

The in-situ clauses, of which there are two varieties—reprises and non-reprises, are discussed in the next chapter. Chapter 8 introduces another type of interrogative construction in order to analyze the phenomenon of ‘sluicing’ (Ross 1969).

As justified in Chapter 3, we treat exclamative constructions in terms of semantic objects like (4):

$$(4) \left[\begin{array}{l} \textit{fact} \\ \text{PROP} \left[\begin{array}{l} \textit{proposition} \\ \text{SIT } s \\ \text{SOA } \textit{soa} \end{array} \right] \end{array} \right]$$

The two types of exclamative clauses discussed in this chapter—both subtypes of *excl-cl*—differ only in that the proposition within the content of *wh*-exclamatives includes the quantifier *unusual-rel* introduced by the nonempty WH specification of the exclamative *wh*-phrase, as described in section 5.2 above.

6.2 Wh-Complementizers

Before considering interrogative-particular construction types, let us first turn to the *wh*-complementizers *whether* and *if*. The lexical entry for the former is as shown in (5):¹

$$(5) \left[\begin{array}{l} \text{PHON} \quad \langle \textit{whether} \rangle \\ \text{SS} \left[\begin{array}{l} \text{LOC} \left[\begin{array}{l} \text{CAT} \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} c \\ \text{IC} \\ \text{VFORM} \quad \boxed{2} \end{array} \right] \\ \text{CONT} \left[\begin{array}{l} \textit{question} \\ \text{PARAMS} \quad \{ \} \\ \text{PROP} \quad \boxed{1} \end{array} \right] \end{array} \right] \\ \text{WH} \quad \{ \} \end{array} \right] \\ \text{ARG-ST} \left\langle \begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{INV} \quad - \\ \text{VFORM} \quad \boxed{2} \end{array} \right] \\ \text{SUBJ} \quad \langle (\textit{pro-ss}) \rangle \\ \text{CONT} \quad \boxed{1} \end{array} \right\rangle \end{array} \right] \end{array} \right]$$

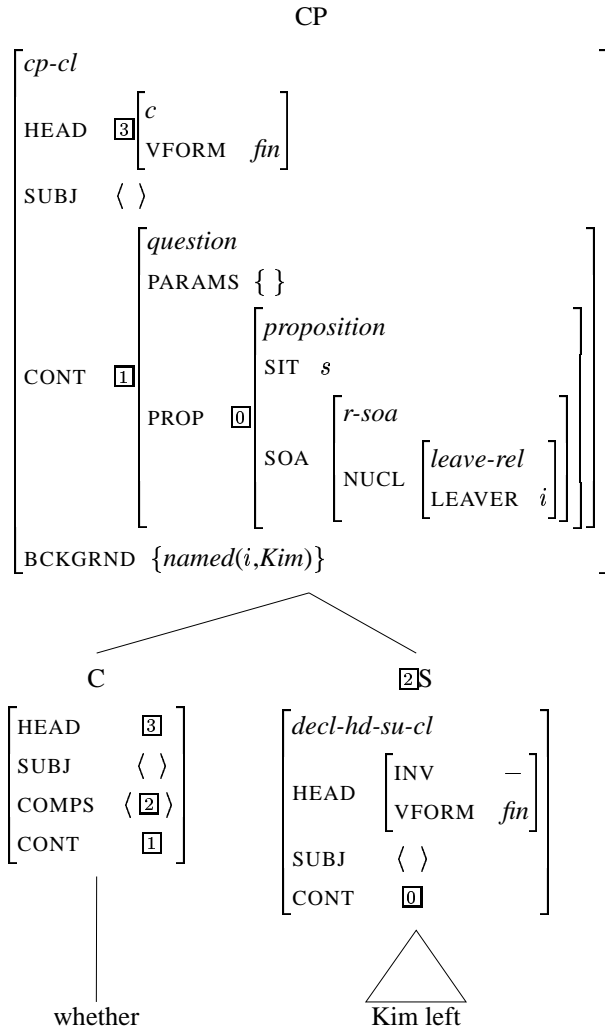
The word *whether* can head a phrase of type *cp-cl* (see Chapter 2), giving rise to structures like the one shown in (6):

¹We provide no treatment here of other uses of *whether*, e.g. in concessive conditionals like (i).

(i) Whether or not they are on time, I refuse to participate.

For a treatment of this construction, see Gawron to appear.

(6)



The content of such a clause is identified with that of the word *whether*. That is, the clause's content is a polar question whose PROP value is determined by the content of *whether*'s clausal complement.

Now consider the possible choices for the complement of *whether*. This complement must satisfy the description of the ARG-ST element in (5), and hence must denote a proposition. In addition, it must be of type *verb* (projected by a verb or a gerund); this follows from the fact that only elements of this type allow specifications for INV. Furthermore, the complement of *whether* must be indicative (its SOA value must be an *r-soa*), it must be specified as [INV –], and its SUBJ value must either be the empty list or ⟨ *pro-ss* ⟩. The following data are therefore predicted: (Conflicting and nonconflicting properties of the *whether*'s complement are indicated in parentheses.)

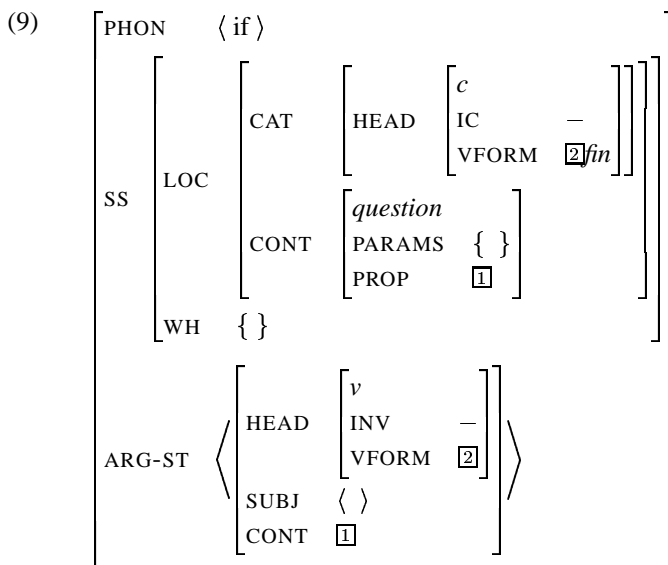
- (7) a. I wonder [whether *Kim left*]. (S, [SUBJ ⟨ ⟩], [CONT *proposition*], [INV –])
- b. *I wonder [whether *Kim leave*]. (S, [SUBJ ⟨ ⟩], *[CONT *outcome*], [INV –])
- c. *I wonder [whether *did Kim leave*]. (S, [SUBJ ⟨ ⟩], [CONT *proposition*],² *[INV +])
- d. *I wonder [whether *for Kim to leave*]. (*CP, [SUBJ ⟨ ⟩], *[CONT *outcome*])
- e. *I wonder [whether *that Kim left*]. (*CP, [SUBJ ⟨ ⟩], [CONT *proposition*])
- f. I wonder [whether *to leave*]. (‘S’, [SUBJ ⟨*pro-ss*⟩], [CONT *proposition*], [INV –])
- g. *Who did you wonder [whether *died*]. (‘S’, *[SUBJ ⟨*gap-ss*⟩], [CONT *proposition*], [INV –])

There is an issue of how to exclude gerunds as the complement of *whether*:

- (8) a. *Kim wondered whether (them) leaving.
- b. *Kim wondered whether their leaving.

We will assume that gerunds may designate facts or events, but not propositions, and are hence incompatible with the semantic demands of *whether*.³

The lexical entry for the interrogative complementizer *if* is similar to *whether*, but the complement of *if* must be [VFORM *fin*] and [SUBJ ⟨ ⟩]:



These small lexical differences serve to predict the following data:

- (10) a. I wonder [if *Kim left*]. (S, [SUBJ ⟨ ⟩], [CONT *proposition*], [INV –])
- b. *I wonder [if *Kim leave*]. (S, [SUBJ ⟨ ⟩], *[CONT *outcome*], [INV –])
- c. *I wonder [if *did Kim leave*]. (S, [SUBJ ⟨ ⟩], [CONT *proposition*], *[INV +])
- d. *I wonder [if *for Kim to leave*]. (*CP, [SUBJ ⟨ ⟩], *[CONT *outcome*])
- e. *I wonder [if *that Kim left*]. (*CP, [SUBJ ⟨ ⟩], [CONT *proposition*])
- f. *I wonder [if *to leave*]. (‘S’, *[SUBJ ⟨*pro-ss*⟩], [CONT *proposition*], [INV –])
- g. *Who did you wonder [if *died*]. (‘S’, *[SUBJ ⟨*gap-ss*⟩], [CONT *proposition*], [INV –])

²The analysis of inverted clauses as propositions is discussed in the next section.

³It is also possible to modify (5) to require that the selected argument be [VFORM *clausal*].

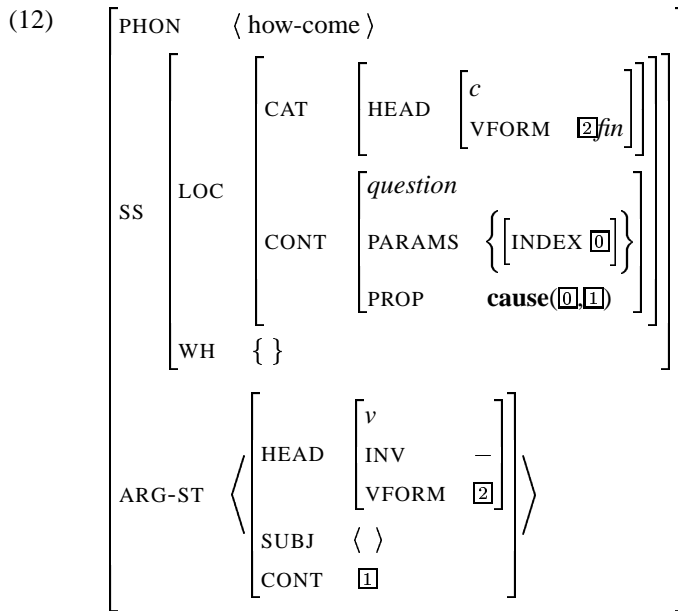
The correct syntactic behavior of such phrases is thus guaranteed by lexical specifications and constructions that we have already motivated.⁴

As a final illustration of a *wh*-complementizer, we offer a speculative treatment of *how come*, the element that appears in examples like (11):

- (11) a. How come they didn't believe you?
 b. I wonder [how come they didn't believe you].

The analysis of the type *root* sketched in Chapter 2 (see also the revision presented in the next chapter) specifies that an independent utterance can in principle be a CP, as well as an S. However, *that*-clauses, *whether*-clauses, etc. cannot function as independent utterances. This is because their lexical entry includes the specification [IC –], which is percolated to the clausal level by the GHFP.

This makes available a lexical treatment of *how come* based on the lexical entry in (12):⁵



Crucially, (12) is unspecified for the feature IC, and hence is compatible with either a positive or negative specification for that feature. It follows that *how-come*-clauses may be either independent utterances (as in (11a)) or selected interrogative complements (as in (11b)).

Contrasts like those in (13), noted by Culicover (1999), also follow from this treatment:

- (13) a. Why the hell did you do that?
 b. *How come the hell you did that?
 c. *How the hell come you did that?

As explained below, our analysis of modifiers like *the heck* requires that they adjoin to a WH-specified lexical item. Since complementizers are not WH-specified, i.e. their WH value is

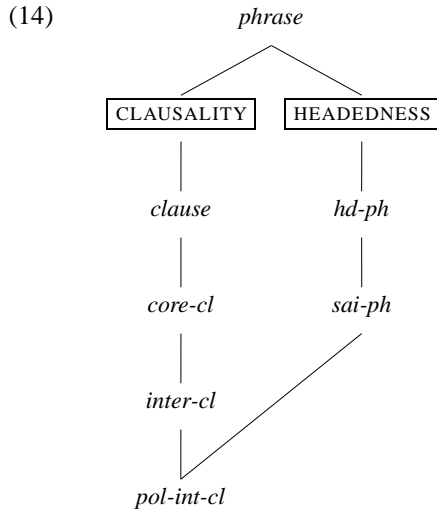
⁴Apparently, there is some variation in judgment regarding (10f). This variation is purely lexical under our account.

