Grammar, Performance, and the *Wh*-Question Typology

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1 Introduction

What is the division of labor between grammar and performance in determining the character of human language? Are Universal Grammar (UG) and performance preferences in competition to optimally account for the attested phenomena of the world's languages? Or can they play complementary roles in linguistic theory? In this paper, I will argue for the latter position by investigating the *wh*-question typology as defined by Cheng (1991), in order to show how both grammar-internal mechanisms and performance preferences can contribute non-redundantly to particular linguistic phenomena. Two relevant proposals from the literature I will discuss in this paper are Hawkins' (2004) Performance-Grammar Correspondence Hypothesis (PGCH) and Cheng's (1991) Clausal Typing Hypothesis (CTH), both introduced here:

(1) *Performance-Grammar Correspondence Hypothesis (PGCH)*
Grammars have conventionalized syntactic structures in proportion to their degree of preference in performance, as evidenced by distributional patterns of selection in corpora and by ease of processing in psycholinguistic experiments. (Hawkins 2004, p. 3)

(2) *Clausal Typing Hypothesis (CTH)*
Every clause needs to be typed. In the case of typing a *wh*-question, either a *wh*-particle in C^0 is used or else fronting of a *wh*-word to the Spec of C^0 is used, thereby typing a clause through C^0 by Spec-head agreement. (Cheng 1991, p. 22)

In addition to the PGCH and the CTH, I will also discuss Miyagawa's (2001) proposal to account for cross-linguistic wh-phenomena by arguing for separate morphosyntactic *wh*- and Q-features as UG elements that differ in their cross-linguistic distribution.

With these proposals as background, I will argue for the following hypothesis to account both for the typological distribution of *wh*-question types as defined by the CTH and predicted by the PGCH, and for certain attested typological anomalies which, I will further argue, a UG-based account, such as Miyagawa's, can adequately explain:

(3) *Question Strategy Determination Hypothesis (QSDH)*
     The strategy choices available to a language for typing a sentence as a question are determined by UG, while the typological distribution of the available strategies is determined by the conventionalization of performance preferences.

The QSDH concerns a specific typological generalization, as expressed by the CTH. Crucially, the strong version of the CTH (which assumes Economy of Derivation (Chomsky 1991) as a UG principle) rules out languages that either employ both Q-particles and *wh*-movement or employ neither of these two strategies for question-typing. In this paper I will discuss apparent exceptions to the CTH with a view towards explaining both why such exceptions exist and why they are typologically rare. Among the exceptions to the CTH that have been cited in the literature are sentences which employ both Q-particles and *wh*-movement, such as the Vata sentence in (4), whose analysis by Koopman (1984) I assume to be correct:

(4) àlÓ$_i$ Kòfĩ yÉ t$_i$ yé lá   (Vata)
     who Kofi see PERF Q
     'who did Kofi see'
     (Koopman 1984, p. 35)

While (4) and similar data can be argued to falsify the CTH, my goal in this paper is not to challenge either the CTH or the PGCH, but simply to argue that UG can explain the existence of exceptions (such as (4) and similar data) to generalizations that follow from the CTH and the PGCH.

The structure of this paper is as follows. In section 2, I discuss the PGCH. In section 3, I discuss the CTH and its apparent exceptions. In section 4, I introduce the efficiency principles defined by Hawkins (2004) that follow from the PGCH. In section 5, I discuss the role of word order in the *wh*-question typology. In section 6, I introduce and discuss Miyagawa's (2001) proposal to account for the *wh*-question typology in terms of

morphosyntactic features. In section 7, I defend my own hypothesis, the QSDH. Section 8 is a brief summary with conclusions.

