Wh-Islands: A View from Correspondence Theory

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1 Introduction

This paper discusses a family of restrictions on syntactic extraction, so-called *wh*-islands. The analysis will be based on the OT syntax model developed in Vogel (2004*a,b*) which focuses on the *correspondence* between semantic, syntactic and phonological representations, in the spirit of work by Jackendoff (1997), Williams (2003) and Culicover & Jackendoff (2005). I will argue that the *wh*-island restriction results from the impossibility to establish a perfect semantics-syntax mapping in the relevant structures. The resulting constraint violations add up to yield the *wh*-island effect. Exceptions to the *wh*-island restrictions in English are argued to be prosodically licensed.

Section 2 introduces the model I am using, and presents examples of some accounts of ineffability which I developed elsewhere. That section also introduces the basics of my treatment of *wh*-movement. Section 3 develops the account of *wh*-islands. Section 4 discusses the exceptions to the *wh*-island restriction that we see in English, and extends my account to handle these cases. The OT implementation of this account is presented in Section 5.

2 Correspondence-based OT syntax

A central question for the design of an OT system is the choice of the objects serving as input and output and their representational formats. OT systems that use the same objects for input and output have to be distinguished from those that use different ones.

In OT syntax, a model that has often been used is that of a mapping from a *semantic* representation in the input to a *syntactic* representation in the output (Grimshaw 1997*a*). Here, input and output are radically different. The input-output mapping has the character of a *translation*.

But it is sometimes useful to have the same kinds of objects in input and output, for example, if one wants to describe the typology of syntactic constructions: If language L_1 lacks a particular construction C_1 that occurs in language L_2, an OT model could show that C_1 would be mapped onto a different construction C_2 if it was in the input in language L_1.[1]

One example in case is the typology of free relative constructions as modeled in Vogel (2001, 2002):

(1)   German free relative and correlative construction:
    a. *Wer   einmal lügt, lügt auch zweimal*
        who-NOM once   lies   lies also twice
    b. *Wer   einmal lügt, der   lügt auch zweimal*
        who-NOM once   lies that-one-NOM lies also twice

(1a) contains a so-called "free relative clause" (FR) which serves as the grammatical subject of the whole sentence. In (1b), this FR is accompanied by a resumptive pronoun. Here, the FR is preposed out of the core sentence – so-called "left dislocation" – and we have a corefering resumptive pronoun, '*der*' ('that one') as grammatical subject. This latter construction is an instance of a "correlative construction".

FRs as in (1a) are marked compared to correlative constructions (CR) as in (1b): Languages that have FRs also have CRs, but there are languages with CRs that lack FRs. Also, languages with FRs differ in the contexts which allow for this construction – contexts which allow for free relatives also allow for correlatives, but there are contexts allowing for correlatives that do not allow for free relatives. For example, in German, a FR is out, if it would imply the suppression of oblique case (in the following example, dative):

(2)   *Wer   einmal lügt, *(dem)   glaubt   man nicht*
      who-NOM once   lies the-one-DAT believes one not

The solution I proposed in the works cited above is an OT system where the syntactic structure (FR or CR) is specified in the input, and where FRs and CRs compete in the output. In cases like (2), a FR in the input is

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[1]The first who proposed a model with such properties for OT syntax, were Legendre et al. (1998) and Baković & Keer (2001), as far as I know.

neutralised to a CR in the output. A CR in the input, however, is always mapped onto a CR in the output. That way, it is possible to account for the absence of a syntactic structure in a language, using the standard OT scheme of markedness outranking faithfulness, where faithfulness is understood in terms of OT correspondence theory (McCarthy & Prince 1995).

Which representations does an OT syntax system actually need? I follow Jackendoff (1997) who summarises the traditional point of view of what grammars are doing: he claims that there are three representations, a semantic one, a syntactic one and a phonological one, and it is their *correspondence* that is modeled by a theory of grammar. Let us use the symbols $\mathcal{M}$ (for 'meaning'), $\mathcal{S}$ (syntax) and $\mathcal{P}$ (phonology) for these representations.

A common assumption about the role of syntax is that it *mediates* between 'meaning' and 'sound'. One way of modelling this could be a serialisation of two optimisations, one where $\mathcal{M}$ is mapped onto $\mathcal{S}$, and a second step, where the winning $\mathcal{S}$ is mapped onto $\mathcal{P}$. This would imply that there is no direct correspondence relation between $\mathcal{M}$ and $\mathcal{P}$. But much work on the interaction of information structure and prosody shows that such a direct relation exists. The picture that we get looks more like a triangle: $\mathcal{M}$ is connected with both $\mathcal{S}$ and $\mathcal{P}$, as are $\mathcal{S}$ and $\mathcal{P}$.

The model that I propose for OT syntax combines these different perspectives: a) we specify for syntax in both input and output to account for optionality and ineffability of syntactic constructions in a standard OT fashion, and b) we use a correspondence-theoretic architecture that organises a mapping from meaning to form in the sense indicated above. Both input and output are ordered pairs which combine a syntactic structure with a semantic (input) or phonological (output) structure, respectively. The structure of input and output (candidates) is the following (the two occurrences of $\mathcal{S}$ in input and output are distinguished by subscripts):

(3)   Input and output representations in OT syntax, (see Vogel 2004*b*):

Input:	$\mathcal{S}_I, \mathcal{M}$
Output:	$\mathcal{S}_O, \mathcal{P}$

Some phenomena require the complexity of a bidirectional model. The examples that I discuss in detail in Vogel (2004*a*) are cases of word order freezing, where a structure that is marked, but well-formed in principle becomes odd because of homophony with a less marked structure. The simple case are German proper names which are ambiguous for nomina-

tive and accusative:

(4)   a.   *Den   Hans liebt Maria*
           the-ACC H.   loves M.
           'Hans, Maria loves'
      b.   Hans liebt Maria
           'Hans loves Maria', NOT: 'Hans, Maria loves'