⁵Here **cause**($\boxed{0}, \boxed{1}$) is a shorthand for the proposition that $\boxed{0}$ caused $\boxed{1}$.

always { }, it follows that examples like (13b) (or (13c)) are systematically ruled out and differentiated from true ('fronted') *wh*-words like *why*.

6.3 Polar Interrogatives

Our analysis of polar questions is based on a type of clause that we call *polar-interrogative-clause* (*pol-int-cl*). Every inverted 'yes-no' interrogative is an instance of this type, which is a subtype of, and hence inherits constraints from, the types *inter-cl* and *sai-ph* (and their supertypes):



Recall from Chapter 2 that all instances of the type *sai-ph* are constrained as follows:

(15) *sai-ph*:

$$\left[\text{SUBJ } \langle \rangle \right] \rightarrow \mathbf{H} \begin{bmatrix} \text{word} \\ \text{INV} & + \\ \text{AUX} & + \\ \text{SUBJ} & \langle \boxed{0} \rangle \\ \text{COMPS} & \boxed{A} \text{nelist} \end{bmatrix}, \boxed{0}, \boxed{A}$$

Thus the only construction-specific constraint that needs to be stated is the following:

(16) *pol-int-cl*:

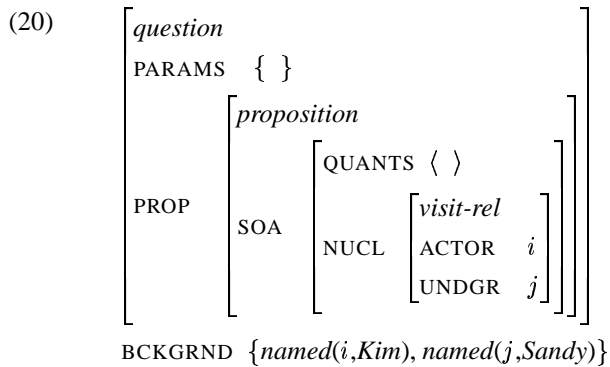
$$\left[\text{CONT} \begin{bmatrix} \text{PARAMS } \{ \} \\ \text{PROP} \begin{bmatrix} \text{proposition} \\ \text{SOA } \boxed{1} \end{bmatrix} \end{bmatrix} \right] \rightarrow \mathbf{H} \begin{bmatrix} \text{IC} & + \\ \text{CONT} & \boxed{1} \end{bmatrix}, \dots$$

That is, the only constraints that are specific to the *pol-int-cl* construction are (1) that it is an independent clause and (2) that its CONTENT is a polar question built from a proposition constructed from its head daughter's SOA value.

it cannot appear in embedded interrogative environments:

- (19) a. *They wondered [had she left].
 b. *No one knew [is that possible].

And the semantics that our analysis assigns to (18) is shown in (20):



There is little more to say about this construction, except, as argued by Fillmore (1999), that it is related to a number of sister constructions (all subtypes of *sai-ph*) that include, *inter alia*, exclamatives like (21), ‘blesses, wishes and curses’ like (22), and auxiliary conditionals like (23):

- (21) a. Boy, *was I stupid!*
 b. Wow, *can she sing!*
- (22) a. May they live forever!
 b. May I live long enough to see the end of this job!
 c. May your teeth fall out on your wedding night!
- (23) a. *Were they here now*, we wouldn’t have this problem.
 b. *Should there be a need*, we can always call for help.

Each of these involves a distinct subtype of *sai-ph* (not all of which are [IC +], as (23) shows). The inverted exclamatives like (21), for example, require a construction type that is also a subtype of *excl-cl*, from which it inherits the constraint that its CONTENT is of type *fact* (see Chap. 2). This leaves only the constraints shown in (24) as particular to the inverted-exclamative construction:⁶

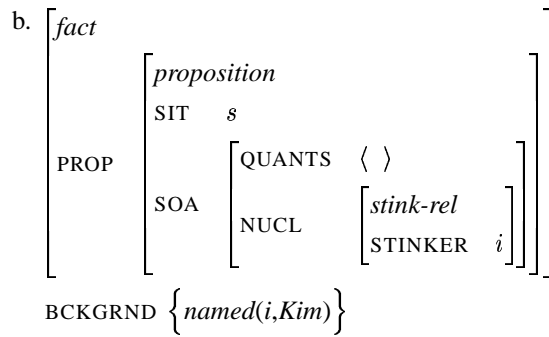
- (24) *inv-excl-cl*:
- $$\left[\text{CONT} | \text{PROP} | \text{SOA} \left[\boxed{\text{I}} \right] \right] \rightarrow \mathbf{H} \left[\begin{array}{l} \text{IC} \quad + \\ \text{CONT} \quad \boxed{\text{I}} \end{array} \right], \dots$$

The semantics we associate with instances of this type is illustrated in (25):

⁶Huddleston (1993a) argues that inverted exclamatives are really interrogatives that give rise to exclamative meaning via pragmatic inference. We could adopt Huddleston’s analysis—it would in fact simplify our grammar by eliminating a construction. However, one problem with assuming polar exclamatives arise via pragmatic inference from interrogative content is that it leads to the expectation that this type of inference should be applicable cross-linguistically, whenever polar interrogative content is expressed. However, as the Hebrew example in (i) illustrates, this expectation is not met. (i) can only be understood as a polar question:

- (i) ha’im omer yaxol laruc
 the-if omer can run
 Can Omer run

(25) a. Does Kim stink!

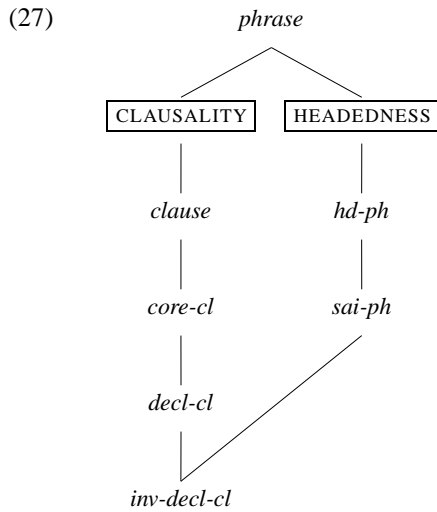


To the family of subject-auxiliary inversion constructions studied by Fillmore, we add another: a slashed, proposition-denoting clause that will be part of our treatment of negative adverb preposing constructions like (26a) and main clause *wh*-questions like (26b).

(26) a. Under no circumstances *did she think they would do that*.

b. Whose book *are you reading*?

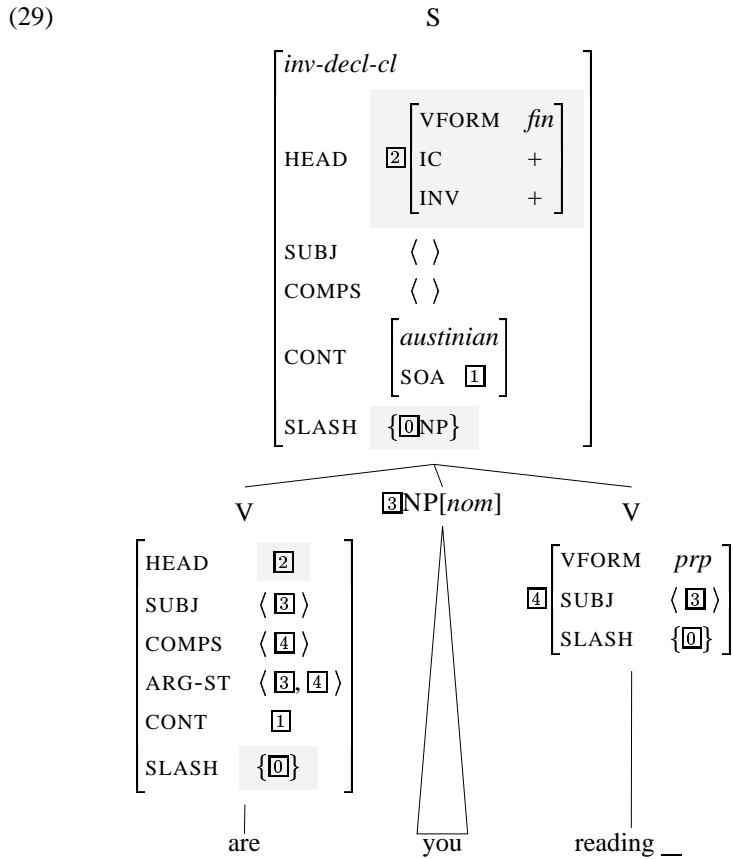
This type, which we call *inverted-declarative-clause* (*inv-decl-cl*), is a subtype of both *sai-ph* and *decl-cl*:



Since *inv-decl-cl* inherits from the *decl-cl* a constraint requiring that its CONTENT be of type *austinian*, it must be further constrained as follows:

- (28) *inv-decl-cl*:
 $[\text{SLASH } neset] \rightarrow \mathbf{H} [\text{IC } +], \dots$

This type of clause, illustrated in (29), has a highly restricted distribution—it occurs only in slashed independent clauses, i.e. root clauses that contain an extraction dependency:⁷



⁷Note that since inverted verbs are all indicative in English, their CONTENT value is always an *r-soa*. Hence the content of an *inv-decl-cl* is always a *proposition* (never an *outcome*).

6.4 Wh-Exclamative Phrases

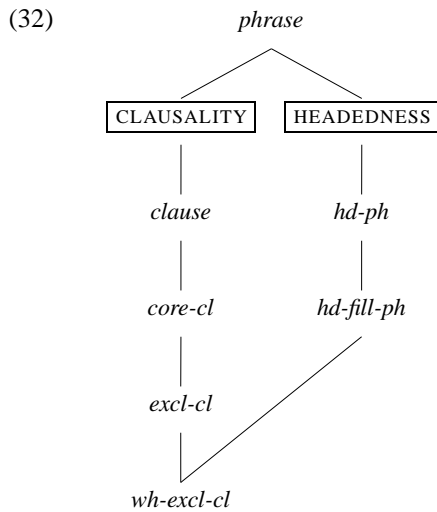
In Chapter 5, we presented the basics of our analysis of filler-gap dependencies in terms of the construction type *hd-fill-ph*. There we considered only ‘topicalized’ clauses like those in (30).

- (30) a. Bagels, I like __ .
 b. People that smart, always pay attention to __ !
 c. That kind of antisocial behavior, can we really tolerate __ in a civilized society?
 d. That kind of behavior, who could object to __ ?
 e. People that stupid, am I ever fed up with __ !

In this section, we will consider the analysis of *wh*-exclamatives like (31a,b).

- (31) a. [How tall] they are __ !
 b. [What a great smile] you have __ !

Examples like these, we treat in terms of the *wh-exclamative-clause* (*wh-excl-cl*) construction, a distinct subtype of *hd-fill-ph*. *Wh-excl-cl* is also a subtype of *excl-cl*, from which it inherits the constraint that its CONTENT value must be of type *fact*:



Otherwise, it is quite similar to the topicalization construction discussed in the previous chapter. For example, an instance of *wh-excl-cl* (and its head daughter, by the GHFP) must be uninverted.

One distinctive feature of *wh-excl-cl* is that the WH value of its filler daughter must be a quantifier that gets added to the head daughter's QUANTS list, as shown in (33):

(33) *wh-excl-cl*:

$$\left[\begin{array}{l} \text{HEAD|INV} \text{ ---} \\ \text{PROP|SOA} \left[\begin{array}{l} \text{QUANTS} \langle \boxed{0} \rangle \oplus \boxed{A} \\ \text{NUCL} \boxed{2} \end{array} \right] \\ \text{STORE} \boxed{\Sigma_1} \\ \text{SLASH} \{ \} \end{array} \right] \rightarrow \left[\text{WH} \{ \boxed{0} \} \right], \mathbf{H} \left[\begin{array}{l} \text{SOA} \left[\begin{array}{l} \text{QUANTS} \boxed{A} \\ \text{NUCL} \boxed{2} \end{array} \right] \\ \text{STORE} \{ \boxed{0} \text{quant-rel} \} \uplus \boxed{\Sigma_1} \\ \text{SUBJ} \langle \rangle \end{array} \right]$$

We have also assumed that *wh-exclamatives* are extraction islands, and hence are [SLASH { }], as indicated in (33).