2   Grammar and Performance

According to Newmeyer (in press),"UG tells us what a possible human language is, but not what a probable human language is" (Ch. 3, p. 36). In other words, while a theory positing an innate human language faculty independent of other cognitive faculties may explain the existence of certain grammatical phenomena attested in natural languages, no such theory can fully account for the cross-linguistic abundance or rarity of such phenomena. In response to this explanatory inadequacy of UG, Hawkins (2004) presents a theory of typological generalizations based on the PGCH (repeated below), which, according to Hawkins, achieves explanatory adequacy for such generalizations:

(1)   *Performance-Grammar Correspondence Hypothesis (PGCH)*
       Grammars have conventionalized syntactic structures in proportion to their degree
       of preference in performance, as evidenced by distributional patterns of selection
       in corpora and by ease of processing in psycholinguistic experiments. (Hawkins
       2004, p. 3)

If Hawkins' theory is correct, must it supersede UG-based theories as a means to account for the facts of human language? In what follows I will argue that the task of accounting for the attested phenomena of natural languages — i.e. "possible languages" — is best suited to theories that assume an innate and autonomous UG, while the task of accounting for the cross-linguistic distribution of such phenomena — i.e. "probable languages" — is best suited to the PGCH and similar performance-based theories. I will argue for this position by investigating the *wh*-question typology as presented in Cheng 1991, cast in the light of the PGCH and its predictions.

3   Cheng 1991 and Apparent Exceptions

Cheng (1991), following a suggestion by Chomsky and Lasnik (1977), proposes that clauses must be 'typed' grammatically as declaratives, interrogatives, etc., and that a language must choose one of two strategies for 'typing' *wh*-questions, namely, either a

clause-peripheral Q-particle[1] or leftward *wh*-movement. This proposal is formalized as the Clausal Typing Hypothesis, repeated here:

(2) *Clausal Typing Hypothesis (CTH)*
     Every clause needs to be typed. In the case of typing a *wh*-question, either a *wh*-particle [i.e. Q-particle — JS] in C^0 is used or else fronting of a *wh*-word to the Spec of C^0 is used, thereby typing a clause through C^0 by Spec-head agreement. (Cheng 1991, p. 22)

Cheng illustrates the CTH with the data in (5) and (6):

(5) $[_{CP}$ Who$_i$ $[_{IP}$ t$_i$ bought what]]?

(6) Qiaofeng mai-le   shenme ne   (Mandarin)
     Qiaofeng buy-ASP what Q_{WH}
     'What did Qiaofeng buy?'
     (Cheng 1991, p. 22)

Under Cheng's account, in (5) the pronoun *who* moves to [Spec, C] to type the clause in the scope of CP as interrogative. The pronoun *what* in (5) does not move because the clause is already typed by *who*. In contrast, in (6) the pronoun *shenme* 'what' stays in situ because the Q-particle *ne* (assumed by Cheng to be a head base-generated in C) has already typed the sentence as interrogative, making *wh*-movement unnecessary.[2,3]

　　Citing the principle of Economy of Derivation from Chomsky 1991, Cheng argues that the CTH predicts the following:

(7) No language has yes-no particles (and thus *wh*-particles) and also syntactic *wh*-movement. (Cheng 1991, p. 28)

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[1] Where Cheng employs the term *wh-particle*, I follow Ultan (1978b) and others in employing the term *Q-particle* for clarity in later sections of this paper. Note also that Cheng distinguishes between *yes-no particles*, which mark yes-no questions, and *wh-particles*, which mark *wh*-questions: languages that employ the former will also employ the latter, although not necessarily vice-versa—a one-way implicational universal. In some languages (Japanese, Korean), but not all (Mandarin), yes-no and *wh*-particles are homophonous. I will restrict my attention to *wh*-questions in the remainder of this paper.

[2] Cheng points out that the Q-particle *ne* is optional, while arguing that *ne* has a non-overt alternate form with the same scopal and quantificational properties as *ne*.

[3] As for multiple-*wh* languages, Cheng argues that in such languages movement of additional *wh*-words is required to license each *wh*-word, and that clausal typing obtains as a secondary consequence of *wh*-movement.

