

Syntactic Patterns of Embedded Wh- Clauses

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Craig Turnbull-Sailor

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Committee members:

Sara Rosen, Committee Chair

Harold Torrence

Alison Gabriele

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The Thesis Committee for Craig Turnbull-Sailor certifies
that this is the approved Version of the following thesis:

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Committee:

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Harold Torrence

Alison Gabriele

Date approved: _____

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Abstract

This thesis investigates constructions commonly referred to as embedded or indirect questions. Evidence is presented (in the form of several diagnostics) that shows a clear behavioral distinction among constructions that are canonically analyzed as being identical. Specifically, these diagnostics (e.g. polarity item licensing, clause fronting, etc.) show that one class of verb (including *wonder* and *ask*) embeds clauses that behave like true questions, while another class (including *discover* and *know*) embeds clauses that do not behave like questions. The non-question clauses under *discover*-class verbs are analyzed as free (“headless”) relative clauses (DPs) while the question clauses under *wonder*-class verbs are analyzed as true embedded questions (CPs). The structural distinction between these homophonous clauses is supported by positive empirical evidence. The ultimate implications of this thesis are a restriction of the term “embedded/indirect question” to *wonder*-class complements and an expansion of the literature on free relatives to include *discover*-class complements.

1. Introduction

The study of embedded clause types – particularly those containing a fronted *wh*-word – has held the attention of many linguists through the years. Looking to the matrix verb to better understand the embedded clauses they select, semanticists have long noted the differential behavior of *wonder* and *discover* (or more commonly, *ask* and *know*) (Quine (1963), Hintikka (1976), Ginzburg & Sag (2000), to name a few).

For example, consider one difference between *wonder* and *discover*:

- (1) a. The man wondered who had broken in.
b. The man wondered: who had broken in?
- (2) a. The man discovered who had broken in.
b. *The man discovered: who had broken in?

The clause embedded under *wonder* can be stranded from the matrix clause prosodically (i.e. by the pause associated with the internal punctuation) while the clause under *discover* cannot. This asymmetry is unexpected because the two embedded clauses appear to be identical. In fact, because a *wh*-word appears clause-initially in both clauses, both (1)a and (2)a are widely referred to as embedded or indirect questions and are assumed to be syntactically identical. In this thesis, however, I establish robust syntactic differences between the embedded [+wh] clauses selected by *wonder* and those selected by *discover*. One goal of this thesis, then – and the reason for its emphasis on [+wh] clauses – is to syntactically disambiguate these two types of homophonous embedded clause.

To achieve this goal, I first offer several diagnostics to illustrate the clauses' differential behavior, including *wh-the-hell* licensing, embedded inversion, and prosodic clause stranding (seen in (1) and (2), above). These diagnostics yield a consistent pattern: *wonder*-class verbs (*wonder*, *ask*, and *inquire*) embed clauses that behave quite differently from the clauses under *discover*-class verbs (*discover*, *know*, *find out*, etc.), despite the clauses' phonological identity. I argue that these behavioral asymmetries follow directly from a major syntactic difference between *wonder*-class and *discover*-class complement clauses. Specifically, I claim that *discover*-class verbs embed free relative clauses (DPs) while *wonder*-class verbs embed true questions (CPs). As a result, *wonder*-class complements behave like questions while *discover*-class complements behave like relative clauses. These findings comprise a novel theoretical contribution to the literature on embedded [+wh] constructions.

Before concluding, I return to the diagnostics to help describe a complex set of data, some of which has not yet been noted in the literature. A more familiar example of such data is in (3) (see e.g. McCloskey (2006)), where the presence of “dying to” allows the clause under *discover* to pass some of our diagnostics that it would typically fail:

- (3) a. *The man discovered: who had broken in?
b. The man was **dying to discover**: who had broken in?

Although these data complicate matters greatly, I show that they also represent an important area of future research into the relationship between the verb and its [+wh] complement.

2. The behavior of *wonder*-class and *discover*-class verbs

2.1 *Prior analyses and terminology*

At least since Quine (1963), semanticists have recognized a relationship between matrix verbs and the types of embedded clauses they select. Among verbs that can take [+wh] embedded clauses, the clauses under some of these verbs seem more “interrogative” than others. In (4) (adapted from Caponigro (2002)), the [+wh] clause embedded under *wonder* is thought of as more question-like than the homophonous clause embedded under *forgot*:

- (4) a. Jane wondered [who left].
b. = Jane wondered [which person left].
c. Jane forgot [who left].
d. = Jane forgot [the person that left].

Any paraphrase of (4)a will yield a question, such as (4)b, while (4)c can be easily restated in a declarative context, as in (4)d. Similar observations have led many to believe that a distinction can be made among verbs that embed [+wh] complements. However, the exact nature of this split, and the grouping of verbs that arises as a result, varies a great deal in the literature.

The motivations for such a distinction are often semantic. For instance, Groenendijk & Stokhof (1986) argue that verbs embedding [+wh] clauses can be distinguished according to whether the verb operates on the denotation of its complement rather than its sense (*extensionality* vs. *intensionality*). The authors reinforce this observation with a few diagnostics. For example, from the sentence “John knows whether Mary walks,” in the case that Mary walks, John knows that she

walks (and in the case that she doesn't walk, John knows she doesn't). However, from the sentence "John guessed whether Mary walked," in the case that Mary walked, it does not necessarily follow that John guessed that she walked. Such interpretational differences lead Groenendijk & Stokhof (1986) to posit two groups of [+wh]-embedding verbs: extensional verbs (*know*, *tell*, et al.) and intensional verbs (*wonder*, *guess*, et al.).

Other arguments for a distinction among [+wh]-embedding verbs have been syntactically motivated. For example, den Dikken & Giannakidou (2002) argue that only *wonder* and *ask* embed "real" questions because their complements contain a silent Q operator in the embedded C⁰ (based on work by Munsat (1986), Berman (1991), and Adger & Quer (2001), among others). Verbs like *know*, on the other hand, lack this Q operator and thus embed "semiquestion" complements. To verify this distinction, den Dikken & Giannakidou (2002) provide *wh-the-hell* licensing as a diagnostic, which I will return to shortly.

Clearly, then, there are several valid ways of classifying verbs that take [+wh] complements (see also Baker (1968) and Caponigro (2003); I will treat these more fully in Chapter 3). However, these classifications cannot all represent a question/non-question distinction, which is a main concern of this thesis. In this chapter, I provide diagnostics that yield the same verb classification as den Dikken & Giannakidou (2002) (and others),¹ but crucially different from the classification in

¹ I will eventually differ with den Dikken & Giannakidou (2002) in Chapter 3, where I propose a more extensive syntactic distinction between the complements of *know* and *wonder* than simply the presence or absence of a Q operator.

Groenendijk & Stokhof (1986) (and others). Specifically, the diagnostics that I present in the following sections show that not all [+wh] complements are alike: the complements under *ask*, *wonder*, and *inquire* consistently pattern together as one group while those under *know*, *discover*, *find out*, etc. pattern as another. Given the nature of the diagnostics and the proposal that follows, this classification can only extend from a [+wh] question/non-question distinction. Alternative classifications, such as the ones offered by Groenendijk & Stokhof (1986) and Baker (1968), undoubtedly capture some fundamental differences among verbal complements, but not a question/non-question distinction.

Before moving to the diagnostics, we must first settle on some terminology. Prior work in the classification of [+wh]-embedding verbs has relied on an array of terminology. For example, prior works have appealed to factivity (from Kiparsky & Kiparsky (1971)) and veridicality (from Giannakidou (1998)), both of which belong to larger theoretical frameworks with consequences extending beyond embedded question contexts, making their application here somewhat imprecise.² Other works have coined new terms to describe verbs, such as “question-embedding” vs. “resolutive” (Ginzburg & Sag (2000)). Their classification, though, is incompatible with the results we will see from the diagnostics in this chapter (similar to Groenendijk & Stokhof’s (1986) classification), so I will not use their terms. The terms “question predicate” vs. “proposition predicate” have also been proposed (Adger & Quer (2001)), and while their classification is very similar to the one I settle

² Giannakidou’s (1998) notion of veridicality comes closest to capturing the patterns treated in this thesis, but it cannot capture certain data involving “want to”-type constructions. See Chapter 4.

on, Adger & Quer deal with verbs that embed yes/no questions versus those that embed *that*-clauses. To avoid confusion with any of these prior works and their findings, I will use different terms in my discussion. I use “*wonder*-class” to describe the group of verbs whose complements pattern like true questions, and I use “*discover*-class” to cover verbs whose complement clauses do not pattern like questions (or are “semiquestions,” according to den Dikken & Giannakidou (2002)).

