Modularity in OT-Morphosyntax*

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1 Introduction

In Noyer (1993) and Trommer (2001b) models for OT-morphology are proposed, where morphology interprets the output of Syntax along the lines of Distributed Morphology (DM, Halle and Marantz, 1993). A major virtue of such a modular architecture is its restrictiveness: Syntactic representations and constraints cannot directly interact with morphological constraints. In contrast, Bresnan (1999b) argues that syntactic constraints *do* directly interact with morphological constraints, and that there is only one morphosyntactic evaluation procedure. In this paper I develop a modular model of morphosyntax based on Trommer (2001b) and show that the data that Bresnan and others have provided in favor of a global model of OT-morphosyntax can be easily reinterpreted in this model.

2 The Framework: Distributed Optimality

In Distributed Morphology (DM, Halle and Marantz, 1993), syntax operates on morphosyntactic feature bundles without phonological content. After syntax, these representations are enriched and manipulated by morphological rules. Finally so-called Vocabulary Items are inserted which interpret morphosyntactic features through phonological material. Thus morphosyntax includes the three levels in (1):[1]

(1) a. Syntax
    b. Morphological Rules
    c. Vocabulary Insertion

This architecture is illustrated in (2) for the German sentence *wir trinken*, 'we drink'. Syntax yields the representation in (2a). Morphological rules add case and agreement affixes as in (2b). In (2c) vocabulary items are inserted: /wir/ $\leftrightarrow$ [+D+1+pl]

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[1] Additionally, Vocabulary Items might be modified by morphonological readjustment rules. Since processes of this type play no role in the following discussion, I will not discuss readjustment rules here.

into [+D+1+pl], /trink/ ↔ [+V] into [+V], and /-en/ ↔ [+Agr+1+pl] into [+Agr+pl]. Note that Vocabulary Items can be underspecified. Thus, /-en/ ↔ [+Agr+1+pl] realizes only part of the features of [+Agr+1+pl]. Zero vocabulary items are inserted in [+I] and [+Nom] which are omitted here for legibility.[2]

(2) a. [+D+1+pl]$_{i}$ [+I] [t$_{i}$ [+V]]$_{VP}$
b. [+D+1+pl][+Nom]]$_{i}$ [+I] [t$_{i}$ [[+V][+Agr+1+pl]]]$_{VP}$
c. /wir/ ↔ [+D+1+pl] /trink/ ↔ [+V] /-en/ ↔ [+Agr+pl]

The model I propose in this paper can be seen as a constraint-based, modular adaptation of DM's architecture. I call this model *Distributed Optimality* since it is based on the assumption of different morphosyntactic components, all mapping specific inputs to outputs according to the principles of Optimality Theory (OT, Prince and Smolensky, 1993; McCarthy and Prince, 1994, 1995).

2.1 The Architecture of DO

I assume that morphosyntax involves the following three modules:

(3) a. Syntax (lexical Items ⇒ syntactic chains)
b. Chain Interpretation (syntactic chains ⇒ single heads)
c. Head Interpretation (heads ⇒ vocabulary items)

Again, the Syntax component creates abstract syntactic representations which contain neither agreement nor case affixes (while chains might be assigned abstract case). Crucially, Syntax creates chains from lexical items.

Chain Interpretation maps chains onto single heads (put another way, traces, i.e., copies produced by movement are eliminated) and adds (abstract) case and agreement heads. This comprises the part of morphology that depends in some way on the structure of chains and non-local parts of phrase structure. As Syntax, this module does not involve phonological features.

Finally, in Head Interpretation, the abstract heads from Chain Interpretation are mapped to Vocabulary Items , This step corresponds to Vocabulary Insertion in DM. (4) illustrates the model for our example sentence:

(4) a. [+D+1+pl]$_{i}$ [+I] [[+D+1+pl]$_{i}$ [+V]]$_{VP}$
b. [+D+1+pl][+Nom]] [+I] [~~[+D+1+pl]~~ [[+V][+Agr+1+pl]]]$_{VP}$
c. /wir/ ↔ [+D+1+pl] /trink/ ↔ [+V] /en/ ↔ [+Agr+1+pl]

The syntax generates the representation in (4a.). There is a chain comprising the pronoun ([+D+1+pl]) in the specifier of IP and its base position in the VP. Chain Interpretation maps this chain onto (4b.), where the chain is reduced to the single head in Spec IP to which the [+Nom] head is added. To V an agreement head is adjoined. Finally, the heads are interpreted by the vocabulary items. Note that not all heads are interpreted by vocabulary items. Thus [+Nom] is simply not realized morphologically. Ina ddition,

[2] [+Nom] tends to be empty crosslinguistically, but is realized by phonological material in some languages such as Latvian (Croft, 1990:104). There might also be the option to leave syntactic heads “unfilled”. See Halle and Marantz (1993:132) for more discussion of null morphemes in DM.

the vocabulary item for *-en* is not marked for its status as a prefix or a suffix which is determined by the ranking of universal alignment constraints (Trommer, 2001c).

2.2 Differences between DO and Derivational DM

Consider another example that illustrates more differences between DM and DO: In Turkana (Dimmendaal, 1983), finite verbs agree with subjects and objects in person, and the same person markers are used for subject and object agreements. However, each verb bears exactly one person marker. If one of the arguments is 3rd person and the other non-third, agreement is with the latter. Hence, the forms in (5) differ only by the inverse marker *k-* in (5b) which marks the fact that the object is higher in animacy than the subject:

(5) a. *à-mın-à* 'I love her' (Dimmendaal, 1983:69)
D-1-love-ASP
b. *k-à-mın-à* 'she loves me' (Dimmendaal, 1983:123)
D-1-love-ASP

Halle and Marantz (1993) assume for a similar case – blocking of person prefixes in the Algonquian language Potawatomi – that it is due to a fusion operation which puts the two relevant nodes (here: AgrS and AgrO) into the same head position while leaving the feature structures themselves intact.[3] By assumption, only one vocabulary item can be inserted into a single head position. Thus a conflict arises whether *à-* is inserted or the 3rd person marker *e-* which appears in intransitive forms or transitive forms without non-third arguments. Halle and Marantz resolve problems of this type by ordering the vocabulary items in a list of the type in (6):

(6) a. /*à-*/ $\leftrightarrow$ [+1]
b. /*e-*/ $\leftrightarrow$ [+3]

Vocabulary insertion now inserts the first matching element. Thus for (5b) we get the derivation in (7):

(7)

a.	[+V] [+AgrS +3] [+AgrO +1]	Fusion	$\Rightarrow$
b.	[+V] $\begin{bmatrix} [\text{+AgrS +3}] \\ [\text{+AgrO +1}] \end{bmatrix}$	Vocabulary Insertion	$\Rightarrow$
c.	/*mın*/ $\leftrightarrow$ [+V] /*à-*/ $\leftrightarrow$ [+1]		

While precedence of vocabulary items can be determined in most cases by specificity – a [+1 +pl] item would be favored over a [+1] or [+pl] item – this is of no use in determining the order of items in (6) which contain each one feature. But since it seems to be a general property of affix blocking crosslinguistically that 1st/2nd person

[3] Alternatively, DM allows rules that delete heads or features or zero affixes. But it is difficult to see how the restriction to one person affix can be achieved without stipulating multiple rules or zero morphemes, which would miss an obvious generalization.

markers "win" over 3rd person markers (cf. Trommer, 2001a), the ordering of these items should not be due to arbitrary stipulation. Indeed Halle and Marantz speculate with Noyer (1992) that such an ordering might be determined by reference to a feature hierarchy (. . . 1/2 . . . > . . . 3 . . .). Compare this to the DO account illustrated in (8). Here the fact that the realization of [+1] is "more important" than the realization of [+3] is captured by a PARSE constraint which states that a PERSON feature ([P]) of a [-3] category should be realized if it is adjacent to a [+3] category. Thus, PARSE $[P]^{[-3]/[+3]}$ in (8) induces a constraint violation for each person feature of [-3] agreement at the input to Head Interpretation that is not realized by a vocabulary item of the output. The ban on two agreement affixes is induced by a higher-ranked constraint BLOCK [P] which allows only one simple person affix in a verb form.

(8) Mixed:$[+\text{Nom } +3]_1[+\text{Acc } +1]_2$

	BLOCK [P]	PARSE $[P]^{[-3]/[+3]}$
a. ☞ $[+1]_2$		
b. $[+3]_1$		*!
c. $[+1]_2[+3]_1$	*!	

The most obvious difference between the accounts is that the morphological rules invoked in DM (here: Fusion) are replaced by constraints (here: the BLOCK constraint). There is however a second, more subtle difference. What the single modules do is to map their input representations into representations of different types (Chains ⇒ heads, heads ⇒ Vocabulary Items). Hence, unlike morphological rules, the modules of this model do qualitatively different things and in different locality domains. Thus, I assume that Head Interpretation operates on small word-like units which I call spell-out domains and which each comprise a lexical category and all string-adjacent heads from its extended projection (see Trommer, 2001b for further discussion), while Chain Interpretation is defined on chains. Note that the constraints invoked in (8) apply at Head Interpretation. Similar types of constraints seem to play a role for Chain Interpretation, but – due to the more global domain of this module – with somewhat different consequences. Section 5 gives an example for the application of constraints at Chain Interpretation.

In Trommer (2001b), I show that the use of violable constraints improves in many respects on derivational DM . Here, I will just point out some aspects connected with our Turkana example. First, features of the agreement heads occur also in other affixes coocuring with the person affixes. Thus, subject plural is standardly marked by a plural suffix:

(9) *ì-los-e-tè* 'you (pl.) go' (Dimmendaal, 1983:122)
2-go-ASP-PL

If AgrS and AgrO are fused, in Classical DM a further operation (called "fission" in Halle and Marantz, 1993) has to be assumed that takes the plural feature from AgrS and transforms it into a separate head. (Otherwise *í-* would block *-t* or vice versa.)[4] In DO, the possibility of the plural marker follows simply from the fact that PARSE [P] is restricted to person features. A further problem with the derivational analysis becomes obvious if we look at the way Turkana manages the resolution of Blocking if both arguments are [-3]. In this case, the person affix corresponding to the [+Nom] head is realized:

(10) a. *k-à-ram-ì* 'I will beat you' (Dimmendaal, 1983:122)
D-1-beat-ASP

b. *k-ì-ràm-e-tè* 'you (pl.) beat me' (Dimmendaal, 1983:122)
D-1-beat-ASP-PL

In the DO account, this can be captured by assuming a further PARSE constraint which favors realization of [+Nom] over [+Acc]:[5]

(11) Only SAP Arguments: $[+\text{Nom} +2]_1[+\text{Acc} +1]_2$

	BLOCK [P]	PARSE $[P]^{[-3]/[+3]}$	PARSE $[P]^{[+Nom]/[+Acc]}$
a. ☞ $[+2]_1$		*	
c. $[+1]_2$		*	*!
b. $[+2]_1[+1]_2$	*!		

As is shown in detail in Trommer (2001a), reranking of these constraints leads to other attested agreement types. Thus ranking PARSE $[P]^{[+Nom]/[+Acc]}$ over PARSE $[-3]/[+3]$ leads to a more familiar language type where all person agreement is with the subject, while ranking both constraints higher than BLOCK results in a language where subject agreement is always marked, but object agreement only if it is higher in animacy than the subject, which seems to be true in Ancash Quechua (Lakämper and Wunderlich, 1989:127). On the other hand non-attested languages for example those where agreement is consistently with the object are excluded.

Obviously, an account in terms of Halle and Marantz cannot generalize in this way. Fusion itself is "blind" to the ranking of features and/or vocabulary items. Hence, an analysis invoking fusion and ranked vocabulary items cannot account for languages like Ancash, where two agreement heads – which cannot otherwise be spelled-out together – are licensed by different aspects of a feature hierarchy.