If we now unify (33) with relevant constraints inherited from the supertypes of *wh-excl-cl*, we arrive at (34):

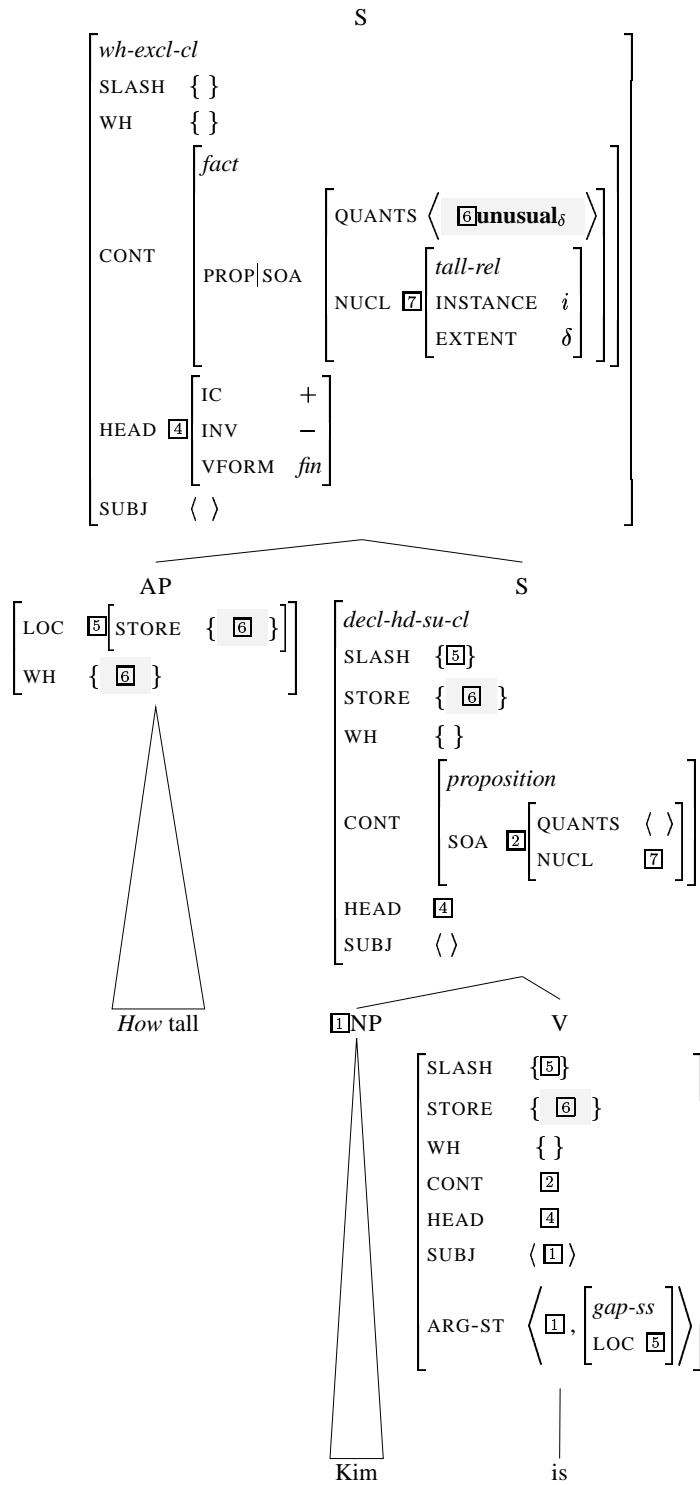
(34) GHFP & *hd-fill-ph* & *excl-cl* & *wh-excl-cl*:

$$\left[\begin{array}{l} \text{CAT} \boxed{5} \left[\begin{array}{l} \text{HEAD|INV} \text{ ---} \\ \text{SUBJ} \langle \rangle \end{array} \right] \\ \text{CONT} \left[\begin{array}{l} \textit{fact} \\ \text{PROP} \left[\text{SOA} \left[\begin{array}{l} \text{QUANTS} \langle \boxed{0} \rangle \oplus \boxed{A} \\ \text{NUCL} \boxed{2} \end{array} \right] \right] \end{array} \right] \\ \text{STORE} \boxed{\Sigma_1} \\ \text{SLASH} \{ \} \\ \text{WH} \boxed{\Sigma} \end{array} \right] \rightarrow \left[\begin{array}{l} \text{LOC} \boxed{4} \\ \text{WH} \{ \boxed{0} \} \end{array} \right], \mathbf{H} \left[\begin{array}{l} \text{CAT} \boxed{5} \\ \text{CONT} \left[\text{SOA} \left[\begin{array}{l} \text{QUANTS} \boxed{A} \\ \text{NUCL} \boxed{2} \end{array} \right] \right] \\ \text{STORE} \{ \boxed{0} \text{quant-rel} \} \uplus \boxed{\Sigma_1} \\ \text{SLASH} \{ \boxed{4} \} \\ \text{WH} \boxed{\Sigma} \end{array} \right]$$

The identification of the mother and head daughter's CAT and WH values (as shaded in (34)) is a consequence of the GHFP. Finally, note that the head daughter's SLASH value is resolved as a singleton set: it must contain the filler daughter's LOC value and whatever other elements it contains must be included in the mother's SLASH value, which must be empty.

As noted in Chapter 5, requiring that the non-head daughter be specified as [WH {*quant-rel*}] will ensure that there is an exclamative *wh*-word present somewhere within that constituent. (33) further guarantees that the quantifier in the WH value of that *wh*-word is integrated into the clause's content, as illustrated via shading in (35):

(35)



The semantic effect of this construction is to associate an example like (36a) with a CONTENT value like (36b):

- (36) a. How tall Kim is __ !
 b.
$$\left[\begin{array}{l} \text{fact} \\ \left[\begin{array}{l} \text{proposition} \\ \text{SIT } s \\ \left[\begin{array}{l} \text{PROP} \\ \left[\begin{array}{l} \text{SOA} \\ \left[\begin{array}{l} \text{QUANTS} \left\langle \begin{array}{l} \text{unusual-rel} \\ \text{IND } \delta \\ \text{RESTR } \{ \} \end{array} \right\rangle \\ \text{NUCL} \left[\begin{array}{l} \text{tall-rel} \\ \text{INSTANCE } i \\ \text{EXTENT } \delta \end{array} \right] \end{array} \right] \end{array} \right] \end{array} \right] \end{array} \right] \\ \text{BCKGRND } \{ \text{named}(i, \text{Kim}) \} \end{array} \right]$$

The generalized quantifier *unusual-rel* holds of a fact-abstract and a SOA-abstract, according to the analysis of Chapter 3. *Unusual-rel* is existential in nature. Thus, in the case of (36) the truth conditions that result require that there be an unusual degree such that Kim is tall to that degree.

What a exclamatives work similarly. The semantic analysis we assign to (37a) is (37b):

- (37) a. What a sunset Kim painted __ !
 b.
$$\left[\begin{array}{l} \text{fact} \\ \left[\begin{array}{l} \text{proposition} \\ \text{SIT } s \\ \left[\begin{array}{l} \text{PROP} \\ \left[\begin{array}{l} \text{SOA} \\ \left[\begin{array}{l} \text{QUANTS} \left\langle \begin{array}{l} \text{unusual-rel} \\ \text{IND } \boxed{2} \\ \text{RESTR } \{ \text{sunset}(\boxed{2}) \} \end{array} \right\rangle \\ \text{NUCL} \left[\begin{array}{l} \text{paint-rel} \\ \text{PAINTER } \boxed{1} \\ \text{PAINTED } \boxed{2} \end{array} \right] \end{array} \right] \end{array} \right] \end{array} \right] \\ \text{BCKGRND } \{ \text{named}(i, \text{Kim}) \} \end{array} \right]$$

Unusual-rel holds of the relevant pair of abstracts just in case there is an unusual sunset that Kim painted.

The constraints in (34) require that the head daughter be specified as [SUBJ < >]. This correctly ensures that there are no *wh*-subject exclamatives, as the contrasts in (38)–(39) indicate.

- (38) a. [How many birds] there are __ on the fence!
 b. ?*[How many birds] __ are on the fence!
 (39) a. [What a nice guy] he is __ !
 b. ?*[What a nice guy] __ walked into the room!

Examples like the following may appear to be counterexamples to the claim that subject exclamatives do not exist:

- (40) a. It's amazing [[how many birds] __ are on the fence].
 b. It's amazing [[how many people's cars] __ will fail this test.]

However, as argued persuasively by Huddleston (1993b), predicates like *amazing* allow either interrogative or exclamative clauses as their complement. The semantics in the case of an interrogative complement, according to Huddleston, is roughly 'the answer to the question ... is amazing'.⁸

Assuming then that the complements in (40) are only interrogative clauses (as analyzed in the next section) and that there are no subject exclamatives, we predict contrasts like the following:

- (41) a. It's amazing [[what a nice guy] he is __].
 b. *It's amazing [[what a nice guy] __ walked into the room].

The predeterminer *what* occurring in *what a nice guy* can only be exclamative, as we know from the ungrammaticality of (42a,b):

- (42) a. *[What a nice guy] is he __ ?
 b. *I wonder [[what a nice guy] he is __].

Therefore the ungrammaticality of examples like (41b) is properly explained by assuming the constraint against subject exclamatives that we have included in (33) (the condition that the head daughter's SUBJ value be $\langle \ \rangle$).

6.5 Wh-Interrogatives

6.5.1 General Constraints

As noted in section 6.1, *inter-cl* is the most general type of interrogative clause in our phrase hierarchy. Hence the constraints that we place on the type *inter-cl*, one of which is shown in (43), reflect the properties common to all interrogative clauses in English:

- (43) Interrogative Retrieval Constraint (IRC)

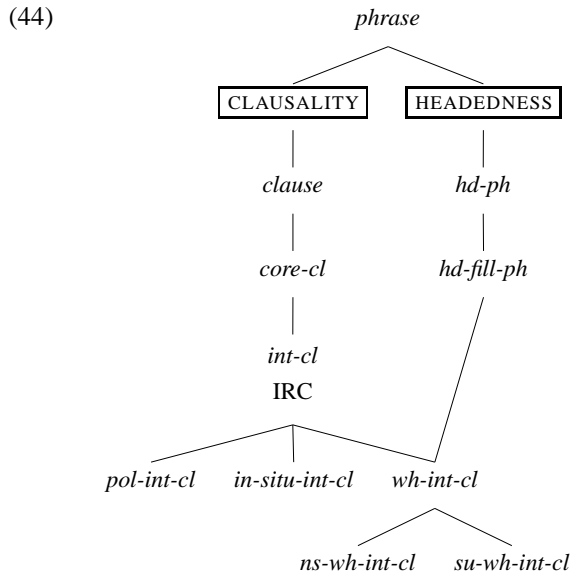
inter-cl:

$$\left[\begin{array}{l} \text{STORE } \boxed{\Sigma_1} \\ \text{CONT } \left[\text{PARAMS } \boxed{\Sigma_2} \right] \end{array} \right] \rightarrow \dots \mathbf{H} \left[\text{STORE } \boxed{\Sigma_1} \uplus \boxed{\Sigma_2} \right] \dots$$

The content of an interrogative clause is necessarily a question, as guaranteed by the constraint placed on the type *inter-cl* in Chapter 2. The IRC is the further requirement that the STORE value of an *inter-cl* be the head daughter's STORE value, minus some set of parameters that is the clause's PARAMS set. Put differently, the clause's STORE value and the clause's PARAMS set add up to be the head daughter's STORE. The IRC applies to the 'extracted' *wh*-constructions that we turn to immediately, to the in-situ *wh*-interrogatives discussed in the Chapter 7, and to the construction we introduce in Chapter 8 to handle sluicing. Note that we intentionally allow the set of retrieved parameters to be the empty set. Thus clausepolar interrogative clauses, whose PARAMS set must be empty, also satisfy this constraint by 'passing up' to the clause's STORE all parameters that are in the head daughter's STORE.