Unless explicitly marked as accusative, as in (4a), a clause-initial proper name is interpreted as nominative. In a suitable context, this can even lead to ill-formedness:

(5)   *??Hans liebt Maria, ohne   ihn zu kennen*
         H.   loves M.   without him to know
       intended: 'Hans, Maria loves without knowing him'

Example (5) is interpreted such that Hans is the subject and Maria is taken for a male's name, due to the gender of the pronoun in the in-finitival clause. This causes the low acceptability. If this example is to be ruled out in the usual way, then we would have to exclude sentences with object-verb-subject order in general. We cannot distinguish between (4a) and (4b) in terms of abstract syntax. Furthermore, it is clear that given appropriate syntactic contexts, this freezing effect disappears.[2]

Hence, it is clear that the ill-formedness of (4b) is due only to non-recoverability of underlying syntactic structure, not because of structural ill-formedness as such. In the model I am advocating this is implemented by adding a second step of optimisation which uses the winning $\mathcal{P}$ of the initial optimisation as input and takes $[\mathcal{M},\mathcal{S}]$ pairs as output candidates. I called this optimisation *feedback optimisation* in Vogel (2004*a,b*):

(6)   Input and output representations in bidirectional OT syntax:

First optimisation:	Input:	$\mathcal{S}_I$, $\mathcal{M}$
	Output:	$\mathcal{S}_O$, $\mathcal{P}$

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[2]One example is a coordination of unambiguous object-verb-subject sentences, where (4b) as final conjunct would be analysed as having a parallel syntactic structure, i.e., object-verb-subject.

(i)   *Den   Peter liebt Sonja, den   Karl liebt Ida, und Hans liebt Maria*
       The-ACC P.   loves S.   the-ACC K.   loves I.,   and H.   loves M.
       "Peter is loved by Sonja, Karl is loved by Ida, and Hans is loved by Maria."

Feedback optimisation:

Input:	$\mathcal{P}$
Output:	$\mathcal{S}_I, \mathcal{M}$

In some rare cases, such surface ambiguities even lead to ineffability, and not only to non-recoverability of underlying structure. The example that I discuss in Vogel (2004*a*) is the following contrast:

(7)   a.   <u>Wem</u>$_1$ *hat er abgeraten, sofort*   <u>wem</u>$_2$ *nach*
            who-DAT has he dissuaded immediately who-DAT to
            Saloniki nachzureisen?
            Saloniki travel-after
            "Who has he dissuaded from travelling after whom to Saloniki?"

      b.   *<u>Wem</u>$_{1/2}$ *hat er (t$_1$)* <u>wem</u>$_{2/1}$ *abgeraten, sofort*   *t$_2$*
            who-DAT has he   who-DAT dissuaded immediately
            nach Saloniki nachzureisen?
            to   Saloniki to-travel-after
            intended reading: "Who is the person such that he has dissuaded whom to travel after that person?"

      c.   <u>Wohin</u>$_2$ *hat er* <u>wem</u>$_1$ *abgeraten, der Prinzessin*   *t$_2$*
            where-to has he who-DAT dissuaded the princess-DAT
            nachzureisen?
            to-travel-after
            "What is the place such that he has dissuaded whom to travel there after the princess?"
            (cf. Haider 1996, 2000, Fanselow 1991)

In principle, it is possible to extract a *wh*-phrase out of an embedded infinitive across another *wh*-phrase in the matrix clause in German. This is exemplified by (7c). But if the two *wh*-phrases are homophonous, this option breaks down. (7b) is ungrammatical. Unlike (4b) above, (7b) is not only impossible to interpret with a particular reading. This is derived in the bidirectional model with a definition of grammaticality that combines both perspectives:

(8)   **Grammaticality:**
      A triple [M_i,S_i,P_i] is grammatical, if and only if the input [M_i,S_i] yields [S_i,P_i] in first optimisation, and the input [P_i] yields [M_i,S_i] in feedback optimisation.

Under the analysis that I developed in Vogel (2004*a*), sentence (7b) is not part of any triple [M_i,S_i,P_i] that is grammatical under the definition in (8).

In feedback optimisation, (7b) is interpreted such that the initial '*wem*' belongs to the matrix clause, and the second '*wem*', though contained in the matrix clause, belongs to the embedded clause. But this underlying interpretation yields a better surface form in first optimisation, namely, (7a). In order to achieve such a result, the bidirectional perspective is unavoidable.

In this paper, I will elaborate on the correspondence theoretic approach to OT syntax that I developed in Vogel (2004*a,b*). I will focus on another aspect of *wh*-movement, *wh*-islands. This time, a unidirectional perspective will be sufficient, but the interactions of the mapping constraints will be quite complex. We will see that cumulation of constraint violations plays a crucial role.

2.1   Syntactic Correspondence Constraints

OT constraints formulate requirements on corresponding elements of these representations. For instance, the argument hierarchy given in the argument structure of the verb (as part of $\mathcal{M}$) can be required by an $\mathcal{M}\Rrightarrow\mathcal{S}$ mapping constraint to be translated into asymmetric c-command at $\mathcal{S}$ between the two phrases that correspond to the arguments.[3]

(9) $\mathcal{M}\Rrightarrow\mathcal{S}$(ARG):
        If an argument m_1 precedes another argument m_2 at $\mathcal{M}$, then s_1 asymmetrically c-commands s_2 at $\mathcal{S}$.

Elements of $\mathcal{M}$ are called, 'm_n', elements of $\mathcal{S}$, 's_n', and elements of $\mathcal{P}$, 'p_n'; identical indices indicate correspondence of elements, e.g., m_1 corresponds to s_1.

Similarly, there are mapping constraints of the $\mathcal{S}\Rrightarrow\mathcal{P}$ family, requiring, for instance, asymmetric c-command to translate into precedence, sisterhood into adjacency, and syntactic phrases to translate into phonological phrases, cf. Truckenbrodt (1999) for the latter. $\mathcal{M}\Rrightarrow\mathcal{P}$ mapping governs the translation of information structure into prosodic structure, among others.

