Have FAITH in Syntax

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1. Introduction

In this paper[*] we argue for the claim that an important source of both optionality and ungrammaticality is the interaction between *faithfulness* constraints and structural output constraints in Optimality Theory (OT, Prince & Smolensky 1993; we assume the OT approach to syntax elaborated in Grimshaw 1997).[1] In OT, candidate structural analyses of an underlying form are subject to evaluation by constraints against input-output disparity, or faithfulness constraints, as well as by structural output constraints. The optimal realization of one input thus may or may not be the optimal realization of another; optimality is necessarily relativized. We propose that optionality is the result of high-ranking faithfulness constraints on distinctive formal properties of syntactic structures, allowing formally distinct underlying forms to remain distinct in the output.[2] As is generally assumed in OT (both for phonology and

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[1] Faithfulness constraints are of course not the only source of ungrammaticality. Another obvious source of ungrammaticality results from the interaction of structural constraints.

[2] On discourse-based or *apparent* optionality within OT, see Grimshaw & Samek-Lodovici 1995, to appear; Samek-Lodovici 1996, Costa 1996, Choi 1996, Legendre 1996.
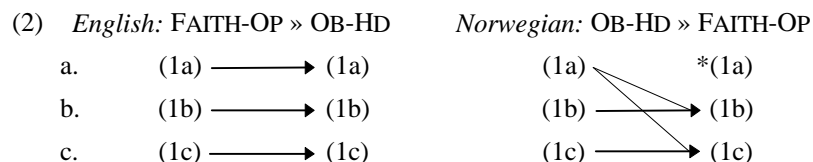
for syntax), ungrammaticality can result from the ranking of faithfulness below a structural output constraint. This schematic ranking forces avoidance of marked structure in the output through unfaithful input-output mappings (see also Legendre et al. 1995, to appear). The dispreferred input fails to surface in the language (is ungrammatical) since it is mapped to a more harmonic output structure.

We demonstrate our approach with an analysis of a specific syntactic difference between English (Doherty 1993, Grimshaw 1997) and Norwegian (Taraldsen 1978, 1986; Keer 1996). As shown in (1), English allows three distinct forms of object relative clause.

(1)   a.   the man who Bill saw

        b.   the man that Bill saw

        c.   the man Bill saw

Norwegian only allows the equivalent of (1b,c); the equivalent of (1a) is ungrammatical. We claim that this difference is due to the different ranking that holds in each language between a structural output constraint, specifically Grimshaw's (1997) OBLIGATORY HEADS (OB-HD), and a faithfulness constraint demanding faithfulness to what we take to be a distinctive formal property of syntactic structures, *operator type*. We call this constraint FAITH-OP (see §3 for a full discussion of the constraint).

In English, FAITH-OP is ranked higher than OB-HD, allowing all three forms of object relative clauses to surface essentially unchanged. This is a case of optionality, as depicted graphically by the input-to-output mappings on the left-hand side of (2). In Norwegian, FAITH-OP is ranked lower than OB-HD. The result is that the *wh*-relative is ungrammatical, as depicted by the mappings on the right-hand side of (2).

(2)   *English:* FAITH-OP » OB-HD   *Norwegian:* OB-HD » FAITH-OP

    a.   (1a) ⟶ (1a)   (1a) ⟍   *(1a)

    b.   (1b) ⟶ (1b)   (1b) ⟶ (1b)

    c.   (1c) ⟶ (1c)   (1c) ⟶ (1c)

If a relevant faithfulness constraint dominates a relevant structural constraint, the result is optionality; the maintenance of underlying formal contrasts. If, conversely, the structural constraint dominates the faithfulness constraint, then ungrammaticality results; the *loss* of underlying formal contrasts.

In §2 we argue that English and Norwegian have in common a ranking of the structural constraints SPECIFIER-LEFT (SPEC-LFT), HEAD-LEFT (HD-LFT) and OB-HD (Grimshaw 1997, Keer 1996). In §3, we introduce FAITH-OP and argue for its placement within the English constraint hierarchy, accounting for the optionality evident in (1). In §4 we show that ranking FAITH-OP

differently within the same subhierarchy accounts for the ungrammaticality of *wh*-relatives (1a) in Norwegian. In §5 we analyze two cases where English and Norwegian agree in only allowing a *wh*-structure. In §6 we examine the factorial typology predicted by the three constraints HD-LFT, OB-HD and FAITH-OP. Finally, in §7, we compare some other approaches to optionality in OT with the approach taken here.