More crucially, a fixed ordering of vocabulary items can not account for the data in (10). since this would predict that in (10a) and (10b), the same item would be inserted, i.e. if *à-* is ranked above *ì-*, *à-* should appear in both forms, and the same for *ì-* if the ranking is reversed.

See Trommer (2001b:chapter 2) on more evidence in favor of a constraint-based version of DM which are not relevant for the crucial point I want to make in this paper: that there are no good reasons to assume a global account of OT-morphosyntax. Most

[4]That subject person and number agreement correspond to the same syntactic head can be seen from the fact that 1pl agreement is marked by the single affix *ki-* expressing person and number. (Dimmendaal, 1983:120)

[5]This has to be ranked below PARSE $[P]^{[-3]/[+3]}$. Otherwise the latter would become inactive in (9).

of the arguments I use to this aim can also be made – and partially have been made, – under the assumptions of derivational DM (see Frampton, 2001 and Marantz, 2000).

3 The Problem: Global Morphosyntactic Competition

A crucial consequence of the architecture proposed in the last section is that constraints belonging to different modules cannot interact, i.e. be evaluated in the same EVAL procedure. However, there are data that seem to show that the details of morphophonological spell-out can affect syntactic wellformedness. Thus the ungrammaticality of (12b) vs. (12a) seems to be due to a morphophonological constraint against the form **amn't*.

(12) a. *Isn't he leaving?*
 b. **Amn't I leaving?*
 c. *Aren't I leaving?*
 d. *Am I not leaving?*

In the literature, there are two main approaches to this problem. Marantz (1999) proposes that conflicting morphophonological constraints can lead to Ineffability. This means that there would be no output for the input that corresponds to (12b). In contrast, Bresnan (1999b) assumes that the sentence is blocked by more optimal sentences such as (12c) or (12d). To make this account work, (12b) and (12c)/(12d) must be evaluated against each other. This evaluation involves syntactic constraints since these are different syntactic constructions, differing in word order. On the other hand, (12d) wins the competition over (12b) under the pressure of a morphophonological constraint (*AMN'T). Hence morphophonological and syntactic constraints must be involved in the same evaluation process. This is impossible under my assumptions.

But also the Ineffability account as proposed by Marantz is not possible in DO: Conflicting constraints in OT cannot lead to ineffability, since it is one of the core assumptions of OT that constraint violation and conflict leads not to ungrammaticality, but to conflict resolution.

What I will propose in this paper is an account in terms of ineffability based on the concept of interpretability (section 4). In sections 5 and 6, it is shown how data that seem to require global evaluation of morphosyntactic constraints can be accounted for by local constraints and ineffability. Section 5 is based on Vogel's (Vogel, 2001) account of Free Relative Constructions and section 6 on Bresnan's (Bresnan, 1999b) work on English negation. In section 7 , I discuss the problem of modularity under a more general perspective. Section 8 gives a short summary of the paper.

4 Approaches to Ineffability

In this section I discuss different approaches to ineffability[6] and propose a new account which is based on the notion of interpretability. This approach will be used in the following sections to account for apparent cases of global morphosyntactic competition.

[6]See Müller (2000:82-88) for a recent overview of approaches to ineffability in OT.

4.1 Ineffability as the result of Constraint Conflict (Marantz, 1999)

Marantz (1999:5) interprets morphological ineffability as the situation where "a well-formed syntactic structure fails to yield a pronounceable interpretation because competing morphophonological constraints cannot be reconciled. One case of ineffability Marantz adduces is the matching requirements for free relatives in German:

(13) a. *Ich zerstöre, was mich ärgert*
I destroy what me upsets
'I destroy what upsets me'
b. **Ich zerstöre wer/wen mich ärgert.*
I destroy who:NOM/ACC me upsets
'I destroy who upsets me'

The idea is that the relative pronoun in these constructions must realize the nominative assigned to the subject position of the embedded relative clause, as well as the accusative assigned from the matrix verb *zerstöre*. This is possible in the neuter gender, where *was* neutralizes the contrast between nominative and accusative, but not in the masculine, where there are two morphologically distinct pronouns.

As Marantz puts it the "vocabulary item for the relative pronoun must be the winning choice both for the case assigned to the free relative and for the case assigned to the trace of the relative pronoun within the free relative. Where the vocabulary items that win the competition for the two sets of case features are different, the structure is ineffable" (Marantz, 1999:5).

This account is problematic in DO since it is not reconcilable with the basic principles of OT, where constraint conflict in principle does not lead to ungrammaticality. In addition, there are empirical and conceptual problems: First, the account is problematic for other cases where two underlying feature structures induce competition for Vocabulary Insertion. Thus, in fusion (see (7) in section 2) two feature bundles are involved that independently would lead to the insertion of different Vocabulary Items: The underlying AgrS head in (7) favors [+3] */e/*, while AgrO favors [+1] */á/* In contrast to the situation with FRs this does not lead to ineffability, but to conflict resolution. Second, the account predicts that all cases of non-matching FRs should be ungrammatical. But there are languages where such a case conflict does not lead to ungrammaticality (see section 5), and even in German there exist grammatical FRs where the case requirements do not match (Vogel, 2001:2):

(14) a. *weil uns besucht, wen Maria mag*
because us visits who-ACC Maria likes
b. *Ich lade ein wem ich vertraue*
I invite who-ACC I trust

4.2 Ineffability as a Result of the Null Parse

Prince and Smolensky (1993) propose to account for ineffability in phonology by the possibility of the "null parse", i.e. a realization of a form that does not contain any phonological material. If the null parse becomes optimal for a certain input I, it blocks all non-null candidates. But since the null parse is unusable for communication, it is nonetheless ill-formed. As a consequence, *I* has no grammatical output at all. This idea which was developed in an early version of OT is somewhat problematic under Correspondence Theory (McCarthy and Prince, 1994, 1995) which is assumed in DO. Take as an example the ineffable structure in (15a):

(15) a. **Amn't I tall?*
b. *Am I tall?*

Assume that the null parse is the optimal candidate for the underlying proposition of (15a). Then the null parse should be more harmonic than (15b). But (15b) is better than (15a) for all constraints that require the realization of underlying heads (e.g. PARSE Person, PARSE Number etc.) and it is difficult to see what type of constraint would favor the null parse over (15b) without also excluding (15b) as the output of the positive question. Hence, the null parse in correspondence-theoretic OT is probably excluded in most cases for principled reasons.[7]

Ackema and Neeleman (2000a) avoid this consequence by guaranteeing a special status to the null parse. In a model with (apparently) global morphosyntactic evaluation, they assume that all candidates must be semantically equivalent to the input. However, they interpret this "condition such that it removes from the candidate set those candidates that have an interpretation which deviates from that of the other candidates. Since the null parse does not have an interpretation it cannot have a deviating interpretation either. It is therefore never affected by the condition of semantic equivalence. Hence, every candidate set contains the null parse." (Ackema and Neeleman, 2000a:281).

The ineffability of **Amn't I tall?* can then be roughly accounted for as follows ("0" stands for the null parse):

(16)

	*AMN'T	PARSE 1sg	PARSE NEG
Amn't I tall?	*!		
☞ 0		*	*

*AMN'T is ranked above all relevant PARSE constraints, hence the optimal candidate cannot contain *amn't*. However the only candidate which avoids *amn't* is the null parse since all other underparsing candidates (such as *Am I tall?*) are excluded by the principle of semantic equivalence.

This approach is difficult to include into a modular architecture since it requires that all constraint evaluation presupposes previous semantic evaluation. At a more

[7] In Prince and Smolensky (1993) deletion of segments was coded by a diacritic notation in output candidates, not by the relation of input and candidate. This led to the paradox situation that the null parse implied no deletion markers. For the constraints against deletion, deletion of all segments in the null parse meant no deletion at all, which made it a rather harmonic candidate. In Correspondence Theory, the null parse implies maximal violation of constraints against deletion. Vogel (2001:fn.15) also considers the possibility of a null parse account for FRs, and suggests that "there is only one constraint that this candidate violates, namely a constraint 'NoNullParse"'. But as already noted the null parse should also violate other constraints, and Vogel himself rejects this approach for independent reasons.

technical level, Head Interpretation as proposed here would be excluded because the structures resulting at this level don't have a (compositional) semantics; they are simply strings of vocabulary items, pairing phonological and syntactic features. But the null parse approach also carries with itself inherent problems: The special status of the null parse has to be stipulated. Moreover, it leads to strange effects once other PARSE constraints are taken into account. Assume, for example, a language where all other PARSE constraints are ranked below *AMN'T, but PARSE PREP(OSITION) is ranked above *AMN'T. Since PARSE PREP is irrelevant for (16), *Amn't I tall?* is still ineffable in this language. However, *Amn't I the emperor of Wyoming?* – containing the preposition *of* – is not as shown in (17):

(17)

	PARSE PREP	*AMN'T	PARSE 1SG	PARSE NEG
☞ *Amn't I the emperor of Wyoming?*		*		
0	*!		*	*

The reason is that any high-ranked Parse constraint can render a structure effable even though the category specified by the constraint is completely unrelated to the constraint that renders the structure ineffable. Thus, under the ranking in (17), any preposition at any distance from *am* can "save" the construction. Such effects, however seem to be conceptually odd and empirically non-existent. The basic problem with this version of the null parse approach seems to be that it is too non-local.[8] The approach to ineffability that I propose in 4.3 can be seen as a localized version of the null parse approach avoiding this problem.

4.3 An Alternative Approach to Ineffability

As we saw in the preceding sections, existing approaches to Ineffability are not consistent with the architecture of DO and/or problematic for independent reasons. What I will propose here, is that the crucial notion to account for morphosyntactic ineffability is *interpretability*. To be grammatical, outputs must be both optimal and interpretable. If a certain input I has an optimal output that is not interpretable, I is ineffable.

More concretely, I assume that there are exactly two reasons why the output of a morphosyntactic grammar module might be optimal but non-interpretable and hence leads to ungrammaticality:

Illegibility: The output of a module might not be a suitable input for the subsequent module. This analysis will be applied to free relative constructions in section 4.

[8]Ackema and Neeleman (2000a:298) propose to circumvent this problem by assuming a special evaluation procedure for parse constraints ensuring that these do never interact. However, there are phenomena where PARSE constraints *must* interact (see the discussion of Turkana in section 2.2 and Trommer (2001b)). The only further motivation Ackema and Neeleman give for treating parse constraints differently from other constraint types is the fact that these allegedly are the only constraints that have to evaluate output candidates against the input. However, as shown in detail in (Trommer, 2001b:ch.4), there is evidence that almost all morphological constraint types exist in versions referring to the input.

Irrecoverability:[9] The suppression of specific morphosyntactic features or categories is excluded because this might make it impossible to recover the semantic content of a syntactic structure.

Irrecoverability partitions morphosyntactic features into two distinct sets: Recoverable features like person and number features can in principle remain unrealized, while irrecoverable features like the lexical features of verbs must surface. This accounts for the fact that there are many cases of zero agreement and pronouns but virtually no instances of lexical verbs that are not overtly realized. This is unexpected if there is any general economy constraint, which could force suppression of all types of features under appropriate constraint rankings.[10]

I assume that there are additional violable constraints that require the realization of recoverable *and* irrecoverable features, but – by definition – their effect can be overridden by other constraints Thus, while a module might have optimal outputs that suppress the lexical verb completely, such a candidate will not be grammatical. An application of the Irrecoverability criterion will be used in section 5 to account for the ineffability of certain English negation constructions.