We can now turn to some diagnostics that help distinguish embedded [+wh] questions from embedded [+wh] non-questions.³

2.2 *Structural diagnostics distinguishing wonder- from discover-class verbs*

A verb’s membership to the *wonder*- or *discover*-class can be confirmed through structural tests that yield grammatical output when the input is an embedded question, and yield ungrammatical output when the input is of some other clause type.

Basically, these tests target syntactic phenomena recognized in root questions but construed in embedded contexts. As the following subsections show, the embedded clauses of *wonder*-class verbs are structurally similar to root questions, while the embedded clauses of *discover*-class verbs behave more like root declaratives.

2.2.1 *Polarity licensing and wh-the-hell*

Giannakidou (1998) argues extensively that a clause’s “veridicality” determines whether a polarity item can be licensed in that clause. A clause is said to be non-veridical when it contains an operator, silent or overt, whose semantics guarantees

³ See Chapter 4 for extensive discussion of these diagnostics.

that the clause is not interpreted as simply true or false. Polarity items are only grammatical when licensed in the scope (c-command domain) of such an operator. This observation becomes directly relevant to the issue at hand when one considers how polarity items are distributed in questions. Polarity items are allowed in root questions because the entire clause has a non-veridical reading, which simple declaratives lack:

- (5) a. ***Anybody** helped you.
b. Did **anybody** help you?

The non-veridical reading in questions comes from a non-veridical Q operator in the clause's C-layer, and is sufficient to license a polarity item under c-command (see e.g. Giannakidou (1998), den Dikken & Giannakidou (2002), and den Dikken (2003)). Extending this analysis to embedded clauses, den Dikken & Giannakidou (2002) argue that only matrix clauses with sufficiently non-veridical interpretations can license polarity items in their clausal complements. They introduce data containing *wh-the-hell*, which they convincingly argue behaves like a polarity item:

- (6) a. Who the hell left?
b. When the hell did this happen?
c. What the hell is going on here?

Wh-the-hell has basically the same distribution as a simple *wh-* word,⁴ but it patterns like a polarity item (den Dikken & Giannakidou (2002)). Whereas a simple *wh-* can occur in veridical contexts (for example, as a relative pronoun), a *wh-the-hell*

⁴ Except *which*; see Pesetsky (1987) for discussion.

construction can only occur in non-veridical contexts. The prediction that follows from this is that *wh-the-hell* should not be licensed in the scope of a so-called veridical verb (a verb whose complement is interpreted as veridical; this is equivalent to our *discover*-class). This prediction is borne out as den Dikken & Giannakidou (2002) note. It turns out, though, that the class of verb that disallows *wh-the-hell* in its complement is actually quite large:

- (7) a. The police wondered who the hell broke in.
b. *The police discovered who the hell broke in.
- (8) a. Julie asked what the hell transpired earlier that day.
b. *Julie knew what the hell transpired earlier that day.
- (9) a. The witness wondered what the hell the suspect said.
b. *The witness discussed what the hell the suspect said.
- (10) a. Everybody inquired when the hell the announcement would be made.
b. *Everybody forgot when the hell the announcement would be made.

Examples (7)-(10) might indicate that the clauses under *wonder*, *ask*, and *inquire* have the structure of questions since *wh-the-hell* is licensed. *Discover*, *know*, *discuss*, and *forget* (to name just a few; see Appendix A) cannot embed clauses containing *wh-the-hell*, possibly pointing to a clause structure distinct from the complements of the *wonder*-class. Thus, the paradigm in (7)-(10) shows a syntactic split in the class of predicates that supposedly embed questions. One set, the *wonder*-class, licenses *wh-the-hell* polarity items just like root questions do. The other set, the *discover*-class, cannot license these polarity items. Under this diagnostic, the clausal complements of

discover-class verbs are not licensing environments for polarity items; that is, they are not questions.

Applying the *wh-the-hell* diagnostic elsewhere, it appears that other verbal constructions pattern with *wonder*-class verbs:

- (11) a. The man **wanted to know** when the hell Vince was coming home.
b. Mary was **dying to see** who the hell won American Idol.

Given the acceptability of (11)a and (b) it appears that *want to know* and *dying to see*⁵ are question-embedding verbal constructions, just like *wonder*, *ask*, and *inquire*. This is rather unexpected, given that these constructions contain the verbs *know* and *see* which, by themselves, pattern like the *discover*-class:

- (12) a. Bill wondered what the hell all the fuss was about.
b. *Bill knew what the hell all the fuss was about.
- (13) a. I asked who the hell left early.
b. *I saw who the hell left early.

I come back to these constructions in Chapter 4, where I lay out the behavioral paradigm of these constructions and our two verb classes.

2.2.2 “*What gives?*”

Joseph (2000) introduces the “*what gives?*” construction and notes its availability in both root and embedded contexts:

- (14) a. What gives with all this traffic?

⁵ *Anxious to find out*, *eager to know*, *need to figure out*, and many similar constructions also behave like *want to know* and *dying to see*. See Chapter 4 for discussion.

b. I wonder what gives with all this traffic.

Joseph also notes that “what gives?” patterns like a question word. In addition to Joseph’s observations, a few other behavioral patterns are worth mentioning: “what gives?” (as well as “what’s up?”) cannot refer to an item familiar in the discourse (15):

- (15) a. *Nancy loves [what gives / what’s up].
b. *[What gives / what’s up] helps Nancy.

These characteristics are also exhibited by *wh-the-hell*, as noted in the previous section. Further, “what gives?” has the same distribution as *wh-the-hell*. Indeed, the former can even contain the latter:

- (16) a. **What the hell gives** with this homework assignment?
b. I’m busy wondering **what the hell gives** with this homework assignment.

Given Joseph’s observations and those I provide in (15) and (16), I propose that “what gives?” should be analyzed like *wh-the-hell*, as in den Dikken & Giannakidou (2002). In other words, “what gives?” is an aggressively non-D-linked polarity item that must be licensed in the scope of a non-veridical operator⁶ and cannot refer to a familiar expression in the discourse (Pesetsky (1987)). As a polarity item, the “what gives?” construction can tell us whether a clause is (non-)veridical (Giannakidou (1998)). More importantly, since question clauses are non-veridical environments, “what gives?” can help us identify verbs that embed questions (*wonder*-class) from verbs that do not (*discover*-class):

⁶ See Chapter 4 for discussion of *wh-the-hell* licensing.

- (17) a. [What gives / what's up] with Greg's attitude?
b. I wonder [what gives / what's up] with Greg's attitude.
c. *I know [what gives / what's up] with Greg's attitude.
d. *We discussed [what gives / what's up] with Greg's attitude.

Just like *wh-the-hell*, “what gives?” clearly distinguishes *wonder*-class verbs from *discover*-class verbs, and as a *wh*-like polarity item, it makes a good diagnostic for testing the question-status of an embedded clause.

2.2.3 Embedded T-to-C movement

Ordinary root questions in English feature “subject-aux inversion,” analyzed as material in T⁰ raising to C⁰ (Koopman (1983)):

- (18) a. Bill will leave.
b. Will_i Bill t_i leave?

In (18), the auxiliary has undergone T-to-C movement (or, given Rizzi (1997), movement to a low projection in the C-layer, such as Fin⁰); thus, it surfaces in a position structurally higher than the subject in [Spec, TP]. This phenomenon is well-established in root contexts (see e.g. Pesetsky & Torrego (2001)), but not as widely discussed in embedded contexts. This is probably because embedded T-to-C movement is ungrammatical in Standard English questions.

However, several varieties of English allow T-to-C movement in embedded clauses as well as root clauses. Henry (1995) and McCloskey (2006) discuss dialects of Irish English⁷ that exhibit T-to-C in embedded [+wh] clauses:

- Irish English* (data from McCloskey 2006 #4b and 2b)
- (19) a. I wonder what should we do.
b. The baritone was asked what did he think of Mrs. Kearney's conduct.