⁸See Chapter 8 for our analysis of interrogatives embedded by factive and resolute predicates.

All extracted *wh*-interrogatives—those that consist of a *wh*-specified non-head daughter followed by a sentential head daughter that contains a gap—are treated as instances of a particular subtype of interrogative clause that we will refer to simply as *wh-interrogative-clause* (*wh-int-cl*). We now expand the hierarchy introduced in section 6.1 so as to include relevant supertypes:



All instances of *ns-wh-int-cl* and *su-wh-int-cl* are thus constrained by the IRC. And since *wh-int-cl* is also a subtype of *hd-fill-ph*, instances of this type must also obey the general constraints on head-filler phrases already illustrated.

In addition, instances of the type *wh-int-cl* must satisfy a constraint we call the ‘Filler Inclusion Constraint’:

(45) Filler Inclusion Constraint (FIC):

wh-int-cl:

$$\left[\text{CONT} \left[\text{PARAMS} \left\{ \boxed{\square} \right\} \uplus \text{set} \right] \right] \rightarrow \left[\text{WH} \left\{ \boxed{\square} \right\} \right], \mathbf{H}$$

The FIC guarantees that the non-head daughter of a *wh*-interrogative clause (always the filler daughter of a head-filler phrase) must be WH-specified, and hence that the filler constituent either is or properly contains an interrogative *wh*-word (as explained in the previous chapter). The FIC further ensures that (1) the filler daughter’s WH value must contain a parameter and (2) that parameter must be included in the PARAMS value (a set of parameters) of the clause’s content. It also crucially leaves open the possibility that other parameters in the head daughter’s STORE are included in the clause’s PARAMS set.⁹ Without further stipulation, this will allow for multiple *wh*-questions (section 6.6 below) as well as for reprise questions like (46) (discussed in the next chapter), where the embedded *wh*-interrogative word WHO outscopes the WH-specified filler in the embedded interrogative clause.

⁹It may not be obvious at first how the filler daughter’s WH member (corresponding to the leftmost *wh*-word within that phrase) can be included in the clause’s STORE, given that (by (43)) all members of the clause’s PARAMS must be included in the head daughter’s STORE. This is explained in more detail in the next section.

(46) You asked [[which book] Sandy gave to WHO]?

In addition to the FIC, *wh*-interrogative clauses in our analysis are subject to the following constraint, which identifies the head daughter's CONTENT value with the clause's PROP value:

(47) Propositional Head Constraint (PHC):

wh-int-cl:

$$\left[\text{CONT} \left[\text{PROP} \boxed{2} \right] \right] \rightarrow \dots \mathbf{H}[\text{CONT} \boxed{2}]$$

Since the value of the feature PROP must be a proposition, the PHC simultaneously resolves the head daughter's content to be of type *proposition* and guarantees that that proposition is the one the clause's content (a question, as guaranteed by *inter-cl*) is based on.

In the previous chapter, we proposed a number of lexical constraints on the distribution of WH specifications. The WHC in particular requires that all noninitial arguments of a lexeme be specified as [WH { }]. This might at first appear to rule out all in-situ occurrences of *wh*-words, e.g. the one in (46), but it does not.

To see this, recall that interrogative *wh*-words may be WH-specified or not. That is, according to lexical constraints, they may be specified either as [WH {*param*}] or else as [WH { }]. This is crucial to our analysis of *wh*-interrogative clauses, where the leftmost *wh*-word will always be WH-specified, but all in-situ occurrences of interrogative *wh*-words will be specified as [WH { }]. This distinction plays an important role in our account of the fact (Brame 1978) that certain items, e.g. *the hell/heck*, can modify a 'fronted' *wh*-expression, but not one that remains in situ.¹⁰

- (48) a. [Who the heck/hell/devil] do you think they visited?
 b. *Who visited [who the heck/hell/devil]?
 c. *Sandy visited [WHO the heck/hell/devil]?

In our analysis, such modifiers are lexically restricted as shown in (49):

(49) $\left[\text{SS}[\text{LOC}|\text{CAT}|\text{HEAD}|\text{MOD} \left[\text{WH} \{ \textit{param} \} \right] \right]$

These contrasts involving *the hell* and the like provide independent motivation for our distinguishing between 'fronted' and in-situ *wh*-expressions via their WH specifications.

These modifiers must be further constrained so as to modify interrogative *wh*-words (not *wh*-phrases), as the following contrasts show:

- (50) a. [Who the hell] did they visit __ ?
 b. *[Which book the hell] did they read __ ?
 c. [[Which the hell] book] did they read __ ?
- (51) a. *[How many books the hell] did they read __ ?
 b. *[How many the hell books] did they read __ ?
 c. [How the hell] many books did they read __ ?
- (52) a. [[who the hell]'s books] did they read __ ?

¹⁰The set of such modifiers is larger than generally appreciated. It includes numerous expressions that have the feel of curses (real or surrogate): *the devil, the fuck, in the world, in God's name, in tarnation, the blazes, in blue blazes, the deuce*.

- b. %[[whose the hell] books] did they read __ ?¹¹
 c. *[whose books the hell] did they read __ ?

There are of course further constraints on the distribution of these modifiers. For example, a semantic distinction something like the distinction between ‘open’ and ‘closed’ questions proposed by Huddleston (1993b)¹² is needed to explain why fronted (WH-specified) *wh*-words like those in (53b) and (54b) cannot be modified by *the hell* and the like.

- (53) a. I wonder [[*who* the hell] they were talking to].
 b. #I found out [[*who* the hell] they were talking to].
 (54) a. I don’t know [[*what* in the world] they were talking about].
 b. #I know [[*what* in the world] they were talking about].

Whatever semantic or pragmatic factors are at work here, we assume they will interact smoothly with the grammatical constraints we formulate in terms of varying WH-specifications.¹³

The diverse possibilities for WH-specification illustrated here seem difficult to reconcile with the suggestion made by Bresnan (to appear) that elements modified by *the hell* and the like all bear an appropriate ‘discourse function’, a kind of grammatical relation native to LFG’s functional structure. Perhaps there is a deeper explanation for which elements can be WH-specified in English. In fact, we think any such explanation is likely to rely on semantics or pragmatics, rather than functional structure relations. In any case, at present, the nature of such a deeper explanation remains obscure.

6.5.2 Nonsubject *Wh*-Interrogatives

The first subtype of *wh-int-cl* that we must consider is *ns-wh-int-cl*, which we use to analyze nonsubject *wh*-interrogatives like (55a,b).

- (55) a. [Who [will Sandy visit __]]?
 b. They wonder [who [Sandy will visit __]].

Instances of *ns-wh-int-cl* come in two varieties: independent clauses and embedded clauses. The primary difference between the two is that the head daughter of the former kind must be inverted, while the head daughter of the latter kind cannot be:¹⁴

¹¹The observed variation here can be analyzed in lexical terms. Those varieties that include *whose the hell* have lexicalized *whose*; in other varieties, *whose* comes about through the syntactic combination of *who* and the possessive marker ‘s.

¹²See also Bolinger 1978.

¹³Some speakers find a contrast between pairs like the following:

- (i) ??I wondered whether the hell they were real.
 (ii) *I wondered if the hell they were real.

However, speakers tend to agree that *whether* does not allow the full range of modifiers that true (interrogative) *wh*-words allow:

- (iii) *I wondered whether in the world/blue blazes/tarnation they were real.
 (iv) *I wondered whether the devil/deuce they were real.

Thus whatever increased acceptability might inhere in examples like (i), it cannot provide serious motivation for treating *whether* as being WH-specified. More likely, *whether the hell*—for those speakers that find it fully acceptable—is a lexicalized remnant of an earlier grammar where *whether* was a true *wh*-word.

¹⁴This is a bit of an oversimplification, as inverted interrogative clauses may sometimes be embedded, as in dialectal variants like (i)–(ii), which seem to exist in some varieties of English in a kind of ‘semi-indirect style’ (a blend of direct and indirect speech):

- (i) I wonder [what did they want].
 (ii) I wonder [did they leave].

- (56) a. [Who [will Sandy visit _]]?
 b. *[Who [Sandy will visit _]]?
 c. They wonder [who [Sandy will visit _]].
 d. *They wonder [who [will Sandy visit _]].

To account for these contrasts, we posit the following constraint:

- (57) Inversion Constraint (INVC):

$$ns\text{-}wh\text{-}int\text{-}cl: \\ [] \rightarrow \dots \mathbf{H} \begin{bmatrix} IC & \boxed{1} \\ INV & \boxed{1} \end{bmatrix}$$

The INVC guarantees that main-clause ([IC +]) questions are inverted and that embedded ([IC -]) questions are uninverted. This rules out (56b), where the clause and its bracketed head daughter are [INV -] but [IC +]. Conversely, if the interrogative clause is embedded, i.e. [IC -], then it must also be [INV -]. The complement of *wonder* in (56d), as well as its bracketed head daughter, is [INV +], in violation of the INVC.

One further property of nonsubject *wh*-interrogatives is shown in (58):

- (58) Optional *Pro* Condition (OPC):

$$ns\text{-}wh\text{-}int\text{-}cl: \\ [] \rightarrow \dots \mathbf{H}[\text{SUBJ } \langle (pro\text{-}ss) \rangle]$$

(58) guarantees that the head daughter's SUBJ list is either empty (making it a saturated clause) or else a singleton list containing an element of type *pro-ss*. The latter instantiation will be relevant for infinitival *wh*-questions, which we turn to in a moment.

In (59) we illustrate the unification of key constraints inherited by instances of the type *ns-wh-int-cl*. These include the IRC, the FIC, the constraints in (47) above, the OPC, and the SLASH-binding constraint on head-filler phrases:

- (59) ECC & GHFP & *core-cl* & *inter-cl* & IRC & *hd-fill-ph* & FIC & PHC & *ns-wh-int-cl*:

$$\left[\begin{array}{l} \text{CAT } \boxed{3} \\ \text{HEAD } \begin{bmatrix} v \\ \text{VFORM } \textit{clausal} \\ IC & \boxed{0} \\ INV & \boxed{0} \end{bmatrix} \\ \text{SUBJ } \langle (pro\text{-}ss) \rangle \\ \text{COMPS } \langle \rangle \\ \text{CONT } \begin{bmatrix} \textit{question} \\ \text{PARAMS } \Sigma_2(\{\boxed{1}\} \uplus \Sigma_4) \\ \text{PROP } \boxed{2} \end{bmatrix} \\ \text{STORE } \Sigma_1 \\ \text{SLASH } \Sigma_3 \\ \text{WH } \Sigma_5 \end{array} \right] \rightarrow \left[\begin{array}{l} \text{LOC } \boxed{4} \\ \text{WH } \{\boxed{1}\} \end{array} \right], \mathbf{H} \left[\begin{array}{l} \text{CAT } \boxed{3} \\ \text{CONT } \boxed{2} \\ \text{STORE } \Sigma_1 \uplus \Sigma_2 \\ \text{SLASH } \{\boxed{4}\} \uplus \Sigma_3 \\ \text{WH } \Sigma_5 \end{array} \right]$$

This example illustrates the highly interactive nature of our analysis. For example, the interaction of type constraints guarantees all of the following divergences between head daughter and mother:

- (61) a. The SLASH value of the *ns-wh-int-cl* differs from that of its head daughter because *ns-wh-int-cl* inherits the SLASH-binding constraint from the type *hd-fill-ph*.
- b. The CONTENT value of the *ns-wh-int-cl* differs from that of its head daughter because the *ns-wh-int-cl*'s content is a *question* (via constraint on the supertype *inter-cl*) and that question's PROP value is identified with the head daughter's CONTENT value (by the PHC in (47)).
- c. The STORE value of the *ns-wh-int-cl* differs from that of its head daughter because *ns-wh-int-cl* inherits the IRC constraint in (43), again from its supertype *inter-cl*

