditions on filler-head constructions are handled (presumably by also having TO-BIND features structure-shared between mother phrases and semantic head daughters), we have the basis for an analysis of Hungarian without complementizers.[8]

One should first recall that the Kathol/P&Y approach to generating a

SLASH value in partial movement languages does not appear to generalize straightforwardly to Hungarian. We might hypothesize instead that the wh-feature Horvath says is required on partial-movement clauses is INHER|QUE. Note that there is evidence that subjects may appear before focussed wh-expressions and that pre-posed subjects may be left-most elements in wh-clauses.

205. <u>Mit</u> gondolsz (**hogy**) Janos <u>kit</u> latott

what-acc think that John-nom who saw

"What do you think that John saw?"

208. **Kinek** mondta [hogy Janos talalkozott **melyik lannyal**]

Who-nom said that John met which girl-with

"Who said John met which girl?"

Assume that verbs may carry a TO-BIND|QUE value, a subset of the INHER|QUE amalgamated from selected arguments. As seen, there is strong evidence that there is lexical binding of SLASH. We have already acknowledged that there is strong evidence in favor of having TO-BIND features structure-shared along head projections. We propose that verbs in Hungarian obey the LQUE-right condition as in English and German, so verbs amalgamate the wh-features of all arguments in LQUE. There are two exceptions to this:

(i) if there is a (SYNSEM) structure bound in SLASH, its INHER|QUE value is amalgamated into the verb's INHER|QUE and may either be bound or remain unbound.

(ii) if TO-BIND|SLASH is empty, the INHER|QUE value of the pre-posed subject may optionally be amalgamated in INHER|QUE.[9]

If the QUE value amalgamated from a filler remains unbound, we expect it to be inherited onto the embedded CP in 205.

205. Mit gondolsz (**hogy**) Janos kit latott

what-acc think that John-nom who saw

"What do you think that John saw?"

Bridge verbs in Hungarian may only take S[fin, QUE] complements if they also amalgamate and bind the appropriately case-marked SLASH value, which is required to be the source of a non-empty INHER|QUE value. However, these exceptional conditions on amalgamation allow the INHER|QUE of the S complement to be amalgamated, not the INHER|QUE value of the filler. As we now expect verbs to be able to bind QUE, the wide scope reading for the partially moved expression is explained.

209. **Kinek** mondta [hogy Janos talalkozott **melyik lannyal**]

Who-nom said that John met which girl-with

"Who said John met which girl?"

In 209, we expect the matrix verb to amalgamate and bind the INHER|QUE value of the pre-posed subject with the INHER|LQUE features of its S complement.

210. ***Kinek mondta** [hogy **melyik lannyal** talalkozott Janos]

Who-nom said that which girl met John

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By contrast, in the severely ungrammatical 210, the INHER|QUE value of the embedded filler will be amalgamated in INHER|QUE, but the conditions on amalgamation will not be met.

The same basic mechanism may be extended to German and other partial movement languages. Of course the conditions suggested for amalgamation of wh-features from selected arguments and fillers has much in common with the conditions imposed by complementizers. However the conditions are relatively simple in that there is no recourse to the SELR. If verbs may amalgamate the wh-question features of fillers, and carry TO-BIND values, it is possible to dispense with empty complementizers. The value of the complementizer specifications lies in the clues they offer as to how features are bound on clausal structures.

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Languages like IA and Hindi pose no problem because the null complementizer may be dispensed with while allowing verbs to carry TO-BIND|QUE. Optional movement is unproblematic because IA and Hindi are syntactic movement languages which amalgamate the wh-features of structures in TO-BIND|SLASH, but not the wh-features of unrealized complements. The possibility of multiple fillers in Hindi, for example, may be handled by assuming that verbs may amalgamate the INHER|QUE value of more than a single TO-BIND|SLASH member, unlike in English, for example.

LQUE may be assumed to play a part in IA, with "sh-" continuing to operate as a phonologically realized complementizer. However, we could equally assume conditions, for example, such that bridge verbs may only take S[QUE] if they also take "sh-" as a pre-posed complement, with the further condion that all INHER|QUE values be bound.