According to Cheng, Economy of Derivation rules out syntactic *wh*-movement where a Q-particle has already typed a clause as interrogative. Thus, it follows from the CTH and (7) that a language exhibiting both overt *wh*-movement and Q-particles is impossible. However, such languages have in fact been attested. Bruening (2004), drawing on Ultan's (1978b) typological survey of interrogative systems in 79 randomly-chosen languages, cites 30 such languages, with varying word orders and variation between initial and final Q-particles: Agta, Albanian, Syrian Arabic, Basque, Burmese, Chontal, Fanti, Finnish, French, Louisiana French, Scottish Gaelic, Gbeya, Grebo, Guarani, Gunwinggu, Hebrew, Hungarian, Irish, Jaqaru, Klamath, Lithuanian, Malagasy, Malay, Ojibwa, Piro, Russian, Squamish, Tagalog, Twi, and Zapotec.[4] In this paper I will focus on relevant data from another such language: Vata, a Kru language spoken in the Ivory Coast whose basic word order is SOV (Koopman 1984). In what follows I will refer to any language that employs both *wh*-movement and Q-particles, regardless of basic word order or Q-clause order, as a *Vata-type language*, the better to compare such languages with *English-type languages* (which employ *wh*-movement without Q-particles) and *Japanese-type languages* (which employ Q-particles without *wh*-movement).

Consider the simple *wh*-question in (4), repeated below, and the embedded clause structure in (8):

(4) àlÓ$_i$ Kòfĭ yÉ t$_i$ yé   lá   (Vata)
     who Kofi see   PERF Q
     'who did Kofi see'

(8) àlÓ$_i$ n   gūgū nā   Kòfĭ yÉ t$_i$ yé   lá
     who you think COMP Kofi see   PERF Q
     'who do you think Kofi saw'
     (Koopman 1984, p. 35)

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[4] Bruening cites these languages partly in order to challenge the CTH. Ultan's survey simply claims that these languages employ both "question particles" and sentence-initial *wh*-words, but does not provide supporting data for all of them. I will assume Ultan's survey to be correct while also assuming, contra Bruening, that exceptions to the CTH are typologically rare, having found little data to support Ultan's claims.

Note that, according to Koopman, the *wh*-movement in (4), (8), and many similar Vata examples discussed in Koopman 1984 is obligatory and therefore cannot be analyzed as scrambling. While such data appear to pose a problem for the CTH, I will not argue here that such data are counterexamples to the PGCH, since the PGCH is intended to predict probable languages, not to constrain possible languages. I will instead attempt to show how UG can explain the existence of such data where the PGCH cannot. I will also suggest that such data lend additional support to the PGCH, since their apparent rarity may be due to parsing difficulty compared to the more widely-attested *wh*-question structures predicted by both the CTH and the PGCH, as I will discuss in section 5.

To show how UG can explain such typological exceptions as (4) and (8) as well as the more common 'possible *wh*-questions', I will consider a recent grammar-based proposal to account for the typology of *wh*-questions: namely, Miyagawa's (2001) proposal (following Hagstrom 1998) to account for cross-linguistic *wh*-phenomena by arguing for separate morphosyntactic *wh*- and Q-features as UG elements that differ in their cross-linguistic distribution: morphologically separate in Japanese-type languages, syncretic in English-type languages. Miyagawa also crucially adopts Chomsky's (2000) suggestion that the Extended Projection Principle (EPP) feature requiring overt movement of an XP to the Spec of the EPP's containing head can be generalized from Tense to other functional heads, including C.

According to Miyagawa, the *wh*-feature in *nani* 'what' in (9) below does not raise to establish clausal scope (as in English-type languages) because the accompanying Q-feature (hosted by the Q-particle *no*) has already raised to C to satisfy the EPP on C:

(9) Taroo-ga nani-o   kat-ta   no?   (Japanese)
     Taro-NOM what-ACC buy-PAST Q
     'What did Taro buy?'
     (Miyagawa 2001, p. 311)

The *wh*-feature determines the indefinite property of *wh*-words (Kuroda 1965) while the Q-feature determines the quantificational and scopal properties of *wh*-questions (Hagstrom 1998). Miyagawa, again following Hagstrom (1998), also argues that the Q-

particle *no* is base-generated right-adjacent to *nani* (as well as other *wh*-words) and is pied-piped to C along with the Q-feature.[5,6]

Miyagawa's proposal appears to reflect the intuitive idea behind the CTH. It also suggests a possible solution to the problem for the CTH presented by the data in (4) and (8). To recapitulate the problem: the CTH predicts that a language employing both *wh*-movement and a Q-particle to type a clause as a *wh*-question should be impossible, whereas the data in (4) and (8) fit this description yet are grammatical in Vata. The possible solution is that the Q- and *wh*-features in Vata can both raise to the C projection, violating Economy of Derivation to fulfill some other requirement of Vata grammar. I will return to this possibility in section 7. In the next section, I discuss Hawkins' (2004) theory of the grammaticalization of performance preferences and its relevance to *wh*-phenomena.