Note that the now-familiar verbs *wonder* and *ask* are used in (19). These verbs both take question-like clauses as complements. Since T-to-C movement is a property of root question formation in English, it is not surprising that it occurs in embedded interrogative contexts for some dialects. On the contrary, the prohibition of embedded T-to-C in Standard English is unexpected. Moreover, we would never expect to see subject-aux inversion in embedded declarative clauses since it does not take place in root declaratives.⁸ We can now see that dialects allowing embedded T-to-C plainly disallow it under verbs of the *discover*-class:

- Non-standard American English*
- (20) a. The district attorney asked who did the police arrest.
b. *The district attorney discovered who did the police arrest.
- (21) a. Henry inquired when would their flight arrive.
b. *Henry knew when would their flight arrive.
- (22) a. The whole room wondered what was Jacob planning to do.
b. *The whole room heard what was Jacob planning to do.

⁷ I was unable to consult with a native speaker of these Irish English dialects; however, embedded T-to-C is also available in certain non-standard American English dialects. I would like to thank Harold Torrence for his judgments in one such dialect.

⁸ Excluding cases of “negative inversion,” such as:
(i) Never have I seen such a thing.

- (23) a. The prisoners wondered when should they make their move.
b. *The prisoners decided when should they make their move.

These examples show that T-to-C in embedded [+wh] contexts seems to occur only in true question clauses, i.e. clauses embedded under *wonder*-class verbs.

2.2.4 Clause-fronting

A similar effect can be created when a [+wh] embedded clause is fronted and appears before the matrix clause.⁹

- (24) a. They all wondered what could be done.
b. What could be done, they all wondered.
c. They all discovered what could be done.
d. *What could be done, they all discovered.
- (25) a. The juror asked who should be found guilty.
b. Who should be found guilty, the juror asked.
c. The juror determined who should be found guilty.
d. *Who should be found guilty, the juror determined.

Here, the embedded clause is fronted to the beginning of the sentence, and only the complements of *wonder*-class verbs seem to tolerate this. *Discover*-class verbs once again display the opposite pattern. This process seems to force the fronted clause to mimic a root question, perhaps because the [+wh] clause has been severed from its

⁹ At a glance, these data appear to be examples of quote-fronting, confounding them as accurate diagnostics for question-embedding. However, consider the following examples from non-standard American English:

- (i) John asked was I hungry.
(ii) Was I hungry, John asked.
(iii) # “Was I hungry?” John asked.

Sentence (iii) is bizarre when interpreted as a quote, particularly considering the availability of (ii) with an embedded question reading, which is preferred. This suggests that the clause-fronting process I appeal to here is *not* an example of quote-fronting (though such a reading may be available for many of these sentences). See Suñer (2000) for discussion of quote-fronting and quotative inversion.

selecting verb. Indeed, this operation seems to treat the fronted clause very much like a root question because inversion in it becomes obligatory after fronting:

- (26) a. The neighbors wondered what the robbers took.
b. *What the robbers took, the neighbors wondered.

By cross-applying our observations from embedded T-to-C in non-standard English dialects, we continue to see that *wonder*-class verbs allow their complements to undergo inversion and then front, but *discover*-class verbs allow neither:

Non-standard American English

- (27) a. The neighbors wondered what did the robbers take.
b. What did the robbers take, the neighbors wondered.
c. *The neighbors discovered what did the robbers take.
d. *What did the robbers take, the neighbors discovered.
- (28) a. The audience inquired where did the story take place.
b. Where did the story take place, the audience inquired.
c. *The audience hated where did the story take place.
d. *Where did the story take place, the audience hated.

If the structure of *wonder*-class embedded clauses is the same as root questions, then it is not surprising that *wonder*-class complements can appear in a position other than complement position, as we see in (27)b and (28)b. On the other hand, *discover*-class clausal complements cannot appear in a position other than complement position, suggesting that their structure is different than those of true questions. This is developed further in Chapter 3.

2.3 Non-structural diagnostics distinguishing wonder- from discover-class verbs

The diagnostics in this section establish a distinction between *wonder-* and *discover-* class verbs through semantics and prosody rather than discrete syntactic operations. In root clauses, we typically identify questions by the presence of a *wh-* word since declaratives lack them (except in relative constructions). As I argue in Chapter 3, *wh-* words are common in embedded contexts, but they are much more likely to be construed as relative pronouns than as a question words. Since we cannot rely on the presence of a *wh-* word as a diagnostic for questions, and we have already applied our structural diagnostics, we can now turn to the non-structural differences between clauses embedded under *wonder* and *discover*.

2.3.1 Prosodic clause stranding

If an embedded clause can truly bear a question interpretation, then the same differences that distinguish root questions from declaratives could perhaps be exploited in embedded contexts. For instance, if an embedded clause really behaves like a question, we predict it should be able to stand alone grammatically, just as a root question can.¹⁰ Separating the matrix clause prosodically from the embedded clause forces this reading:

- (29) a. Michael wondered: what happened?
b. *Michael discovered: what happened?
c. Chris asked: which player scored a touchdown yesterday?
d. *Chris knew: which player scored a touchdown yesterday?

¹⁰ Excluding non-subject *wh-* constructions in Standard English, which have a different form in embedded contexts (no T-to-C) than root contexts (obligatory T-to-C). See Henry (1995) and McCloskey (2006) for discussion of English dialects that permit T-to-C in either environment.

The [+wh] clauses embedded under *wonder*-class verbs permit this prosodic stranding process. Since these clauses have the structures of root questions, they can behave like root questions if stranded from their matrix clause. The same cannot be said for the *discover*-class: their [+wh] clauses are ungrammatical when stranded. We deduce, then, that their structure is one that cannot stand alone in root contexts. This prediction is attested given the structure proposed in the next chapter.

Just like the clause fronting diagnostic in 2.2.4, prosodic stranding seems to force the stranded clause to behave like a matrix clause. We know this because T-to-C inversion is obligatory in Standard English matrix questions, and it is also obligatory in prosodically stranded clauses, as well:

- (30) a. The whole team inquired when the coach would call it quits.
b. *The whole team inquired: when the coach would call it quits?

If we appeal to a dialect that allows embedded inversion, such as the non-standard English dialect discussed in 2.2.2, we see that non-subject *wh*- constructions follow the same pattern as the data in (29), above:

- Non-standard American English*
(31) a. The whole team inquired: when would the coach call it quits?
b. *The whole team remembered: when would the coach call it quits?
c. He wondered: what flowers did Tracy like best?
d. *He found out: what flowers did Tracy like best?

Each of these embedded clauses is prosodically differentiated from its matrix clause. The result is as predicted: the ability of the embedded clauses to stand alone in (29)

and (31) depends entirely on the verbs that embed them: namely, whether these clauses are under a *wonder*-class verb or a *discover*-class verb. Thus, *wonder*, *ask*, and *inquire* take complements that behave like matrix questions, while *discover*, *know*, *remember*, and *find out* take non-question complements.

2.3.2 *Substitutivity*

Quine (1963) put forth a diagnostic using substitution to determine an embedded clause's interpretation. In Quine's test, which he called, "Substitutivity," the embedded [+wh] clause is replaced with a "question-denoting nominal" such as "a question" or "an issue" (Ginzburg & Sag (2000)). His test is based on the observation that only a subclass of verbs can take question-denoting nominals as complements; thus, a grammatical output from Substitutivity would suggest that a verb is among the *wonder*-class. The model in (32) is adapted from Quine:

- (32) *Substitutivity*
Replace a [+wh] embedded clause with a question-denoting nominal. If the resulting interpretation is unaffected, the replaced clause is a question. If the interpretation is nonsensical, the replaced clause is not a question.

Because the [+wh] clause can be replaced with a question-denoting DP, "a question", the replaced clause must bear the interpretation of a question, according to Quine. If the DP "a question" really has interrogative semantics, it should not appear as the complement of a verb that does not embed questions. Consider some concrete examples:

- (33) a. John asked [who left]. = John asked [a question]. *wonder*-class

- b. Bill discovered [who left]. ≠ #Bill discovered [a question]. *discover*-class
 c. Lisa smelled [what left]. ≠ #Lisa smelled [a question]. *discover*-class

If a question-denoting nominal can only replace a question clause, then this diagnostic shows that *discover*-class verbs do not embed questions. As before, the test works with non-subject *wh*- clauses if we go to varieties of English that permit embedded inversion:

- Non-standard American English*
 (34) Maria asked [when did the incident occur].
 Therefore,
 Maria asked [a question].

Since the output of (34) is grammatical, the matrix verb, *ask*, must take question complements.¹¹

2.3.3 Summary

Having applied several diagnostics in this chapter, we see that among the verbs that select [+wh] clausal complements, two quite distinct classes exist. The data are summarized in Table 1:

¹¹ This diagnostic is more restrictive than the others given so far since it only works with transitive verbs. Thus, verbs such as *wonder* and *inquire*, which do not take DP internal arguments, would be ungrammatical in this test. This is an issue of argument selection and not embedded clause-type.