Irrecoverability is a restricted version of the Null-Parse-Account of Prince and Smolensky (1993)[11] while Illegibility is inspired by the interface conditions of Chomsky (1995)[12]. It is crucial that these conditions do not trigger the formation of candidates that conform to them but simply render candidates ungrammatical that do not satisfy them. In the following two sections, I will show that data which seem to require the interaction of constraints from different morphosyntactic modules can be neatly accounted for in terms of ineffability.

5 Free Relatives

Recall from section 4.1 that free relative construction with two non-matching cases are not always excluded, which makes an account in terms of ineffability problematic. In section 5.1, I will outline the approach of Vogel (2001) which relies on global morphosyntactic competition. In 5.2 and 5.3, I show that all the data Vogel provides can be recast in the modular framework given the account of ineffability from 4.3.

[9] The idea of invoking irrecoverability is inspired by a related approach in Frampton (2001). See section 6.6 for discussion.

[10] Note that recoverability is not checking syntactic configurations to determine whether features actually can be recovered in a given construction. For example, pro drop is possible even in a language without agreement such as Japanese. Possible counterexamples to the claim that lexical verbs are never suppressed are sentences such as German *Ich muss nach Hause*, I:NOM must to home, 'I must go home', or *I began the book* implying 'I began to read the book' (thanks to J.D. Bobaljik for coming up with these examples). Interestingly, in English, there is independent evidence that *go* is not a lexical verb: It shows suppletion (*went*), which is otherwise only found in functional elements. See the Alllomorphy section of the DM website for discussion (`http://www.ling.upenn.edu/˜rnoyer/dm/`).

[11] I.e. here not suppression of all input features leads to unusability, but suppression of specific features.

[12] Müller (1997) uses a similar approach to ineffability invoking uninterpretability at the LF interface.

5.1 Vogel (2001)

Reconsider the data from (13) in 4.1 which Marantz (1999) analyzed by invoking ineffability:

(18) a. *Ich zerstöre, was mich ärgert*
I destroy what me upsets
'I destroy what upsets me'

b. **Ich zerstöre wer/wen mich ärgert.*
I destroy who:NOM/ACC me upsets
'I destroy who upsets me'

Vogel (2001) also assumes that the grammaticality contrast between (18a) and (18b) is induced by the inventory of FR pronouns, and conflicting constraints. (19) contains a rough paraphrase of the two constraints that are crucial for his analysis.

(19) a. **REALISE CASE:** For each case feature assigned at LF, there is an element at PF that realizes it. (Vogel, 2001:26)

b. **INTEGRITY:** – No Breaking – No input element (Free relative pronoun) has more than one output corespondents. (Vogel, 2001:22)

While Vogel does not make it clear what is meant exactly by "realization of a case feature", it seems that *was* is supposed to be able to realize accusative and nominative case at the same time, while *wer* and *wen* realize only nominative or only accusative respectively.

To solve the problem that EVAL will always produce an output candidate for a given input – and here the analysis differs crucially from the one by Marantz – Vogel assumes that the input that corresponds to (18b) results in the output in (20):

(20) *Wer mich ärgert, den zerstöre ich.*
who me upsets him destroy I.
'Who(ever) makes me angry, I destroy him.'

While this output violates INTEGRITY (the free relative pronoun is "split" into a demonstrative and a standard relative pronoun), this is justified by REALISE CASE which is by assumption higher ranked in German, and which would be violated by a free relative which realizes only one case. The tableaux in (21) and (22) show the contrast of *was* and *wer/wen*:[13]

(21)

		REALISE CASE	INTEGRITY
☞	Wer mich ärgert, den zerstöre ich		*
	Ich zerstöre, wer mich ärgert	*!ACC	
	Ich zerstöre, wen mich ärgert	*!NOM	

[13]While the suboptimal forms in (21) are ungrammatical, the correlative *Was mich ärgert, das zerstöre ich* is grammatical since it is the optimal output for a different (correlative) input LF.

(22)

		REALISE CASE	INTEGRITY
	Was mich ärgert, das zerstöre ich		*!
☞	Ich zerstöre, was mich ärgert		

It is crucial to note of what type are the competitors in Vogel's model. He assumes that Inputs are fully specified LF representations while each outputs candidate is an ordered [LF,PF] pair (Vogel, 2001:15). Thus for the evaluation of morphosyntactic constraints, there exists only one grammar module, and each constraint is ranked with respect to each other constraint.

If something like Vogel's analysis of FRs is correct, DO is untenable, since the spell-out of morphemes (i.e. the choice of *was* vs. *wer/wen*) in a modular model cannot interact with truly syntactic constraints concerning the choice whether a given input results in a syntactic structure like (22) or (21). We cannot even say that non-matching structures such as (18-b) are uninterpretable in general, since – as we saw – there are languages that allow such structures and even German has non-matching free relatives for other case combinations. (cf. Vogel, 2001:18)

In 5.2, I will introduce some more data following closely the presentation of Vogel (2001), and show that the typology for free relatives that he proposes can be reconstructed in modular OT if we make the natural assumption that the conflict resolution relevant for FRs is located in Chain Interpretation, not in Head Interpretation. In section 4.2, it will be shown that the contrast between *was* and *wer/wen* in (22) and (21) can also be interpreted straightforwardly in the same way.

5.2 Accounting for the Typology of FRs

Recall from (14) the German cases with non-matching FRs, repeated here as (23):

(23) a. *weil uns besucht, wen Maria mag*
because us visits who:ACC Maria likes

b. *Ich lade ein wem ich vertraue*
I invite who:ACC I trust

In both sentences the FR realizes the case of the embedded sentence (r-case), the case of the matrix sentence (m-case) remains un-realized. Even the sentence in (18-b) is acceptable for some speakers of German (German B in the terminology of Vogel, German A is the variant that does not accept these structures). Moreover, there is a great deal of crosslinguistic variation in the distribution of FRs, as is illustrated in (24). "M"("m") stands for m-case, "R"("r") for r-case, "-" marks the combinations where no FR construction is possible. Res (only in Modern Greek) means that in addition to the FR pronoun spelling out m-case, a resumptive clitic has to be used that has r-case.

(24) Typology of case conflict resolution in FRs (Vogel, 2001:12)

Conflict	Hindi	Engl.	Icel.	Ger.A	Ger.B	Gothic	M. Greek
m=NOM;r=ACC	-		M	R	R	R	M
m=NOM;r=OBL	-	-	M	R	R	R	Res
m=ACC;r=OBL	-	-	M	R	R	R	Res
m=ACC;r=NOM	-		M	R	-	M	M
m=OBL;r=NOM	-	-	M	-	-	M	M
m=OBL;r=ACC	-	-	M	-	-	M	M
m=r	-	FR	FR	FR	FR	FR	FR

The fact that the possibility of non-matching FRs varies considerably crosslinguistically seems to be strong evidence against an analysis in terms of ineffability and hence evidence in favor of global optimality. However, I will show that the data can be neatly accounted for in a modular architecture, and I will assume that the basic explanation for impossible FRs is indeed ineffability.

Recall that the attachment of case features to DPs in the proposed model does not happen in syntax proper, but at Chain Interpretation. It is driven by constraints that require the realization of specific cases on DPs which are assigned to the corresponding chains in Syntax. Thus a constraint such as PARSE NOM at Chain Interpretation[14] demands that nominative features which are assigned to a chain are realized on a corresponding DP.

I will assume that the FR pronoun constitutes a wh-moved DP in the specifier of a CP, but remain agnostic for whether the FR clause contains a D head as in Alexiadou and Varlokosta (1995) (25a), or not (Vogel, 2001) (25a):[15]

(25) a. Ich zerstöre [$_{\text{CP}}$ [FR$_i$ [$_{\text{C'}}$ $\_\__i$ mich ärgert]]
b. Ich zerstöre [$_{\text{DP}}$ Ø$_{\text{D}^0}$ [$_{\text{CP}}$ FR$_i$ [$_{\text{C'}}$ $\_\__i$ mich ärgert]]]

Crucially, Spec(CP) is assigned the case of the matrix verb, and the base position ($\_\__i$) the case of the embedded verb. Hence the chain FR$_i$ ... $\_\__i$ is assigned two cases, in (25), nominative and accusative. This means that the FR pronoun as the correspondent of FR$_i$ ... $\_\__i$ at the output of Chain Interpretation is subject to two Parse constraints.[16]

All accounts of the case conflict in FRs that we have encountered so far are based on the idea that a FR pronoun cannot realize two cases at the same time. I propose to capture this idea by the assumption that case affixes which contain two instances of case features (e.g. Nom and Acc) are illegible at Head Interpretation. In other words, an input I that leads to such a configuration as the output of Chain Interpretation leads

[14]Note that technically a constraint of the same form has a slightly different interpretation since it relates two feature structures while nominative is not a feature structure in syntax.

[15]There is still a vivid debate on the correct internal structure for FRs and relative clauses in general. See Alexiadou et al. (2000) for a recent overview of possible analyses.

[16]As an anonymous reviewer points out, the syntactic position of the FR plays a crucial role in determining whether the FR pronoun matches the case of the matrix verb. Thus in Modern Greek, left dislocated FRs do not match the case requirement of the matrix verb (Alexiadou and Varlokosta, 1995:21). With Alexiadou, I assume that in cases like this the FR is not in (or linked by movement to) an argument position, and the chains of the FR pronoun are only assigned one case. The discussion in the following will be restricted to FRs in (or linked to) argument positions.

to crash, and the grammar as a whole will not generate any output for I. On the other hand, I assume that Chain Interpretation *can* in principle produce structures with two case specifications in the same affix, and will do so, whenever the relevant PARSE constraints are ranked higher than all constraints that would disfavor such affixes. This is illustrated schematically in (26):

(26) Input: $[+\text{Acc}]_{\text{m-case}} \rightarrow \text{Chain}_i \leftarrow [+\text{Nom}]_{\text{r-case}}$

		PARSE Case	...
☞	DP_i [+Nom +Acc] ☨		
	DP_i [+Nom]	*!ACC	
	DP_i [+Acc]	*!NOM	

The chain Chain_i is assigned [+Nom] and [+Acc]. Since PARSE CASE is ranked above all other relevant constraints, both features are realized in the same feature structure, which induces crash at the interface. This is indicated in (26) by the cemetery sign ☨.

This analysis is based on the notion of Ineffability, not at the level of Head Interpretation (where vocabulary items are involved) but at Chain Interpretation. On a ranking as in (26), we get the distribution of FRs in languages such as Hindi, where no FRs are allowed. [17]

If Chain Interpretation also involves constraints requiring systematic feature neutralization (deletion) which serve to avoid two case features in a single affixes, we can account for the observed variation in other languages. Thus, we can assume a constraint such as *CaseCase[18] which banishes two case features in the same affix. I hypothesize further that PARSE Case actually consists of two subconstraints which require the realization of m-case and r-case: [19] For Icelandic we can then assume the ranking in (27). Since no affix ever leaves Chain Interpretation with two case features, FRs are possible for all case combinations. Since PARSE m-case is ranked over PARSE r-case, it is always m-case that is realized (see (24)). (27) illustrates this with the input already familiar from (26):

(27) Input: $[+\text{Acc}]_{\text{m-case}} \rightarrow \text{Chain}_i \leftarrow [+\text{Nom}]_{\text{r-case}}$ (Icelandic Ranking)

		PARSE m-case	*CaseCase	PARSE r-case
	DP_i [+Acc +Nom]		*!	
☞	DP_i [+Acc]			*
	DP_i [+Nom]	*!		

[17] Hindi has a correlative construction which is in many respects similar to FRs (Srivastav, 1991). But correlatives also occur in languages with FRs such as German. See Vogel (2001) for more discussion.

[18] This corresponds in function to Vogel's Ident(CASE).LF-PF, which also marks all FRs , (41),p. 24.