2. The Doubly-Filled Comp Filter

In this section we show a ranking common to English and Norwegian. This ranking defines what is referred to as the Doubly-Filled Comp Filter (Chomsky & Lasnik 1977). Neither language allows *wh*-complementizer configurations in embedded object questions, as is shown in (3) and (4).[3]

(3)   a.   I wonder [$_{CP}$ who$_i$ [$_{IP}$ Bill saw t_i]]

        b. * I wonder [$_{CP}$ who$_i$ that [$_{IP}$ Bill saw t_i]]

(4)   a.   Jeg vet ikke [$_{CP}$ hvem$_i$ [$_{IP}$ Bill så t_i]]
              I know not who Bill saw

        b. * Jeg vet ikke [$_{CP}$ hvem$_i$ som [$_{IP}$ Bill så t_i]]
              I know not who that Bill saw   (Taraldsen 1986)

We assume the three constraints in (5) to account for this Doubly-Filled Comp Filter effect, following Grimshaw (1997). (See also Keer 1996.)

(5)   a.   SPEC-LFT: Specifiers are leftmost in their projections.

        b.   HD-LFT: Heads are leftmost in their projections.

        c.   OB-HD: A projection has a head.

The constraints SPEC-LFT (5a) and HD-LFT (5b) regulate the positioning of material within the phrasal projection. SPEC-LFT demands the specifier to be the leftmost element in the projection. It is violated by a specifier which is not leftmost.   Potentially conflicting with this constraint is HD-LFT, which demands the same of heads. In specifier–head–complement languages such as English and Norwegian, SPEC-LFT dominates and forces minimal violation of HD-LFT, as shown in the constraint tableau in (6).

(6)   *English and Norwegian:* SPEC-LFT » HD-LFT

Input: {spec,X,comp}	SPEC-LFT	HD-LFT
a. ☞ [$_{XP}$ spec [$_{X'}$ X comp]]		*
b. [$_{XP}$ [$_{X'}$ X comp] spec]	*!	
c. [$_{XP}$ spec [$_{X'}$ comp X]]		**!

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[3] We leave aside embedded subject questions and subject relatives due to complicating (anti-)*that*-trace effects; see Rizzi 1990, Déprez 1994, Grimshaw 1997, Keer 1996.

The result is that in the optimal candidate (6a), the specifier is leftmost; compare suboptimal (6b), in which it is rightmost. The head comes in second, minimally violating HD-LFT compared to suboptimal (6c).

One way to satisfy *both* SPEC-LFT and HD-LFT is to not have a head, vacuously satisfying HD-LFT. This is impossible in lexical projections, since not having a lexical head (such as a verb) would violate the Theta Criterion, a plausibly inviolable principle (see Grimshaw 1997). In a functional projection like CP, this option only violates OB-HD (5c). If HD-LFT dominates OB-HD, then a headless CP will be optimal. This is exactly the case in English and Norwegian, as demonstrated in tableau (7).[4]

(7)   *English and Norwegian:* HD-LFT » OB-HD

Input: V *wh*	HD-LFT	OB-HD
a. ☞ [CP *wh_i* [IP …V *t_i*…		*
b. [CP *wh_i* C [IP …V *t_i*…	*!	

In both languages, candidate (7a) prevails over candidate (7b) despite its OB-HD violation since the latter violates higher-ranked HD-LFT. This ranking is what defines the Doubly-Filled Comp Filter, as analyzed for English by Grimshaw (1997) and recapitulated for Norwegian by Keer (1996). The two languages thus share the following ranking.

(8)   SPEC-LFT » HD-LFT » OB-HD

The ranking of SPEC-LFT above HD-LFT gives the specifier–head–complement order apparent in both languages. The further ranking of HD-LFT above OB-HD helps to enforce the Doubly-Filled Comp Filter in embedded object questions. In §§3–4 we show that the difference between English and Norwegian with respect to relative clause types, as outlined in (1) above, results from a difference in ranking between the faithfulness constraint FAITH-OP and OB-HD, given the constraint hierarchy in (8).

