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Free Relative Constructions in OT- Syntax*

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Abstract

The paper presents an OT account of the typology of free relative (FR) constructions and the resolution strategies for case conflicts in FRs: the FR pronoun has to 'serve' two different case assigners at once. Languages differ as to how big a case conflict must be to cause ungrammaticality. While English requires true categorial matching, German allows the suppression of structural cases, if assigned by the matrix verb. The typology includes 7 different language types. The paper argues that the matching effect is about surface forms. Not abstract features have to match, but their mode of morpho-phonological realisation. A second important fact is that many languages only allow for FRs, if the suppressed case is lower on the (language particular) case hierarchy.

The model of OT-syntax used here has some 'non-standard' features. Both inputs and output candidates are full-fledged syntactic structures - LFs in Chomskyan terms, while PFs are only contained in output candidates. FR constructions as such are marked from a typological perspective, and can only 'survive' via faithfulness. The observed effects of case hierarchies are derived indirectly, by a constraint on case realisation that allows a 'lower marked' case to be 'realisable' by a 'higher marked' one. This requires a 'case module': An actual form given in a candidate is compared with an alternative form, i.e. that of the suppressed case. This alternative form has to be taken from a 'database of case forms'. To account for ineffability, the paper makes use of two different neutralisation strategies, neutralisation to a different form and neutralisation to a FR that has a different meaning and/or might be uninterpretable.

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1 Introduction

This paper is part of a research project on OT-Syntax and the typology of the free relative (FR) construction. It concentrates on the details of an OT analysis and some of its consequences for OT-syntax.[1] I will not present a general discussion of the phenomenon and the many controversial issues it is famous for in generative syntax.[2] An example of an English free relative (FR) clause is the subordinate *wh*-clause in (1), taken from Bresnan & Grimshaw (1978):

(1) [CP I drank [FR whatever there was]]

The FR clauses that we will be examining here are clauses that stand for a verbal argument. An interesting debate about the correct syntactic analysis of FR clauses took place in the late 1970s and 1980s. The most widely discussed proposals were by Bresnan & Grimshaw (1978) and Groos & van Riemsdijk (1981). The debate concentrated on the question how to represent FRs syntactically, i.e. which node label should replace the 'FR' in (1).

In Vogel (2001) I assume that FR clauses have the structure of other ordinary subordinate clauses and that the label 'FR' is to be replaced by 'CP' in (1). Rooryck (1994) argues for this proposal in detail.[3] Many earlier accounts claim that there must be an NP node heading the FR clause. Bresnan & Grimshaw (1978) assume that this NP node hosts the FR pronoun. Groos & van Riemsdijk (1981), and many others following them, propose that the NP node is occupied by a phonetically empty pronoun, *pro*. However, none of the earlier accounts could convincingly prove the need for the proposed exceptional structure of FR clauses by showing exceptional syntactic behaviour – compared to ordinary subordinate clauses.

The only exceptional property of FRs is the so-called 'matching effect': the FR pronoun seems to be sensitive to the requirements of both the matrix verb and the relative clause internal verb. As an effect of this, English and Dutch, and some other languages, including perhaps variants of German, only have well-formed FRs if the pronoun is able to 'fulfil' both requirements simultaneously. This is the case in (1). But note that the *requirements* of the verbs do *not* match here literally: the matrix verb requires a direct object, while the FR pronoun is the subject of the FR clause. But the *form* of the pronoun is the same for subject and direct object, so its form *matches* both requirements.

[1] The analysis to be presented here is a significant revision and extension of the one presented in Vogel (2001).

[2] This is done to some extent in Vogel (2001) and Vogel (to appear).

[3] See also Åfarli (1994) for a similar proposal for Norwegian FRs. In fact, this is a revival of the first generative account of this construction by Kuroda (1968). The latter proposal, to be honest, incorporates both the NP and the CP treatment in a way that was only possible in the pre-X-bar period. The topmost node is an NP node that immediately dominates an S node that hosts all the material inside the FR, including the FR pronoun. With respect to the 'outside world' an FR is an NP, but its internal structure is clausal: [NP [S ... FR ...]].