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[3]In the definitions of the mapping constraints, $\mathcal{S}$ stands for $\mathcal{S}_O$, unless otherwise indicated. The role of $\mathcal{S}_I$ is in fact limited to constraints of the $\mathcal{S}_I\Rrightarrow\mathcal{S}_O$ constraint family. Precedence in $\mathcal{M}$ refers to the standard assumption that argument structures are ordered tuples.

2.2   The typology of *wh*-movement

How can we account for ineffability with these mapping constraints? A very simple application of this idea is the typology of *wh*-movement, which, in the case of questions with a single *wh*-word, roughly divides languages into two large groups, namely, those that front the *wh*-phrase, and those that do not. This typology can be derived under the assumption that the *wh*-phrase is subject to conflicting $\mathcal{M} \Rightarrow \mathcal{S}$ mapping demands, the constraint in (9) conflicts with the one in (10):

(10) $\mathcal{M} \Rightarrow \mathcal{S}$(SCOPE):
        If an element m_1 has scope over another element m_2 at $\mathcal{M}$, then s_1 asymmetrically c-commands s_2 at $\mathcal{S}$.

In the case of an object *wh-phrase*, as in Table 1, $\mathcal{M} \Rightarrow \mathcal{S}$(ARG) requires the *wh*-phrase to remain behind the subject NP, but $\mathcal{M} \Rightarrow \mathcal{S}$(SCOPE) requires it to be located before the subject:[4]

$\mathcal{M} =$ Qx.bought(john,x)		$\mathcal{M} \Rightarrow \mathcal{S}$(ARG)	$\mathcal{M} \Rightarrow \mathcal{S}$(SCOPE)
wh-in-situ	*John bought what*		*
wh-fronting	*What bought John*	*	

Table 1: Wh-fronting vs. wh-in-situ languages

As can easily be seen from Table 1, whether a language is of the wh-in-situ or the wh-fronting type is a matter of the relative ranking of the two constraints. *Wh*-fronting is then ill-formed in in-situ languages and *wh*-in-situ is ill-formed in fronting languages.

It is possible that additional factors come into play that introduce more options. One example is Turkish, where focus is another semantic factor relevant for *wh*-placement:

> [...] It should be noted that, although Turkish is an SOV language, the basic word order is overridden by various other factors. For example, the most unmarked position for a WH-element is to the immediate left of the verb, irrespective of the grammatical relation. The second-best alternative is for the WH-element to be placed in its original position; [...]
> (Kornfilt 1997)

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[4]I am abstracting from a couple of issues here, for instance, the fact that *do*-support is necessary in English to form an English object question.

(11)   Optional '*wh*-lowering' in Turkish subject questions:

    a. *bu kitab-ı   **kim** oku-du?*
        this book-ACC who read-Past

    b. ***kim** bu kitab-ı   oku-du?*
        who this book-ACC read-Past

The position left adjacent to the verb is the focus position in Turkish. Under the assumption that the *wh*-phrase bears focus in simple questions, unless some other element is contrastively focused, it is easy to integrate Turkish into our alternative account, just by adding an additional constraint of the $\mathcal{M}{\Rightarrow}\mathcal{S}$ family which is concerned with focus:

(12)   Constraint Ranking for Turkish:
    $\mathcal{M}{\Rightarrow}\mathcal{S}(\text{FOCUS}) \gg \mathcal{M}{\Rightarrow}\mathcal{S}(\text{ARG}) \gg \mathcal{M}{\Rightarrow}\mathcal{S}(\text{SCOPE})$

The actual formulation of the focus placement constraint might be prosodic in nature. Thus, it might rather be an element of the $\mathcal{M}{\Rightarrow}\mathcal{P}$ mapping family, requiring, presumably, a focus to be left aligned in its phonological phrase. In addition, a prosodic well-formedness constraint might be needed which requires that the phonological phrase which is the head of the intonation phrase is aligned with the intonation phrase's right edge.

A further question is whether the linear order represented in $\mathcal{P}$ should also be required to fully reflect $\mathcal{S}$. Note that the system allows for mismatches between $\mathcal{S}$ and $\mathcal{P}$, such that the linear order observed in (11) might not exactly reflect the c-command relations in the underlying constituent tree. For ease of exposition, this whole interaction is abbreviated here with the constraint $\mathcal{M}{\Rightarrow}\mathcal{S}(\text{FOCUS})$.[5]

The optionality of wh-in-situ and wh-in-focus position might result from the possibility that a constituent other than the *wh*-phrase bears focus. In that case, the focused element is in focus position and the *wh*-element will occupy its argument position.

Before we proceed, it has to be noted that the picture is complicated by another factor introduced by the model I gave in (3). The fact that $\mathcal{S}$ is contained both in the input and in the output makes it possible for the worse structure to survive independent of the ranking of our $\mathcal{M}{\Rightarrow}\mathcal{S}$ constraints. Highly ranked $\mathcal{S}_I{\Rightarrow}\mathcal{S}_O$ faithfulness lets both structures survive if specified in the input. Thus, it is predicted that there are languages with more than one option for *wh*-phrase placement. One example in case is French, which has both in situ and fronting.
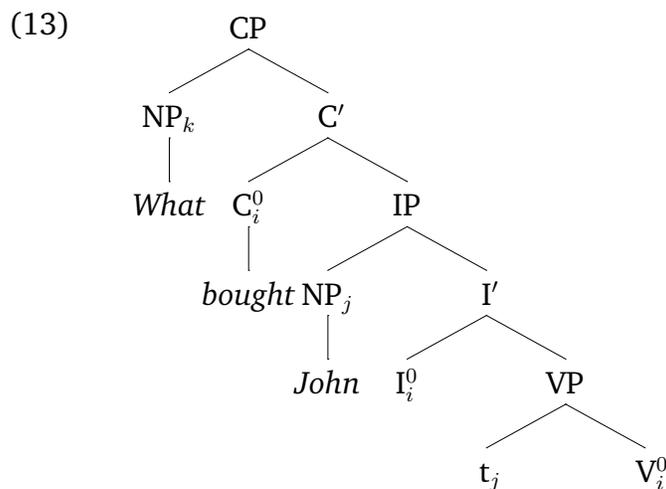
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[5]See Schmid & Vogel (2004), Vogel (2004*a*, 2006*b*) for several analyses exploiting the option of $\mathcal{S}{\Rightarrow}\mathcal{P}$ mismatches.