3. Optionality: English relative clauses

As we noted in the introduction, English has three forms of object relative clause, as repeated in (9a–c). We give the subject extraction facts in (9d–f) for completeness (as we do for Norwegian in §4); however, we will not discuss these examples further due to the complications noted in fn. 2.

(9)   a.   the man who Bill saw   d.   the man who saw Bill

       b.   the man that Bill saw   e.   the man that saw Bill

       c.   the man Bill saw   f. * the man saw Bill

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[4] Only violations of constraints incurred by CP are shown in this and subsequent tableaux.

Following Doherty 1993, the structures we assume for the three forms of object relative clause in (9) are as shown in (10).

(10) a. the man$_i$ [$_{CP}$ who$_i$ [$_{IP}$ Bill saw t_i]]

  b. the man$_i$ [$_{CP}$ *op*$_i$ that [$_{IP}$ Bill saw t_i]]

  c. the man$_i$ [$_{IP}$ Bill saw t_i]

An OVERT-OPERATOR RELATIVE (10a) is like an embedded object question, a headless CP with a *wh*-phrase in its specifier. An EMPTY-OPERATOR RELATIVE (10b) is a CP headed by the complementizer *that*, with an empty operator in the specifier. Contra Grimshaw (1997), we follow Doherty (1993) in assuming that empty operators are present structurally, but that their presence does not cause a violation of HD-LFT. A NO-OPERATOR RELATIVE as in (10c) is simply an IP, with no operator, and the necessary trace within the relative clause is bound by the clause-external relative head. English can thus be said to exhibit *operator-type optionality* in object relatives, the three operator types being (i) overt operator, (ii) empty operator, and (iii) no operator.[5]

Doherty (1993) provides the following relative clause extraposition facts, among other arguments, as evidence for the three structures in (10).

(11) a. the man$_i$ <u>arrived yesterday</u> [$_{CP}$ who$_i$ [$_{IP}$ Bill saw t_i]]

  b. the man$_i$ <u>arrived yesterday</u> [$_{CP}$ *op*$_i$ that [$_{IP}$ Bill saw t_i]]

  c. * the man$_i$ <u>arrived yesterday</u> [$_{IP}$ Bill saw t_i]]

Overt-operator and empty-operator relatives can be separated from the relative head but no-operator relatives cannot, as is shown by the contrast between (11a,b) on the one hand and (11c) on the other. Doherty (1993) argues that the CPs in (11a,b) show some freedom of positioning with respect to the relative head because they have a clause-internal operator to locally bind the trace. Since the IP in (11c) has no clause-internal operator, the trace must be locally bound by the clause-external relative head. Therefore, its position with respect to the relative head is more restricted.

One might think that the ranking of constraints already established in (8) is sufficient to account for the facts of English. Suppose each operator type is a possible input specification, and that candidate outputs must share this specification with their inputs. Applying the ranking in (8) to these three inputs, we seem to get the results depicted by the tableaux in (12).

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[5] In related joint work-in-progress with Jane Grimshaw, Susanne Preuss and Vieri Samek-Lodovici, we pursue a simpler distinction: operator vs. no operator. The distinction between types (ii) and (iii) is analyzed as an example of complementizer optionality (on which see §6, Grimshaw 1997, and Pesetsky, to appear) obviating the need to posit empty operators.

(12)   *Object relative clauses:* SPEC-LFT » HD-LFT » OB-HD

Input: overt operator	SPEC-LFT	HD-LFT	OB-HD
a. ☞ [$_{CP}$ *wh$_i$* [$_{IP}$ …V *t$_i$*…			*
b. [$_{CP}$ *wh$_i$* that [$_{IP}$ …V *t$_i$*…		*!	
Input: empty operator	SPEC-LFT	HD-LFT	OB-HD
c. [$_{CP}$ *op$_i$* [$_{IP}$ …V *t$_i$*…			*!
d. ☞ [$_{CP}$ *op$_i$* that [$_{IP}$ …V *t$_i$*…			
Input: no operator	SPEC-LFT	HD-LFT	OB-HD
e. ☞ [$_{IP}$ …V *t$_i$*…			
f. ☞ [$_{CP}$ that [$_{IP}$ …V *t$_i$*…			