Rooryck (1994) notes that it is not necessary to assume a more complicated structure in order to allow for such effects. The accessibility of the [Spec,CP] position of the subordinate clause for the matrix verb is also necessary in order to account for complementation in subordinate *wh*-clauses, as in (2):

(2) [$_{CP}$ Mary asked [$_{CP}$ what Peter said]]

The verb *ask* requires a *wh*-complement, but it is the [Spec,CP] position of the complement clause, and not the CP node itself, where this requirement is fulfilled.[4] Another example in case are so-called ECM-constructions, where the subject of an embedded infinitival clause is 'exceptionally' assigned accusative by the main verb of the superordinate clause, as in (3):

(3) John expected [$_{IP}$ Mary to leave]

The NP *Mary* occupies the highest specifier of the infinitival complement clause of the verb 'expect', but can nevertheless be assigned case by *expect* into this position.

The situation in the case of FR complements is not very different. In FR constructions, we are dealing with case requirements that have to be fulfilled by the element in the [Spec,CP] position of the subordinate clause.

In languages other than English that have a more elaborated case system, a case conflict can occur on the FR pronoun between the case required by the matrix verb (henceforth `m-case`) and the case required by the FR-internal verb (henceforth `r-case`). Consider the following German clauses with the verbs *vertrauen* ('trust'), which requires a dative object, and *einladen* ('invite'), which requires an accusative object:

(4) a. Ich lade ein *wen/ wem ich vertraue
I invite *who-ACC/ who-DAT I trust

b. Ich vertraue *wem/ *wen ich einlade
I trust *who-DAT/ *who-ACC I invite

A case conflict in German FRs need not lead to ill-formedness, as can be seen in (4a). But it can do so sometimes, as (4b) shows. Although the FR pronoun in (4a) has dative case, and although the accusative case is not realised, the clause is well-formed. The same 'violation' leads to ungrammaticality for many German speakers[5], when the FR pronoun has nominative case:

(5) Ich lade ein *wen/ *wer mir begegnet
I invite *who-ACC/ *who-NOM me-DAT meets

[4] Other crucial data are possible extractions out of a complex *wh*-DP in [Spec,CP]. See (Chomsky 1986) for a discussion of these issues.

[5] Though not for all German speakers, see section 2.4.

The clause in (5) with *wer* has the same 'constraint violations' as (4a) with *wem* – both suppress the accusative case required by the matrix verb and realise `r-case` on the pronoun. However, (4a) is well-formed, (5) is not.

Standard explanations for data of this kind, which can be found in many languages, rely on the observation that there is a case hierarchy at work. In the German data above, it is not crucial whether accusative is realised or not, but whether of the two conflicting cases that one is realised that is higher on the German case hierarchy. This is the case in (4a) with *wem*, but not in (5) with *wer*. For German, it is quite clear that the case hierarchy must be of the following form (see also Pittner (1991), and Bayer, Bader & Meng (2000) for additional evidence for this hierarchy from language comprehension):[6]

(6) nominative < accusative < dative, genitive, PP

The constraints that have to be obeyed in German FRs seem to be the following ones:

[6] One important question that I discuss in detail in (Vogel, to appear) is whether case hierarchies are universal or language particular. First of all, there is no consensus among case theoreticians that there is a universal inventory of cases, let alone what it looks like. Case inventories might well be language particular as such. But even if we take a universal inventory of (abstract) cases for granted, it is not clear that this universal inventory is the crucial factor here. The reason is that it seems to be essential how a certain case is overtly realised in a language. The conflict in German between `m-case`=accusative and `r-case`=nominative that yields ungrammatical FRs for many speakers, as we saw above, can be resolved for inanimates, because the inanimate *wh*-pronoun is the same for nominative and accusative. Furthermore, while in German accusative can be suppressed in favor of oblique case, this is impossible in Spanish and Romanian for animate accusatives, presumably because in this case the *wh*-pronoun takes the form of a PP (see Grosu (1994) for further details). If we only used an abstract notion of universal accusative case we would have to determine universally whether accusative can be suppressed in favor of oblique case or not. Depending on which decision one makes, one would fail to predict either German or Spanish/Romanian. One could, however, assume that only the hierarchisation is language particular. As I show in Vogel (to appear), such language particular hierarchisation crucially relies on what surface form a case takes in a language. The assumption that the case hierarchies that take effect in FRs are language particular hierarchies of surface case forms is, as I see it, unavoidable.