2.3   *Wh*-movement in OT Syntax

A couple of OT accounts of *wh*-movement have been proposed in the past already, among others, Grimshaw 1997*b*, Ackema & Neeleman 1998, Legendre et al. 1998. A feature that they share, and which differentiates them from the strictly representational account which I defend here, is that the fronting vs. in situ split is accounted for by the interaction of a constraint requiring wh-fronting (similar to our $\mathcal{M}\Rightarrow\mathcal{P}(\text{SCOPE})$) and a constraint that bans syntactic movement, STAY, originally introduced by Grimshaw (1997*b*), importing the idea of derivational economy from minimalist syntax.

At first sight, the two ways of accounting for wh-movement seem to be equivalent. But the solution based on derivational economy needs to rule out the following structure from the candidate set:

(13)

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                    CP
                   /  \
               NP_k    C'
                |      /  \
             What  C_i^0   IP
                    |     /  \
               bought NP_j    I'
                       |     /  \
                    John  I_i^0   VP
                                 /  \
                              t_j    V_i^0
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The violation of STAY can be avoided by simply inserting the *wh*-phrase directly in [Spec,CP]. This candidate also fulfils the *wh*-fronting constraint. Hence, it should be optimal even (wrongly) in in-situ languages.

In our approach, however, this structure still violates $\mathcal{M}\Rightarrow\mathcal{S}\text{ARG}$. So, it does not cause additional problems.

In a derivational system, like minimalism and its predecessors, structure (13) is usually ruled out by interpretive and case requirements: The NP is assigned its Θ-role inside VP, and uninterpretable otherwise. Likewise, case is assigned into that position, or another one designated for object case assignment, hence an NP inserted into [Spec, CP] has no case, or its case feature unchecked.

These options are not as straightforwardly applicable in OT. The OT syntax approaches which use STAY, following Grimshaw (1997*b*), agree

in another, architectural aspect: the input contains an argument structure specification.

For this reason, an argument against the structure in (13) in terms of a violation of the Θ-criterion is much less forceful than in a purely derivational system: omitted merge into Θ-position does not lead to a loss of semantic information. It is still there, in the input.

A constraint on case assignment, on the other hand, should be as violable as a constraint requiring *wh*-movement. So obligatory insertion into case position can hardly be motivated.

Hence, if one assumes STAY, it has to be *stipulated* that arguments of a verb are inserted into their VP-internal position – an arbitrary restriction on the candidate generator. As already mentioned, this stipulation is superfluous in the account that I am advocating.[6]

3   Wh-Islands

German is a language where the extraction of a *wh*-element is possible in principle, as (14a) shows, but where this is impossible, if the *wh*-item is extracted out of a *wh*-clause (14b):

(14)   German:

      a.   *Was   glaubt Maria, dass sie gekauft hat?*
          What thinks M.   that she bought has
          "What does Maria think that she bought?"

      b.   **Was   fragt sich Maria, wer gekauft hat?*
          What asks SELF M.   who bought has
          intended reading: "What is the thing such that Maria wonders who bought it?"

How can we account for this contrast? Let us have a look at the simplified semantic representation for (14b) in (15). The question operator is symbolised by 'Q' here.

(15)   Qy.wonder(maria, (Qx.bought(x,y)))

We have two *wh*-operators with different semantic scope, although both belong to the embedded clause. These operators are subject to the constraint $\mathcal{M}\!\Rightarrow\!\mathcal{S}$(SCOPE), which requires the syntactic correspondents of the operators, the noun phrases '*was*' and '*wer*', to c-command the elements

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[6]This issue and related problems in designing an OT syntax grammar are discussed more deeply in Vogel (2006*a*).

in their scope. While '*wer*' in (14b) (corresponding to 'Qx' in (15)), having embedded scope, only needs to occur in the specifier of the embedded CP in order to fulfil $\mathcal{M}\Rightarrow\mathcal{S}$(SCOPE), '*was*' (corresponding to 'Qy' in (15)) has to occur in the specifier of the main clause CP, outside the embedded clause where it originates.

As we see in the semantic representation in (15), an operator always binds a variable, the operator 'Qx' binds 'x', and 'Qy' binds 'y'. Let us assume that the noun phrases '*was*' and '*wer*' are the correspondents of both the operator and the variable at the same time. Fulfilling $\mathcal{M}\Rightarrow\mathcal{S}$(SCOPE) for Qy now requires that the NP '*was*' c-commands the NP '*wer*' (because Qy has scope over Qx and x), but fulfilling $\mathcal{M}\Rightarrow\mathcal{S}$(SCOPE) for Qx requires that '*wer*' c-commands '*was*' (because Qx has scope over y). Therefore, if '*was*' moves out of the embedded clause in order to fulfil $\mathcal{M}\Rightarrow\mathcal{S}$(SCOPE), that same constraint becomes violated for '*wer*'.

Hence, it is impossible to satisfy $\mathcal{M}\Rightarrow\mathcal{S}$(SCOPE) for both operators at the same time. This dilemma, I contend, lies at the heart of *wh*-island phenomena.

Extraction of '*was*' leads to a violation of further constraints, for instance, the constraint $\mathcal{M}\Rightarrow\mathcal{S}$(PRED), defined as in (16):

(16) $\mathcal{M}\Rightarrow\mathcal{S}$(PRED): If m_1 is a predicate of m_2, then s_1 and s_2 are dominated by the same CP nodes.[7]

This constraint requires two elements which are semantically related by predication to be clause-mates, it thus penalises extraction across clause boundaries.