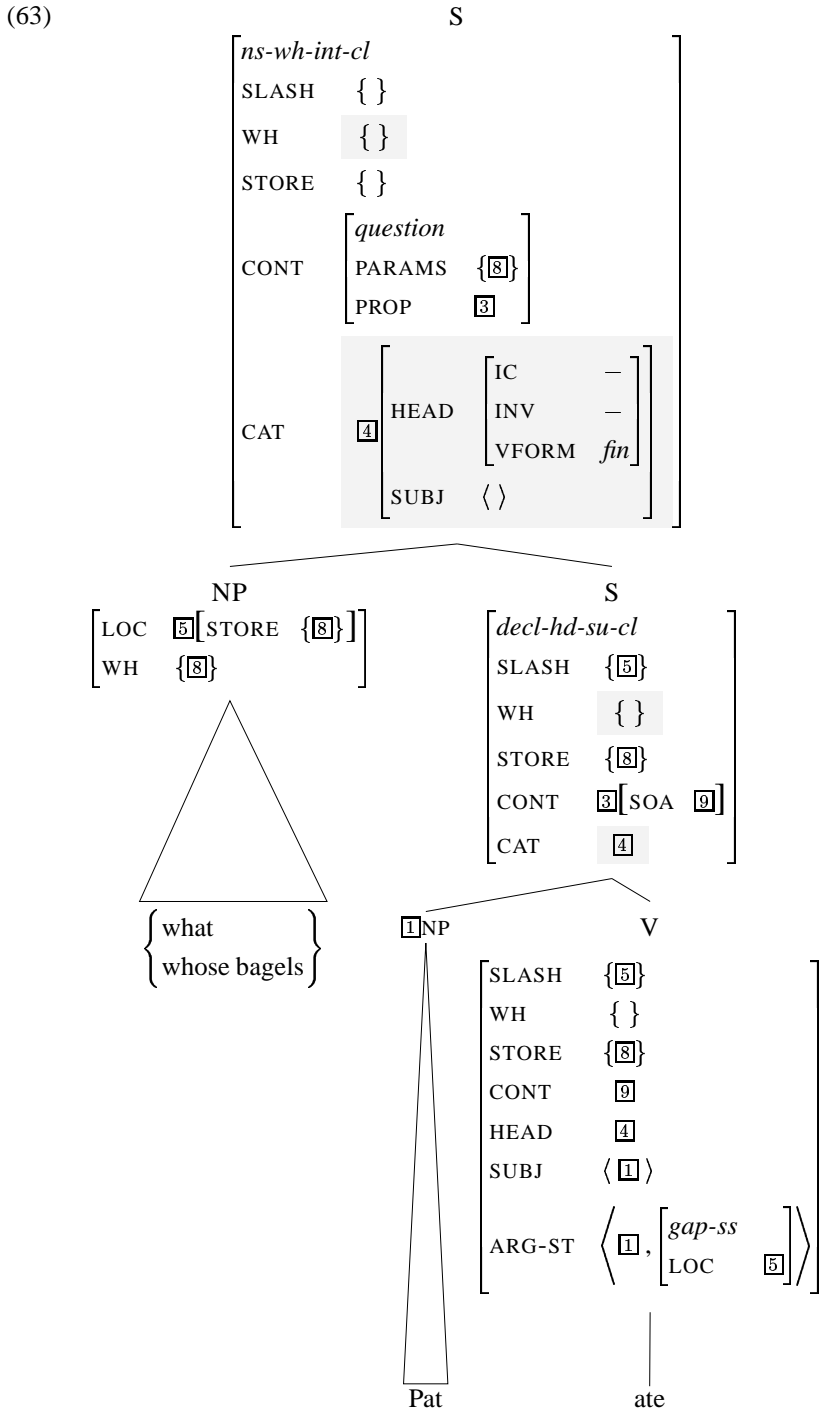
In all other cases, the feature specifications of the head daughter are identified with those of the mother via the GHFP, as indicated. Note further that the head daughter of the *ns-wh-int-cl* must express a proposition, and hence must be constructed as an *inv-decl-cl*, not as a *pol-int-cl*.

There is a crucial constraint interaction illustrated in (60). Because the feature STORE is a feature of *local* objects (as explained in section 5.3), the STORE value of the *gap-ss* in (60) contains the element $\boxed{8}$ that is in the STORE of the clause's filler daughter. This is a consequence of the extraction theory outlined in the previous chapter: the inheritance of SLASH values throughout the extraction path results in an identification of the two indicated LOCAL values (tagged $\boxed{9}$). Furthermore, the *gap-ss* has the parameter $\boxed{8}$ in its STORE, which is amalgamated into the STORE of the inverted auxiliary verb and then passed up to the S[INV +] (by the GHFP). Because of this interaction, the parameter of the *wh*-word within the clause's filler daughter is also in the STORE of the clause's head daughter, whence it is retrieved in accordance with the FIC (45), which affects all clauses of type *wh-int-cl*. The effect of the FIC therefore is to guarantee that the WH value of the phrase's filler daughter is within the PARAMS value of the interrogative clause. In this case, the filler's parameter is the only member of the PARAMS set, i.e. $\boxed{\Sigma_4}$ in (59) is the empty set in (60).

The content of the phrase in (60) is shown in (62):

$$(62) \left[\begin{array}{l} \text{question} \\ \text{PARAMS} \left\{ \left[\begin{array}{l} \text{IND} \quad j \\ \text{RESTR} \quad \{ \text{thing}(j) \} \end{array} \right] \right\} \\ \text{PROP} \left[\begin{array}{l} \text{SIT} \quad s \\ \text{SOA} \left[\begin{array}{l} \text{QUANTS} \quad \langle \rangle \\ \text{NUCL} \quad \left[\begin{array}{l} \text{eat-rel} \\ \text{EATER} \quad i \\ \text{EATEN} \quad j \end{array} \right] \end{array} \right] \end{array} \right] \end{array} \right] \\ \text{BCKGRND} \quad \{ \text{named}(i, \text{Pat}) \} \end{array} \right]$$

Consider now the embedded analogue of this same interrogative. The phrase in (63) is also an instance of the type *ns-wh-int-cl*, but it is uninverted, as explained above:



All other relevant properties of this phrase are the same as those just described for its inverted counterpart, except that the clause's head daughter is an instance of the type *decl-hd-su-cl* (which satisfies the [INV –] constraint), rather than an *inv-decl-cl* (which cannot satisfy that constraint).

Note that the INVC has an effect analogous to that of head movement in *wh*-interrogative clauses. In a main ([IC +]) clause, the verb must precede the subject because the [INV +] constraint constrains what kind of construction can appear 'at the next level down'. Conversely, in an embedded *wh*-interrogative clause the verb can never precede the subject because the [INV –] constraint ensures that the next constituent down is incompatible with the type *sai-ph*. Movement is thus an illusion caused by the interaction of constraints.

Finally, it should also be noted that the INVC applies more generally in other Germanic languages, deriving well-known movement effects in declarative clauses, as well as interrogatives. Moreover, the analysis of movement phenomena in this way is in no sense more stipulative than the transformational alternatives. In movement-based theories, it must be stipulated that main clauses are rooted in CP[*fin*] (or TP), while embedded and nonfinite clauses lack the appropriate movement triggers. These stipulations are similar to the constraint on the type *root* formulated in Chapter 2, some analog of which must be part of any empirically adequate grammar, as far as we can see.

There is one further way that the constraints on the type *ns-wh-int-cl* can be satisfied. Because there are proposition-denoting *to*-clauses—the subjectless declarative clauses discussed in Chapters 2 and 5, these may also serve as the head daughter of an *ns-wh-int-cl*. Since we have no head-subject clauses that consist of a subject followed by VP[*to*], the only infinitival clauses that can function as head daughters of non-subject *wh*-interrogative clauses are those constructed as instances of the type *decl-ns-cl*, as illustrated in (64):¹⁵

¹⁵Gerund phrases are ruled out as possible head daughters here: (1) they do not denote propositions and (2) they are incompatible with the [VFORM *clausal*] constraint inherited from the supertype *core-cl*.

- (65) a. *Who* visits Merle?
 b. *Whose friends* left?
- (66) a. I wonder [*who* visited Merle].
 b. I wonder [*whose friends* left].

First, we can be sure that the *wh*-phrases in these examples are WH-specified, as they allow *the hell* and the like as modifiers:

- (67) a. I wonder [*who the heck/hell/devil* would eat that].
 b. *Who the heck/hell/devil* would eat that?

By treating subject *wh*-questions as a kind of *wh-int-cl* we predict this, because the bracketed constituents must be WH-specified, according to the FIC in (45).

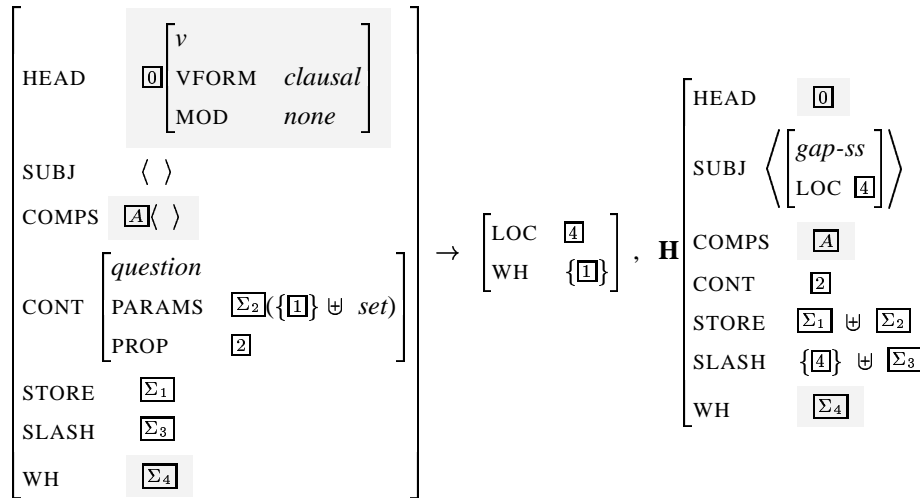
Note that we cannot treat subject *wh*-questions as a kind of *hd-subj-ph*, because the WHSP (discussed in section 5.2) requires that all SUBJ values be [WH { }]: the WH-specified subject could not combine directly with a VP specified as [SUBJ < [WH { }]]. Rather, we treat this kind of interrogative as a head-filler construction where the subject is extracted:

(68) *su-wh-int-cl*:

$$[\text{SUBJ } \langle \rangle] \rightarrow [\text{LOC } \boxed{4}], \mathbf{H} \left[\text{SUBJ } \left\langle \left[\begin{array}{c} \text{gap-ss} \\ \text{LOC } \boxed{4} \end{array} \right] \right\rangle \right]$$

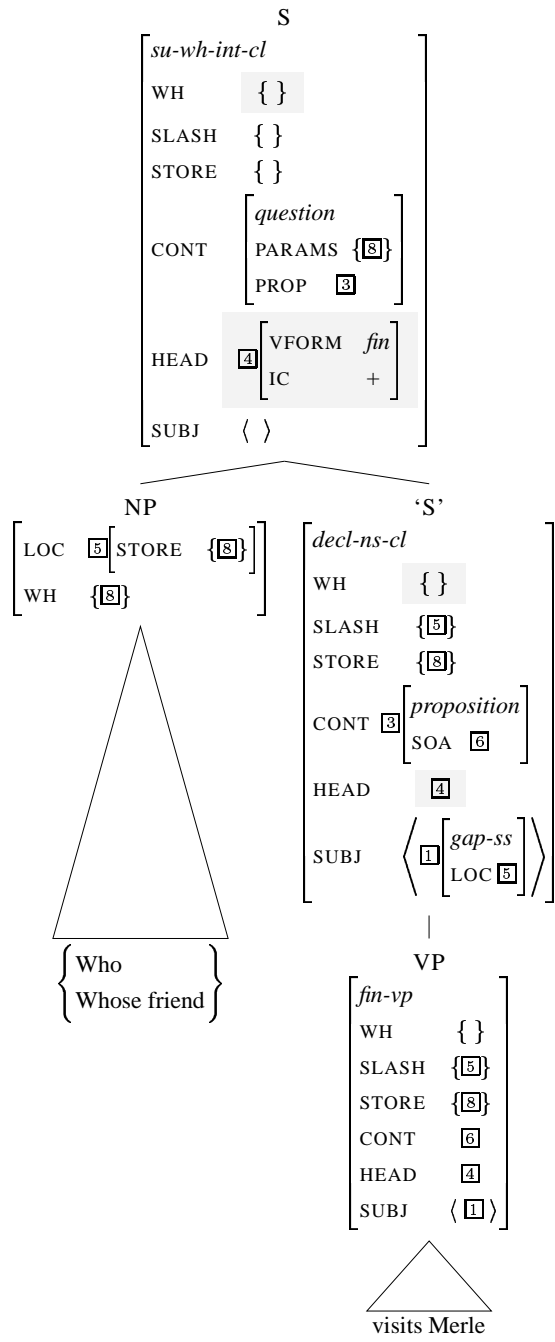
We illustrate in (69) the unification of key constraints on supertypes that are inherited by this construction. These again include the IRC, the FIC, the PHC, and the SLASH-binding condition on head-filler phrases:

(69) ECC & GHFP & *hd-fill-ph* & *core-cl* & *inter-cl* & IRC & FIC & PHC & *su-wh-int-cl*:



Because the head daughter of this construction must have a CONTENT value of type *proposition* and must in addition have a non-empty SUBJ list, one of the few possible expansions of this head daughter will be via the *decl-ns-cl* construction discussed in Chapter 2. This is illustrated in (70):

(70)

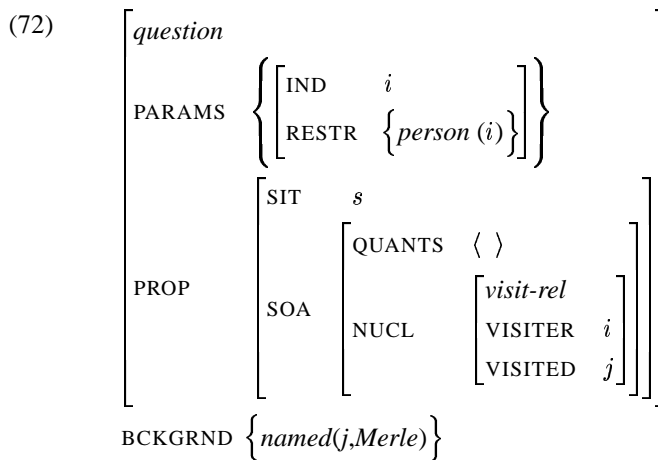


Thus in all subject *wh*-questions, the subject NP is in fact extracted and the verb heading such a question is slashed. This treatment is thus consistent with the generalizations of Hukari and Levine (1996a,b), who observe that extraction-sensitive phenomena, in all languages where they exist, manifest themselves in subject *wh*-interrogative constructions like these, as well as in constructions containing object or adverbial gaps.

Moreover, since no constraint requires an instance of *su-wh-int-cl* to be an independent clause, it follows that such clauses may also be [IC –]. This provides an account of embedded subject *wh*-interrogatives like those in (71).

- (71) a. I wonder [*who* visits Merle].
 b. I wonder [*whose friends* left].

The semantics we provide for an interrogative clause like (70) or (71a) is shown in (72):



Finally, note that the lower VP in (70) is an instance of the *fin-vp* construction discussed in Chapter 2. Since phrases of this type are [AUX –] unless they are polarized (see Chapter 2), it follows that unfocussed *do* (lexically specified as [AUX +]) can never head such a phrase unless it is polarized. As a consequence of this, there can be no subject *wh*-questions like those in (73a,b).

- (73) a. *Who did leave?
 b. *I wonder [who did leave].
 c. Who didn't leave?
 d. Who did not leave?
 e. Who DID leave?
 f. I wonder [who didn't leave].
 g. I wonder [who did not leave].
 h. I wonder [who DID leave].

Again, key data that have been analyzed in the literature in terms of complex interactions of movement transformations (e.g. head movement and Affix ‘Hopping’) or else in terms of ‘optimization’ are here analyzed simply via the simultaneous satisfaction of grammatical constraints.

6.6 Multiple *Wh*-Questions

As we noted above, multiple *wh*-questions can be treated straightforwardly in our analysis. In this section, we outline the basics of our account and address certain issues in the grammar of multiple *wh*-questions that have been much discussed under such rubrics as ‘superiority effects’ and ‘D-Linking’.

6.6.1 The Basic Analysis of Multiple *Wh*-Questions

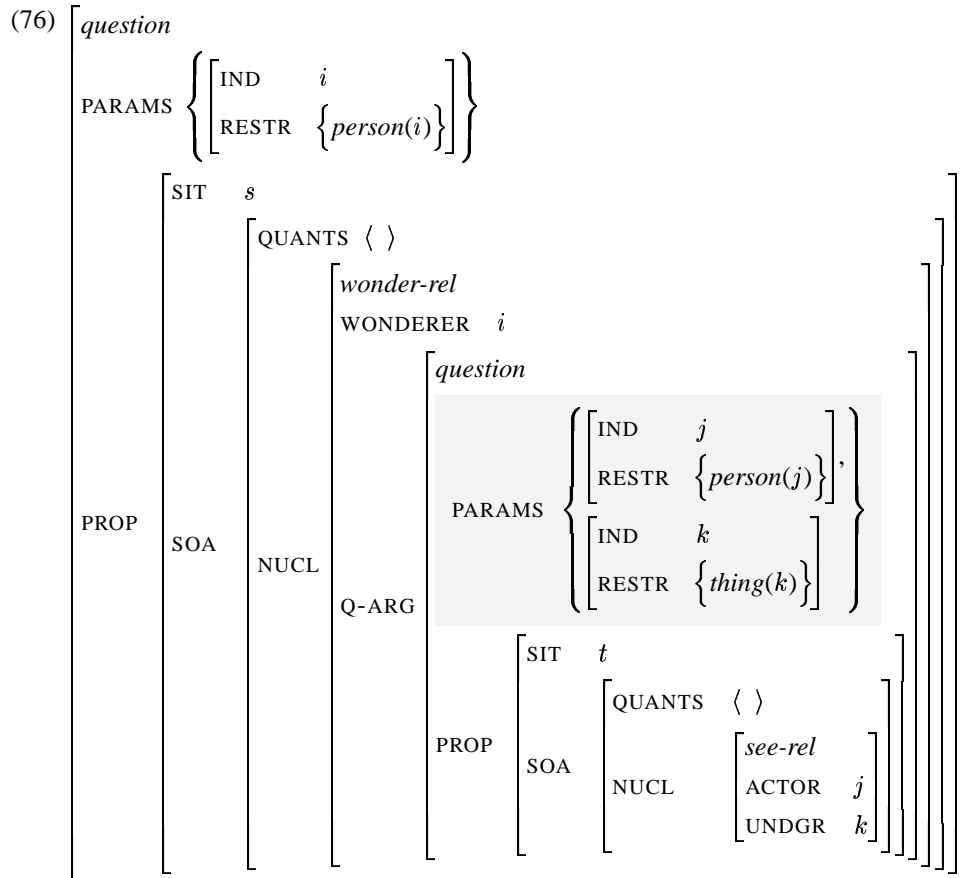
In our analysis, there is only one *wh*-word per interrogative clause that is WH-specified. This follows from the interaction of the GHFP with the various lexical constraints discussed in the previous chapter (specifically WH-Amalgamation, the WHSP, and the WHC), which ensure that the arguments of verbs (except the specifiers of verbal gerunds) are all [WH { }]. It is only within the initial phrase (the filler daughter) of a *wh*-interrogative clause that WH-specified phrases may appear. This means first that there can only be one exclamative *wh*-word per exclamative clause, as these words must be WH-specified. However, since interrogative *wh*-words are optionally WH-specified, they may appear in unfronted positions. Such in-situ *wh*-words, though not WH-specified, will nonetheless have a parameter in their STORE. This parameter is amalgamated into the STORE of the lexical head that combines with the in-situ *wh*-word and is consequently (by the GHFP) part of the STORE of the phrases that that lexical head projects.

In the case of the famous ambiguities discussed by Baker (1970), e.g. (74), the parameter of an embedded *wh*-interrogative word may be retrieved from storage at the level of the embedded clause or the highest clause.

(74) Who wondered who saw what?

Such parameters can thus become part of the meaning of either interrogative clause. Consider first the possibility that the parameter of *what* is inherited via STORE and retrieved in the lower interrogative clause, as indicated via shading in (75):

Here the analysis of both subject *wh*-interrogative clauses is just as described in the previous section.¹⁶ Notice that the FIC is obeyed in both clauses. When the parameter of the object in the lower clause is retrieved in the lower clause, as indicated in (75), the resulting CONTENT value is (76):



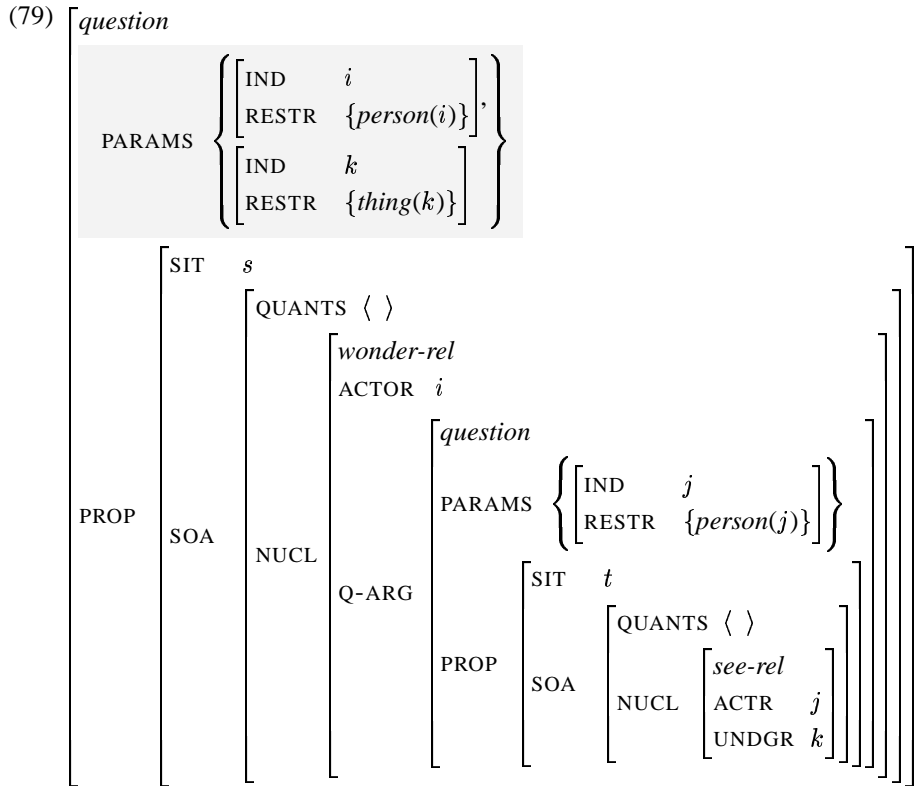
This is the reading of (74) that can be paraphrased as:

(77) Who wondered about the answer to the following question: Who saw what?

But nothing requires that the parameter π_k be retrieved in the lowest clause. If it is not, it continues being passed up in STORE (by the GHFP) and is retrieved into the content of the higher interrogative clause. This alternative analysis is illustrated in (78):

¹⁶The focussed nature of the in-situ *wh*-word *what* is discussed in the next section.

Nothing has changed here, other than the indicated inheritance and retrieval of the parameter π_k . When this parameter is retrieved in the higher clause, as shown in (78), the CONTENT value that results is (79).



This is the alternate ‘pair list’ reading of (74) that is appropriately answered (see Chapter 4) by citing pairs of wonderers and things, as in (80):

(80) Bo wondered who saw the Picasso; Dana wondered who saw the Monet;

The ambiguity just described follows without stipulation from our analysis, since the IRC allows optional retrieval of stored parameters in either *wh*-interrogative clause.