This has an important consequence for the grammar model one assumes: How does a grammar, consisting of only universal constraints, determine whether a given FR clause is well-formed, if it has to rely on a language particular hierarchy of forms? The suppressed case could be assumed to be present in the form of an abstract feature that is not spelled out. But this would not be sufficient, we need the surface form that the suppressed case would have had, if it had been spelled out. But this form is not present in the expression to be evaluated. The grammar needs to have access to an (external) 'database' of case forms. This problem, as I see it, calls for modularity of the kind popular in the generative debates of the 1980s in the context of the GB framework. The current minimalist paradigm, avoiding any kind of modular computation or other non-local operations, does not seem to be able to make the generalisations that seem to hold here. One anonymous reviewer tries to reformulate the approach developed here in a derivational way compatible with minimalism. The idea is basically that the FR pronoun leaves the syntax doubly case marked and that a post-syntactic device D that maps chains onto linearized heads which are subject to lexical insertion could work as well as the non-minimalist global account advocated here. This could well be the case, but does not affect the problem just discussed, namely, language particular case form hierarchies. Such a device D would still have to 'know' that hierarchy in order to work correctly. It might contain a universal principle stating that oblique case is more marked than non-oblique case, but what it means to be oblique differs from language to language. So the necessity of a case module will not go away in a derivational model.

(i) The FR pronoun realises `r-case`.
(ii) `m-case` is not higher than `r-case` on the case hierarchy.

Other languages have other solutions of the problem. Gothic and Romanian can shift between `m-case` and `r-case` on the pronoun. Modern Greek, realising `m-case` in general, has a resumptive pronoun inside the FR, if the otherwise suppressed case is oblique. More details of the typology will be discussed in section 2. An optimality theoretic treatment appears to be promising for the following reasons:

- FRs seem to be 'imperfect' as such. All possible resolutions of case conflicts in FRs have certain disadvantages. Either one of the two required cases is suppressed, or a resumptive pronoun is inserted to realise both cases, which is 'bad' under considerations of economy.
- We find that different languages use different solutions under different circumstances, which could mean that the different 'imperfections' of the possible solutions mentioned above have different 'weight' in different languages.
- There is a markedness scale of cases at work. OT, in principle, can make use of universal markedness scales in a direct way. However, as the scales at issue might turn out to be language particular scales, it is much less clear how to proceed in our case.
- We have a quite diverse typology. Although other frameworks can also deal well with typology, an OT account might do so in a more transparent and systematic way.

The next section will present some details of the typology to be accounted for. The third section introduces the OT analysis, and section 4 shows how it predicts the given data.

2 The Typology of FRs

With respect to FRs, languages differ in 2 dimensions: first, they differ in whether they have FRs at all, only matching FRs or also some or all non-matching FRs; second, languages differ in the resolution strategies. We observe three different ways of realising FRs: we find FRs with the FR pronoun realising `r-case` and `m-case` remaining unrealised, FRs with the FR pronoun realising `m-case` and `r-case` remaining unrealised, and we find FRs with the FR pronoun realising `m-case` and an additional resumptive pronominal element realising `r-case`. The fourth type of 'resolution' that also has to be considered in an OT account is the shift to another construction like, for instance, a correlative construction, a left dislocated structure or an ordinary headed relative construction. This section will briefly introduce the different language types that have to be considered.

2.1 Languages without FRs

There are languages that do not allow for free relatives. One example in case is Hindi (cf. Dayal 1996). The usual way to translate a clause like 'I didn't like whatever Anu ordered' is by using a correlative construction:[7]

(7) jo ciizeN anu-ne mangaayiiN **ve** mujh-ko nahiiN pasand aayiiN
which things Anu-Erg ordered them I-Dat not like come-P
'Which things Anu ordered, I didn't like them' (Dayal 1996, 213)

Another language that might belong to this class is Tok Pisin:

(8) Wanem ol kaikai ol i givim yu, yu no ken kaikai
what Pl. food they give you, you Neg can eat
'Whatever food they give you you must not eat' (Woolford 1978, 484)

Although Tok Pisin is classified as a language having FRs in the literature (cf. Bresnan & Grimshaw 1978 and Woolford 1978) the data can be interpreted in a different way. The reason is that here the FR looks exactly like a headed relative construction, cf.:

(9) Ol samting mipela salim i go long yu i kamap pinis long yu
Pl.thing we sent go to you come Aspect to you
'The things that we sent you arrived' (Woolford 1978, 485)

Restrictive relative clauses in Tok Pisin look like ordinary clauses, they are not introduced by a complementiser or a relative pronoun. So we only have to exchange the 'FR' pronoun in (8) with an ordinary NP to yield a headed relative construction as in (9).