It seems, therefore, that structure (14b) is harmonically bounded by a structure like (17) where '*was*' remains in situ – provided that no other constraint makes a distinction between the two structures.

(17)   Maria fragt sich, wer was gekauft hat?
        M. asks SELF who what bought has
        "Maria wonders who bought what"

A third candidate structure that performs even better than (17) has a resumptive pronoun in place of the variable and the 'extracted' *wh*-phrase is base generated in its operator position, accompanied by a preposition to assign case to the *wh*-phrase:

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[7]This constraint has been formulated as a constraint on clause-mateness in Vogel (2004*a*) in a less formal way.

(18)   **Von was** *fragt sich Maria, wer **es** gekauft hat?*
       Of   what asks SELF M.   who **it** bought has
       "For what does Maria wonder who bought it?"

This structure circumvents the problem posed by the *wh*-island completely, by using unique syntactic correspondents for 'Qy' and 'y'.

The constraint violations for the three competing candidates are as illustrated in Table 2.

Qy.wonder(m, (Qx.buy(x,y)))	$\mathcal{M}{\Rightarrow}\mathcal{S}$(SCOPE)	$\mathcal{M}{\Rightarrow}\mathcal{S}$(PRED)
(14b)	*('*wer*')	*('*was*')
(17)	*('*was*')	
(18)		

Table 2: German wh-islands by harmonic bounding

Structure (18) is syntactically different from the other two in two respects, the preposition heading the initial *wh*-phrase and the resumptive pronoun. Whether that structure is able to outperform the other two in a language, is also a matter of the ranking of syntactic faithfulness. If a syntactic structure like (14b) is specified in the input, then (17) must already be considered as unfaithful, but (18) is even less faithful.

We have to consider, nevertheless, that each of these two constraints individually *can* be violated in German. In multiple questions, only one of the *wh*-items can fulfil $\mathcal{M}{\Rightarrow}\mathcal{S}$(SCOPE) (19). Likewise, as seen in (14a), extraction across clause boundaries is possible, if the embedded clause out of which movement takes place is not a *wh*-island.

(19)   *Wer   hat was   gesagt?*
       who-NOM has what-ACC said

Thus, only a violation of both constraints leads to ungrammaticality. This cumulative effect is captured by a local constraint conjunction:

(20) $\mathcal{M}{\Rightarrow}\mathcal{S}$(SCOPE) &$_{\text{CP}}$ $\mathcal{M}{\Rightarrow}\mathcal{S}$(PRED) (**WhIsl**):
       No simultaneous violation of $\mathcal{M}{\Rightarrow}\mathcal{S}$(SCOPE) and $\mathcal{M}{\Rightarrow}\mathcal{S}$(PRED) within the same CP.

This constraint describes *wh*-islands in a classical way: extraction out of a clause is ruled out, if this leads to a violation of $\mathcal{M}{\Rightarrow}\mathcal{S}$(SCOPE). WHISL is ranked higher than its two component constraints. The division be-

tween grammatical and ungrammatical is expressed by ranking the syntactic faithfulness constraint $\mathcal{S}_I \Rightarrow \mathcal{S}_O$ between them:

(21)   WHISL $\gg \mathcal{S}_I \Rightarrow \mathcal{S}_O \gg \mathcal{M} \Rightarrow \mathcal{S}$(SCOPE) $\mathcal{M} \Rightarrow \mathcal{S}$(PRED)

A structure S_1 which is given in the input and violates WHISL will be neutralised to a different structure which fulfils that constraint.

The analysis also carries over to relative clauses, which behave on a par with embedded questions, as already shown by Ross (1967). A variant of (14b) where the extracted element is a relative pronoun is also ungrammatical:

(22)   *Dies ist das Buch, das   sich Maria fragt, wer gekauft hat.*
        This is the book which SELF M.   asks who bought has
        "This is the book for which Maria wonders who bought it."

The only grammatical version of such a clause uses a resumptive pronoun:

(23)   *Dies ist das Buch, von dem   sich Maria fragt, wer es gekauft*
        This is the book of   which SELF M.   asks who it bought
        hat.
        has
        "This is the book for which Maria wonders who bought it."

Semantically, the relative pronoun is treated as an operator, which turns the relative clause into a modifier, i.e., a predicate of the modified noun, as expressed by the lambda operator in (24):

(24) λx(wonder(m, Qy.buy(y,x))) (book)

The constraint $\mathcal{M} \Rightarrow \mathcal{S}$(SCOPE) therefore applies to relative pronouns in the same way as it does to *wh*-pronouns.

4   Exceptions to the *wh*-island constraint

If all languages were as strict as German with respect to *wh*-island effects, we could stop here. Unfortunately, English provides already some exceptions. The classical example is the contrast in (25):

(25)   (Sabel 2002, 274):
        a. ??[$_{CP}$ What do you [$_{VP}$ t''wonder [$_{CP}$ how John could [$_{VP}$ t' [$_{VP}$ fix t]]]]] ?

b. *[$_{CP}$ How do you [$_{VP}$ t" wonder [$_{CP}$ what John could [$_{VP}$ t'
[$_{VP}$ fix t]]]]] ?

c. *[$_{CP}$ Who do you [$_{VP}$ t' wonder [$_{CP}$ how [$_{IP}$ t could fix the car
]]]] ?

Sabel (2002) and other authors before him claim that extraction out of
a *wh*-island is possible from a $\Theta-$position, typically the complement po-
sition of a verb phrase hosting a direct object, as in (25a). However, the
clause is only slightly better than the two ungrammatical clauses. This
lead Chomsky & Lasnik (1993) to an analysis in terms of chain licens-
ing. Only uniform chains are legitimate at LF, either all members of a
movement chain are A- or L-related,[8] or non-A- (or non-L-) related. In an
A-chain, intermediate traces in non-A positions are deleted. This holds of
t' and t" in (25a).