Since HD-LFT dominates OB-HD (see §2), an input overt-operator relative respects the Doubly-Filled Comp Filter by not having a complementizer, as in (12a). An empty operator is invisible to HD-LFT, therefore it is possible to satisfy both HD-LFT and OB-HD when the input is an empty-operator relative, as in (12d): the candidate in (12c), with its gratuitous violation of OB-HD, is ungrammatical. The presence or absence of a complementizer in no-operator relatives (12e,f) makes no difference with respect to the two constraints, since CP is either missing entirely or SpecCP is empty. Note that this predicts two optimal candidates, the first being the distinct string without the complementizer that we are interested in and the second being string-wise identical to the optimal covert operator structure in (12d). These two candidates will henceforth be consolidated into the representation in (13), an IP with an optional complementizer-headed CP above it.

(13)   ([$_{CP}$ that) [$_{IP}$ …V *t$_i$*…

    Now recall that Norwegian shares the ranking in (8)/(12) with English. If (12) is all there is to the analysis of English relatives, then how is it that Norwegian lacks overt-operator relatives? Either Norwegian simply lacks overt-operator inputs to relative clauses, or the grammar of Norwegian resolves those inputs in such a way that the violation of OB-HD in (12a), the would-be winner, is avoided, the result being derived that Norwegian lacks overt-operator relatives. Under one conception of this latter view, the problem with the analysis in (12) is that the candidate sets for each of the three inputs are artificially limited to include only candidates with the same operator type. We say "artificially" because OT already has a way to relativize candidate outputs for a given input: *faithfulness*. All sorts of candidate outputs can compete with each other in each candidate set, deviation from a given input being regulated by faithfulness constraints.

    If candidate outputs with different operator types can compete with each other, then the faithfulness constraint in (14) must be invoked to maintain the

appropriate input-output relativization. The different ranking of this constraint within the constraint hierarchy proposed above in (8) accounts for the different object relative clause facts in English and Norwegian.

(14) FAITH-OP: The input operator type is preserved in the output.

FAITH-OP is violated by any change in the operator type. In other words, it is only satisfied if an input overt operator matches an overt one in the output, an input empty operator matches an empty one in the output, or the absence of an operator in the input matches the absence of one in the output.

Notice that by virtue of their structure, none of the optimal candidates in (12d–f) violate OB-HD or HD-LFT. The position of FAITH-OP in the hierarchy is only crucial in the case of (12a,b) since violation of FAITH-OP provides another way to avoid a violation of the two structural constraints. FAITH-OP must thus, along with HD-LFT, dominate OB-HD in English. This is shown in tableau (15). (There is no ranking argument for HD-LFT and FAITH-OP since the optimal candidate satisfies both constraints.)

(15) *English ranking:* {HD-LFT, FAITH-OP} » OB-HD

Input: overt operator	HD-LFT	FAITH-OP	OB-HD
a. ☞ $[_{CP}\,wh_i\,[_{IP}\,…V\,t_i…$			*
b. $[_{CP}\,wh_i$ that $[_{IP}\,…V\,t_i…$	*!		
c. $[_{CP}\,op_i$ that $[_{IP}\,…V\,t_i…$		*!	
d. $([_{CP}$ that$)\,[_{IP}\,…V\,t_i…$		*!	

Input: empty operator	HD-LFT	FAITH-OP	OB-HD
e. ☞ $[_{CP}\,op_i$ that $[_{IP}\,…V\,t_i…$			
f. $[_{CP}\,wh_i\,\varnothing\,[_{IP}\,…V\,t_i…$		*!	*
g. $([_{CP}$ that$)\,[_{IP}\,…V\,t_i…$		*!	

Input: no operator	HD-LFT	FAITH-OP	OB-HD
h. ☞ $([_{CP}$ that$)\,[_{IP}\,…V\,t_i…$			
i. $[_{CP}\,wh_i\,[_{IP}\,…V\,t_i…$		*!	*
j. $[_{CP}\,op_i$ that $[_{IP}\,…V\,t_i…$		*!	

Candidate (15b) is ruled out by the dominance of HD-LFT. However, with FAITH-OP as a violable constraint it now becomes possible to make an end run around the two structural constraints by being unfaithful to the input. Candidates (15c,d) satisfy both HD-LFT and OB-HD. With FAITH-OP dominating OB-HD, the optimal candidate is (15a) since it avoids a fatal violation of FAITH-OP. Since the faithful outputs of the other two inputs do not violate HD-LFT or OB-HD, they are optimal as shown in (15e–j).