4   Hawkins' Theory and its Explanatory Domain

In addition to the Performance-Grammar Correspondence Hypothesis (PGCH), introduced above in (1), Hawkins (2004) proposes three efficiency principles that follow from the PGCH, all of which are relevant to wh-phenomena, and therefore to the present discussion. These are Minimize Domains (MiD), Minimize Forms (MiF), and Maximize On-line Processing (MaOP), each summarized below:

(10) *Minimize Domains (MiD)*
      The human processor prefers to minimize the connected sequences of linguistic
      forms and their conventionally associated syntactic and semantic properties in
      which relations of combination and/or dependency are processed. The degree of
      this preference is proportional to the number of relations whose domains can be
      minimized in competing sequences or structures, and to the extent of the
      minimization difference in each domain. (Hawkins 2004, p. 32)

MiD appears to explain a significant cross-linguistic generalization involving *wh*-fronting and basic verb position, namely, that *wh*-fronting is more frequent in VSO and SVO

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[5] The Q-particle *no*, while functioning as a question marker in clause-final position, is generally assumed in the literature on Japanese questions to be a shortened version of *no desu ka* (Hagstrom 1998). *no* is the Japanese genitive marker, which is often used to nominalize a clause; *desu* is the Japanese formal-register copula; *ka* is the Japanese formal-register Q-particle.

[6] Hagstrom presents data from Sinhala, a language of Sri Lanka which is structurally similar to Japanese but with overt Q-particles right-adjacent to *wh*-words at PF, to support his proposal.

languages than in SOV languages. When languages front *wh*-words, they form what is known as a 'filler-gap dependency', defined by Hawkins as a 'filler-gap domain' as in (11):

(11) *Filler-Gap Domain (FGD)*
An FGD consists of the smallest set of terminal and non-terminal nodes dominated by the mother of a filler and on a connected path that must be accessed for gap identification and processing; for subcategorized gaps the path connects the filler to a co-indexed subcategorizor and includes, or is extended to include, any additional arguments of the subcategorizor on which the gap depends for its processing; for non-subcategorized gaps the path connects the filler to the head category that constructs the mother node containing the co-indexed gap; all constituency relations and co-occurrence requirements holding between these nodes belong in the description of the FGD. (Hawkins 2004, p. 175)

According to Hawkins, the increasing size and complexity of FGDs as the distance increases between *wh*-fillers and their gaps (or subcategorizing verbs) accounts for the increasing dispreference for *wh*-movement in verb-final languages compared to verb-initial and verb-medial languages. For example, consider the simple English wh-question in (12):

(12) $[_{CP}$ Who$_i$ $[_{IP}$ t$_i$ greeted Mary]]?

Under Hawkins' definition of an FGD, a gap cannot be identified by the parser until its subcategorizor has been parsed, therefore the verb *greeted* in (12) must also be co-indexed with the filler along with the gap, as in (13):

(13) $[_{CP}$ Who$_i$ $[_{IP}$ t$_i$ greeted$_i$ Mary]]?

Now consider a hypothetical language with SOV order and wh-fronting (call it SOV English), where the counterpart of (13) would be (14):

(14) $[_{CP}$ Who$_i$ $[_{IP}$ t$_i$ Mary greeted$_i$]]?

Comparison of (13) and (14) should reveal the increased complexity of the FGD in (14) compared to that in (13): in the SOV structure in (14), the object intervenes between the filler *Who$_i$* and its subcategorizer *greeted$_i$*, whereas in (13) the path from filler to subcategorizor is less structurally complex and therefore easier to process. I will discuss the correlation between *wh*-movement and basic word order further in section 5.