The deletion of t', in particular, makes the difference to the other two
structures. This trace is created by a movement step which violates the
economy principle 'Minimise Chain Links' (MCL) which requires move-
ment steps to be as short as possible: the long extracted *wh*-phrases in
(25) have to skip the already filled specifier positions of IP and CP of the
embedded clause. But as this offending trace is deleted in order to yield a
uniform LF chain, the violation of MCL is cancelled out with the offending
trace. Nevertheless, the MCL violation leads to slight deviance.

Violations of MCL also occur for t' in (25b) and t in (25c). But these
traces cannot be deleted, as they are part of uniform chains. In (25b), we
have a non-A chain, and all chain links are in appropriate positions, so
trace deletion is not licensed. In (25c), on the other hand, the offending
trace t is in an A-position, it represents the variable and cannot be deleted
for semantic reasons anyway. Thus, in these two cases the MCL violation
cannot be cancelled out, and this causes the ungrammaticality of the two
sentences.

This whole mechanism has a very technical, and partly stipulative na-
ture. Sabel's (2002) improvements do not change this impression signifi-
cantly. In particular, typological differences are accounted for by him in a
quite ad hoc manner: for those languages where the counterpart of (25a)
is ill-formed, it is assumed that the starting position for wh-movement is
the case position (where the trace is not deletable, by stipulation). Like-
wise, for a language like Spanish, which has a well-formed counterpart
of (25b), it is assumed that the movement originates in a position which

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[8]A-related positions are positions where an argument is assigned case or thematic
role, and L-related positions are positions which are governed by lexical categories.

is both a Θ- and a case position. Also, it remains in the dark, why it is Θ-positions which are relevant here.

From an OT perspective, it is also important to consider which the alternative candidate structures are that clauses like (25c) lose against. As we will see, the most likely candidates are the structures with a resumptive pronoun which we already discussed in the previous section. A brief look at corpus data will confirm this. I found the following examples in the world wide web via a *google* search (all highlightings by me, R.V.).

(26)   "Jerry Hall is one of those models, along with so many nowadays (including her daughter) <u>who I wonder how **they** ever made it</u>."
`chat.dailymail.co.uk/dailymail/threadnonInd.`
`jsp?forum=82&thread=9689929&message=10932031`

(27)   "I have a couple of friends who I've lost touch with <u>who I wonder what gender **they** are now</u>"
`forum.genderpeace.com/index.php?t=msg&goto=`
`158034&`

(28)   "I too have seen CMTs <u>who I wonder how **they** ever passed that test</u>."
`archives.mtstars.com/main/13766.html`

Here we have three examples for the extraction of a *wh*-subject out of a *wh*-island, where the trace position is now occupied by a resumptive pronoun, '*they*'. For a minimalist analysis, the question arises, why such structures are well-formed at all, if the resumptive pronoun does nothing more than spelling out a movement trace – which still violates the principle MCL under the analysis of Chomsky & Lasnik (1993).

From the perspective of correspondence theory, it is not necessary to assume a derivational relation between the *wh*-phrase and the resumptive pronoun. We simply have a situation where operator and variable both have a syntactic correspondent of their own. That there might be a non-derivational relation between the two is also suggested by examples like the following which I also found at the WWW. The possibility of such structures has already been noticed by Ross (1967), describing their acceptability status as outside the norm, but nevertheless common in spoken American English.

(29)   "I realize Nursing is an important job, but I see many Nurses <u>who I wonder how accurate is **their** opinion</u>?!!"
`allnurses.com/forums/showthread.php?t=109128`

(30)   "There are some super-fast DB players out there, tremendous musicians, <u>who I wonder what **their** ambitions were</u>."
`www.talkbass.com/forum/showthread.php?t=124023`

(31)   "I welcome questions if you have any pertaining to my mother, the definite P, her husband <u>who I wonder what **his** motives may be with my daughter</u>, ... "
`www.psychopath-research.com/ubbthreads/showflat`
`.php?Cat=&Board=PSYCHOP_MAIN_FORUM&Number=195`

Here, the resumptive pronoun and the extracted *wh*-pronoun are incompatible in their case features. Even worse, if the extracted '*who*' is assigned case, the question is, which is its case assigner? Usually, case assignment and assignment of thematic roles go hand in hand. But here, the resumptive pronoun is assigned both inside the embedded clause. For the examples in (26)-(28) we could simply assume that the extracted *wh*-phrase has case by agreement with the resumptive pronoun. This cannot be the answer in (29)-(31). Nevertheless, the least likely answer is that *who* is moved from the position of the resumptive pronoun. One reason is that such movement is ruled out in general:

(32)   *Whose did you buy [$_{NP}$ t books] ?

In the following two examples the extracted *wh*-pronoun is in the accusative ('*whom*'), while the resumptive pronoun is nominative.

(33)   "and I have come to realize That there are quite a few folks with Nursing licenses <u>whom I wonder how the hell **they** ever got them</u>."
`www.urban-living.org/new-1556448-697.html`

(34)   "I spend a good deal of my time cruising through other people's blogs ... some people I know (<u>whom I wonder how **they**'d feel if they knew I was reading</u>)... "
`mylifeinretrospect.blog.com/2005/4/`

These examples suggest that the *wh*-phrases can be assigned accusative case by '*wonder*'. This could also be the answer to (29)-(31). Examples where a preposition is inserted to assign case to the 'extracted' *wh*-pronoun can also be found:

(35)   "Obvious bug, <u>**for** which I wonder how **it** slipped the Opera quality control</u>."
`list.opera.com/pipermail/opera-users/2001-Novem`