[19] PARSE m-case corresponds in function to Vogel's Matrix Integration (54), p. 30.

In **Gothic**, as in Icelandic, all case combinations lead to grammatical FRs. In contrast to Icelandic, the realized case does not depend on which case is m-case and which one is r-case, but on the relation between the cases: Whenever an oblique case appears in the context of a non-oblique, the oblique case surfaces. Whenever an accusative meets a nominative, the accusative surfaces. I implement these observations by means of the constraints PARSE +OBL/-OBL and PARSE ACC/ NOM. The first constraint means that an oblique case (dative, etc.) assigned to a chain should be realized if the chain is also assigned a non-oblique case (Nominative, Accusative). PARSE ACC/NOM requires the realization of accusative case if the chain is also assigned nominative.[20] The ranking in (28) then derives the FRs for Gothic:

(28) Input: $[+\text{Acc}]_{\text{m-case}} \rightarrow \text{Chain}_i \leftarrow [+\text{Nom}]_{\text{r-case}}$ (Gothic Ranking)

		PARSE +OBL/-OBL	PARSE ACC/NOM	*CaseCase	PARSE m-case	PARSE r-case
	DP_i [+Acc +Nom]			*!		
☞	DP_i [+Acc]					*
	DP_i [+Nom]		*!		*	

Recall from (24) that in **German B**, the more restrictive variant of German with respect to FRs, free relative constructions are excluded, if the r-case is nominative and the m-case is any other case[21], or if r-case is accusative and the m-case is oblique. For all other case combinations the FR construction is grammatical and the pronoun realizes r-case.

To derive German B, all that is necessary is to take the Gothic ranking and to rerank PARSE r-case over *CaseCase. For $[+\text{Nom}]_{\text{m-case}}$ $[+\text{Acc}]_{\text{r-case}}$, this leads to the situation that PARSE ACC/NOM and PARSE r-case both require the realization of accusative. Since this is the only relevant constraint ranked above *CaseCase, [+Acc] surfaces as the only case feature and the construction is grammatical:

[20] This implementation of the case hierarchy is analogue to the account of the distribution of direction markers in Trommer (2001b:ch. 7) and avoids the construction of language-particular feature hierarchies in Vogel (2001:28). Probably the same effect could be achieved by DO constraints that are closer to Vogel's Realise Case (relativised) (Vogel, 2001:(51):28).

[21] With the exception of *was* sentences which will be discussed in 5.3.

(29) Input: Input: $[+\text{Nom}]_{\text{m-case}} \rightarrow \text{Chain}_i \leftarrow [+\text{Acc}]_{\text{r-case}}$ (German B Ranking)

	PARSE r-case	PARSE +OBL/-OBL	PARSE ACC/NOM	*CaseCase	PARSE m-case
DP$_i$ [+Acc +Nom]				*!	
☞ DP$_i$ [+Acc]					*
DP$_i$ [+Nom]	*!		*		

If the roles are reversed, i.e. for $[+\text{Acc}]_{\text{m-case}}$ $[+\text{Nom}]_{\text{r-case}}$, PARSE r-case requires realization of [+Nom], and PARSE ACC/NOM the realization of [+Acc]. Since both are ranked above *CaseCase, both cases are realized, which leads to crash:

(30) Input: Input: $[+\text{Acc}]_{\text{m-case}} \rightarrow \text{Chain}_i \leftarrow [+\text{Nom}]_{\text{r-case}}$ (German B Ranking)

	PARSE r-case	PARSE +OBL/-OBL	PARSE ACC/NOM	*CaseCase	PARSE m-case
☞ DP$_i$ [+Acc +Nom] ✝				*	
DP$_i$ [+Acc]	*!				
DP$_i$ [+Nom]			*!		*

German A differs from German B only for the fact that the input of (30) leads to a grammatical output Thus (31) is ungrammatical in German B, but grammatical in German A (Vogel, 2001:8):

(31) *Er zerstörte, wer ihm begegnete*
he destroyed wo him:DAT met

This can be captured by ranking PARSE ACC/NOM below *CaseCase:

(32) Input: $[+Acc]_{\text{m-case}} \rightarrow \text{Chain}_i \leftarrow [+Nom]_{\text{r-case}}$ (German A Ranking)

	PARSE r-case	PARSE +OBL/-OBL	*CaseCase	PARSE ACC/NOM	PARSE m-case
DP$_i$ [+Acc +Nom]			*!		
DP$_i$ [+Acc]	*!				
☞ DP$_i$ [+Nom]				*	*

For $[+Nom]_{\text{m-case}}$ $[+Acc]_{\text{r-case}}$, the only relevant constraint above *CaseCase is PARSE r-case. This leads to (grammatical) realization of r-case, just as in German B.

In **English**, only FRs with identical m-case and r-case are allowed. We can derive this if we assume that one case feature can realize two (identical) case features, i.e., $[+Nom]_{i,j}$ can realize $[+Nom]_i$ *and* $[+Nom]_j$.[22] This raises the question why Hindi does not have the same option. But this can be blocked by a highranked constraint against features with more than one index (*F$_{i,j}$).

(33) Input: $[+Nom_p]_{\text{m-case}} \rightarrow \text{Chain}_i \leftarrow [+Nom_k]_{\text{r-case}}$ (Hindi ranking)

	PARSE m-case	PARSE r-case	*F$_{i,j}$	*CaseCase
☞ DP$_i$ [+Nom$_p$ +Nom$_k$] ✝			*	
DP$_i$ [+Nom$_{p,k}$]			*!	
DP$_i$ [+Nom$_p$]	*!$_p$			
DP$_i$ [+Nom$_k$]		*!$_k$		

As all affixes with two case features, [+Nom$_p$ +Nom$_k$] leads to crash at the interface to Head Interpretation, and no FR is possible. In English the ranking of *F$_{i,j}$ and *CaseCase is reversed. The output contains a doubly indexed single case feature which is legible for the interface and leads to a well-formed structure:

[22] Alternatively we might assume a constraint against a case affix with two identical case features (*Case$_i$Case$_i$).

(34) Input: [+Nom$_p$]m-case $\rightarrow$ Chain$_i$ $\leftarrow$ [+Nom$_k$]r-case (English ranking)

	PARSE m-case	PARSE r-case	*CaseCase	*F$_{i,j}$
DP$_i$ [+Nom$_p$ +Nom$_k$]			*!	
☞ DP$_i$ [+Nom$_{p,k}$]				*
DP$_i$ [+Nom$_p$]	*!p			
DP$_i$ [+Nom$_k$]		*!k		

Since FRs with two identical cases are allowed in all discussed languages apart from Hindi, *F$_{i,j}$ must be crucially undominated in these languages.

Modern Greek patterns with Icelandic in that the FR pronoun always realizes m-case. [23] However, if the r-case is dative (oblique)[24], this has to be realized by a resumptive clitic (Vogel, 2001:11 citing Alexiadou and Varlokosta, 1995:13)

(35) *Tha voithiso opjon tu dosis to onoma mu*
FUT help:S1 whoever:ACC cl:DAT give:S2 the name my
'I will help him whoever you give him my name'

I will follow Vogel (2001:23) who analyzes the resumptive clitic as the spell-out of a trace of the FR pronoun, and assume that such resumptive elements are normally excluded by a constraint that forbids multiple heads as correspondents of a chain (INTEGRITY). Note that this analysis fits nicely with the assumption that resolution of case conflicts in FRs is part of the evaluation process at Chain Interpretation. If INTEGRITY is ranked below PARSE +OBL/-OBL, but above PARSE ACC/NOM and PARSE r-case, it will be violated just in [+Nom]/[+Acc]m-case [Dat]r-case constellations, but not to satisfy one of the lower ranked constraints. Note that [+Acc] [+Dat] does not violate *CaseCase (nor lead to ineffability) since accusative and dative are part of distinct feature structures.

[23] with the exception of FRs which are not in argument position. See fn. 12

[24] Modern Greek not longer distinguishes dative (DAT) and genitive. The forms labeled here dative are labeled genitive by Alexiadou and Varlokosta (1995).

(36) Input: [+Acc]$_{\text{m-case}}$ $\rightarrow$ Chain$_i$ $\leftarrow$ [+Dat]$_{\text{r-case}}$ (M. Greek Ranking)

	PARSE m-case	*CaseCase	PARSE +OBL/-OBL	INTEGRITY	PARSE ACC/NOM	PARSE r-case
DP$_i$ [+Acc +Dat]		*!				
DP$_i$ [+Dat]	*!					
DP$_i$ [+Acc]			*!			*
☞ DP$_i$ [+Acc] [+Dat]				*		

For all other combinations, m-case will be the only output case. This is guaranteed by the crucially undominated constraints PARSE m-case and *CaseCase, just as in Icelandic.[25]

For all other languages which do not show resumptive pronouns we can simply assume that INTEGRITY is crucially undominated. (37) shows the proposed rankings for all constraints in the discussed languages. INTEGRITY is abbreviated as INT, *CaseCase as *CC and "PARSE" is omitted from the PARSE constraints. Thus, "r-case" stands for "PARSE r-case":

(37) Summary of Constraint Rankings

Hindi	INT, $\gg$ m-case,r-case $\gg$ *F$_{i,j}$ $\gg$ *CC $\gg$ +OBL/-OBL, ACC/NOM
Icelandic	INT,*F$_{i,j}$ $\gg$ m-case $\gg$ *CC $\gg$ r-case
Gothic	INT.*F$_{i,j}$ $\gg$ +OBL/-OBL, ACC/NOM $\gg$ *CC $\gg$ m-case,r-case
German B	INT,*F$_{i,j}$ $\gg$ r-case $\gg$ +OBL/-OBL, ACC/NOM $\gg$ *CC $\gg$ m-case
German A	INT,*F$_{i,j}$ $\gg$ r-case $\gg$ +OBL/-OBL $\gg$ *CC $\gg$ ACC/NOM $\gg$ m-case
English	INT,*F$_{i,j}$ $\gg$ m-case,r-case $\gg$ +OBL/-OBL, ACC/NOM, *CC
M. Greek	*F$_{i,j}$,m-case $\gg$ *CC $\gg$ +OBL/-OBL $\gg$ INT $\gg$ ACC/NOM $\gg$ r-case

It is crucial to note that under this account deletion of case features saves the construction from ineffability. This is intuitively the same thing that happens with neuter FRs in German that are otherwise predicted to be ill-formed (18-a). Under a morphological perspective *was* does not "realize two cases", but neutralizes the contrast of nominative and accusative, which implies that again feature deletion has taken place. In the next section, I will argue that this is due to the same type of constraints as the other cases of well-formed FRs.

5.3 Vocabulary-driven Ineffability

In all the cases discussed so far, there is no interaction between the constraints regulating Head Interpretation and the constraints of other grammar modules. This is no

[25] To block that, [+Dat]$_{FR}$ [+Acc]$_{Res}$ [+Acc]$_{FR}$ [+Dat]$_{Res}$. PARSE m-case must actually require that m-case is realized by the FR pronoun and not lower. I leave it open here how this can be implemented.

special virtue of my analysis. It is already implicit in Vogel's analysis and ultimately prescribed in the data where the resolution of case conflicts in FRs seems to be completely independent from the choice or inventory of vocabulary items. Given the proposed, modular architecture this and especially the data from Modern Greek strongly suggest that competition of this type happens at Chain Interpretation. This evidence renders the contrast in (18) repeated here as (38) especially problematic, since it seems to be governed by the inventory of vocabulary items.

(38) a. *Ich zerstöre, was mich ärgert*
I destroy what me upsets
'I destroy what upsets me'

b. **Ich zerstöre wer/wen mich ärgert.*
I destroy who:NOM/ACC me upsets
'I destroy who upsets me'

If this would be correct, competition in FRs would be determined by vocabulary items as well as by constraints of Chain Interpretation. This would be impossible under the modularity assumption and hence provide strong evidence against the architecture of DO.