In (16) is the partial English ranking established so far. (The ranking of FAITH-OP with respect to SPEC-LFT and HD-LFT is undetermined.)

(16) {SPEC-LFT » HD-LFT; FAITH-OP} » OB-HD

Because it outranks conflicting OB-HD in English, FAITH-OP ensures that an input overt operator will surface as an overt operator in the output.

4. Ungrammaticality: Norwegian relative clauses

Norwegian allows only two of the three forms of object relative clause that English allows. An overt operator in a relative clause is ungrammatical with argument extractions, as shown in (17).[6]

(17) a. * mannen hvem jeg kjenner
        the man who I know

    d. * mannen hvem så Bill
          the man who saw Bill

    b.   mannen som jeg kjenner
        the man that I know

    e.   mannen som så Bill
          the man that saw Bill

    c.   mannen jeg kjenner
        the man I know

    f. * mannen så Bill
          the man saw Bill

Following Taraldsen 1978, 1986 and Keer 1996 we assume the object relative clause structures in (18) (cf. the promotion analysis of Åfarli 1994).

(18) a. * mannen$_i$ [$_{CP}$ hvem$_i$ [$_{IP}$ jeg kjenner t_i]]
      the man who I know

    b.   mannen$_i$ [$_{CP}$ *op*$_i$ som [$_{IP}$ jeg kjenner t_i]]
      the man that I know

    c.   mannen$_i$ [$_{IP}$ jeg kjenner t_i]
      the man I know

A central claim of OT is that crosslinguistic variation is captured through the different ranking of conflicting universal constraints. We argue that the ranking of OB-HD over FAITH-OP, the opposite of the ranking necessary for English, is the one necessary for Norwegian. In Norwegian, the overt-operator structure in (18a) is impossible because FAITH-OP is forced to be violated, and this violation is forced by the structural constraint OB-HD. Therefore any input with an overt operator will surface unfaithfully with either an empty operator or with no operator. In English, FAITH-OP dominates OB-HD, making this possibility unavailable. In Norwegian, the ranking is reversed, making this option grammatical.

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[6] For a discussion of similar facts in French, see Kayne 1994 and Pesetsky, to appear; for Italian, see Kayne 1994. Pied-piped argument *wh*-operators are also ungrammatical in Norwegian relative clauses, contrasting with French and Italian (and English, with optional pied-piping) in this respect (Kayne 1994):

  i. * jenta med hvem jeg danset
     the girl with whom I danced

    iii. * mannen hvis kone jeg har ikke mått
       the man whose wife I have not met

  ii. jenta som jeg danset med
     the girl that I danced with

    iv. mannen som jeg har ikke mått sin kone
       the man that I have not met his wife

(19) *Norwegian:* HD-LFT » OB-HD » FAITH-OP

Input: overt operator	HD-LFT	OB-HD	FAITH-OP
a. $[_{CP}$ *wh*$_i$ $[_{IP}$ …V t_i…		*!	
b. $[_{CP}$ *wh*$_i$ som $[_{IP}$ …V t_i…	*!		
c. ☞ $[_{CP}$ *op*$_i$ som $[_{IP}$ …V t_i…			*
d. ☞ $([_{CP}$ som$)$ $[_{IP}$ …V t_i…			*

Input: empty operator	HD-LFT	OB-HD	FAITH-OP
e. ☞ $[_{CP}$ *op*$_i$ som $[_{IP}$ …V t_i…			
f. $[_{CP}$ *wh*$_i$ $[_{IP}$ …V t_i…		*!	*
g. $([_{CP}$ som$)$ $[_{IP}$ …V t_i…			*!

Input: no operator	HD-LFT	OB-HD	FAITH-OP
h. ☞ $([_{CP}$ som$)$ $[_{IP}$ …V t_i…			
i. $[_{CP}$ *wh*$_i$ $[_{IP}$ …V t_i…		*!	*
j. $[_{CP}$ *op*$_i$ som $[_{IP}$ …V t_i…			*!