(15) *Minimize Forms (MiF)*
The human processor prefers to minimize the formal complexity of each linguistic form F (its phoneme, morpheme, word or phrasal units) and the number of forms with unique conventionalized property assignments, thereby assigning more properties to fewer forms. These minimizations apply in proportion to the ease with which a given P can be assigned in processing to a given F. (Hawkins 2004, p. 38)

MiF appears to partially explain the cross-linguistic rarity of Vata-type languages, for reasons involving the redundancy of combining *wh*-movement with Q-particles. I will discuss this matter in section 7.

(16) *Maximize On-line Processing (MaOP)*
The human processor prefers to maximize the set of properties that are assignable to each item X as X is processed, thereby increasing O(n-line) P(roperty) to U(ltimate) P(roperty) ratios. The maximization difference between competing orders and structures will be a function of the number of properties that are misassigned or unassigned to X in a structure/sequence S, compared with the number in an alternative. (Hawkins 2004, p. 51)

MaOP predicts a number of asymmetries, many involving *wh*-phenomena. Crucially, fillers tend to precede gaps in *wh*-questions and relative clauses, as well as other filler-gap constructions. According to Hawkins, MaOP explains these asymmetries along lines proposed by Fodor (1983): When parsing a filler such as a *wh*-phrase in a non-argument position, the hearer is primed to search for a co-referential gap. By contrast, a gap is inaudible and can easily go undetected by the hearer — especially if it precedes its filler in linear order. Crucially, during on-line sentence processing, more properties (categorical, selectional, etc.) are immediately assignable to an overt *wh*-phrase than to a gap.

This appears to explain why the displacement of *wh*-words, in addition to being non-universal, is asymmetric. In almost all languages, *wh*-phrases move to the left and not to the right, i.e. to clause-initial position (as first noted in Bach 1971, p. 160).[7] Hawkins argues that this universal asymmetry can be explained by Fodor's (1983) principle *Fillers First*, which, according to Hawkins, is subsumed under MaOP:

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[7] At least two exceptional cases have been cited where *wh*-phrases move obligatorily to the right-peripheral position of the clause: Khasi (Mon-Khmer, Austro-Asiatic, SVO), cited by Ultan (1978b), and Tangale (Chadic, Afro-Asiatic, SVO), cited by Kenstowicz (1987).

(17) *Fillers First*
      The human processor prefers to process fillers before their co-indexed
      subcategorizers or gaps. (Hawkins 2004, p. 204)

Hawkins (2004) claims that filler-gap dependencies are generally difficult to process. Why then are they attested at all? On one view (cf. Cheng 1991), in direct *wh*-questions, the matrix C carries interrogative force, and the relevant feature on this C is associated with the *wh*-phrase to form a content question. This association is accomplished in English-type languages by moving the *wh*-phrase into the Spec of the interrogative C, thus satisfying the so-called *Wh-Criterion* (May 1985) at the expense of diminished processing ease. Languages with Q-particles available to satisfy the interrogative feature on C can avoid the processing difficulties that come with filler-gap dependencies by leaving the *wh*-word *in situ*. These observations suggest an interaction between the formal mechanisms of *wh*-fronting and its functional motivation — which brings us to Miyagawa's (2001) proposal, to be discussed in section 6. First, a note on the role of word order in the *wh*-question typology.

5   *Wh*-Questions and Word Order in Typology

Basic word order is relevant to the *wh*-question typology, since there exists a much-discussed correlation between basic verb position and the probability of syntactic *wh*-fronting. According to Dryer (1991), approximately 40% of the world's languages exhibit wh-fronting, while Bruening (2004), based on Dryer's typological database of over 500 languages (described at http://wings.buffalo.edu/soc-sci/linguistics/people/faculty/dryer/dryer/database), claims that between 60 to 70 percent of the world's languages employ question particles, whether with *wh-in-situ* or *wh*-movement. Dryer's data show that VO languages tend strongly to have overt *wh*-movement, while OV languages tend to be *in-situ* languages. As for the word order breakdown, according to Dryer, while 71% of verb-final languages are *in-situ* languages, 42% of SVO languages lack *wh*-movement, while only 16% of verb-initial languages lack *wh*-movement, as shown in Table 1, which also shows the correlation between *wh-in-situ* and final Q-particles:

Table 1
**Proportion of languages with either *wh*-in-situ or final question particles,
by word order type (Dryer 1991)**

	V-final	SVO	V-initial
wh-in-situ	71%	42%	16%
final Q-particles	73%	30%	13%

Greenberg (1963) and Ultan (1978a) provide partially overlapping data on the correlation between *wh*-fronting and basic verb position that serves as a corollary to Table 1. Hawkins (2004) combines these data as in (18), along with similar data provided by Dryer (1991) from Dryer's own genetically and areally controlled sample, presented in terms of genera:

(18)   *Wh-fronting and basic verb position*
       Greenberg/Ultan (Hawkins 1999, p. 274)   Dryer (1991)
       V-initial: 17/20 lgs = 85%   23/29 genera = 79%
       SVO: 25/34 lgs = 73.5%   21/52 genera = 40%
       SOV: 7/33 lgs = 21%   26/82 genera = 32%

These typological generalizations are worth considering in terms of the division of labor between UG and performance preferences as expressed by Hawkins' efficiency principles. If one follows Chomsky (1995) in assuming that Merge is less costly for Economy of Derivation than Move, it makes sense to consider Merge of a Q-particle to a clause as a primary strategy for *wh*-question formation cross-linguistically, and *wh*-movement as a 'last resort' when a Q-particle is not available to satisfy the relevant feature in C. As Hawkins (2004) argues in detail, MiD explains why languages tend to prefer Q-particle Merge to *wh*-movement the further their basic verb positions are to the right, since the greater the complexity of the FGD formed by *wh*-movement, the more difficult that FGD will be to process. I believe this lends support to the QSDH, which states that UG determines the possible strategies available for *wh*-question formation, while performance preferences — here, MiD in particular — determine the cross-linguistic distribution of the available strategies. In the next section, I discuss a recent proposal from the literature for how the *wh*-question strategies made available by UG can be precisely formalized in grammatical theory.

6 Miyagawa's (2001) Proposal

Miyagawa (2001) offers a formal account of *wh*-question phenomena which appears useful for typology when cast in the light of the PGCH. Miyagawa follows Hagstrom (1998), who proposes that the Q-particle in Japanese originates within the same constituent as the *wh*-phrase. Under Miyagawa's account, in a Japanese *wh*-question, the Q-particle is raised to C, being attracted by the EPP feature on C. If correct, this analysis unifies Japanese and English *wh*-questions in the sense that they both exhibit overt movement: either to C (as in Japanese) or to [Spec, C] (as in English), either way serving to satisfy the Q-feature on C. This proposal appears to reflect Cheng's (1991) idea that a *wh*-question must be grammatically typed as such, either by *wh*-movement or by a Q-particle located in C (whether by Move or Merge).

According to Miyagawa, in English, C is associated with both the Q- and *wh*-features. Chomsky (2000) suggests that head-to-head movement can satisfy the EPP-feature on the target head. Miyagawa (2001) assumes that the Q-feature is universally on C, though not the *wh*-feature. Under Miyagawa's analysis, in English both the Q-feature and the *wh*-feature occur on the *wh*-phrase and are morphologically inseparable, thus requiring the entire *wh*-phrase to pied-pipe along with the Q-feature to satisfy the EPP on C. In Japanese, by contrast, the two features are morphologically separable and distributed accordingly: when the Q-feature associated with the Q-particle raises to C, the *wh*-feature remains in situ along with the *wh*-phrase, as in (9), repeated here:

(9) Taroo-ga nani-o   kat-ta   no?   (Japanese)
     Taro-NOM what-ACC buy-PAST Q
     'What did Taro buy?'
     (Miyagawa 2001, p. 311)

In further support of his account of *wh-in-situ* in Japanese, Miyagawa, employing Japanese data involving both negation and quantifier phrases, argues that the *wh*-feature in Japanese is on T, not C, as illustrated in (19):

(19) Dare-to$_i$ zen'in-ga   t$_i$ asoba-nakat-ta   no?   (Japanese)
      who-with$_i$ all-NOM   t$_i$ play-NEG-PAST   Q
      'With whom, all did not play?'
      not > all, (all > not)
      (Miyagawa 2001, p. 318)