The FIC plays a crucial role in our analysis as well—it ensures that the index of the WH-specified *wh*-word (i.e. the leftmost interrogative *wh*-word) is retrieved at the lowest possible level in the tree. This is a correct prediction of our analysis, as the Baker example in (74) has no pair-list reading like (81).

- (81) a. For which persons x and y , did x wonder what was seen by y .
 b. Bo wondered what was seen by Kim; Dana wondered what was seen by Lee;

The way to ask such a question in English is of course with (82).

(82) Who asked what was seen by WHO?

And in (82), the lower *who* is in situ, and hence not WH-specified on our analysis. It is therefore free to be retrieved from STORE at the highest interrogative clause in (82), as required to produce the reading described in (81). By contrast, the word *what* in (82)—because it is the filler of the

lower interrogative clause—must be WH-specified in our analysis, and hence must be retrieved within the lower interrogative clause. This correctly predicts that (82) lacks the reading in (79), i.e. the reading indicated in (83).

- (83) For which person *x* and which thing *y*, did *x* ask who saw *y*.

These data, much discussed in the syntactic literature since Baker 1970, follow to the letter from our proposal.

In addition, it should be noted that our analysis provides a correct account of the ambiguity of examples like (84) (due to Engdahl 1986), where the in-situ *wh*-word is properly contained within the clause's filler daughter.

- (84) Who remembers [whose recordings of which Beethoven symphony] Leslie prefers?

Because the entire STORE of the bracketed NP in (84) is amalgamated into the store of the lowest verb *prefers*, the parameter associated with the NP *which Beethoven symphony* 'starts out' in storage there and may be retrieved at any higher node. This parameter can thus be part of the PARAMS set of either question; the account is essentially identical to the one just illustrated.

Another descriptive advantage of our approach, already mentioned above, is that it accounts for the fact that *the hell* and the like can modify a 'fronted' *wh*-expression, but not one that remains in situ. The consequences of this are pervasive in multiple *wh*-questions and include an explanation of contrasts like the following.

- (85) a. [Who the heck/hell/devil] does the cooking around here?
 b. [Who the heck/hell/devil] does WHAT around here?
 c. * Who does [what the heck/hell/devil] around here?
 d. *[Who the heck/hell/devil] does [what the heck/hell/devil] around here?

Our analysis explains these contrasts because it distinguishes 'fronted' *wh*-expressions from in-situ *wh*-expressions via their WH specifications.¹⁷

Finally, note that our treatment of multiple *wh*-questions makes a surprising prediction about gerunds. On Malouf's (1998) analysis, as modified slightly in the preceding chapter, gerunds select accusative subjects as in (86a)—via the SUBJ feature, but they select possessive NPs, as in (86b), via the SPR feature.

- (86) a. Sandy/them winning the election...
 b. Sandy's/their winning the election...

Given the WHSP, which disallows WH-specified subjects, and the WHC, which ensures that all non-initial members of an ARG-ST list are specified as [WH { }], examples like (87) are predicted to be ungrammatical.

¹⁷It is tempting to provide a similar account of the obligatory fronting of *why*:

- (i) Why did Sandy leave?
 (ii) *Who left why? (cf. Who left WHEN?)

This contrast would be accounted for if *why* were specified as in (iii).

- (iii) [SS|WH {*param*}]

This treatment is not yet satisfactory, however, as the specification in (iii) leaves unexplained why other in-situ occurrences of *why*, discussed more fully in Chapter 7, are possible:

- (iv) A: Bo left because she was exasperated.
 B: Right; and Sandy left WHY?

We leave this matter to future research.

(87) *I wonder [[*who(m)* winning the election] Chris wrote about].

This follows because there is no way for the gerund phrase to be WH-specified: a subject-selecting gerund and all its arguments must be [WH { }].

By contrast, a gerund cooccurring with a *wh*-word as specifier is WH-specified just in case its specifier is. This follows from WH-amalgamation and the absence of any constraint requiring the gerund's specifier to be [WH { }]. We thus correctly predict that pied piping from the possessor should be possible:

(88) I wonder [[whose winning the election] Chris wrote about _].

There is a further prediction made by our analysis, taken together with Malouf's theory of gerunds. In a sentence like the following, the clausal head *wrote* and its PP argument must be [WH { }]. (this follows from the WHC, the WHSP, and their interaction with WH-amalgamation).

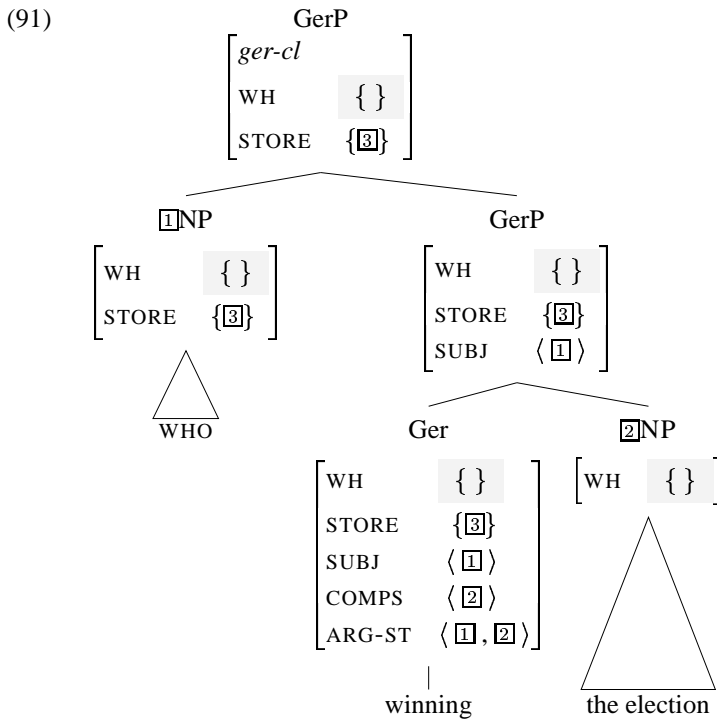
(89) Pat wonders who wrote about [WHOSE winning the election].

But because the PP is [WH { }], so is the preposition *about* (this follows from the GHFP). And because such prepositions identify their WH value with that of their object argument (see section 5.2), it follows that the gerund phrase *winning the election* is [WH { }], and hence its head (again by the GHFP) and its specifier *whose* (by WH-amalgamation) are [WH { }]. In other words, in this kind of example, the *wh*-word *whose* is in situ.

Moreover, as Malouf (1998, 2000) notes, multiple *wh*-interrogatives like (90) are also possible.

(90) Pat wonders who wrote about [WHO(M) winning the election].

This too is predicted, because we allow optional WH-specification for interrogative *wh*-words. Hence no constraints of our theory are violated in structures like (91).



6.6.2 Superiority Effects

Contrasts like the following have been known for some time (Kuno and Robinson 1972, Chomsky 1973):

- (92) a. Who saw what?
 b. *What did who see ?

Chomsky (1973) proposes to account for such contrasts in terms of a ‘superiority’ condition which prevents a transformation from applying to a given phrase if it could also have applied to a superior phrase, i.e. one closer to the root sentence. Because of the way superiority is defined,¹⁸ the superiority condition blocks (92b), but allows both the examples in (93) (Chomsky’s (71)–(72)).

- (93) a. John remembers where Bill bought which book .
 b. John remembers to whom Bill gave which book .

Chomsky (1980) assumes that the contrast between (92a) and (92b) represents a subject/object asymmetry and offers an alternative account on the basis of the Empty Category Principle (ECP). However, as Hornstein (1995: 124) argues (following Hendrick and Rochemont 1982), similar contrasts like (94), where neither *wh*-expression is in subject position, are not easily amenable to analysis in terms of the ECP.

- (94) a. Who did you persuade to buy what?
 b. *What did you persuade who to buy ?

The literature on the superiority phenomenon is considerable and we cannot do justice to it here. However, in our view, this phenomenon has not yet been adequately analyzed, despite frequent assertions to the contrary.

There are a number of reasons why we say this, not the least of which is the difficulty in coming up with a clear characterization of what the data actually are. There are many potential counterexamples to the basic superiority effect—the generalization that a *wh*-dependency between a binder and a gap may not cross a *wh*-expression that is syntactically superior to the gap. For example, it is generally agreed that *which*-phrases are immune to the effect:

- (95) a. I wonder which book *which man* read .
 b. To which organization did *which people* give money

An influential strategy that data like (95) have spawned, following Pesetsky (1987), is to distinguish between inherently D(iscourse)-linked and non-D-linked *wh*-phrases: some interrogative phrases are quantificational and require fronting at LF for their interpretation; others are interpreted like indefinites and do not require fronting at LF. According to Pesetsky’s proposal, these latter expressions require ‘D-linking’; their use requires a set of possible instantiators for the argument role with which the D-linked expression is associated to be salient. The prototypical D-linked interrogative expressions are *which*-phrases. Pesetsky’s conclusion is that an ECP-based account for the asymmetries above can be maintained, albeit restricted to the quantificational interrogative phrases.

¹⁸“A is superior to the category B in the phrase marker if every major (N, V, or A) category dominating A dominates B as well but not conversely.” (Chomsky 1973: 246)

We are skeptical about the grammatical viability of the D-linking distinction: although it is clear that *which*-phrases differ *presuppositionally* from *what* and *who* (in that the former carry a uniqueness presupposition that the latter do not carry),¹⁹ there is no independent evidence for interpretational asymmetries (and hence distinct interpretational mechanisms) between the putatively distinct classes of *wh*-phrases. Both *which*-phrases and *who/what* (and indeed all other *wh*-phrases we are aware of) can be used independently, functionally, and to reprise. Moreover, the condition that Pesetsky suggests characterizes felicitous uses of *which*-phrases is incorrect.²⁰ Thus it is implausible to suggest that in using a sentence such as (96), a speaker has in mind a range of felicitous answers more precise than the range of answers that someone who used any of the examples in (97) might have in mind:

- (96) I don't know anything about cars. Do you have any suggestions about which car, if any, I should buy when I get a raise?
- (97) a. I don't know anything about cars. Do you have any suggestions about what car, if any, I should buy when I get a raise?
 b. I don't know anything about cars. Do you have any suggestions about what, if anything, I should buy when I get a raise?
 c. I don't know anything about cars. Do you have any suggestions about how many (cars), if any, I should buy when I get a raise?

Though these varying choices differ little, if at all, with respect to the specificity of the answer set presupposed by the speaker, they apparently have quite different behavior with respect to the possibility of multiple *wh*-questions:

- (98) a. Who did which president greet __ ?
 b. */# Who did what president greet __ ?
 c. */# Who did how many presidents greet __ ?

In short, the appeal to D-linking fails to explain such constraints on multiple *wh*-questions in terms of any distinguishing semantic property.

Similarly problematic are claims such as that made by Hornstein (1995), that fronted *wh*-phrases in multiple *wh*-interrogatives must be D-linked, as illustrated by (99):

- (99) a. Which recently published reports should be made required reading for which government departments?
 b. Don't just make big claims for the current administration. Tell us specifically: What has the government done in recent years for which underprivileged group?

¹⁹For discussion, see section 4.3.3.

²⁰In fact, it is not the case that D-linking, in the sense of linking an NP use with a contextually provided domain, in any way *characterizes* sentences containing *which*-phrases or superiority-violating multiple *wh*-sentences. Any use of a sentence (an episodic sentence, at least) requires for full comprehension the fixing of a domain or situation which the utterance concerns. Without this, the utterance is not felicitous. This applies as much to uses of declaratives as to uses of interrogatives. Thus, out of the blue, an utterance of (i), (ii), or (iii) contains no semantic clues to the domain over which the possible fillers of either the quantifier or interrogated roles vary:

- (i) Who likes whom?
 (ii) Someone was asleep.
 (iii) Who was asleep?

Hence, without further contextual specification of the domain, the corresponding query or assertion will be infelicitous. As these data make evident, this phenomenon is quite orthogonal to the semantics of (multiple) *wh*-interrogatives.

A newly elected public official, ignorant of the available government reports, can utter (99a), whereas (99b) can be uttered by an activist who believes the government has not done anything to help underprivileged groups.