Table 1 *The Properties of wh-Clauses*

	root question	<i>wonder</i> -class complement	<i>discover</i> -class complement
T-to-C	✓	✓	*
<i>wh-the-hell</i>	✓	✓	*
<i>what gives?</i>	✓	✓	*
Clause-fronting	N/A	✓	*
Prosodic stranding	N/A	✓	*
Substitutivity	N/A	✓	*

Wonder-class predicates take complements that are questions. We say this because, as Table 1 shows, *wonder*-class complements pattern like root questions. *Discover*-class complements take complements that are something else. To this point I have been agnostic about the syntax of the complement clause of *discover*-class predicates. In the next chapter, I propose a structure for the clause that accounts for the differences between *wonder*-class and *discover*-class complements.

3. A proposal: embedded questions versus free relatives

In the previous chapter, I developed a hypothesis that is initially quite unintuitive: that the embedded clauses of (35) are different, despite being entirely homophonous:

- (35) a. I wondered [who left].
b. I discovered [who left].

In this chapter, I argue that the semantic distinctions between (35)a and (b) follow from their distinct syntactic structures. That is, (35)a and (b) are really:

- (36) a. I wondered [_{CP} who left].
b. I discovered [_{DP} who left].

Specifically, *wonder*-class verbs embed true question clauses (i.e. CPs), while *discover*-class verbs embed free (“headless”) relative clauses (i.e. DPs). Entailed in this proposal is the conclusion that the terms “indirect question” or “embedded question” can only apply to sentences with *wonder*-class verbs. Despite appearances, the vast majority of embedded [+wh] clauses in English are not interrogative at all (see Appendix A for a list of predicates in each class).

There is a large body of work on free relatives. Following van Riemsdijk (2000), a free relative clause is defined as a relative clause lacking an overt (phonologically expressed) head. Many assume that these “headless” relative clauses actually do have some type of head that is unpronounced (see Bresnan & Grimshaw (1978) and Groos & van Riemsdijk (1981) for opposing views, for example). While there is no consensus on the precise syntactic structure of free relatives, many agree

that the structure should minimally consist of a DP headed by a phonologically null element (*pro* in Grosu (1994)) which selects a CP containing the *wh*- and the rest of the predicate (ex. Suñer (1984), Grosu (1994), etc.). I set aside the fine structure of free relatives – and the bevy of problems that accompany any single account (matching effects, transparent free relatives, etc.) – as this goes beyond the scope of this thesis.¹²

3.1 *Alternative proposals*

3.1.1 *Lahiri (2002)*

There is still much to be said about the details of this proposal, but first we can briefly consider the implications of a syntactic distinction among [+wh] complement clauses. As mentioned in section 2.1, prior works have argued for such a distinction, typically instantiated as a silent Q operator in the complement clause of a given class of verb (see e.g. Munsat (1986), Berman (1991), and den Dikken & Giannakidou (2002)). Still, others have argued explicitly for syntactic identity among embedded [+wh] clauses. For instance, Lahiri (2002) claims that the only fundamental distinction between his *wonder*-class and *know*-class predicates is in their semantics.¹³ In turn, Lahiri argues that a syntactic distinction (Q operator or otherwise) does not and cannot exist between *wonder*-class and *know*-class verbs.

Lahiri (2002) presents data from Right-Node Raising (RNR) (Ross (1967)) and Null Complement Anaphora (NCA) (Grimshaw (1979)) as evidence that the two

¹² For an excellent survey of the literature on free relatives, see van Riemsdijk (2000).

¹³ Lahiri (2002) has *investigate* and other verbs as *wonder*-class, but I argue they are *discover*-class (see Appendix A). His reasons for this classification are not entirely clear (they are based on “independent criteria” (Lahiri (2002) p. 258). See Chapter 2 for discussion of verb classification.

[+wh] clause types are syntactically identical. In both Right-Node Raising and Null Complement Anaphora, *wonder* and *discover* appear to “share” a complement clause:

- (37) a. John **wondered** and Bill **knew** [who left yesterday]. *RNR*
b. John **wondered** [who left yesterday], and Bill **knew**. *NCA*

This complement sharing, Lahiri claims, indicates that the verbs select syntactically identical complements. If they selected distinct complements, either one or the other verb would be sharing a complement clause that it was syntactically incompatible with.

Upon closer examination, though, these data do not preclude a syntactic distinction between clauses under *wonder* and *discover*. First, it is quite possible that the two verbs are not syntactically “sharing” anything, particularly since Lahiri (2002) does not offer an analysis for either Right-Node Raising or Null Complement Anaphora that suggests they do. In fact, recent works such as Abels (2004) have argued that these constructions are best analyzed as complex cases of phonological deletion, meaning that the two verbs in question do not syntactically “share” the pronounced clause. Instead, two homophonous [+wh] complement clauses are present at some point in the derivation, but one clause is deleted at PF (deletion of the first clause would yield RNR; deletion of the second yields NCA). If this reasoning is correct, then the pronounced clause and the deleted one need not be syntactically identical. They only need to be homophonous.

Another, similar way of looking at this RNR/NCA data comes from case syncretism in German (Schütze (2003), van Riemsdijk (2000)). In German, *wh*-

words are marked for nominative and accusative case. As a result, free relative clauses pose a potential problem: hypothetically, a sentence could contain a *wh*- word that has fronted from subject (nominative) position in a free relative clause to what looks like object (accusative) position with respect to the matrix clause (as in (38)a, below), or vice-versa. When the *wh*- word is [+human] (as in “who”), such sentences are always ungrammatical in German, regardless of the case on the *wh*- word. However, when the *wh*- word is [-human] (as in “what”), these constructions are fine, as in (38)b:

- German* (data taken from Schütze 2003 #12)
- (38) a. * ich zerstöre wer/wen mich ärgert
 I destroy who(nom)/who(acc) me upsets
 “I destroy who upsets me”
- b. ich zerstöre was mich ärgert
 I destroy what(nom/acc) me upsets
 “I destroy what upsets me”

This is because the [-human] *wh*- word in German, *was*, is syncretic: it occupies both the nominative and accusative cells in the paradigm (see e.g. van Riemsdijk (2000) for discussion). Because of this syncretism – in other words, because nominative and accusative are pronounced identically – *was* can be interpreted as both nominative and accusative simultaneously in constructions such as (38)b. The sentence in (38)a is ungrammatical because the paradigm lacks nominative/accusative syncretism in [+human] *wh*- words, and neither *wer* nor *wen* can play the dual role that *was* can.

In these examples, the *wh*- word *was* is playing two roles: one for the matrix clause and one for the free relative clause. Going back to the Lahiri (2002) data,

perhaps this is not so different from the “shared” [+wh] clauses we have seen. Given the data from German case syncretism, we can propose an alternative analysis for (37)a and (b): the [+wh] clauses selected by *wonder* and *know* are syntactically distinct (contra Lahiri (2002)), but because they are phonologically identical, a single instantiation of the clause satisfies the requirements of the two verbs, as well as the grammar. Like German *was*, a single embedded [+wh] clause can play two roles: it is the complement both of *wonder* and *know*. This only works because the two verbs happen to select phonologically identical complement clauses. Under this analysis, Right-Node Raising and Null Complement Anaphora do not pose any challenges for the proposal in this thesis.

3.1.2 Baker (1968)

So far in this thesis, I have worked to disambiguate two types of homophonous [+wh] clause, arguing that some are embedded questions while others are free relative clauses. This thesis is not the first attempt at doing so, however: much earlier, Baker (1968) noted that the [+wh] clauses embedded underneath certain verbs do not behave like questions and could be relative clauses. Baker offered several diagnostics that he claimed could distinguish questions from free relatives, some of which have resurfaced recently in other works on free relatives (Caponigro (2003)). The output of these diagnostics creates a verb classification that differs greatly from the one I develop in Chapter 2; therefore, the class of clauses that Baker (1968) refers to as “embedded questions” is quite different from my own.

In one particular diagnostic, Baker (1968) claims that any embedded question clause must, itself, be questioned with *what*, whereas a free relative clause can be questioned by an array of (semantically determined) *wh*- words (examples adapted from Baker (1968)):

- (39) a. John lives where the road ends.
b. Where does John live?
c. *What does John live?
- (40) a. John knows where the road ends.
b. *Where does John know?
c. What does John know?