(iv) Syntactic movement in Japanese

The final piece in Takahashi's (93) puzzle fits naturally into place under the treatment suggested here. Recall that fillers at the left boundary of a "ka" CP are required to take scope there.

211. Nani-o kimi-wa [John-ga t katta ka] shiritagatte-imasu ka

what-acc you-top J-nom t bought Q want-to-know Q

"What do you want to know if John bought?"

NOT: "Do you want to know what John bought?"

As we now must assume that Japanese does not have wh-features amalgamated from TO-BIND|SLASH members, but via amalgamated SLASH values introduced by the CELR, it does not follow that the wide scope reading for the wh-filler is the only one available. The non-availability of the embedded scope reading may not be straightforwardly captured if TO-BIND|SLASH is not inherited onto clausal structures. However, if TO-BIND|SLASH is also structure-shared through head projections (as, we should strongly emphasize, it *must* be in order to handle – without complementizers -- the amalgamation of wh-features from fillers in syntactic movement languages like IA) a highly natural solution is available.

We expect "ka" to carry rich, non-default specifications for binding of NONLOCAL features, as verbs (in Japanese) may not allow binding of wh-expressions themselves. We might suppose that "ka" takes S[QUE:A, TO-BIND|SLASH{(XP[QUE:B])}], amalgamates (A union B), and imposes the conditions that B must form a subset of its own TO-BIND|QUE value.

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We now assume the possibility that verbs may be subject to conditions governing the amalgamation and binding of NONLOCAL features of fillers. We may derive clues from the null complementizer R in Lappin 1996 and Gregory and Lappin 1997 to determine the conditions on feature amalgamation and binding carried by a MOD-bearing verb. Recall that the null complementizer R takes three alternative feature specifications in English.

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(i) Wh-phrase RC's:

a. SUBCAT <[2], INHER|REL {[1]}], S[fin, INHER|SLASH {[2]}>

b. NONLOCAL|TO-BIND|SLASH {[2]}

(ii) That-RC's:

a. SUBCAT <[2]:[CONTENT *relpron*], S[fin, INHER|SLASH {[2]}>

b. NONLOCAL|TO-BIND|SLASH {[2]}

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(iii) Bare-RC's:

a. SUBCAT < S[fin, INHER|SLASH {[2]}>

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We might propose, for example, that a verb may bear a MOD feature for a nominal with INDEX [1], on condition it generates and binds REL [1] which is required to unify with either the REL value carried by its filler or, if the member of TO-BIND|SLASH is absent, the subject. As the relative pronoun "that" may be assumed to carry a non-empty REL value, there seems no reason to distinguish between cases where "that" appears as the subject or filler, and cases where the REL value is contributed by a wh-REL-bearing expression in subject or filler. This appears to take care of the conditions in (i) and (ii) adequately.

For (iii) we might say that verbs allow [1] to be identified with the index of the member of TO-BIND|SLASH if there is no REL value on either the subject or filler. We might also assume the condition that all INHER|SLASH values be bound if verbs carry the MOD feature.[10]

Footnotes to Chapter Five

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(a) *I met [a man a man Mary likes]

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Conclusion

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might well suppose that the wh-features will be contained in this SLASH value as it unifies with the filler. If verbs which take clausal complements may amalgamate wh-features from SLASH values, this provides a solution to the problem. Indeed, there appears to be no other possible way that these verbs can amalgamate the NONLOCAL features of fillers.[4]

The problem with such a solution is that multiple clausal-embeddings such as in 207 will create the undesirable possibility of both higher verbs collecting the wh-features of the filler. The obvious solution to this difficulty is to have wh-features amalgamated from bound SLASH values in syntactic movement languages like Hungarian. As the filler is bound on only the matrix clause in 207, this desirably restricts feature amalgamation to the matrix verb. This is entirely in keeping with the view in this dissertation that heads may be subject to non-default conditions on amalgamation and binding of NONLOCAL features. It also seems to be the only possible means of allowing amalgamation of wh-features directly from fillers without complementizers, while the evidence from Hungarian, Iraqi Arabic, and Hindi indicate that such a mechanism is necessary.[5]

The problem with this kind of straightforward and highly natural solution is that lexical binding of SLASH is not assumed in the general case. Termination of SLASH is accomplished by constraints applying to certain phrases (head-filler phrases have SUBJECT-saturated SLASH-bearing heads in English, apparently a somewhat different condition is required for Hungarian). Although heads participating in so-called "tough"-constructions and certain focus constructions in English are assumed to bear TO-BIND|SLASH in P&S, this is not assumed to be the case for verbs which have SLASH terminate in their clauses.