Likewise, it is hard to see why examples like (100) involve mechanisms of interpretation different from those that are relevant to the semantic analysis of the questions in (101).

- (100) a. How many students took how many courses?
 b. How many courses did how many students take?
- (101) a. Who took what courses?
 b. ?What courses did who take?

Because of problems of this sort, we reject the claim that there are two distinct mechanisms for interpreting *wh*-expressions: quantification and D-linking. The theory we present treats all *wh*-phrases in terms of a single interpretive technique: the abstraction of indices of interrogative parameters.

Moreover, as Bolinger (1978) and others have pointed out, there are other kinds of systematic exceptions to the superiority effect. First, there are echo questions like (102B).

- (102) A: What did Agamemnon break?
 B: What did WHO break __ ?

Second, there are 'reference' questions like (103B).

- (103) A: What did he break?
 B: What did WHO break __ ?

We discuss and analyze both of these interrogative types in the next chapter.

Third, there are superiority-violating multiple *wh*-questions such as those in (104).

- (104) a. Who wondered what WHO was doing?
 (= Who are the *x, y* pairs such that *x* wondered what *y* was doing?)
 b. Who asked how often WHO went to a baseball game?
 (= Who are the *x, y* pairs such that *x* asked how often *y* went to a baseball game?)

In addition, there are single clause interrogatives that violate superiority. As Bolinger (1978: 108) notes, when more than two (interrogative) *wh*-words are present, any of them can appear in fronted position:

- (105) a. Who took WHAT WHERE?
 b. What did WHO take __ WHERE?
 c. Where did WHO take WHAT __ ?

It is hard to see how examples like (105b,c) can be squared with any purely syntactic account of superiority, including those of Pesetsky (1987), Lasnik and Saito (1992), Hornstein (1995), or Chomsky (1995b). These theories offer an account of at best a small subset of the phenomena, with no precise alternative offered for the remaining cases.

Notice that in all of the examples we have been considering, accentual prominence typical of focus is evident on the non-fronted *wh*-expressions. That is, the most natural phonetic renditions of all these examples involve the presence—to varying degrees—of a focus-related pitch accent. Perhaps focus holds the key to understanding the exceptions to superiority.

In this connection, it is interesting to consider further counterexamples to superiority offered by Bolinger (1978: 108):

- (106) a. I know that among all the disasters in that kitchen, Jane scorched the beans and Lydia put salt in the ice tea; but WHAT did WHO BREAK? I know somebody broke some something, so stop evading my question.
 b. I know what just about everybody was ASKED to do, but what did WHO (actually) DO?

Pesetsky (1987: 109), who agrees fully with Bolinger's claim about the acceptability of these examples, adds a further counterexample of his own:

- (107) I know that we need to install transistor A, transistor B, and transistor C, and I know that these three holes are for transistors, but I'll be damned if I can figure out from the instructions WHERE WHAT goes.

He observes that these require a proper context and that the felicity is particularly evident "if all the *wh*-words are given extremely heavy stress" (Pesetsky 1987: 108).

Now Pesetsky (as well as Hornstein (1995)) sees the absence of superiority effects as an indication of D-linking, a mechanism that has never been made precise and whose motivation we believe is dubious, as previously discussed. However, the intuition behind D-linking may well be related to the focus facts that have been observed.

We suggest that the following generalization is true:

- (108) In a multiple *wh*-interrogative, all *wh*-phrases except the first must be accented.

If we build an analysis that embodies this generalization, then the only thing wrong with examples like (92b) (repeated here as (109a)) is that the second *wh*-word is unaccented.

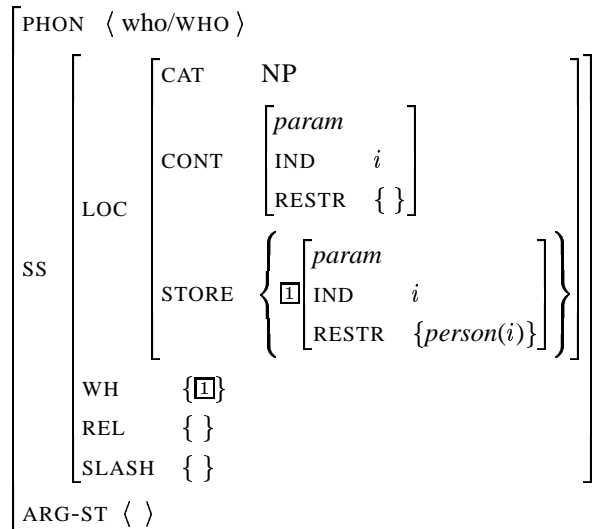
- (109) a. *What did whǒ see __ ?
 b. *What did whǒ break __ ?
 c. *What did whǒ do __ ?
 d. *Where did whǎt go __ ?

This would account nicely for the contrasts agreed upon by Bolinger and Pesetsky (compare (106) and (107) above).

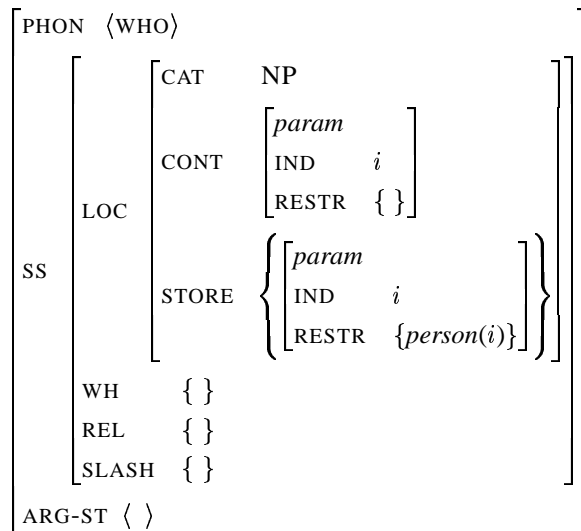
It is straightforward to modify our analysis to express this generalization. In the previous chapter, we assumed a single lexical entry—with a disjunctively specified WH value—for each interrogative *wh*-word. Suppose instead that we distinguished the WH-specified *who* from its [WH { }] counterpart phonologically. That is, we could posit the following two lexical entries for interrogative *who*.²¹

²¹ Obviously, the clumsy disjunction '*who*/WHO' should be replaced by an appropriately formulated accentual underspecification.

(110) a. WH-Specified Interrogative *who*:



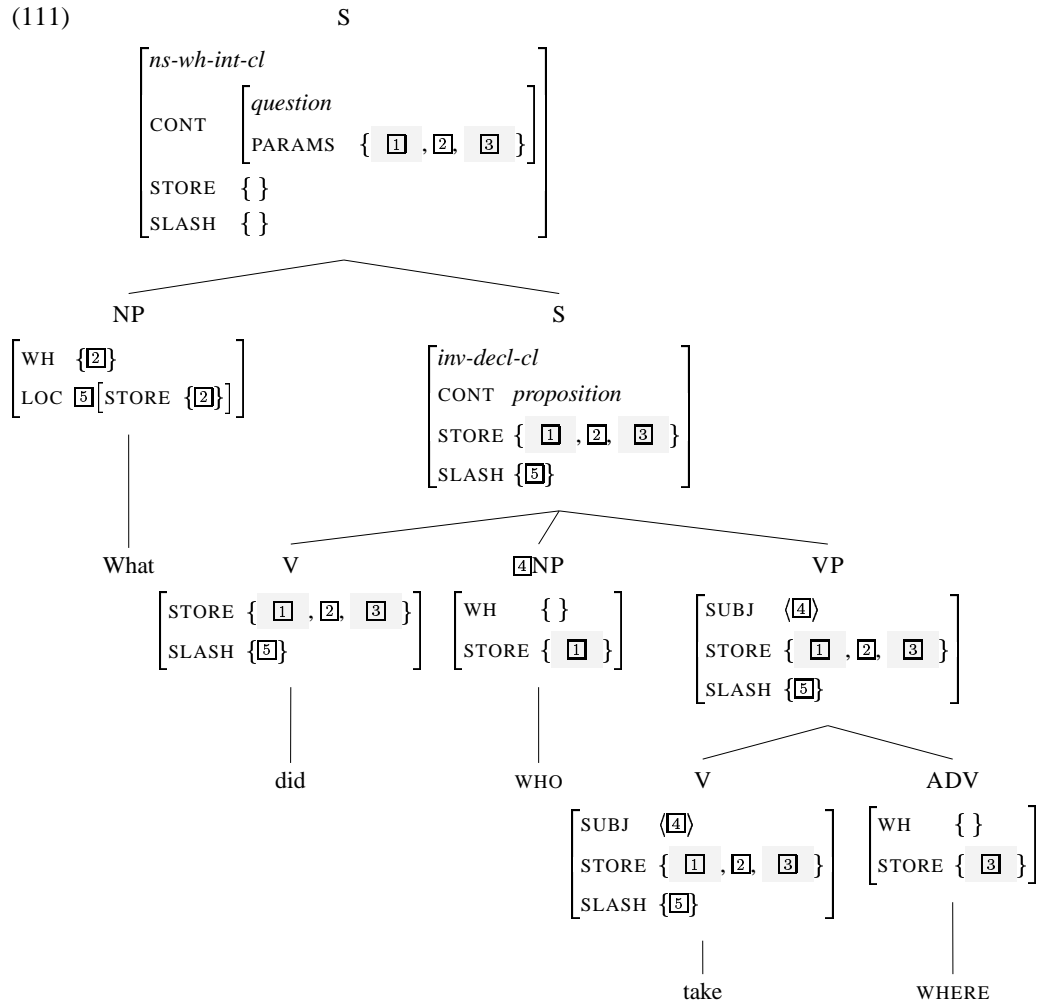
b. WH- $\{ \}$ Interrogative *who*:



Since our syntactic analysis guarantees that only (110b) can appear in situ, we then immediately predict that in-situ *wh*-words must be accented, while ‘fronted’ *wh*-words are only optionally so. This, by the way, is precisely the generalization offered by Ladd (1996: 170–172) in his brief discussion of English *wh*-interrogative intonation.

With this revision in place, we have an analysis of all of the preceding contrasts. The analysis of Bolinger’s example (105b), for example, is shown in (111).

(111)



Since both WHO and WHERE are [WH { }], they must be accented, as lexical entries like those in (110) guarantee.

In order to account for the relative ease with which *which*-phrases violate superiority, we need only state that the [WH { }] lexical entry for *which* allows, but does not require a pitch accent. This will allow us to explain examples like (112).

- (112) a. I wonder which book *which man* read __.
 b. To which organization did *which people* give money __

This account thus requires no new interpretative mechanism for *which*-interrogatives: *which* differs from other *wh*-expressions only in terms of accentual properties and presupposition. Superiority-violating multiple *wh*-questions like (113) are also now allowed, with focussing of the parameter of the in-situ *wh*-word *who*:

It does not matter at which level of structure the in-situ *wh*-expression's parameter is retrieved. An in-situ *wh*-word (other than *which*) must be accented. A similar interaction will result from the analysis of echo and reference interrogatives developed in the next chapter.

There is one final piece of the prosodic account we have sketched here that needs to be fleshed out. We have been led to the conclusion that in all the examples in (114) (at least) the noninitial *wh*-words are focussed.

- (114) a. What did *who* take *where*?
 b. Who gave *what* to *whom*?
 c. Who said *what* about *when*?

Yet the degree of intonational prominence on the penultimate *wh*-expression may be considerably less than that of the final *wh*-word. It seems plausible to attribute this to a prosodic effect that subordinates a given pitch accent to one that follows. That is, our claim about the data here crucially involves FOCUS, which is typically—but not always—associated with a clearly discernable pitch accent. Whether there are other effects (e.g. duration or tempo) that corroborate our claims about the obligatory presence of focus in the examples we have considered is regrettably a matter we must leave to future research.

6.7 Conclusion

In this chapter, we have presented the basics of a grammar of polar and *wh*-interrogative clauses, as well as an account of exclamative clauses—both with and without *wh*-expressions. The overall organization of the clausal types we have posited is sketched in (115). Our analysis includes an account of the ambiguities of multiple *wh*-interrogatives as well as a novel approach to the treatment of superiority effects.