As a result, Baker's definition of question-embedding verbs includes *know*, *forget*, *decide*, etc. – all verbs I argue belong to the *discover*-class and embed free relatives, not questions. I will return to this diagnostic shortly.

3.1.3 Munsat (1986)

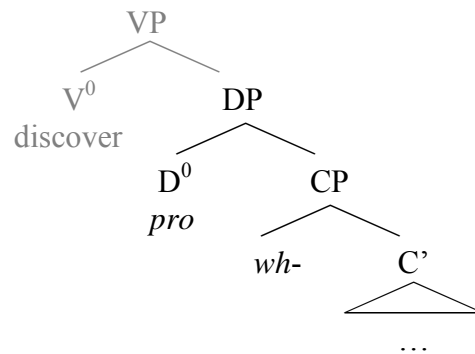
To this point in the discussion, we have focused on the differential patterns exhibited by two classes of verbs, but there has been little mention of why this distinction exists at all. In other words: why can *wonder*-class verbs embed questions while *discover*-class verbs cannot? The reasons seem to be heavily tied up in the verbs' interpretation, and what Grimshaw (1979) would call their inherent s(emantic)-selectional properties. Munsat (1986) argues that *know* and *wonder* select different complement clauses based on their interpretations: "to *wonder* is to have a question in one's mind, whereas to *know* is not" (194). This stance intersects directly with our claim that only *wonder*-class verbs embed questions. Indeed, Munsat provides a few

diagnostics, some of which are based on polarity item licensing (similar to my section 2.2.1), to argue for the same verb classification that I have. He proposes that *wonder* and *ask* embed a “Wh-Q” complementizer while other verbs embed “Wh-that”. His proposal is sufficiently structural to capture the patterns of polarity item licensing in embedded [+wh] clauses, but it also provides an explanation for some of the interpretational differences between these two classes of verb (Munsat (1986)). An analysis based on complementizers, however, fails to capture certain features of *discover*-class complements that we will see next. Despite our similar observations, then, I offer an alternative proposal. In the next few sections, I show that an analysis based on a free relative vs. question distinction is comparatively advantageous.

3.2 Free relative complements of discover-class verbs

For the syntactic structure of the free relative embedded under *discover*-class verbs, I will adopt a structure like Grosu’s (1994), which assumes a DP headed by a little-*pro* that selects the CP complement containing the free relative:

(41)



This, I propose, is the underlying structure for all [+wh] clausal complements of *discover*-class verbs.¹⁴

Returning now to the diagnostic from Baker (1968), there is reason to doubt that it actually tests for a question/free relative distinction. It seems, instead, to test for verbs that take clausal arguments. I argue that the [+wh] clause in (40)a is a free relative clause that happens to appear in the internal argument position of a verb. This is unlike uncontroversial free relatives, such as (39)a, which occupy an adjunct position when they contain a *wh*- word such as *where*, *when*, *why*, etc. My diagnostics have shown, though, that free relatives can also occur under verbs that normally select clausal arguments, such as *discover* (as well as *know*, *forget*, *decide*, etc.). We can independently verify that clausal arguments – free relative or otherwise – are always questioned with *what* by testing verbs that do not take [+wh] clauses at all:

- (42) a. Connor thinks/hopes/claims [that Evelyn likes him].
b. *Who does Connor think/hope/claim?
c. What does Connor think/hope/claim?

¹⁴ This proposal conflicts with McCloskey's (2006) adjunction data. He argues that CPs embedded under "factive" (*discover*-class) verbs are illegal adjunction sites because these CPs are lexically selected by the verb. Following the Adjunction Prohibition, lexically-selected categories are illegal adjunction sites.

I argue, however, that the [+wh] clause under *discover* is contained in a free relative DP, headed by little-*pro*. Because *pro* is not a lexical item by definition, its CP complement is not lexically selected. This ought to make it a legal site for adjunction. As we see in (i), though, adjunction is not allowed (from McCloskey's (58) with notation added):

(i) *The police established [_{DP} *pro* while we were out [_{CP} who had broken into our apartment]].
If the proposal in this thesis is correct, the data in (i) has no analysis. The blocking of adjunction cannot be explained by the Adjunction Prohibition.

In (42), the clausal complements (in this case, CPs) must be questioned with *what*, despite that these clauses are clearly not questions. It seems that *what* is the default *wh*- word for a clausal argument. Embedded question clauses (those under *wonder*-class verbs) must be questioned with *what* because they always appear in an argument position. On the other hand, free relative clauses can sometimes appear in adjunct position, as in (39)a. When they do, these free relatives are questioned with the same *wh*- word that appears in their left periphery. Under Baker's diagnostic, *discover*-class verbs pattern like *wonder*-class verbs simply because they all take clausal arguments.¹⁵ Baker's resulting verb classification (i.e. *know* being grouped with *wonder*) reflects this common characteristic. The underlying nature of these clausal arguments – that is, whether they are question CPs or free relative DPs – is irrelevant to this diagnostic.

We can see further evidence of this argument/adjunct distinction when we consider how free relatives in subject position are questioned. Given Baker's assumptions, free relatives can always be questioned with a semantically-appropriate *wh*- word; however, when the free relative occupies the external argument position, it can only be questioned with *what*:

- (43) a. [Where we went for a drive today] was impressive.
b. *Where was impressive?
c. What was impressive?

¹⁵ The null D⁰ in the free relative complement of a *discover*-class verb may be the reason such clauses are only questioned with *what*. To be sure, much more can be said about this interesting pattern, but it extends far beyond the purposes of this thesis. My goal here is only to suggest that this diagnostic may test for other phenomena besides a question/free relative distinction.

These data clearly show that free relatives must be questioned with *what* when they appear in an argument position. Thus, it seems that Baker's (1968) diagnostic creates a valid classification of [+wh]-embedding verbs, but it is not one based on the structural differences between questions and free relatives.

3.3 Free relative diagnostics

Several distributional and behavioral questions are raised by assuming a free relative structure for [+wh] clauses under *discover*-class predicates. However, there is strong evidence supporting my claim that *discover*-class predicates embed free relative clauses. The literature on free relatives has established independent diagnostics for identifying them. For instance, Caponigro (2003) notes that *wh*- words appearing in free relative clauses can optionally take an *-ever* suffix,¹⁶ yielding *whoever*, *whenever*, etc.:

(44) I ate **whatever** you cooked.

Question *wh*- words cannot undergo this suffixation. The following examples show that only clauses under *discover*-class predicates can take *-ever*:

- (45) a. *Emily wondered **whenever** the party was.
b. Emily discovered **whenever** the party was.
c. *The kids ask **whatever** happened yesterday.
d. The kids remember **whatever** happened yesterday.

¹⁶ Except *why*, which is independently disallowed in free relatives. Since I argue that *discover*-class verbs embed free relatives, we do not expect *why* to occur in the complement clause of such a verb. This must remain an unresolved issue. See Caponigro (2003, ch. 4) for extensive discussion of the semantics of *-ever* suffixing.

In (45), the complement clauses of *discover*-class predicates pattern identically with uncontroversial free relatives.

This trend continues as we apply other diagnostics for identifying free relatives. For example, if a free relative is really a “headless” relative clause, we should predict that the head can be expressed without skewing the judgments. My analysis has been that free relatives are contained within a DP headed by *little-pro*. If this structure is correct, there is room in the derivation to support the expression of a full head. Uncontroversial free relatives can undergo head expression:

- (46) a. Bill hates [_{DP} *pro* [_{CP} who got elected]].
b. Bill hates [_{DP} the person [_{CP} who got elected]].

Applying this diagnostic to our data, we see that only complements of *discover*-class verbs can undergo head expression:¹⁷

- (47) a. *Kate wondered **the place** where Julian went.
b. Kate discovered **the place** where Julian went.
c. *Everybody inquired **the man** who was causing all the problems.
d. Everybody determined **the man** who was causing all the problems.

Once again, the clauses embedded under *discover*-class predicates exhibit the same behavior as a type of relative clause.