In (19), the oblique *wh*-phrase *dare-to* 'with whom' moves to T to satisfy both the *wh*-feature and the EPP on T, allowing the subject quantifier *zen'in-ga* 'all' to remain in [Spec, v] and thus be interpreted with narrow scope in relation to negation. Miyagawa's proposal is compatible with Cheng's Clausal Typing Hypothesis, to a degree. In English, one *wh*-phrase must move, either to clause-type the sentence as a question (under Cheng's analysis) or to satisfy the EPP on C (under Miyagawa's analysis). In Japanese, the Q-particle raises (or is Merged) for the same purpose (in both analyses).[8] Thus the attested facts of the *wh*-question typology can be boiled down to morphology, supporting the first clause of the QSDH (repeated below), if Miyagawa's proposal is adopted. But what about the typological distribution of these strategies? Here apparently is where a strict appeal to grammar fails, and performance must be appealed to instead for explanatory adequacy. This leads to the explanatory advantage of the PGCH for typology, supporting the second clause of the QSDH.

(3)   *Question Strategy Determination Hypothesis (QSDH)*
       The strategy choices available to a language for typing a sentence as a question
       are determined by UG, while the typological distribution of the available strategies
       is determined by the conventionalization of performance preferences.

7 Defending the QSDH

In this section, I will defend the QSDH by first showing how a grammar-based proposal — namely, Miyagawa's feature-driven proposal discussed in section 6 — can explain the range of attested facts in the *wh*-question typology. I will then show how performance preferences as formalized in the PGCH and its accompanying principles can account for the rarity of Vata-type languages. In earlier sections, I have presented

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[8] Cheng (1991) mentions the possibility that the Q-particle may originate somewhere below C, but assumes that it is base-generated in C for ease of exposition. My discussion in section 5 of Q-particle Merge in relation to processing complexity suggests the potential depth of the question whether Q-particle Merge is External or Internal, which is beyond the scope of this paper.

elements of the defense that follows; here I will gather these elements to make this defense explicit.

7.1 Grammar in the *Wh*-Question Typology

Miyagawa's proposal to separate the UG elements that determine available *wh*-question strategies into distinct morphosyntactic *wh*- and Q-features appears to straightforwardly account for the existence of the three *wh*-question types discussed in this paper: obligatory *wh*-movement (English-type), *wh-in-situ* with a clause-peripheral Q-particle (Japanese-type), and obligatory *wh*-movement co-occurring with a Q-particle (the admittedly rare Vata-type). I have already discussed how this proposal accounts for the first two types in section 6. As for the Vata-type, I will avoid further detailed analysis of the grammar of Vata in this paper, and instead offer a simple suggestion: It seems fairly straightforward to argue that, under Miyagawa's proposal, the Vata Q-particle *là* can be merged with the clause to satisfy the interrogative feature on C, while the *wh*-word can also raise to [Spec, C], if we assume that Vata is similar to English in having both *wh*- and Q-features on C. Thus, feature mismatch should not be a problem in this analysis, only the apparent violation of Economy of Derivation due to the redundant use of two clause-typing strategies.

As stated earlier, *wh*-movement in Vata cannot be analyzed as scrambling, since it is obligatory. I will simply suggest here that there is some requirement in the grammar of Vata that takes priority over Economy of Derivation, therefore either allowing or forcing *wh*-movement along with Q-particle Merge. I will leave the formal development of this suggestion for future research.

7.2 Performance in the *Wh*-Question Typology

Now I arrive at the question why Vata-type languages, shown above to be among the class of 'possible languages', are typologically rare. First, I review how the PGCH predicts the more common *wh*-question types.