As in English, the empty-operator and no-operator inputs are realized faithfully (19e,h), since neither violates HD-LFT or OB-HD. However, the faithful overt-operator candidates in (19a,b) violate OB-HD and HD-LFT, respectively. These violations are fatal, given the low rank of FAITH-OP. As the grammar stands, both (19c,d) are the grammatical outputs for the overt-operator relative input. This result is entirely consistent with the Norwegian data; it may be that other considerations decide between the two candidates here, but this need not be the case.

Norwegian thus differs from English only in the relative ranking of two constraints. This analysis relies solely on a difference in constraint ranking, the only device available in the theory to account for crosslinguistic variation. The total ranking for Norwegian is given in (20).

(20) SPEC-LFT » HD-LFT » OB-HD » FAITH-OP

With the structural constraint OB-HD dominating the faithfulness constraint FAITH-OP, Norwegian will not have surface violations of OB-HD in relative clauses. The descriptive lack of *wh*-relatives in Norwegian thus emerges as a typological consequence of the OT faithfulness account of the optionality evident in English. We consider this a desirable result.

5. More ungrammaticality

In this section we discuss two other cases of ungrammaticality. In §5.1 we return to embedded object questions, and in §5.2 we examine adverbial relatives. In both cases, English and Norwegian show the same pattern: only the overt-operator structure is grammatical. To account for these facts, we

propose a universal condition on the generation of candidate outputs demanding that traces be appropriately antecedent-governed.

5.1 Embedded object questions revisited

The analysis presented above for object relative clauses has important consequences elsewhere. Simply applied to embedded object questions, for instance, it predicts that English should display optionality among three types of embedded questions and that Norwegian should have no *wh*-embedded questions. However, both English and Norwegian have the same pattern in embedded object questions, as is shown in (21).

(21)   *English*   *Norwegian*

    a.   I wonder [who Bill saw]   d.   Jeg vet ikke [hvem Bill så]

    b. * I wonder [that Bill saw]   e. * Jeg vet ikke [som Bill så]

    c. * I wonder [Bill saw]   f. * Jeg vet ikke [Bill så]

In embedded object questions, only the overt operator structures are possible in both languages. The fact that nonovert operator types are ungrammatical in embedded questions seems to have to do with their interpretability: they lead to ungrammaticality when their meaning cannot be recovered (e.g., through an overt antecedent).

This cannot be due to some sort of interpretation filter which rules out otherwise optimal outputs (cf. the notion of "grammatical gibberish" in Chomsky 1995). To see why, consider the case of Norwegian. Since OB-HD dominates FAITH-OP, an embedded question with an overt operator (21d) is expected to be ruled out and (21e,f) are expected to be the outputs of the grammar. The hypothetical interpretation filter would then rule these out, and Norwegian would lack embedded questions altogether. The result would be absolute ungrammaticality, counterexamplified by (21d).

The facts in (21) must thus be due to a forced violation of FAITH-OP. We propose that the universal output generation condition on covert elements in (22) is what forces this violation of the faithfulness constraint.[7]

(22)   Empty operators and traces are appropriately antecedent-governed.

A clause-external relative head serves as an appropriate antecedent governor for an otherwise unbound trace (23c) and for an empty operator (23b) (which is in turn an appropriate antecedent governor for the trace). This satisfies Condition (22). The overt-operator relative in (23a) also satisfies Condition (22) because the trace is antecedent-governed by the overt operator, which in turn is not subject to the condition.

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[7] Condition (22) is in the same spirit as Pesetsky's (to appear) constraint on recoverability. Note that under the assumptions of our related joint work-in-progress (see fn. 4), Condition (22) need only apply to traces, since empty operators are no longer necessary.

(23) a. the man$_i$ [$_{CP}$ who$_i$ [$_{IP}$ Bill saw t_i]] Condition (22) satisfied

  b. the man$_i$ [$_{CP}$ *op$_i$* that [$_{IP}$ Bill saw t_i]] " " satisfied

  c. the man$_i$ [$_{IP}$ Bill saw t_i] " " satisfied

In the embedded question examples in (24), there is nothing to govern an otherwise unbound trace (24c) or an empty operator (24b), so the only case where Condition (22) is satisfied is in (24a), because the trace is governed by the overt operator, which is not subject to the condition.