Bresnan & Grimshaw argue on the basis of the Tok Pisin data that FRs are structurally different from interrogative *wh*-clauses. Tok Pisin does not have *wh*-movement, i.e. *wh*-pronouns in interrogative clauses remain in situ:

(10) Yutupela sutim husat tru?
You shot who really
'Who did you really shoot?' (Woolford 1979, 43)

If Tok Pisin has no FRs, then this argument breaks down, and the parallelism of FRs and other subordinate *wh*-clauses is re-established.

[7] The example is syntactically parallel to a left dislocated structure. I will treat correlatives and left dislocated FRs on a par.

2.2 Languages with only matching FRs

In languages which only have matching FRs the surface form of the FR pronoun has to 'match' the forms required for the realisation of both `m-case` and `r-case`. English is such a language:

(11) a. I drank whatever there was
b. I'll reread whatever paper John has worked *(on)
c. *I'll reread on whatever paper John has worked
d. I'll live wherever you live
e. I'll live in whatever town you live (in)
(Bresnan & Grimshaw 1978)

If the matrix verb requires an NP, then the FR pronoun has to be of that category, as we see in (11a–c). The same holds for a PP requirement (11e). However, English has preposition stranding. Although there is a conflict in (11b) with respect to the forms required by the verbs – the matrix verb requires a direct object, i.e. an NP, and the embedded verb a PP –, a FR is possible, if the pronoun moves alone and leaves its preposition behind (11b). Pied-piping as in (11c) yields ungrammaticality. This shows again that it is not the requirements of the verbs that have to match, but it is the element in the [Spec,CP] position of the FR that has to match the matrix requirement, and on the other hand fulfil its requirements inside the embedded clause. One might argue that English only has this matching effect, because it has preposition stranding: (11c) is odd because of the possibility of (11b). Groos & van Riemsdijk (1981, 173) show that Dutch is also a matching language, but Dutch does not have English type preposition stranding:[8]

(12) a. * Ken jij met wie zij flirt?
know you with who she flirts?
'Do you know (the person) with who she is flirting?'

b. Ken jij wie zij net kuste?
know you who she just kissed?
'Do you know (the person) who she just kissed?'

Norwegian also seems to be a matching language, as reported by Åfarli (1994). German is classified as a matching language by Groos & van Riemsdijk (1981). Pittner (1991) and Vogel (2001) show that many German speakers do accept

[8] Dutch only has preposition stranding in a very restricted way:
(i) Waar heb je ob gerekend?
where have you on counted?
'What have you counted on?'
This is the same in most variants of German, where preposition stranding is also possible only with the *r*-pronouns *wo* ('where') and *da* ('there'). See Herslund (1984) and Müller (2000) for further discussion.

non-matching FRs. In the latter paper I also show that German speakers vary in which kinds of non-matching FRs they accept. I assume two 'dialectal' variants German A and German B. It cannot be excluded that there are speakers of German who only accept matching FRs, as proposed by Groos & van Riemsdijk (1981). These speakers would then constitute a third variant, German C.

2.3 Icelandic

Icelandic has an interesting and somewhat surprising pattern. The FR pronoun always bears `m-case`.[9] In addition, there do not seem to be any restrictions on the suppression of cases and Icelandic has preposition stranding. So it is hard to find a configuration that does not yield a well-formed FR.

In the following examples, two headed restrictive relative constructions (13a,c) are paired with two FR constructions (13b,d). The chosen verbs are *hjálpa*, which requires a dative object, and *elska*, which requires an accusative object. In German the same configuration would yield ungrammaticality for (13b). This is not the case here. Icelandic FR pronouns always take `m-case` and `r-case` is simply suppressed. This is, however, not very surprising, if we look at restrictive relative clauses. They are uniformly introduced by the complementiser *sem* ('that'), and the relativised argument (which is represented by a relative pronoun in many other languages) remains unrealised, no matter what case it should have:[10]