The solution to this problem I propose is the following: The contrast in (38) is *not* the result of arbitrary neutralization in the inventory of vocabulary items. Rather the case neutralization in (38b) reflects a constraint against the coocurrence of [-masc] features and structural case features (*[-masc StructCase])[26] at Chain Interpretation. If this constraint is ranked above all PARSE constraints for case features, the case features of neuter DP chains will be completely deleted in the course of Chain Interpretation.

(39) Input: Input: $[+\text{Acc}]_{\text{m-case}} \rightarrow$ Chain $[+\text{Neut}]_i \leftarrow [+\text{Nom}]_{\text{r-case}}$

	*[-masc StructCase]	PARSE Gend	PARSE r-case	PARSE +OBL/-OBL	PARSE ACC/NOM	*CaseCase	PARSE m-case
DP_i [+Neut +Acc +Nom]	*!					*	
DP_i [+Neut +Acc]	*!		*				
DP_i [+Neut +Nom]	*!				*		*
DP_i [+Acc +Nom]		*!				*	
☞ DP_i [+Neut]			*		*		*

In contrast, for a [+masc] chain, *[-masc StructCase] has no effect and the optimal candidate has two case features leading again to crash:

[26] It might be desirable not to represent the gender features as part of the case affix. This would necessitate a slightly different implementation of this constraint. I leave this question open here.

(40) Input: Input: $[+\text{Acc}]_{\text{m-case}} \rightarrow$ Chain $[+\text{Masc}]_i \leftarrow [+\text{Nom}]_{\text{r-case}}$

	*[-masc StructCase]	PARSE Gend	PARSE r-case	PARSE +OBL/-OBL	PARSE ACC/NOM	*CaseCase	PARSE m-case
☞ DP$_i$ [+Masc +Acc +Nom]						*	
DP$_i$ [+Masc +Acc]			*!				
DP$_i$ [+Masc +Nom]					*!		*
DP$_i$ [+Acc +Nom]		*!				*	
DP$_i$ [+Masc]			*!		*		*

Put another way, the vocabulary item *was* does not cause neutralization. It does only reflect neutralization at a deeper level. Constraints at Chain Interpretation have the effect that Nominative and accusative are deleted in neuter categories, and the underspecified item *was* can be inserted that is not specified for case.[27]

There is additional evidence both for the claim that *was* is unspecified for case and for the "deep" character of case neutralization in neuter DPs.

In its interrogative reading, *Was* can also be used in contexts in which dative case is assigned.[28] Thus, the preposition *mit* assigns dative case (41a), but can also be used with *was*:

(41) a. *Mit was hat er sie erschlagen?*
with what has he them killed
'With what did he kill them?'

b. *mit dem blutigen Kinnbacken eines Esels*
with the:DAT bloody jaw:bone a-GEN donkey:GEN
'with a bloody jaw bone of a donkey'

The only case which systematically excludes *was* is the genitive, but there is also no other wh-item that could appear in this context and would imply neuter gender:[29]

(42) a. *der Titel des Buches*
the title the:GEN book:GEN
'the title of the book

b. *was Titel/*wessen Titel
'the title of what'

[27]Note that I do not claim with Bresnan (1999b) that the distribution of vocabulary items is completely determined by constraints. See Trommer (2001b:chapter 4) for discussion.

[28]This does not mean that *was* is possible in other contexts where dative is assigned. The point here is not to account for these rather complex restrictions, but to show that *was* is in principle compatible with dative case.

[29]*wessen Titel* is grammatical, if *wessen* refers to an animate referent.

Thus interrogative *was* is possible in all contexts where a neuter wh-word is possible at all. Since there is no reason to assume that interrogative pronouns are expressed by different vocabulary items than FR pronouns, this supports the assumption that *was* has no specification for case.

There is additional evidence that the case neutralization in neuter FRs is not an accidental property of a single vocabulary item. Actually, no neuter DP in German ever shows any differentiation between nominative and accusative. This is illustrated in the following examples for the different case-marking categories of the German DP (relevant items are boldface):

(43) **weak adjectival inflection:** 'a new one'

a. *ein neu-**er*** (Nom.)/ *einen neu-**en*** (Acc.)
b. *ein neu-**es*** (Nom./Acc.)

(44) **strong adjectival inflection:** 'the big one'

a. *der gross-**e*** (Nom.)/ *den gross-**en*** (Acc.)
b. *das gross-**e*** (Nom./Acc.)

(45) **Determiners:** 'the big one'

a. ***der** gross-e* (Nom.)/ ***den** grossen* (Acc.)
b. ***das** gross-e* (Nom./Acc.)

(46) **Relative pronouns:** 'the man which . . .'/'the house which . . .'

a. *der Mann **welcher*** . . . (Nom.) / *der Mann, **welchen*** . . . (Acc.)
b. *das Haus, **welches*** . . . (Nom/Acc.)

(47) **Personal pronouns:** 'he/it'

a. ***er*** (Nom.)/ ***ihn*** (Acc.)
b. ***es*** (Nom/Acc.)

(48) **Nouns:** 'the lion/the heart'

a. *der **Löwe*** (Nom.) /*den **Löwen*** (Acc.)
b. *das **Herz*** (Nom./Acc.)

To be sure, there is also accusative/nominative neutralization in masculine nouns. But this is neutralization of a rather different type. Thus, in (49) no case features are realized on the adjective and the noun:

(49) 'the lilac tiger'

a. *der lila Tiger* (Nom.)
b. *den lila Tiger* (Acc.)

However, in (50), which is syntactically identical to (49) in all crucial respects both categories show an overt case distinctions:

(50) 'the green lion'

a. *der grün**e** Löw-**e*** (Nom.)
b. *den grün-**en** Löw-**en*** (Acc.)

This suggests that the neutralization in (49) is driven by idiosyncratic features of single vocabulary items. In other words, this is the type of neutralization Marantz (1999) and Vogel (2001) claim to hold for the FR pronoun *was* which is argued here to be only a surface reflex of a "deeper" neutralization process. Of course it is possible to assume that all the neutralizations in (43) to (48) are due to accidental properties, but this seems to miss an important generalization in the morphosyntax of German DPs[30]

Similar effects as with German *was* arise with matching FRs in English. Consider for example the sentence in (51), where m-case is accusative and r-case nominative:

(51) I drank whatever there was

But also in English, case-neutralization is highly systematical which seems to make it amenable to a similar treatment as the *was* case in German.

Since the FR data can be accounted for in the global as well as in the modular architecture, the question arises if there are any principled differences between the two approaches. Note that it is no principled problem for the global account to incorporate the insight that neuter DPs neutralize the nominative/accusative distinction. But this would not be connected in any way to the grammaticality contrast in FRs. If the case neutralization in neuter noun phrases was not systematical, i.e. , if there were neuter categories in (43) to (48) that would not neutralize, this would falsify the proposed modular architecture, but not the global account. Thus the modular architecture makes much stronger predictions on possible languages.

6 Explaining Morphosyntactic Competition

Joan Bresnan has argued in a number of articles (Bresnan, 1996, 1999a,b) for a model of grammar where morphological and syntactic constraints are globally evaluated in the same evaluation procedure.

In contrast to the model of Vogel, her approach is based on Lexical Functional Grammar (LFG, see e.g. Bresnan, 2001 and Falk, 2001). In LFG, syntactic objects are represented by pairs of f-structures and c-structures, where f-structures are complex feature structures encoding mostly language-invariant and semantic properties of sentences, while c-structures are phrase structure representations including constituency and linear order. As a consequence, candidates in OT-LFG are f-structure/c-structure pairs and the inputs to morphosyntactic computation are single f-structures. (52) shows the two models in comparison:

(52)

	Input		**Candidates**
Vogel (2001)	LF_0	$\Rightarrow$	$[\mathrm{LF}_1,\mathrm{PF}_1]$, $[\mathrm{LF}_2,\mathrm{PF}_2]$, ...
Bresnan (1999a)	f-struct.$_0$	$\Rightarrow$	[f-struct.$_1$,c-struct.$_1$], [f-struct.$_2$,c-struct.$_2$], ...

[30] The same would have to be said about the same items in feminine DPs which show the same behavior as neuter DPs.

While the two models differ in implementation, they are identical in one point: There is only one morphosyntactic evaluation process.

Bresnan's arguments in the cited articles are mainly based on negation data in different dialects of English, which I will discuss in sections 6.2 to 6.7. In 6.1, I discuss the role of phonological spell-out in Bresnan's approach.

6.1 Phonological Spell-out in (Bresnan, 1999a)

Corresponding to the vocabulary items of DM, Bresnan assumes that the lexicon of a language contains pairings of morphosyntactic features and phonological content. Bresnan simply refers to these items as "pronunciation" and their role in the grammar is rather different from the one that is played by vocabulary items. Recall from section 2 that in German verb forms 1pl agreement is expressed by the [+pl] affix *-n*. The derivation of this fact in DO can be schematized as in (53):

(53) $$\begin{bmatrix} +1 \\ -2 \\ \text{+pl} \end{bmatrix} \Rightarrow \quad \text{Competition} \quad \Rightarrow \left\langle \begin{bmatrix} \text{+pl} \end{bmatrix} \leftrightarrow /n/ \right\rangle$$

Note that "Competition" in (53) actually comprises a sequential ordering of competition processes, and vocabulary items are only involved in the last one, namely head interpretation. In Bresnan's approach 'pronunciations' are not directly involved in any form of morphosyntactic competition. They just interpret the results of competition. This results in something like (54): The output of the competition process is $\begin{bmatrix} \text{+pl} \end{bmatrix}$ The deletion of +1 and -2 is probably caused by markedness constraint disfavoring these features in this context. That the choice of pronunciation is v"competition-free" is symbolized in (54) by the symbol $\Leftrightarrow$:

(54) $$\begin{bmatrix} +1 \\ -2 \\ \text{+pl} \end{bmatrix} \Rightarrow \quad \text{Competition} \quad \Rightarrow \begin{bmatrix} \text{+pl} \end{bmatrix} \Leftrightarrow \left\langle \begin{bmatrix} \text{+pl} \end{bmatrix} \leftrightarrow /n/ \right\rangle$$

Actually, (54) gives a wrong picture of Bresnan's representations. Pronunciations refer to parts of c-structure associated with f-structure. It is not clear if Pronunciations can spell-out single heads or if they always refer to words. The examples Bresnan gives seem to favor the latter hypothesis. Thus, she gives something like the following[31] (Bresnan, 1999a:35):

(55) $$isn't : \left\langle V_f^0 + ninfl \begin{bmatrix} BE \\ PRES \\ 3 \\ SG \\ NEG \end{bmatrix} \leftrightarrow /n/ \right\rangle$$

[31] This example is reconstructed from the corresponding 1st person form, which according to Bresnan is zero (**amn't*). See the discussion below.

6.2 English Negation

Bresnan claims that syntactic constructions sometimes block morphological ones. She illustrates this with the expression of negation in different dialects of English. For example, in Hawick Scots, three possible realizations of negation exist which appear in different (partially overlapping) morphosyntactic contexts: *nae*, a clitic usually adjoined to IP, *n't*, a suffix, and *no*, a full form. An adequate analysis must then fix for every syntactic configuration which markers is possible and which are not.