(24) a. I wonder [$_{CP}$ who$_i$ [$_{IP}$ Bill saw t_i]] Condition (22) satisfied

  b. * I wonder [$_{CP}$ *op$_i$* that [$_{IP}$ Bill saw t_i]] " " **violated**

  c. * I wonder [$_{IP}$ Bill saw t_i] " " **violated**

Although the English ranking in (16) prefers a formal contrast of three operator types, this optionality is precluded in embedded questions because Condition (22) is only satisfied by the overt-operator structure. The Norwegian ranking in (20) is designed to rule overt-operator structures out, but this very same structure emerges as the only grammatical form in embedded questions, again due to Condition (22). Condition (22) thus imposes itself not as a filter on otherwise grammatical outputs but as a condition on possible candidate outputs; it thus overrides rather than undercuts the preferences of the two languages' rankings.

5.2 Adverbial relatives

As mentioned earlier, Norwegian does have adverbial *wh*-relatives even though it lacks argument *wh*-relatives. In (26) we offer some relevant adverbial relative clause facts in both English and Norwegian. The only grammatical adverbial relative in either language is the one with an overtoperator (26a,d). Both the empty-operator (26b,e) and no-operator relatives (26c,f) are ungrammatical.

(26) *English* *Norwegian*

  a. the town where I live d. byen hvor jeg bor

  b. * the town that I live e. * byen som jeg bor

  c. * the town I live f. * byen jeg bor

Adverbial relatives thus parallel embedded object questions: in both languages and in both constructions, only the overt-operator structure is grammatical. We analyze the facts in (26) as another result of Condition (22). If part of the definition of "appropriate" antecedent government is that the governor and governee must be of the same type (e.g., argument vs. adverbial), then the adverbial relatives in (27b,c) below violate Condition (22), since the relative head itself is an argument (cf. Åfarli 1994). In overt-operator adverbial

relatives such as (27a), Condition (22) is satisfied because the operator is a *wh*-adverbial and it antecedent-governs its adverbial trace.

(27) a. the town [$_{CP}$ where$_i$ [$_{IP}$ I live t_i]]   Condition (22) satisfied

  b. * the town [$_{CP}$ *op*$_i$ that [$_{IP}$ I live t_i]]   "   " **violated**

  c. * the town [$_{IP}$ I live t_i]   "   " **violated**

The result here is thus the same as it is for embedded questions; a desirable unified explanation for a unifiable set of facts. Of course, the vague notion of "appropriate" that we have appealed to here needs to be refined, for instance in light of the following facts, pointed out to us by James Lyle:

(28) a. the reason (that) we felt self-conscious

  b. the way (that) they were looking at us

  c. the moment (that) we walked in

The argument vs. adverbial distinction is predictably too simplistic, and further investigation in this complex area is certainly called for.

5.3 Summary

The problem with empty operators and traces in embedded questions and adverbial relatives is that they lack a suitable antecedent to recover their meaning, an intuition we formalize as Condition (22). We demonstrated in this section that, under our assumptions, Condition (22) must be a prior condition on possible output structures, not an after-thought filter on the output of the grammar (Chomsky's "LF interface gibberish"). We take Condition (22) to be an inviolable condition on candidate output generation, but it could also be understood as a sufficiently high-ranked constraint (above FAITH-OP and OB-HD in English and Norwegian, at least). Pesetsky (to appear) adopts this latter view for the analog of Condition (22) in his system (RECOVERABILITY); we adopt the former because we find it unlikely that Condition (22) is violable.

6. Factorial Typology

For the following discussion we will be assuming that SPEC-LFT dominates HD-LFT; that is, we will only be considering languages with specifier–head–complement word order. With this ranking held constant, we have three constraints that can be permuted. This gives a possible six (3!) distinct total rankings. However, this only results in four distinct grammars, since some rankings result in equivalent grammars.

We have of course already considered two of the rankings in detail. These are the ones in which HD-LFT dominates OB-HD; in other words, the ones in which the Doubly-Filled Comp Filter is respected. In English, FAITH-OP also dominates OB-HD as in (29a). In Norwegian, OB-HD dominates FAITH-OP, as in (29b).