(13) a. ég hjálpa þeim/ *þann sem ég elska
I help those-DAt/ *those-ACC that I like

b. ?ég hjálpa hverjum/ *hvern (sem) ég elska
I help who-DAT/ who-ACC (that) I like

c. ég elska *þeim/ þann sem ég hjálpa
I like those-DAT/those-ACC that I help

d. ?ég elska *hverjum/ hvern (sem) ég hjálpa
I like *who-dat/ who-acc (that) I help

The classification of (13b,d) as FRs and (13a,c) as headed relatives is based on two observations: the complementiser can be omitted in the FRs with the *wh*-pronoun, and in (13a,c) the *d*-pronoun can be separated from the relative clause:[11]

[9] This phenomenon is called *case attraction* in the literature.

[10] The FRs in (13b,d) are judged as 'archaic' or 'a bit strange' by my informants. But they agree that they are possible. The complementiser *sem* is optional here, contrary to restrictive relative clauses. Many thanks to Halldór Sigurðsson and Gunnar Hrafn Hrafnbjargarson for sharing their expertise with me.

[11] To be honest, (14b) is not just ill-formed because the FR is disrupted. The *wh*-pronoun *hverjum* can be interpreted as interrogative. The variant of the clause with an overt complementiser is then odd because of difficulties to connect the relative clause to its antecedent and make

(14) a. þeim hjálpa ég sem ég elska
those-DAT help I that I like

b. *hverjum hjálpa ég (sem) ég elska
who-DAT help I (that) I like

2.4 German A

German has matching FRs and, in addition, non-matching FRs, if `m-case` is one of the structural cases nominative and accusative. As already noted, we can identify at least two, if not three different variants of German with respect to FRs. In Vogel (2001) I discuss two variants I call German A and German B. These differ only in the treatment of one particular case conflict, namely, if `m-case` is accusative and `r-case` is nominative:[12]

(15) a. *Er zerstörte, wer ihm begegnete
He destroyed who-NOM him-DAT met
'He destroyed who he met'

b. Er zerstörte was ihm begegnete
he destroyed what-NOM him-DAT met
'He destroyed what he met'

The given judgement is for German B. German A differs from German B in that here (15a) is fine. One possible interpretation of these facts could be that in German B FRs are sensitive to the case hierarchy: only FRs that suppress the lower marked case are acceptable. German A could then be seen as a kind of mirror image of Icelandic in that it does not care about the case hierarchy and always realises the FR pronoun with `r-case`, suppressing `m-case`.

The difference to Icelandic is, however, that oblique cases, i.e. dative and genitive and PPs, cannot be suppressed at all in German. But the fact that in Icelandic relative clauses any case form can be suppressed is quite exceptional and surprising anyway.

Further examination suggests an explanation for this phenomenon that sheds some light on the functioning of case systems as such. Let us compare the dative in German and Icelandic: German has a phenomenon called 'free dative'.

sense of the clause. Interrogative pronouns usually cannot be relativised.

[12] The well-formedness of (15b) is due to the fact that the FR pronoun *was* has the same form for accusative and nominative – because of this we find a matching configuration here, although the required/assigned cases are in conflict. Cf. the analogous case in English discussed above. The examples in (15) are taken from (Pittner 1991). One anonymous reviewer pointed out that (15a) is odd for the independent reason that *zerstören* is quite unusual with animate direct objects. This is true. However, on the other hand there is a difference between a judgement of ungrammaticality and a judgement of being unusual and informants usually are able to keep the two apart. But the effect, of course, occurs with any German transitive verb. The verb in (15a) could be replaced by *verletzen* ('hurt') or *töten* ('kill') without a change in the grammaticality status of the datum.

Dative objects can be added in many clauses, receiving a benefactive, malefactive, 'affected possessor' or similar reading:

(16) Ich backte meiner Mutter einen Kuchen
I baked my mother-DAT a cake-ACC
'I baked my mother a cake'

Contrary to German, Icelandic does not have free datives (cf. Holmberg & Platzack 1995, 202):[13]

(17) *Èg bakaði mömmu minni köku
I baked mother my (a) cake

This 'gap' might suggest the following conclusion: The case systems of German and Icelandic have different 'places' in their grammars. In German, case is comparatively autonomous. Oblique case plays an independent role in semantic interpretation.[14] Suppression of oblique case thus yields uninterpretability. In Icelandic, case is always lexically licensed,[15] and because of this case suppression is easily recoverable via the lexical entry of the verb. No semantic information is lost by case suppression. This explains why on the one hand in relative clauses all cases can be suppressed, but, on the other hand, case forms do not make an independent contribution to the meaning of the clause and hence cannot occur freely.