Bresnan starts from the observation that there are different means to express negation in different languages and often even in one and the same language. (affixes, negation verbs, etc.) Bresnan relates the choice of a negation strategy one by one to different markedness constraints. (p. 22)

(56)

Negation Strategy	**Markedness Constraints**
Analytic negation adjoined to C,I,V,VP	*NEG-C, *NEG-I, *NEG-V, *NEG-VP
Negation by an affix on an auxiliary	*NINFL-V^0_f
Negation by an affix on a lexical verb	*NINFL-V^0_{lex}
Negation lexicalized as a verb	*NEG-LEX-V

As long as no other constraints interfere, the choice of negation type simply depends on the ranking of these constraints: Everything else equal, The strategy which corresponds to the lowest-ranked markedness constraint is chosen since it involves the least serious constraint violations.

But, as there are different means and positions to express negation, there are also different semantic scope positions which are expressed by the position of negation. The following faithfulness constraint requires that scope is overtly marked in the output Bresnan (1999a:24):

(57) **FAITH**^{NEG}**:** preserve input scope of negation in the output

In Hawick Scots, sentence negation, Neg is expressed by *nae*, which is analyzed by Bresnan as the marker for negation adjoined to INFL. The appearance of *nae* in sentence negation is then accounted for by the following ranking (58). As expected, *nae* as the marker corresponding to the lowest-ranked markedness constraint (*NEG-I) is chosen. The input scope is represented in (58) schematically by bracketing (Bresnan, 1999b:14):

(58) Input: ¬(POSS(work(he)))

		*NEG-C	FAITH^{NEG}	*NEG-VP	*NINFL-V^0_f	*NEG-I
	he couldn't work				*!	
☞	he couldnae work					
	he could no work			*!		

A different result is obtained for questions, where we find the negation markers *n't* and *no* instead. *n't* according to Bresnan is an affix attached to *could* while *no* expresses negation adjoined to VP. By assumption (i.e., by crucially higher ranked constraints), I in Hawick Scots questions must appear in the sentence-initial complementizer position C. For this reason, the constraint *NEG-C, which was irrelevant in (58) becomes decisive, since *nae* (now in C) would now violate the highest-ranked markedness constraint. *no* and *n't*) avoid this violation, *no* since it is lower than C and *n't* since it is not adjoined to C, but an affix. Bresnan (1999b:14):

(59) Input: Q(¬(POSS(work(he))))

		*NEG-C	FAITH^{NEG}	*NEG-VP	*NINFL-V^0_f	*NEG-I
☞	couldn't he work?				*	
	couldnae he work	*!				
☞	could he no work			*		

Standard English is analyzed by Bresnan in a similar way, using the same constraints:

(60) Input: ¬(POSS(work(he)))

		*NEG-C	FAITH^{NEG}	*NEG-VP	*NINFL-V^0_f	*NEG-I
☞	he can't have been working					*
☞	he cannot have been working				*	
	he can not have been working			*!		

Bresnan uses the orthographically contracted form *cannot* to express Neg adjoined to VP (Scots *nae*), which is not phonologically different from Neg in I in Standard English (*can not*). *NEG-VP is ranked higher here than the tied constraints *NEG-I and *NINFL-V^0_f which means preference for the two possibilities where Neg is not adjoined to VP. For the same reasons as in Hawick Scots, in interrogatives only “reduced” negation is possible:

(61) Input: Q(¬(POSS(work(he))))

	*NEG-C	FAITH^{NEG}	*NEG-VP	*NINFL-V^0_f	*NEG-I
☞ can’t he have been working?					*
cannot he have been working?	*!			*	
can he not have been working?			*		

What makes these data awkward is the fact that these constraints seem to interact with morphophonological constraints. This seems to be true in the case of the impossible combination **am’nt*. In declaratives, where **am’nt* would be expected, in analogy to the corresponding contracted 3rd person form (*Isn’t he working*), only *am not* is possible:

(62) Input: declarative

	*am’nt	*NEG-C	FAITH^{NEG}	*NEG-VP	FAITH$^{P\&N}$	*NINFL-V^0_f	*NEG-I
I amn’t working	*!					*	
I aren’t working				*	*!	*	
☞ I [am not] working							*
I am [not working]				*!			

While **am’nt* is also impossible in interrogatives, here the conflict is resolved in a different way. The default form *are* is used instead of the 1sg form *am*. This leads to a violation of the constraint FAITH$^{P\&N}$ which requires the realization of person and number features. This violation is tolerated to avoid the violation of the higher ranked *AMN’T. In contrast to the declarative input, the analytic form *am not* is impossible since this would violate *NEG-C, which is again higher ranked than *NINFL-V^0_f and *NEG-I:

(63) Input: interrogative

		*am'nt	*NEG-C	FAITH^{NEG}	*NEG-VP	FAITH$^{P\&N}$	*NINFL-V^0_f	*NEG-I
	Amn't I working	*!					*	
☞	Aren't I working					*	*	
	Am not I working		*!					*
	Am I [not working]				*!			

The general point these data provide in favor of an global OT account is the following: We have one conflict (the otherwise perfect form *amn't* cannot appear), and instead two different strategies are used. In declarative contexts (62), a different syntactic construction is used instead (analytical *am not*). In an interrogative context, **amn't* is replaced by a minimally less specified item (*aren't*). To describe the first solution, we need syntactic constraints (e.g. *NEG-VP), for the second one spell-out constraints (*AMN'T and FAITH$^{P\&N}$). To describe both scenarios, the two kinds of constraints have to interact. This means globality of constraint evaluation.

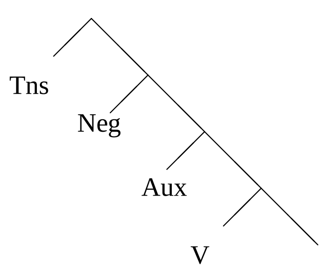
6.3 Why English Negation does not imply global competition

While Bresnan's arguments seem rather compelling, they depend crucially on the model of grammar Bresnan presupposes. In this section I show how the data can be derived in a postsyntactic account. To start with, we have to determine the relevant syntactic structures which form the input at Head Interpretation. Consider the sentences in (64):

(64) a. *Isn't she coming?/*Is not she coming.*
b. *She isn't coming/ she is not coming.*
c. **Is shen't coming./?Is she not coming?*

For all negated sentences, I assume the following basic phrase structure:

(65)



With Frampton (2001), I assume that in (65b) the auxiliary (Aux) has moved to Tense and attracted the negation head (Neg) (66b)[32]. In questions, this complex has moved to

[32] Wilder (1997)345 argues that *not* is not "a head governing VP, but a phrasal satellite, like an adverbial." This analysis is in principle also compatible with the account of reduction proposed in the next section as

the question head Q in the complementizer position to yield (66a). (65c) corresponds to (66c). This option seems to be only magically possible in Standard dialects of English. I assume that it results in dialects or registers where there is no obligatory attraction of Neg to Aux. See section 6.6 for more discussion.

(66) a. [[[Aux Tense] Neg] Q]
b. [[Aux Tense] Neg]
c. [[Aux Tense]Q] . . . [Neg]

Since both, (66a) and (66b), form spell-out domains, the competition between *isn't* and *is not* happens at Head Interpretation inside the predicted locality domain. No matter how this competition is modeled in detail, it can be located in one module of the grammar (Head Interpretation) and no violation of the modularity assumption is necessary. In the following sections, I develop two possible analyses. The starting point is the assumption of two vocabulary items for negation:

(67) a. /not/ $\leftrightarrow$ [+Neg]
b. /n't/ $\leftrightarrow$ [+Neg]

There are two options to account for the different distribution of /n't/ and /no/ in (64): By lexical stipulation or by additional constraints. Frampton (2001) assumes the first alternative. In the appendix, I will sketch how his account can be rephrased in DO. In the next section, I will explore the second possibility.

6.4 An Alternative Analysis

The idea behind the constraint based analysis I will propose is to formalize the well-documented observation that elements which are syntactically bound tend to be phonologically reduced. Clearly, /n't/ is a reduced form of /not/, and Neg in the head adjunction structures (HAS) of (66) exhibits different degrees of embeddedness. Thus we have the hierarchies in (68): "Free" refers to (66-c) where Neg is not part of a HAS, "peripheral" to (66-a) where it is the outermost head of a HAS, and "embedded" to a Neg that is deeper embedded in a HAS (66-a). I leave it open here what is the exact phonological correlate of weak and strong:

(68) a. **Phonological weight:** Strong form $\gg$ weak form
b. **Embededness:** Free $\gg$ Peripheral $\gg$ Embedded

Now interestingly, the two hierarchies correlate: The less embedded a negation marker is in the terms of (68b), the more likely is it to be weak. This is shown schematically in (69):

long as the vocabulary item *not* is not related one-by-one to "phrasal" negation.

(69)

	Syntactic Structure	Description	Reduction
a.	[[[Aux Tense] Neg]Q]	Embedded part of a HAS	Reduction obligatory
b.	[[Aux Tense] Neg]	Peripheral part of a HAS	Reduction possible
c.	[Aux Tense] . . . [Neg]	Not part of a HAS	Reduction impossible

This observation can be captured by harmonic alignment (Prince and Smolensky, 1993; Aissen, 1999) of the two hierarchies in (68) into the following fixed constraint hierarchies:[33]

(70) a. *strong/Embedded $\gg$ *strong/Peripheral $\gg$ *strong/Free
b. *weak/Free $\gg$ *weak/Peripheral $\gg$ *weak/Embedded

In the following I will show how the distribution of negation markers follows from an interspersing of these constraint hierarchies with other constraints, where the constraints are roughly ranked as follows:

(71) *weak/Free $\gg \ldots \gg$ *strong/Embedded $\gg \ldots \gg$
$\left\{ \begin{array}{l} \textbf{*strong/Peripheral} \\ \textbf{*weak/Peripheral} \end{array} \right\} \gg \ldots \gg \left\{ \begin{array}{l} \text{*strong/Free} \\ \text{*weak/Embedded} \end{array} \right\}$

Crucially *strong/Peripheral and *weak/Peripheral are tied, i.e. not ranked with respect to each other which accounts for the optionality of *not* or *n't* in declaratives. Note that all these constraints are relativized to specific input structures, and are irrelevant for other inputs. For example, if Neg is embedded, all constraints over free and peripheral inputs are vacuously satisfied. In the following I will omit all constraints that are irrelevant in this way from discussion and from the tableaux. (72) to (74) show how the data from (64) can be captured. For comprehensibility, full sentences are given. The items that are actually involved in the evaluations are in boldface:

(72) **Input:** [[[Aux Tense] Neg]Q] (embedded Neg)

		*strong/Embedded	*weak/Embedded
☞	**Isn't** she coming?		
	Is not she coming?	*!	

(73) **Input:** [[Aux Tense] Neg] (Peripheral Neg)

		*strong/Peripheral	*weak/Peripheral
☞	She **isn't** coming		*
☞	She **is not** coming	*	

[33] In de Lacy (2001) and Trommer (2001a) it is argued that harmonic alignment and hence (universally) fixed constraint ranking can be dispensed with. This is also possible for the analysis of negation presented here. Thus, the constraints in (70) could be replaced by *strong/Adjoined and *strong/Embedded where Adjoined = {Embedded or Peripheral}, and a counter constraint *weak/X under the ranking *strong/Adjoined,*weak/X $\gg$ *strong/Embedded. Since the pro and contra of fixed constraint rankings is not crucial in this paper, I will adopt harmonic alignment here as the more common means to relate markedness hierarchies to constraints.

(74) **Input:** ([[Aux Tense]Q] . . .) [Neg] (free Neg)

		*weak/Free	*strong/Free
	Is she **n't** coming?	*!	
☞	Is she **not** coming?		*

Let us now look at the corresponding sentences in the 1st person:

(75) a. **Amn't I coming?/*Am not I coming?/Aren't I coming.*
b. **I amn't coming/ I am not coming.*
c. **Am In't coming/?Am I not coming?*

The simplest case is (75b). Here I assume that a high-ranked morphophonological constraint against the sequence **amn't* prevents *I amn't coming*. Note that we also have to exclude forms with *are* instead of *am*, which we find in (75a). This is achieved by PARSE PER-NUM which stands here as a shorthand for all relevant PARSE constraints.