As discussed in section 5, the UG-based assumption that Merge is less costly than Move leads to the suggestion that Merge of a Q-particle to a clause should be a primary strategy for *wh*-question formation cross-linguistically, and that *wh*-movement must be a 'last resort' when a Q-particle is not available to type the sentence as a *wh*-question. In

turn, MiD explains in processing terms why Q-particle Merge tends to be preferred to *wh*-movement in V-final languages, since the greater the complexity of the FGD formed by *wh*-movement, the more difficult that FGD will be to process. The closer the basic verb position of a given language is to the left periphery, the more that language will tolerate wh-movement as an alternative to Q-particle Merge.[9]

Given that Vata is an underlyingly SOV language, MiD explains its rarity with respect to *wh*-movement, as discussed above. As for the co-occurring Q-particle, it may be the case that Vata-type questions also violate MiF, since the final Q-particles in (4) and (8) are redundant to the parser. Thus, performance principles can explain the cross-linguistic rarity of Vata-type languages, as well as the typological distribution of the *wh*-question strategies made available by UG.

7.3   Another *Wh*-Movement Problem in Vata

Before concluding, I will briefly present another set of Vata data that suggests something interesting in the grammar of Vata related to *wh*-movement. In addition to its exceptions to CTH, Vata presents an interesting problem with respect to Keenan & Comrie's (1977) Accessibility Hierarchy, which posits that subjects tend to be easier to extract than non-subjects cross-linguistically, as well as Hawkins' (2004) closely-related Resumptive Pronoun Hierarchy Prediction (RPHP), from which it follows that resumptive pronouns should tend to occur more frequently than gaps in extraction sites as one goes down this hierarchy:

(20) *Resumptive Pronoun Hierarchy Prediction (RPHP)*
      If a resumptive pronoun is grammatical in position P on a complexity hierarchy H, then resumptive pronouns will be grammatical in all lower and more complex positions that can be relativized at all. (Hawkins 2004, p. 186)

Consider the following subject-object asymmetry in Vata, involving resumptive pronouns. When a subject is *wh*-moved, a resumptive pronoun must occur in subject position, as shown in (21). When non-subjects are moved, the occurrence of resumptive pronouns is excluded, as shown in (22):

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[9] The question why morphologically free Q-particles are not a universal feature in all languages is beyond the scope of this paper.

(21) àlÓ *(Ò) lē   saká lá   (Vata)
    who he-R eat   rice   Q
    'who is eating rice?'

(22) yĪ   Kòfí lē (*mÍ) lá
    what Kofi eat (*it-R) Q
    'what is Kofi eating?'
    (Koopman 1984, p. 37)

I grant two facts here: one, the data in (21) and (22) involve *wh*-questions, not relativization (although these are closely related); and two, the RPHP is a typological prediction, not an absolute universal. Nevertheless, the data in (21) and (22), coupled with the co-occurrence of *wh*-movement and Q-particles in the same language, suggests an area for future research involving *wh*-movement constructions in Vata.

8 Summary and Conclusions

I have argued in this paper that the strategy choices available for a language to type sentences as *wh*-questions are determined by Universal Grammar, while the typological distribution of the available strategies is determined by the conventionalization of performance preferences. I have further argued that Miyagawa's (2001) proposal to divide *wh*-question morphology into separate and universal *wh*- and Q-features can account for the different forms of *wh*-questions in English-type, Japanese-type and Vata-type languages. In addition, I have attempted to show how Hawkins' (2004) Performance-Grammar Correspondence Hypothesis and its predictions about the typological distribution of *wh*-question forms can account for the rarity of Vata-type *wh*-questions, which employ both *wh*-movement and Q-particles. In other words, UG can account for the existence of Vata-type *wh*-question forms, while the conventionalization of performance preferences can account for why such forms are not more abundant: the redundancy of this strategy, as well as its violation of the efficiency principles Minimize Domains and Minimize Forms, makes it less preferable to grammars than the alternative strategies of either *wh*-movement or Q-particle Merge to establish interrogative force in a sentence.

A final note: I have presented the Vata data in this paper for comparative purposes, not to support any possible counterclaims against Cheng's (1991) Clausal Typing Hypothesis or Hawkins' (2004) Performance-Grammar Correspondence Hypothesis. Nevertheless, if one accepts that such data are accurately attested, they should be accounted for somehow, and I have argued here that Miyagawa's (2001) UG-based proposal suggests a possible account. The precise form of that account, which would require a more thorough investigation of Vata grammar than appropriate for this paper, is left for future research.

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