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ber/006894.html
```

(36)   "... have a lot of confidence in most of the material, although there are a few sketches **for** which I wonder how an audience will react."
```
annekenstein.typepad.com/monster/2005/07/index.
html
```

(37)   "they somehow managed to get two volunteers, **of** whom I wonder if **they** are still together?!"
```
www.byrnerobotics.com/forum/forum_posts.asp?TID=
6690&PN=1&TPN=1
```

(38)   "My body has painfull feelings **of** which I wonder what emotional state causes **them** ..."
```
www.palikanon.com/diverses/guestbook/guest-03_0
1-04_04.htm
```

We have evidence, thus, that an alternative analysis of the structure of *wh*-island configurations is available which does not rely on syntactic movement at all:

(39) $[_{CP1}$ WH$_1$ ... *wonder* $[_{CP2}$ WH$_2$ ... pronoun$_1$ ... $]]$
       1. WH$_1$ is directly inserted into CP1.
       2. CP2 is a *wh*-clause which has another *wh*-pronoun or *wh*-complementiser (WH$_2$) in initial position, and a resumptive pronoun that correlates with WH$_1$.

This point of view also sheds some light on exceptions to the wh-island constraint in Spanish (and, likewise, Italian, cf. Rizzi 1982), as illustrated in (40), after Sabel (2002):

(40)   *?Quién no sabes   qué compró ?*
       who   not know-you what bought
       'Who don't you know bought what'

Spanish and Italian are pro-drop languages, which means that subject pronouns usually remain unrealised, unless they are focused, or otherwise information structurally prominent. This also holds of resumptive pronouns. Thus, instead of an exceptional movement analysis, structure (40) could as well be interpreted as a structure with a resumptive pronoun inside the *wh*-island, with the perhaps irritating property that the resumptive subject pronoun is the null pronoun. From this perspective, there is no exception to the *wh*-island constraint to be accounted for.

I postulate that the exceptions to the *wh*-island constraint that we observe in English are of the same kind: what has taken place here, is not exceptional syntactic movement out of the *wh*-clause, but rather the surface deletion of the resumptive pronoun.

The crucial task is now to determine the conditions under which it is possible to leave out `pronoun`$_1$ in English. In terms of our correspondence theoretic analysis, the relevant structures have a syntactically present resumptive pronoun which has no $\mathcal{P}$ correspondent.

The description of such structures that has been given by Sabel (2002), among others, is that the resumptive pronoun can be omitted in a position where a thematic role is assigned. It is not a pure case position. Example (41) is of this kind:

(41)   "met some new people last night <u>who i wonder how i didn't meet before</u>."
`chainedlightning.blogspot.com/`

The pronominal gap is not obligatory, though. An example with a resumptive pronoun is the following one:[9]

(42)   "I meet people everyday <u>who I wonder how their parents could love **them**</u> not TO mention a partner."
`supernaturale.com/glitter/viewtopic.php?p=2077`
`95&sid=6f3fd91ce2635dec876dabfeb19be8ba`

Typical positions for the pronominal gap are also sisters to prepositions:

(43)   "There are lots more examples of that in my life; people that were cool, and unique, and <u>who I wonder how things have worked out for</u>."
`homepage.mac.com/dvorak/Journal.html`

(44)   "he is like a long lost sister who I wonder How I ever lived without."
`onefuckedupgirl.blogspot.com/2004_11_01_onefucke`
`dupgirl_archive.html`

What these examples share is that the 'gap' is at the right edge of the verb phrase. However, as the following example shows, it need not necessarily be the right edge:

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[9]But examples like (41) are rather rarely to be found at the WWW. With direct objects and objects of prepositions the gap seems to the preferred option. This preference seems to be even stronger with '*whether*'-clauses as *wh*-islands.

(45)   "Lately I feel an ever so slight tug toward things <u>which I wonder</u>
<u>whether I have truely left behind</u>."
`www.livejournal.com/users/martian2b/2003/03/05/`

Here the pronoun would have to occur between the verb and the particle:

(46)   . . . left (them) behind (*them)

Nevertheless, the position after the particle is a legitimate position for an
object, as in (47):

(47)   She left behind her rival.

In Vogel (2006*b*), I gave an explanation of the contrast between (46) and
(47) in terms of prosody-syntax interaction, based on the account of the
prosodic properties of English weak function words by Selkirk (1996).
She shows that function words may only occur in a prosodically strong
form in particular positions within the sentence. Consider the following
example:

(48)   I can$_i$ eat more than Sara *cán*$_j$
       [kæn],[kən],[kn̩]   [kæn],*[kən],*[kn̩]

The modal verb '*can*' may appear in a prosodically weak form ([kən],[kn̩]),
if it stands in a medial position, like '*can*$_i$' above. However, for '*can*$_j$', stand-
ing in final position, the weak forms are excluded. Selkirk shows that the
relevant constraint is prosodic: in English, the right edge of a phonologi-
cal phrase has to be aligned with the right edge of a prosodic word. She
postulates the prosodic alignment constraint ALIGNPPhR:

(49)   **ALIGNPPhR**:
       Align(PPh, R; PWd, R)

Weak function words lack word stress. Only their strong forms count as
prosodic words, so only the strong form of '*can*$_j$', [kæn], is possible in (48),
to fulfil ALIGNPPhR.
    I argue in Vogel (2006*b*) that there is a difference between pronouns
and modal verbs like '*can*': pronouns do not have a semantically neu-
tral strong form. If pronouns are stressed, they bear focus. This explains
why an unfocused pronoun is ungrammatical in the final position in (46).
Given that there exists a syntactically legitimate alternative – the pronoun
might stand between verb and particle –, leaving the pronoun in final po-

sition is odd. On the other hand, there are cases like (50) where a weak pronoun does stand in final position:

(50)   We need'm (= "We need him/them")

Contrary to Selkirk (1996), I assume in (Vogel 2006*b*) that this is a case where ALIGNPPhR is violated. This violation is due to the absence of a syntactically legitimate alternative that avoids this constraint violation. Contrary to a language like French, see (51), it is impossible to move an object pronoun in front of the finite verb.

(51)   a.   *Marie le   voit.*