¹⁷ Although they can occur in standard free relatives, the *wh*- words *how* and *what* cannot occur with an expressed head in standard American English:

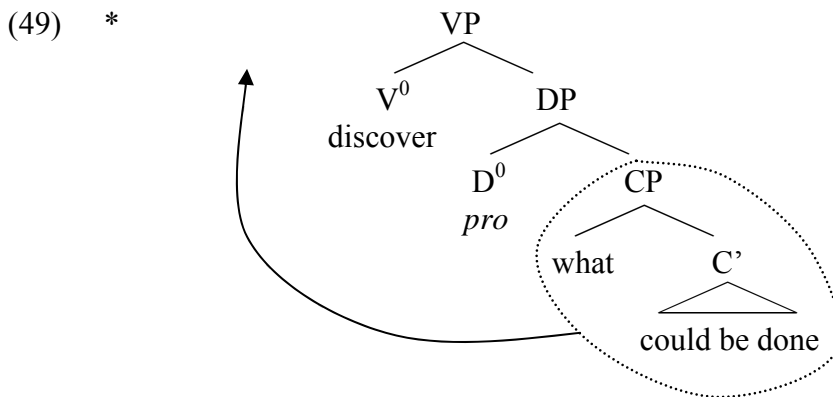
- (i) Bill liked what Mary said / how Mary laughed.
(ii) *Bill liked **the things** what Mary said / **the way** how Mary laughed.

In non-standard varieties of British English, however, *how* and *what* can occur in headed relative clauses. Speakers of this dialect have improved or grammatical readings for sentences like (ii), meaning this dialect fills in an accidental gap in the prediction made by this proposal. I thank Tom Johnson for his British English judgments.

We are now in a position to account for the syntactic asymmetries raised in our diagnostics from Chapter 2. For example, recall the clause-fronting diagnostic (reprinted from Chapter 2, (24)):

- (48) a. They all wondered what could be done.
 b. What could be done, they all wondered.
 c. They all discovered what could be done.
 d. *What could be done, they all discovered.

Wonder-class predicates embed clauses that can be fronted. This fronting process can be analyzed as clausal pied-piping of the embedded CP to a position in the matrix C-layer.¹⁸ Clauses under *discover*-class predicates apparently cannot undergo clausal pied-piping, but the free relative analysis offers an explanation for this: to appear sentence-initially, a *wh*- word under *discover* would have to move out of its parent DP in order to proceed up the tree (the following structure is based on (48)d):



¹⁸ Note that the matrix clause cannot undergo inversion when the embedded clause is fronted:

- (i) *What could be done, did they wonder.

Contrast this with similar-looking examples of clause fronting in English, where matrix inversion is obligatory:

- (ii) What can be done, do you think?

- (iii) *What can be done, you think?

These data suggest that the fronting operation I use as a diagnostic is not the same as the one in (ii).

The structure in (49) is ungrammatical because extraction from the complement of D^0 is not permitted in English:

- (50) a. Chloe kissed the boys.
b. *It was boys_i that Chloe kissed [_{DP} the t_i].

We can now account for asymmetries under the prosodic stranding diagnostic from 2.3.1, as well. In that section, I noted that stranding the embedded [+wh] clause was grammatical under the *wonder*-class but not the *discover*-class:

- (51) a. Sean asked: who enjoyed singing?
b. *Sean discovered: who enjoyed singing?
c. *Sean discovered: the truth.

In (51)c, we see that a DP cannot be prosodically stranded. Under our free relative analysis, (51)b is ungrammatical because the stranded clause in is a DP. If a *wonder*-class verb with a DP complement is tested, the same pattern arises:

- (52) a. Sean asked who enjoyed singing.
b. Sean asked a question.
c. *Sean asked: a question.
- Substitutivity*
Prosodic stranding

This means that prosodic stranding is sensitive to the syntactic category of the constituent being stranded rather than its semantic denotation (question vs. non-question). What this test tells us, specifically, is that the complements of *discover*-class verbs are DPs. Earlier in this section, I proposed that the differing patterns of the *wonder* and *discover* classes seen in Chapter 2 were caused by their dissimilar

structures. We now have positive evidence suggesting that a free relative analysis of *discover*-class complement clauses is correct.

This account explains why the *discover* class of verbs is so much larger than the *wonder* class. If the maximal projection of a free relative is a DP, we would expect free relatives to be distributed as widely as DPs, barring obvious semantic restrictions. This applies whether or not the matrix verb selects an internal argument, since the free relative account of *discover*-class verbs applies to intransitives such as *run* (“I ran when the sun came out”) the same as it applies to transitives such as *notice* (“I noticed when the sun came out”). The interpretational difference between the two (apart from the semantics of the verbs in question) is due directly to the adjunct status of the free relative DP in the case of *run* versus the argument status of the DP with *notice*. Interestingly, the implication does not work both ways. In other words, a verb that selects for a CP complement does not necessarily embed questions; in fact, there is no correlation between the two phenomena (cf. *think*, *claim*, *assume*, etc.). We will see next that *wonder*-class and *discover*-class verbs exhibit unpredicted behavior when they occur with certain matrix constructions, but the fundamentals of our theory need not be altered to capture these cases.

4. Negation and “want to” as ameliorative constructions

This chapter describes in some detail an extremely interesting and complex pattern associated with matrix negation and modality, which I will collectively term “ameliorative constructions.”¹⁹ That is, when *discover*-class verbs with [+wh] complements are negated or construed in “want to”-type modal constructions, the resulting sentences become improved in certain cases (McCloskey (2006), den Dikken & Giannakidou (2002), Adger & Quer (2001), Groenendijk & Stokhof (1984), among others). These cases are subsumed in the diagnostics from Chapter 2 (*wh-the-hell* licensing, embedded T-to-C, etc.), in which this amelioration effect persists with few exceptions. On the other hand, certain *wonder*-class constructions become ungrammatical under negation. This has not been noted in the literature, and does not follow straightforwardly from any analyses of these constructions. I present these patterns in the following sections.

These asymmetries will force us to conclude that the diagnostics in Chapter 2 do not explicitly test embedded clauses for a binary question/non-question abstraction. They would all pattern the same if that were the case. Instead, these diagnostics should be seen as syntactically complex operations that are able to pick out certain properties exhibited by questions. The underlying differences among the diagnostics are clear in the patterns that follow.

¹⁹ The patterns described in this chapter also arise from matrix interrogation, imperative mood, and various other modal constructions not mentioned in this chapter. See den Dikken & Giannakidou (2002) and Adger & Quer (2001) for relevant discussion.

The conclusion of this chapter is that the addition of ameliorative constructions, despite appearances, does not facilitate the embedding of true questions where they would not normally occur (i.e. as complements of *discover*). The generalization from Chapter 3 persists: *discover*-class verbs take free relative complements in the form of DPs, no matter what modal or negative contexts they occur in. These ameliorative constructions facilitate other syntactic processes, such as polarity item licensing, but they do not change the nature of the complement clause from non-question to question (as argued by McCloskey (2006) and others). We now turn to the effects of negation and “want to” on each of the diagnostics in Chapter 2.

4.1 *Effects on wh-the-hell licensing*

Recall from Chapter 2 that verbal constructions such as “want to know” and “dying to see” seem to embed question clauses, according to diagnostics such as *wh-the-hell*:

- (53) I want to know **who the hell** is responsible for this.
(54) She’s dying to see **how the hell** MacGyver will get out of this.

As noted previously, applying the same diagnostic to the bare verbs “know” and “see” yield ungrammatical outputs:

- (55) *I know **who the hell** is responsible for this.²⁰
(56) *She sees **how the hell** MacGyver will get out of this.

²⁰ When judging this sentence, readers should labor to read it as a novel utterance rather than as a direct response to an utterance such as (53). The latter contains an emphatic repetition of the *wh-the-hell* construction, and it is not a true embedded question like those I am testing here.

This suggests that the presence of “want to” (and “dying to,” “anxious to,” “eager to,” etc.) affects some property of the predicate it occurs with, seemingly allowing an embedded question clause to occur with it. Shields (2006) describes a phenomenon she calls “modal repair” which, at first glance, looks similar to this. In cases of modal repair, the addition of a modal seems to improve an otherwise ungrammatical yes/no question containing an epistemic adverb:

- (57) a. *Did John probably check this before we sent it out? (Shields 2006 #1c)
b. Should John probably check this before we send it out? (Shields 2006 #5c)

Comparing our two cases more closely, though, it does not seem that modal repair and “want to” amelioration are directly related. The repair effect in (57)b arises from the modal’s ability to restrict the quantification of the adverb (Shields (2006). Since there is no corresponding quantifier in our cases, modal repair cannot help us.

McCloskey (2006) attributes the “want to” effect (with embedded inversion rather than *wh-the-hell*) to felicity conditions: the difference between questions and declaratives is whether the force of the sentence demands new information or relies on given information; and, in this case, the presence of “want to” is sufficient to allow a complement that requests new information (in the form of an embedded question). This has a great deal of intuitive value – after all, one asks questions about what one *wants to know*, not what one *already* knows. The picture is far more complicated than this, however.