However, the evidence very strongly suggests that this is precisely what is necessary in order to allow amalgamation of certain NONLOCAL features from fillers. As there seems no way to compromise on this, we must assume that verbs may in fact bear TO-BIND|SLASH containing values they amalgamate.[6] The problem which now arises is that, given both the classical and modified form of the NFP presented here, if a verb binds SLASH no record of this is carried up the head projection in order to allow a properly licensed head-filler phrase. This entails that TO-BIND|SLASH values are also carried up head projections so that a filler XP[1] may be licensed to the left of TO-BIND|SLASH {[1]} phrase. As the NFP, modified in this dissertation in order to allow feature amalgamation, would then require NONLOC|SLASH to be inherited via structure-sharing of both INHERITED and TO-BIND features, one may well wonder if in fact the structure of NONLOCAL should be modified to allow full NONLOCAL structure-sharing between heads and mother phrases, bringing it fully in line with the conditions applying to inheritance of CONTENT and HEAD features.[7]

(ii) Hungarian without empty complementizers

Assuming that verbal heads may carry TO-BIND|SLASH values and that the licensing conditions on filler-head constructions are handled (presumably by also having TO-BIND features structure-shared between mother phrases and semantic head daughters), we have the basis for an analysis of Hungarian without complementizers.[8]

One should first recall that the Kathol/P&Y approach to generating a

SLASH value in partial movement languages does not appear to generalize straightforwardly to Hungarian. We might hypothesize instead that the wh-feature Horvath says is required on partial-movement clauses is INHER|QUE. Note that there is evidence that subjects may appear before focussed wh-expressions and that pre-posed subjects may be left-most elements in wh-clauses.

205. Mit gondolsz **(hogy)** Janos kit latott

what-acc think that John-nom who saw

"What do you think that John saw?"

208. **Kinek** mondta [hogy Janos talalkozott **melyik lannyal**]

Who-nom said that John met which girl-with

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Assume that verbs may carry a TO-BIND|QUE value, a subset of the INHER|QUE amalgamated from selected arguments. As seen, there is strong evidence that there is lexical binding of SLASH. We have already acknowledged that there is strong evidence in favor of having TO-BIND features structure-shared along head projections. We propose that verbs in Hungarian obey the LQUE-right condition as in English and German, so verbs amalgamate the wh-features of all arguments in LQUE. There are two exceptions to this:

(i) if there is a (SYNSEM) structure bound in SLASH, its INHER|QUE value is amalgamated into the verb's INHER|QUE and may either be bound or remain unbound.

(ii) if TO-BIND|SLASH is empty, the INHER|QUE value of the pre-posed subject may optionally be amalgamated in INHER|QUE.[9]

If the QUE value amalgamated from a filler remains unbound, we expect it to be inherited onto the embedded CP in 205.

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Bridge verbs in Hungarian may only take S[fin, QUE] complements if they also amalgamate and bind the appropriately case-marked SLASH value, which is required to be the source of a non-empty INHER|QUE value. However, these exceptional conditions on amalgamation allow the INHER|QUE of the S complement to be amalgamated, not the INHER|QUE value of the filler. As we now expect verbs to be able to bind QUE, the wide scope reading for the partially moved expression is explained.

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I have presented a powerfully *head-driven* account of wh-dependencies, befitting our Head-driven Phrase Structure Grammar. On the assumption that there are two related but distinct wh-question features, the facts suggest that inheritance reduces to structure-sharing between head daughters and mother phrases. The view that there should be generalized lexical binding of SLASH provides the basis for further, highly promising research, allowing phonologically empty complementizers to be dispensed with.

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