(76) **Input:** [[Aux Tense] Neg] (Peripheral Neg)

		*AMN'T	PARSE PER-NUM	*strong/Peripheral	*weak/Peripheral
	I **amn't** coming	*!			*
☞	I **am not** coming			*	
	I **aren't** coming		*!		*
	I **are not** coming		*!	*	

In interrogative sentences as in (75-a), *strong/Embedded and hence the ranking of this constraint with respect to PARSE PER-NUM becomes relevant. Since *strong/Embedded is ranked higher, the form *aren't* is chosen which does not realize the underlying person and number features, but satisfies *strong/Embedded:

(77) **Input:** [[[Aux Tense] Neg] Q] (Embedded Neg)

	*AMN'T	*strong/Embedded	PARSE PER-NUM	*weak/Embedded
Amn't I coming?	*!			*
Am not I coming?		*!		
☞ **Aren't** I coming?			*	*
Are not I coming?		*!	*	

Finally, if negation is "stranded" below the subject, Neg forms its own spell-out domain. The only relevant *strong constraint is ranked below *weak/Peripheral. Therefore, the full form is chosen:

(78) **Input:** [Neg] (Free Neg)

	*weak/Free	*AMN'T	PARSE PER-NUM	*strong/ Free
Am I **n't** coming?	*!			
☞ Am I **not** coming?				*
Are I **n't** coming?	*!		*	
Are I **not** I coming?			*!	*

6.5 Hawick Scots

Negation in Hawick Scots a Scottish dialect of English also treated by Bresnan, differs from English only in small details. First, there is no ban on *amn't*, Hence there is no difference between negation with 1sg and other forms. Second, as noted before, there are three negation markers. /no/ and /n't/ which roughly correspond to Standard English /not/ and /n't/ and the phonological clitic /nae/. (79) hows the distribution of these markers:

(79) a. *Am no I happy?/*Amnae I happy?/Amn’t I happy?*
b. *I am no happy/I amnae happy/*I amn’t happy*
c. *Am I no happy?/*Am I nae happy?/*Am I n’t happy?*

It is natural to extend the phonological height hierarchy from (68-a) to (80):

(80) **Phonological weight hierarchy:** Strong form (no) ≫ clitic ≫ weak form

But, since harmonic alignment is based on binary scales, I assume that this is decomposed in two binary hierarchies, as in (81)

(81) a. [+dependent] ≫ [-dependent]
b. [+deficient] ≫ [-deficient]

“deficient” (+def) corresponds to not including a potential syllable nucleus (a vowel, /n’t/). “dependent” (+dep) refers to prosodic dependency i.e. the incapacity of an item to form a prosodic word on its own, which seems to be true of /n’t/ and /nae/. (82) shows the assumed feature values for the Hawick Scots negation markers:

(82)

	+dep	**-dep**
+def	*n’t*	–
-def	*nae*	*no*

Again, phonological weight corresponds closely to syntactic embeddedness:

(83)

	Syntactic Structure	**Description**	**Reduction**
a.	[[[Aux Tense] Neg]Q]	Embedded part of a HAS	[+dep +def] (*n’t*)
b.	[[Aux Tense] Neg]	Peripheral part of a HAS	[-def] (*nae*,*not*)
c.	[Aux Tense] . . . [Neg]	Not part of a HAS	[-dep -def] (*no*)

Harmonic alignment of the scales in (81) with the embeddedness scale from (68-b) gives the constraint rankings in (84):

(84) a. *dep/Free ≫ *dep/Peripheral ≫ *dep/Embedded
b. *ndep/Embedded ≫ *ndep/Peripheral ≫ *ndep/Free

(85) a. *def/Free ≫ *def/Peripheral ≫ *def/Embedded
b. *ndef/Embedded ≫ *ndef/Peripheral ≫ *ndef/Free

To account for the distribution of the single markers, the constraint ranking must include the three subrankings in (86):

(86)

a. *ndep/Embedded,*ndef/Embedded ≫ *dep/Embedded,*def/Embedded
b. *def/Peripheral ≫ *dep/Peripheral,*ndep/Peripheral ≫ *ndef/Peripheral
c. *dep/Free, *def/Free ≫ *ndep/Free, *ndef/Free

In (86a), *ndep/Embedded,*ndef/Embedded are ranked highest which ensures that the negation markers in standard questions will be [+dep +def], hence /*n't*/. In a symmetric fashion the high-ranking of *dep/Free,*def/Free ensures a [-dep -def] element for free negation, which is /*not*/. The tied ranking of *dep/Peripheral,*ndep/Peripheral has the effect that /*no*/ and /*nae*/ are equally harmonic in declaratives. Since *def/Peripheral is ranked higher and *ndef/Peripheral lower than these constraints the [+def] element /*n't*/ is excluded in this position. Since the options Embedded/Peripheral and Free are mutually exclusive, the constraints from a., b. and c. in (86) do not interact. Thus, all that we need is an overall ranking which obeys the subrankings in (86) and (84):

(87)
$$\left\{\begin{array}{l}\text{*dep/Free}\\ \text{*def/Free}\end{array}\right\} \gg \text{*def/Peripheral} \gg \left\{\begin{array}{l}\text{*ndep/Embedded}\\ \text{*ndef/Embedded}\end{array}\right\} \gg$$
$$\left\{\begin{array}{l}\text{*dep/Peripheral}\\ \text{*ndep/Peripheral}\end{array}\right\} \gg \text{*ndef/Peripheral} \gg \left\{\begin{array}{l}\text{*dep/Embedded}\\ \text{*def/Embedded}\end{array}\right\} \gg$$
$$\left\{\begin{array}{l}\text{*ndep/Free}\\ \text{*ndef/Free}\end{array}\right\}$$

6.6 Ineffability Again

Bresnan (1999b:17) hints at the possibility that there are speakers that spell out sentence negation by *Am I not working?* instead of **Amn't I working?* and *Aren't I working?* i.e. the latter are outranked. If **Amn't I working?* and *Am I not working?* are candidates in the same competition involving *AMN'T, this cannot happen at Head Interpretation, since the subject *I* is not part of the same spell-out domain as *am*. Again, this seems to force us to give up modular constraint evaluation. But, as Alec Marantz Marantz (2000:3) points out, Bresnan's analysis

(88) "makes the prediction that dialects that allow *Am I not leaving?* instead of *Aren't I leaving?* should disallow *Is he not leaving?*. That is, *Am I not leaving?* should be much better as a sentential negation than *Is he not leaving* in such dialects since *amn't drives the grammaticality of *Am I not leaving?* while *isn't* is a fine word. However Bresnan presents no evidence that there is such a ^{ok}*Am I not leaving?/*Is he not leaving?* dialect, and discussions with native speakers of *??Aren't I leaving?* dialects suggests that there is no such dialect. Thus Bresnan's specific proposals are untenable, regardless of the the theoretical assumptions."

This means that in dialects where *Amn't I leaving?* is ungrammatical and cannot be replaced by **Aren't I leaving?*, we have again ineffability.[34] In the modular approach, advocated in this paper, this can be captured by assuming that high-ranked *AMN'T leads to an output for the underlying sentence where Neg is not spelled out at all. (Note that in the preceding tableaus I have assumed silently that PARSE +Neg is ranked high enough to prohibit the null parse for Neg.)

[34]See Frampton (2001) for more discussion of the empirical evidence that ineffability in this domain exists.

(89) **Input:** [[[Aux Tense] Neg] Q] (Embedded Neg)

	*AMN'T	*strong/Embedded	PARSE PER-NUM	PARSE NEG
Amn't I coming?	*!			*
Am not I coming?		*!		
Are not I coming?		*!	*	
Aren't I coming?			*!	
☞ **Am** I coming?				*

Following the approach of Frampton (2001) we can make the plausible assumption that [+Neg] is an irrecoverable feature. Hence, the optimal candidate is *Am I leaving?*, which is irrecoverable, and therefore ill-formed. But since it is optimal at Head Interpretation, no other candidate can be used instead.

6.7 How to treat Paradigm Gaps

As is predicted by the modular architecture of DO, morphophonological constraints such as *AMN'T are evaluated locally. Thus, this account is superior conceptually to the one by Bresnan since it is more restricted. But Bresnan's account is also problematic empirically, as we saw in the last section, since it predicts competition effects that are not documented. Finally, the account in terms of morphophonological constraints determining the choice of negation markers, predicts the phonological differences between the negation markers in Standard English and Hawick Scots. These are completely accidental in Bresnan's account. Taken together, an approach using local morphological competition seems to give a better account of the data.

In the rest of this section, I will briefly discuss one further difference of my analysis to Bresnan's account. Bresnan claims that the ban on **amn't* can be derived in her framework "...by means of a universal constraint ..." (99b:17), elaborated in Bresnan (1999a). The assumption there is that the pronunciation of the negated form for *be* (i.e. for non-existing **amn't*) is zero. Bresnan now assumes a high-ranked constraint LEX that forbids such zero pronunciations and therefore favors other forms. In other words, there is no constraint like *AMN'T, but an empty pronunciation that corresponds to this (expected) form, and a constraint that blocks the empty pronunciation.

I think that this account in no way is an improvement over a constraint like **AMN'T*, since it introduces an item which is not only zero (which is impossible in the more restricted framework of DO) but also never surfaces, since its only sense of being is to favor other candidates. In fact, this means two zero items since the verb stem

as well as negation are zeroified. The proposal also runs counter to the spirit of Bresnan's approach, where the Lexicon is claimed "not to be the source but the result of syntactic variation (99b:2). Finally the assumed universal constraint" (LEX) "is used only for truly accidental gaps" (99b:35, fn. 35). Again, this underlines the stipulative nature of Bresnan's account and makes a morphological constraint against **amn't* as least as plausible.

7 Modularity and Restrictiveness

A major appeal of a modular architecture is its restrictiveness. If a module M_1 generates the input of a second module M_2, it is predicted that M_1 influences (via its output) M_2, but that there is no comparable influence in the opposite direction. Thus, much of the work on the morphology/syntax interface in the eighties and in the early versions of the Minimalist Program (Chomsky, 1995) followed the idea that morphology consists of an autonomous word-formation module that feeds syntactic computations. In such a "lexicalist" model, morphology drives syntax, but not vice-versa. However, plenty of evidence has been amassed that morphological structure is in many ways sensitive to syntactic structure (see Marantz, 2001 and Trommer, 2001b:ch. 2 for recent discussion), and the English negation data discussed in section 6 constitute a further piece of evidence supporting this conclusion: A lexicalist model has no way to cope with the problem that *am not* competes with *amn't*. The competition which would be necessary to do so cannot be located in Morphology, since *am not* under this approach is not a morphological object. And it cannot be located in syntax because a morphological constraint has to be evaluated (*AMN'T).

Hence, the modularity assumption seems to have failed.[35] However, it has never been convincingly shown that morphology really drives syntax in the sense that syntactic computations are sensitive to morphological details. Symptomatically even work started under the assumption of such an influence comes to the conclusion that the influence is just the other way around (cf. Bobaljik, 1995)[36] In the preceding sections, I have argued that two sets of data which seem to show that morphological detail influences syntactic computation can be fruitfully reanalyzed in terms of constraint evaluation restricted to Head Interpretation or Chain Interpretation. Thus, syntactic case neutralization (at Chain Interpretation) in Free Relative construction enforces neutralization at the level of vocabulary items (at Head Interpretation), as we saw for the *was* case in section 5 . But idiosyncratic constraints at Head Interpretation cannot influence the evaluation process selecting optimal syntactic structures, as was shown for the ban in *amn't* in section 6. These results strengthen further the hypothesis that syntax

[35]Lexicalist approaches usually assume that the morphology component generates word-internal phrase structures and provides a phonological spell-out for these structures. While spell-out in DO happens at Head Interpretation for all structures, it is in principle possible that there are two structure-building devices, (one for word-internal and one for word-external syntax) interacting in a specific manner. Such a proposal is put forth in Ackema and Neeleman (2000b). Since the same authors seem also to assume that spell-out is sensitive to word-external context (Ackema and Neeleman, 2001), this seems to open up a further dimension of modularity. Here, I assume with Marantz (2001) that the distinction between word-internal and -external syntax is captured in terms of different syntactic configurations in the same syntactic module.