In (53) through (56) above, the addition of “want to” and related predicates ameliorates embedded *wh-the-hell* in an unexpected environment (namely, under a

discover-class verb). Giannakidou (1998) notes that this same effect occurs when a matrix *discover*-class verb is negated:

- (58) a. *John knew where the hell Mary had parked the car.
b. John didn't know where the hell Mary had parked the car.
- (59) a. *The audience saw what the hell happened to Caliban.
b. The audience didn't see what the hell happened to Caliban.

Giannakidou accounts for this phenomenon by arguing that the negation itself (say, Neg⁰) functions as the non-veridical operator that typically must be present in the embedded C-layer in order to license *wh-the-hell*. Because the Neg⁰ c-commands the polarity item, the licensing relationship is established. McCloskey (2006) takes Giannakidou's observations as following from the pragmatic account he gives for "want to" constructions.

While it is tempting to treat ameliorative constructions as a group because of the data we have seen so far, further investigation yields a necessary and useful distinction between negated constructions and those containing "want to." Recall how the *discover*-class behaves when negated:

- (60) a. *Thomas knew who the hell stole his bike.
b. Thomas didn't know who the hell stole his bike.
c. *The police determined what the hell had been stolen.
d. The police couldn't determine what the hell had been stolen.

A bare *discover*-class verb cannot embed a complement containing *wh-the-hell*, but under negation it can. Strikingly, *wonder*-class predicates show the opposite pattern:²¹

- (61) a. Marie wondered why the hell they were all laughing.
b. *Marie didn't wonder why the hell they were all laughing.
c. We asked who the hell was supposed to be there.
d. *We didn't ask who the hell was supposed to be there.

As we saw above, negating a *discover*-class verb allows *wh-the-hell* to be licensed. Surprisingly, negating a *wonder*-class verb does not have a similar licensing effect. Under a pragmatic approach, we would expect negation to either consistently license a polarity item in its scope, or never license one. The pattern in (60) and (61) shows neither to be the case: *wh-the-hell* licensing apparently involves a combination of negation *and* some as-yet undefined property of the negated verb; that is, whether it could embed a true question clause to begin with.

Under the notion of s-selection (Grimshaw (1979)), *wonder*-class verbs bear a question-embedding property in the lexicon. As we have already seen, Giannakidou (1998) notes that questions provide non-veridical contexts in which polarity items can be licensed, as does negation. The null hypothesis that follows is that the combination of both a question and negation should easily license a polarity item. Crucially, the data in (61)b and (61)d show that this is clearly not the case. I will refer to this phenomenon as the “double-licenser effect,” whereby two licensers –

²¹ The following examples may be better under a focal reading (i.e. *I didn't even ask who the hell was supposed to be there because I didn't wanna know*). Readers should read these examples as novel utterances to avoid the interference of focus.

questions and negation, each of which can independently license *wh-the-hell* – fail to license *wh-the-hell* when they are both present in the same matrix clause. We will return to this shortly.

Turning briefly to “want to” constructions with *wh-the-hell*, a different pattern emerges in the properties of the embedded clause. In examples (62) and (63), we see that “want to” creates a pattern that is different from the one we saw in the negation examples above:

- (62) a. *Thomas knew who the hell stole his bike.
 b. Thomas wanted to know who the hell stole his bike.
- (63) a. We asked who the hell was supposed to be there.
 b. We wanted to ask who the hell was supposed to be there.

If “want to” patterned like negation, the data in (63)b ought to be the same as (61)b, with *wonder* + “want to” failing to license *wh-the-hell*. However, this is not the case.

The pattern is laid out in Table 2:

Table 2 *Embedded wh-the-hell licensing under negation and “want to”*

	Bare verb	Negated verb	“want to” + verb
<i>discover</i> -class	*	✓	✓
<i>wonder</i> -class	✓	*	✓

It appears that “want to” constructions can only facilitate *wh-the-hell* licensing. This differs crucially with negation, which can facilitate or block *wh-the-hell*, depending on the matrix verb it occurs with. The current theory (including the one proposed in this thesis) has no adequate way of explaining this unpredicted pattern, nor the

patterns stemming from ameliorative constructions in the other diagnostics proposed in Chapter 2.

An issue remains: is *wh-the-hell* a true question diagnostic? The data in Chapter 2 suggested as much, but these ameliorative constructions seem to confound the proposal in Chapter 3. After all, if the above data were taken straightforwardly, the assumption should be that negation and “want to” change the selectional properties of the matrix verb; hypothetically speaking, then, *discover* would select a question CP when it is negated, instead of its usual free relative DP. Such a paradigm would seem to have serious implications for a phase-based model of derivation (Chomsky (2001)) operating bottom-up. If the verb’s selectional properties could be changed by material higher than the verb (such as negation), we could imagine a construction where the matrix vP, as a phase, is sent to Spellout (along with everything underneath it) before the selectional effect of negation has been factored in, causing the derivation to crash. Looking at it another way, in order for negation to have a selectional impact on the verb, at least some part of the derivational model would have to operate top-down. Such an operation cannot be easily accommodated in the minimalist program (Chomsky (1995)). Instead of this undesirable conclusion, then, *wh-the-hell* should be seen only as a diagnostic for polarity item licensing,²² with a question clause representing only one of several possible licensing environments (see e.g. Giannakidou (1998)). This avoids positing any changes to the

²² With the notable exception of the “double-licenser effect,” noted above.

selectional properties of the verb, meaning simple licensing poses no problems for the current derivational model.

4.2 Effects on embedded inversion

We can now reexamine the second diagnostic from Chapter 2: embedded T-to-C (inversion). McCloskey (2006) notes that matrix negation and “want to” constructions will substantially improve cases of embedded inversion that would otherwise be ungrammatical:

Irish English (data from McCloskey 2006 #92)

- (64) a. Everybody wants to know did I succeed in buying chocolate for Winifred.
b. Aunt Kate wants to know won't you carve the goose as usual.
c. I was dying to find out was he circumcised.

Extending the implication from Chapter 2, embedded inversion continues to pattern like *wh-the-hell* in the cases we have seen so far, even with the addition of this new data. Looking through the entire paradigm, however, the direct correspondence is broken:

Non-Standard American English

- (65) a. *The district attorney knew who had the police arrested.
b. ?The district attorney didn't know who had the police arrested.²³
c. The district attorney wanted to know who had the police arrested.
- (66) a. The district attorney asked who had the police arrested.
b. The district attorney didn't ask who had the police arrested.
c. The district attorney wanted to ask who had the police arrested.

²³ This example is significantly degraded with *did* as the auxiliary, instead of *had*:

(i) ?The district attorney didn't know who **had** the police arrested.

(ii) *The district attorney didn't know who **did** the police arrest.

This pattern may be related to the effect of modal repair (Shields (2006)). See my section 4.1 for a brief discussion of modal repair in another context.

Whereas *wh-the-hell* is subject to the “double-licenser effect” with neg + *wonder*, the data in (65) and (66) show that the same is not true of embedded inversion. In other words, when negation is applied to a *wonder*-class verb, embedded inversion is still available. Table 3 shows the pattern.

Table 3 *Embedded inversion under negation and “want to”*

	Bare verb	Negated verb	“want to” + verb
<i>discover</i> -class	*	?	✓
<i>wonder</i> -class	✓	✓	✓

Recall from the last section that *wh-the-hell* is a polarity item (den Dikken & Giannakidou (2002)), but that the “double-licenser effect” is problematic. Looking now at embedded T-to-C, the data in Table 3 show the embedded-inversion construction behaves more like a polarity item than *wh-the-hell* does: it is “licensed” in all non-veridical environments (see Giannakidou (1998)), even those in which multiple licensers are present. In other words, no double-licenser effect is present with embedded inversion, and it patterns like a kind of polarity item.²⁴

Just like *wh-the-hell*, then, we have a new way of looking at the distribution of embedded inversion. Perhaps it need not occur strictly in question clauses, as argued by McCloskey (2006) and Henry (1995). Instead, embedded inversion can be seen as a diagnostic for polarity item licensing in general (of which questions are a subpart).

²⁴ This analysis suggests that embedded inversion constructions contain a silent operator that is licensed in the scope of negation and other licensing environments, similar to the Q operator from den Dikken & Giannakidou (2002) and the Δ from Adger & Quer (2001).