               M.   him sees
        b.   *Mary'm/him sees

That ALIGNPPhR can control the placement of weak pronouns in English can be seen with minimal pairs like (52). An NP might precede or follow a verbal particle, but if it is a pronoun, as in (52c,d), it has to precede the particle (52d) in order to avoid a violation of ALIGNPPhR:

(52)   a.   I gave up the plan.
        b.   I gave the plan up.
        c.   *I gave up it.
        d.   I gave it up.

The relation between these cases and the apparent exceptions to the *wh*-island constraint is fairly obvious: all such cases documented for English in the literature are cases where the resumptive pronoun would occur at the right edge of a phonological phrase. Resumptive pronouns are necessarily unfocused, therefore they can only appear in a weak form, and hence, their occurrence would violate ALIGNPPhR.

   I assume that in these cases, it is legitimate in English to delete the resumptive pronoun. The details of the OT formulation of this approach are discussed in the following section.

5   Exceptions to *wh*-islands within OT

How can the account sketched in the previous section be implemented within OT? First of all, let us consider the structure of the candidates like (53).

(53)   What do you wonder how John could fix?

The semantics of this structure can be paraphrased as in (54), simplifying the interpretation of the adverbial *wh*-phrase.

(54) $\mathcal{M}$: Qx. wonder(you, Qy. (could-fix(john,x) & mode(y)))

For the syntactic analysis, let us assume that no syntactic movement has taken place. Thus, *'what'* is base-generated in the position of WH_x in (55). The verb *'fix'* nevertheless has a syntactic complement within its VP, the resumptive pronoun.

(55) $\mathcal{S}$: [$_{CP1}$ WH_x ... [$_{CP2}$ WH_y ... [$_{VP}$ could [$_{VP}$ fix pro_x]]]]

The surface form P roughly has the following structure:

(56) $\mathcal{P}$: (*what*$_x$)$_{PhP}$ ... (*how*$_y$ *John*)$_{PhP}$ (could <u>fix</u>)$_{PhP}$

The deletion of the pronoun is an instance of 'underparsing' in the mapping from $\mathcal{S}$ to $\mathcal{P}$. It violates the constraint $\mathcal{S}{\Rrightarrow}\mathcal{P}$(MAX), which is defined in (57) in the spirit of OT correspondence theory (McCarthy & Prince 1995).

(57) $\mathcal{S}{\Rrightarrow}\mathcal{P}$(MAX):
        For every element s_i in $\mathcal{S}$, there is a corresponding p_i in $\mathcal{P}$.

As we saw above, the deletion of the resumptive pronoun is optional. I assume that $\mathcal{S}{\Rrightarrow}\mathcal{P}$(MAX) is ranked on a par with ALIGNPPhR. In particular, I assume that the two constraints are globally tied, i.e., there are two parallel co-grammars of English, one where ALIGNPPhR immediately dominates $\mathcal{S}{\Rrightarrow}\mathcal{P}$(MAX), and another one where it is the other way around. However, we have to take care that deletion of weak pronouns is not licensed in general, otherwise (58b) would be well-formed:

(58)   a.   I saw it
        b.   *I saw (meaning 'I saw it')

We have to restrict the deletion of resumptive pronouns to those cases, where such pronouns are indeed resumptive, i.e., where they denote a discourse referent that has already been denoted by another element within the sentence. In our cases, this other element is the *wh*-pronoun. In terms of our correspondence theoretic framework, we can formulate this as an $\mathcal{M}{\Rrightarrow}\mathcal{P}$ mapping constraint: every discourse referent that occurs in $\mathcal{M}$ should have a correspondent in $\mathcal{P}$.

(59) $\mathcal{M}{\Rrightarrow}\mathcal{P}$(MAX):
        For every element m_i in $\mathcal{M}$, there is a corresponding p_i in $\mathcal{P}$.

This is the case when a resumptive pronoun is deleted, but not, for instance, in (58b), where the only element denoting the theme argument of the verb 'buy' would be deleted. Hence, to exclude (58b) we have to rank $\mathcal{M} \Rightarrow \mathcal{P}$(MAX) on top of the constraint tie:

(60) $\mathcal{M} \Rightarrow \mathcal{P}$(MAX) $\gg$ ALIGNPPhR $\circ$ $\mathcal{S} \Rightarrow \mathcal{P}$(MAX)

This sub-ranking has to be integrated with the constraint sub-ranking for the *wh*-island effect in (21) to yield the English ranking. But it seems that there is no phenomenon observable that would provide hints for the exact ranking. It seems, thus, that any ranking will do for our purposes, as long as the two sub-rankings are preserved.

6   Conclusion

A *wh*-island is a syntactic structure which contains two *wh*-operators that originate within the same finite clause, but one of them has a scope which is wider than that of the other one. A rough semantic characterisation might look like (61):

(61)   Qx [... Qy [... x y ...]]

In the syntactic structure, the two operators correspond to two *wh*-phrases WH_x and WH_y. To fulfil scoping for Qx, WH_x has to c-command/precede WH_y. However, because the variable x is in the scope of Qy, WH_x is at the same time required to *be* c-commanded/preceded by WH_y, if WH_x counts as the syntactic correspondent of x. This dilemma is unavoidable. Scoping can therefore only be fulfilled for one the two operators. Because extraction out of a clause is marked as such, it is preferred to fulfil scoping for WH_y. WH_x then appears syntactically at the position that conforms to the variable x, violating scoping for WH_x. The result is the phenomenon we know as *wh*-island.

In the analysis that I developed here, the *wh*-island restriction results from a cumulation of constraint violations which independently are often tolerated. An OT implementation of this analysis requires a constraint interaction where a conjoined constraint outranks a faithfulness constraint, which in turn outranks the component constraints of the conjunction:

(62) C_1&C_2 $\gg$ FAITH $\gg$ C_1 C_2

The optimal structure for a *wh*-island configuration that can be observed in many languages uses a resumptive pronoun that corresponds to

the variable x. Now Qx and x both have a correspondent of their own and the constraints on scoping can be fulfilled for both operators.

In accounting for the exceptions to the *wh*-island constraint that we found in English, I argued that a prosodic constraint plays a crucial role here, which could already be shown to play an important role in the English grammar (Selkirk 1996, Vogel 2006*b*): the resumptive pronoun may be omitted if it would appear at the right edge of a phonological phrase, as this would violate a prosodic well-formedness constraint.

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