[36]Bobaljik discusses the fact that the (im)possibility of AgrS and Tense coocuring in a single verb form (e.g. **hint-ed-s*) covaries with certain syntactic properties such as the possibility of object shift and the acceptability of Transitive Expletive Constructions. In chapter 1 of his thesis, he proposes an account where the syntactic facts follow from the morphological restriction. In chapter 5 he revises the analysis and comes to the conclusion that the morphological constraint is just a consequence of a syntactic parameter.

triggers morphology, but not vice versa. If this turns out to be correct, it should be reflected in some way in our conception of Universal grammar. The architecture of DO as proposed in this paper is a concrete proposal how this goal can be achieved.

8 Summary

In this paper I have shown that crucial data which have been used to argue for global competition in OT-morphosyntax can be reanalyzed in a framework with a modular structure, closely related to the assumptions of Distributed Morphology. Moreover, the modularity assumption has led us to the discovery of an important asymmetry in German case neutralization, which has no status in a global approach but is predicted by the modular architecture. A modular analysis of English negation has also be shown to be empirically superior to the global analysis provided by Bresnan (1999a). Finally, it was shown that lexicalist approaches to modularity in fact lead to the problems which seemed to speak against modularity in general.

A Appendix: Reconstructing the analysis of Frampton (2001) in DO

Frampton (2001) criticizes the approach of Bresnan (1999a) from the perspective of derivational Distributed Morphology, and develops an account of the data discussed in 6.2 that also avoids global morphosyntactic competition but is based on syntactic mechanisms rather than on morphophonological constraints. In this appendix, I show how his account can be restated in DO.

Frampton assumes stipulations in the Vocabulary items for *n't* and *not* regarding their distribution. Thus we can assume something like (90), where the context restriction "/HAS" restricts /n't/ to the position internal to a head adjunction structure, and "/Free" restricts /not/ to the complementary environments:

(90) a. /not/ $\leftrightarrow$ Neg /Free
     b. /n't/ $\leftrightarrow$ Neg / HAS

(91b) shows the structure Frampton assumes as the output of syntax (Frampton, 2001:6) for *isn't* or *is not* in a declarative sentence such as (91a):

(91) a. John is not/isn't tall
     b. $\ldots$ [[$<$ be $>_i$ Tns] Neg$_j$] Neg$_j$ $<$ be $>_i$

To account for the optionality of *isn't* vs. *is not* in this construction he assumes that Neg – which otherwise has to be spelled out in the head position of the chain – can be spelled out in its base position if this is adjacent to the head position.This can be translated into DO by the assumption that chain interpretation gives us two possible outputs:

(92) a. $\ldots$ [[$<$ be $>_i$ Tns] Neg$_j$] $\cancel{\text{Neg}_j}$ $\cancel{<\text{be}>_i}$

b. $\ldots [[< \text{be} >_i \text{ Tns }]\ \cancel{\text{Neg}_j}\ ]\ \text{Neg}_j\ \cancel{< \text{be} >_i}$

Since context restrictions in DO are not violable, at Head Interpretation, only /n't/ can be inserted for Neg in (92a), and in (92b) only /not/ can be used.

As in the approach developed in section in 6.4 , Frampton assumes a filter that blocks the insertion of /n't/ in the context of /am/. The effect is again an output where Neg is not realized, and the non-realization of negation leads to absolute ill-formedness. Thus, the first person form of (92a) leads to no grammatical output at all (i.e., ineffability), while (92b) is correctly realized as ... /am/ /not/ .... This differs from the account in 6.4 where only one input for Head Interpretation was assumed, and /amn't/ was assumed to be blocked by /am not/.

In inverted questions, this account leads also to ineffability. Since now the chain positions of Neg are not adjacent, chain interpretation yields only one input to head interpretation, where Neg is inside a head adjunction structure:

(93) [[[be Tns] Neg] Q]

If *AMN'T and PARSE PER-NUM are crucially undominated, this leads to an output containing /*am*/ but no item corresponding to negation, i.e. we have again ineffability. According to Frampton (2001:7), this state of affairs corresponds to the grammar of English at the historical time when *amn't* became ungrammatical. In his analysis, the functional problems which resulted from the unavailability of a grammatical form, where solved in the course of language development by the introduction of an additional filter blocking /*am*/ in the context of Neg and Q. In DO terms we would get something like (94):

(94) **Input:** [[[be Tense] Neg] Q]

	IMPOVERISH be,1,sg / Neg,Q	*AMN'T	PARSE PER-NUM	PARSE NEG
Amn't I coming?	*!	*		
Am I coming?	*!			*
☞ **Aren't** I coming?			*	
Are I coming?			*	*!

The IMPOVERISH constraint requires that 1sg (i.e., *am*) is not realized if the input of Head Interpretation contains Q and Neg, Note that this has different effects than the constraint *AMN'T, which refers only to the output of head interpretation. For this reason, the IMPOVERISHMENT constraint is violated by all candidates (with or without overt negation) that contain /*am*/ while *am*-forms do not violate *AMN'T as long as the sequence *amn't* is avoided.

References

Ackema, P. and Neeleman, A. (2000a). Absolute ungrammaticality. In Dekkers, J., van der Leeuw, F., and van de Wijer, J., editors, *Optimality Theory; Phonology, Syntax, and Acquisition*, pages 279–301. Oxford University Press, Oxford.

Ackema, P. and Neeleman, A. (2000b). Competition between syntax and morphology. In Grimshaw, J., Legendre, G., and Vikner, S., editors, *Optimality-Theoretic Syntax*, pages 29–60. MIT Press, Cambridge, MA.

Ackema, P. and Neeleman, A. (2001). Context-sensitive spell-out and adjacency. Handout of a talk given at the Third Mediterranean Morphology Meeting, Barcelona, September 20 - 23, 2001. Abstract available under: http://www.iula.upf.es/mmm3ab17.htm.

Aissen, J. (1999). Markedness and subject choice in Optimality Theory. *Natural Language and Linguistic Theory*, 17:673–711.

Alexiadou, A., Law, P., Meinunger, A., and Wilder, C. (2000). Introduction. In Alexiadou, A., Law, P., Meinunger, A., and Wilder, C., editors, *Relative Clauses*, pages 1–51. John Benjamins.

Alexiadou, A. and Varlokosta, S. (1995). The syntactic and semantic properties of free relatives in modern greek. In *ZAS Working Papers in Linguistics*, pages 1–30. Zentrum für Allgemeine Sprachwissenschaft, Berlin.

Bobaljik, J. D. (1995). *Morphosyntax: The Syntax of Verbal Inflection*. PhD thesis, MIT.

Bresnan, J. (1996). Morphology competes with syntax: Explaining typological variation in weak crossover effects. In Hagstrom, P., McGinnis, M., and Pesetsky, D., editors, *Is the Best Good Enough?*, pages 59–92. MIT Press.

Bresnan, J. (1999a). Explaining morphosyntactic competition. In Baltin, M. and Collins, C., editors, *Handbook of Contemporary Syntactic Theory*, pages 1–44. Oxford:Blackwell.

Bresnan, J. (1999b). The lexicon in Optimality Theory. paper presented to the 11th Annual CUNY Conference on Human Sentence Processing, Special Session on the Lexical Basis of Syntactic Processing: Formal and Computational issues, Rutgers University, March 20, 1998.

Bresnan, J. (2001). *Lexical-Functional Grammar*. Oxford: Blackwell.

Chomsky, N. (1995). *The Minimalist Program*. MIT Press.

Croft, W. (1990). *Typology and Universals*. Cambridge University Press.

de Lacy, P. (2001). Conflation and scales. In P.Menendez-Benito, editor, *NELS*. GLSA Publications.

Dimmendaal, G. J. (1983). *The Turkana Language*. Foris Publications - Dordrecht.

Falk, Y. (2001). *Lexical-Functional Grammar. An Introduction to Parallel Constraint-Based Syntax*. Stanford, CA: CSLI Publications.

Frampton, J. (2001). The *amn't* gap, ineffability, and anomlous *aren't*: Against morphosyntactic competition. In *CLS37*, papers from the 2001 Chicago Linguistic Society Meeting.

Halle, M. and Marantz, A. (1993). Distributed Morphology and the pieces of inflection. In Hale, K. and Keyser, S. J., editors, *The View from Building 20*, pages 111–176. MIT Press, Cambridge.

Lakämper, R. and Wunderlich, D. (1989). Person marking in Quechua – a constraint-based minimalist analysis. *Lingua*, 105:113–148.

Marantz, A. (1999). *Morphology as Syntax: Paradigms and the Ineffable (The Incomprehensible and the Unconstructable).* Talk given at the University of Potsdam.

Marantz, A. (2000). Lecture notes. MIT.

Marantz, A. (2001). Words. Handout of a talk given at the XX West Coast Conference on Formal Linguistics, University of Southern California, available under: http://www.usc.edu/dept/LAS/linguistics/wccfl/program1.htm.

McCarthy, J. and Prince, A. (1994). The emergence of the unmarked: Optimality in prosodic morphology. In Gonzàlez, M., editor, *Proceedings of the North East Linguistic Society 24*, pages 333–379. Amherst, MA:Graduate Linguistic Student Asociation.

McCarthy, J. and Prince, A. (1995). Faithfulness and reduplicative identity. *University of Massachusetts Occasional Papers in Linguistics*, pages 249–384.

Müller, G. (1997). Partial wh-movement and Optimality Theory. *The Linguistic Review*, 14:249–306.

Müller, G. (2000). *Elemente der optimalitätstheoretischen Syntax*. Tübingen: Stauffenburg Verlag.

Noyer, R. R. (1992). *Features, Positions and Affixes in Autonomous Morphological Structure*. PhD thesis, MIT.

Noyer, R. R. (1993). Optimal words: towards a declarative theory of word formation. Ms. Princeton University, available under: http://www.ling.upenn.edu/˜rnoyer/papers.html.

Prince, A. and Smolensky, P. (1993). Optimality theory: Constraint interaction in generative grammar. Technical reports of the Rutgers University Center of Cognitive Science.

Srivastav, V. (1991). The syntax and semantics of correlatives. *Natural Language and Linguistic Theory*, 9:637–686.

Trommer, J. (2001a). Direction marking as agreement. Ms., University of Osnabrück.

Trommer, J. (2001b). *Distributed Optimality*. PhD thesis, University of Potsdam.

Trommer, J. (2001c). A hybrid account of affix order. In Andronis, M., Ball, C., Elston, H., and Neuvel, S., editors, *CLS 37: The Panels. Papers from the 37th Meeting of the Chicago Linguistic Society*. Chicago: Chicago Linguistic Society.

Vogel, R. (2001). Free relative constructions in OT syntax. In Fanselow, G. and Féry, C., editors, *Linguistische Berichte Sonderheft Optimalitätstheorie*.

Wilder, C. (1997). English finite auxiliaries in syntax and phonology. In Black, J. R. and Motapanyane, V., editors, *Clitics, Pronouns and Movement*, pages 321–362. John Benjamins.