This analysis once again avoids the undesirable conclusion in the existing literature that ameliorative constructions change the selectional properties of the verbs they occur with.

4.3 *Effects on clause fronting and stranding*

So far in this chapter, we have seen that ameliorative constructions can have unpredictable effects on sentences with embedded [+wh] clauses, depending on the diagnostic being applied. However, two of the diagnostics from Chapter 2 – namely, clause fronting and prosodic stranding – pattern similarly when combined with negation and “want to.” These two diagnostics are perhaps the most problematic, since they do not immediately lend themselves to a polarity item analysis, and the syntactic operations involved in their construal is not fully understood. *Discover*-class predicates occurring with clause fronting and prosodic stranding are not greatly improved by ameliorative constructions, suggesting that these two diagnostics are very different from the others. They are also more difficult to judge than the other diagnostics, as well.

Looking at clause fronting and stranding side-by-side, we can see that they exhibit the same outputs when negation and “want to” are involved:

Clause Fronting

- (67) a. The juror determined who should be found guilty.
b. *Who should be found guilty, the juror determined.
c. *Who should be found guilty, the juror didn't determine.
d. Who should be found guilty, the juror wanted to determine.
- (68) a. The juror asked who should be found guilty.
b. Who should be found guilty, the juror asked.

- c. *Who should be found guilty, the juror didn't ask.
- d. Who should the found guilty, the juror wanted to ask.

Prosodic Clause Stranding

- (69) a. The man found out who had broken in.
- b. *The man found out: who had broken in?
- c. *The man didn't find out: who had broken in?
- d. The man wanted to find out: who had broken in?

- (70) a. The man asked who had broken in.
- b. The man asked: who had broken in?
- c. *The man didn't ask: who had broken in?
- d. The man wanted to ask: who had broken in?

Negation + *wonder* is ungrammatical,²⁵ as is negation + *discover*. Table 4 shows the full paradigm:

Table 4 *Clause fronting and prosodic clause stranding with negation and “want to”*

	Bare verb	Negated verb	“want to” + verb
<i>discover</i> -class	*	*	✓
<i>wonder</i> -class	✓	*	✓

Once again, we see that the effect of negation is unpredictable in various environments, yet the effect of “want to” remains stable: it is grammatical with all the diagnostics used so far.

Clause fronting and stranding pose a familiar selectional problem when combined with ameliorative constructions. That is, the cases with *discover* + “want to” seem to embed questions despite that these verbs ordinarily select free relative

²⁵ This could be seen as an argument for a polarity-like relationship between the embedded clause and negation. In other words, when the [+wh] clause is fronted, it is no longer in the scope of negation, and therefore the clause’s Q operator (or similar PI) is not properly licensed. This does not explain why [+wh] clauses can be fronted with “want to” constructions, however.

DPs. An analysis appealing to polarity item licensing clearly will not work here: there is no clear sense of how clause fronting or clause stranding could be related to polarity licensing. Moreover, what we know about the structures of clause fronting and stranding (see Chapter 2) suggests that they may be true question diagnostics, unlike *wh-the-hell* and embedded inversion. If they are true question diagnostics, this again implies the potential for selectional changes in certain verbal constructions, which we previously established is not desirable. This must remain an unresolved issue here.

4.4 *Effects on substitutivity*

Substitutivity, the final diagnostic from Chapter 2, turns out to be an exception to a stable generalization we have made so far: that “want to” constructions consistently alleviate ungrammatical *discover*-class [+wh] constructions in the diagnostics. In fact, the output of substitutivity appears to be completely unaffected by the presence of ameliorative constructions:²⁶

- (71) a. John knew [what happened]. ≠ #John knew [a question].
 b. John didn’t know [what happened]. ≠ #John didn’t know [a question].
 c. John wanted to know [what happened]. ≠ #John wanted to know [a question].
- (72) a. John asked [what happened]. = John asked [a question].
 b. John didn’t ask [what happened]. = John didn’t ask [a question].²⁷
 c. John wanted to ask [what happened]. = John wanted to ask [a question].

²⁶ Including those not discussed in this thesis, such as imperative mood and matrix interrogation:

- (i) *Determine a question!
 (ii) *Did Bill determine a question?

See fn. 19 for references.

²⁷ This is more acceptable if the question-denoting nominal is specific, as in: “John didn’t ask [the / that question].”

The data in (71) shows that *discover*-class verbs cannot take question-denoting nominals, even in an ameliorative construction. Likewise, no unexpected patterns emerge with *wonder*-class verbs, as they did with *wh-the-hell*. The pattern in substitutivity is represented in table 5:

Table 5 *Substitutivity with negation and “want to”*

	Bare verb	Negated verb	“want to” + verb
<i>discover</i> -class	*	*	*
<i>wonder</i> -class	✓	✓	✓

Because substitutivity appears to be completely unaffected by ameliorative constructions, it does not pose a problem for the proposal in Chapter 3. Specifically, substitutivity does not challenge the conclusion that *discover*-class verbs select free relative DPs while *wonder*-class verbs select question CPs. Since ameliorative constructions show no effect in substitutivity, we have no reason to doubt its validity as a true question diagnostic; however, the nature of the question-denoting nominal and its peculiar ability to replace a CP warrant a great deal more investigation.

4.5 Summary

Throughout this chapter, I have uncovered a behavioral paradigm containing the interaction of several variables: two types of ameliorative constructions, two types of verbs, and five diagnostics. The combination of each table in this chapter is represented in table 6:

Table 6 *Full paradigm of negation and “want to”*

	Bare verb		Negated verb		“want to” + verb	
	<i>d</i> -class	<i>w</i> -class	<i>d</i> -class	<i>w</i> -class	<i>d</i> -class	<i>w</i> -class
<i>Wh-the-hell</i>	*	✓	✓	*	✓	✓
T-to-C	*	✓	?	✓	✓	✓
Clause fronting	*	✓	*	*	✓	✓
Stranding	*	✓	*	*	✓	✓
Substitutivity	*	✓	*	✓	*	✓

We have seen evidence that two diagnostics, *wh-the-hell* and embedded T-to-C, are actually diagnostics for polarity item licensing, an environment that subsumes question clauses (as well as clauses with negation, modality, etc.). For this reason, the unpredictable patterns of these diagnostics with negation and “want to” do not challenge the selection-based proposal in Chapter 3, though the double-licenser effect exhibited in *wh-the-hell* licensing remains unexplained. I then showed that substitutivity is entirely unaffected by ameliorative constructions, suggesting that it may be the most accurate question diagnostic. Finally, clause fronting and prosodic clause stranding are aberrant when negation and “want to” are introduced within the framework presented earlier. The two pattern together, as table 6 shows, and it remains to be seen why the addition of “want to” would permit a *discover*-class complement clause to undergo the processes involved in the diagnostics, and why the addition of negation would block a *wonder*-class complement clause from doing the same.

5. Conclusion

I have argued throughout this work for a basic distinction between two types of English verbs: those in the *wonder*-class, which embed [+wh] complement clauses that behave like questions, and those in the *discover*-class, whose embedded clauses do not behave like questions. At the onset, I supported this proposal with several novel diagnostics that test properties canonically associated with questions. The differential pattern between the verb types follows predictably from the proposal in Chapter 3, which holds that the complements of *discover*-class verbs are free relative clauses contained in DPs, while *wonder*-class verbs embed question CPs. Finally, in Chapter 4, I address data that seem to challenge a syntactic separation of *wonder* and *discover*. I conclude that these data do not conflict with the proposal put forth in this thesis if we amend our assumptions about the diagnostics used in Chapter 2.

The original theoretical question, “are the clauses under verbs like *know* truly embedded questions?” seems at first a small one. However, addressing this question to any satisfactory extent touches on extremely complex syntactic, morphological, and semantic phenomena and their interactions. This thesis addresses a few of the most relevant issues, such as the unpredictable effects of ameliorative constructions with various question diagnostics. Recognizing that many questions remain unanswered, the novel diagnostics, proposal, and accompanying phenomena explored herein help to clarify and set new standards for work in the syntax of embedded [+wh] clauses.

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Appendix A

The following lists contain some of the verbs in the *wonder*- and *discover*-classes. These lists are not comprehensive. Their contents are yielded from the diagnostics set out in Chapter 2.

	<u><i>Wonder-class</i></u>		<u><i>Discover-class</i></u>
wonder		discover	
ask		know	
inquire		determine	
		find out	
		figure out	
		decide	
		discuss	
		forget	
		remember	
		hear	
		see	