(29) a. *English ranking*   b. *Norwegian ranking*

        HD-LFT   FAITH-OP   HD-LFT

              OB-HD   OB-HD

                                         FAITH-OP

The result of (29a), as shown in §3, is that, all three forms of object relatives surface as grammatical. The effect of (29b) is that overt-operator object relatives are impossible, as shown in §4. This leaves two more grammars. They differ from those above in that OB-HD dominates HD-LFT — these are languages in which the Doubly-Filled Comp Filter is violated. In one grammar, FAITH-OP dominates HD-LFT (30a). In the other, HD-LFT dominates FAITH-OP (30b).

(30) a. *Spanish ranking?*   b. *Swedish ranking?*

        OB-HD   FAITH-OP   OB-HD

              HD-LFT   HD-LFT

                                       FAITH-OP

As in English, all three forms of object relatives are grammatical under (30a). This may be Spanish, but the issue is clouded by the fact that Spanish is an obligatory complementizer language, so empty-operator and no-operator structures will be string-wise identical. In addition, the cases of Doubly-Filled Comps in Spanish involve subject–verb inversion in *wh*-clauses. Inversion is variably optional depending on the "argumenthood" of the moved *wh*-phrase (Torrego 1984, Suñer 1994) and on the distinction beween matrix and subordinate clauses (Baković, to appear).

As in Norwegian, overt-operator object relatives are impossible under (30b). This is possibly Swedish. Complicating matters here is the fact that the Doubly-Filled Comp Filter violations in Swedish (*wh*-complementizer configurations in embedded object questions) are optional; that is, the complementizer may or may not be present. This indicates that OB-HD can be forced to be violated — as in fact would have to be said for the optionality of Spanish inversion. We (see fn. 4) are extending our faithfulness approach to these and related cases (e.g., optionality of verb second in German, complementizer optionality in English), the idea being that faithfulness to formal properties associated to the C position are at play.

7. Concluding Remarks

In this paper we have provided an OT analysis of true optionality (as opposed to apparent optionality; see fn. 1). This analysis predicts that some languages will show ungrammaticality where other languages display optionality. This result follows from the free ranking of constraints. Here we would like to compare

this approach with other approaches to optionality proposed in the OT literature.

One way to get optionality in OT is to formulate the constraints in such a way that the members of the set of candidates *S* in free variation have identical constraint-violation profiles, as Grimshaw (1997) does for the optionality of the complementizer *that* in English. This is an extremely difficult if not impossible result to achieve, and there are cases of optionality where the candidates in free variation clearly violate different structural constraints (as in the Swedish case above, where the constraints are HD-LFT and OB-HD).[8] However, note that the method behind this approach cannot be ruled out a priori since it follows from the theory that any number candidates which tie for optimality will all be grammatical.

A second method allows constraints to be crucially unranked or "tied". There are as many as three empirically distinguishable formal definitions of a "constraint tie" in the OT Syntax literature (see for instance Pesetsky, to appear; Ackema & Neeleman, to appear; Müller 1996). This line of attack predicts that any point of linguistic variation that is analyzed as the different available rankings of conflicting constraints could be a point of free variation in some language, through the crucial nonranking of the relevant constraints. For instance, SPEC-LFT and HD-LFT could be tied and specifiers could alternate being leftmost and rightmost in their projections (see tableau (6)). There seems to us to be too much descriptive looseness and too little explanatory pay-off with this approach, under any plausible definition of "constraint tie" (*pace* the references cited above).

Finally, there is the approach advocated here, which admits faithfulness to distinctive formal properties of syntactic structures. When conflicting structural constraints are either irrelevant or subordinate to one of these faithfulness constraints, optionality of a formal property arises. What this approach predicts is ungrammaticality, with the opposite ranking of faithfulness and structural constraints, and we have attempted to argue in this paper that such a prediction is borne out.

Language-particular ungrammaticality in general follows in OT from constraint interaction, not from constraints specific to the inputs of particular languages. The subordination of faithfulness as an important source of ungrammaticality has been argued and amply demonstrated in phonology beginning with Prince & Smolensky 1993, and supported in syntax by the work of Legendre et al. (1995, to appear). Our proposal is that the failure of optionality to arise in a particular language is another instance of language-particular ungrammaticality. The subordinated faithfulness constraint in such a case is one that, when higher-ranked, gives rise to optionality, because it is a

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[8] See Legendre et al. 1995 for discussion of an empirical problem with Grimshaw's analysis.

constraint demanding faithfulness to a strictly formal property of syntactic structures.

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