With respect to the OT analysis that I will propose below, there is an interesting consequence. We might get winners of OT competitions in German A and in Icelandic that both suppress dative case. While the Icelandic example would be fine, the German A example is odd, although it is the winner: the reason for this lies in the fact described above, namely, that dative case is semantic information in German that gets lost under suppression: The German A winner fails in the semantic component of the grammar.

[13] Free dative FRs are o.k. in German, while they seem to be uninterpretable, if not unparsable in Icelandic:

(i) a. Ich backe einen Kuchen wem ich vertraue
I bake a cake-ACC who-DAT I trust
'I bake a cake for whom I trust' (German)

b. *Ég bakaði köku hverjum/hvern ég elska
I bake a cake who-DAT/who-ACC I like
'I bake a cake for whom I like' (Icelandic)

[14] For a recent proposal that oblique case has some semantic implications see Wunderlich (2000).

[15] This claim has previously been made, among others, by Holmberg & Platzack (1995).

2.5 German B

As shown above, German B is a language that has matching FRs. It also has non-matching FRs, but only if the suppressed case is hierarchically lower than the case realised on the FR pronoun. In addition, the FR pronoun cannot bear `m-case`, obviously for a general reason. This means that FRs are impossible in German B, if `m-case` is higher than `r-case`, but possible in the opposite situation:[16]

(18) a. `m-case`=ACC;`r-case`=NOM:
*Er zerstörte, wer ihm begegnete
He destroyed who-NOM him-DAT met
'He destroyed who met him'

b. `m-case`=NOM;`r-case`=ACC:
Ihm begegnete, wen er zerstören wollte
Him-DAT met who-ACC he destroy wanted
'Him met who he wanted to destroy'

(19) a. `m-case`=DAT;`r-case`=ACC:
*Er begegnete, wen er zerstören wollte
He-NOM met who-ACC he destroy wanted
'He met who he wanted to destroy'

b. `m-case`=ACC;`r-case`=DAT:
Er zerstörte, wem er begegnete
He-NOM destroyed who-DAT he-NOM met
'He destroyed who he met'

2.6 Gothic and Romanian

German and Icelandic are languages that uniformly realise either `m-case` or `r-case` on the FR pronoun, but cannot shift between the two. This is possible in Gothic and Romanian. In these languages, it is always the 'higher' case that is realised.

(20) Romanian, nominative vs. dative

a. Cui i se dă de mîncare trebuie să muncească
who-DAT him self give of food must SUBJ work
'(He) who gets food must work' (Grosu 1994, 116)

[16] The verbs in the following examples differ in that *zerstören* requires an accusative object, while *begegnen* requires a dative object.

b. Mă voi adresa cui mă poate întelege
me will-I address who-DAT
'I shall turn to who can understand me' (Grosu 1994, 120)

In (20a) the embedded verb requires dative on the pronoun, while the FR is the subject of the clause. In (20b) the FR pronoun is subject of the FR clause, while the FR itself serves as dative object of the matrix clause. In both instances, the FR pronoun must bear dative case.

The same behaviour can be observed in Gothic, as reported by Harbert (1983):[17]

(21) Gothic, nominative vs. accusative (Harbert 1983, 248f)

a. jah *þo*-ei ist us Laudeikaion jus ussiggwaid
and Acc-Compl is from Laodicea you read
'and read (the one) which is from Laodicea' (Col 4: 16)

b. *þan*-ei frijos siuks ist
Acc-Compl you-love sick is
'(The one) whom you love is sick' (Joh. 11: 3)

In (21a) the `m-case` is accusative and in (21b) it is the `r-case`. Nevertheless, the FR pronoun bears accusative morphology in both instances. Accusative is, however, always suppressed, if it conflicts with higher marked dative or genitive:

(22) Gothic, accusative vs. dative/genitive (Harbert 1983, 248f)

a. hva nu wileiþ ei taujau *þamm*-ei qiþiþ þiudan Iudaie?
What now you-want that I-do dat-Compl you-say king of-Jews
'What now do you want that I do to him (whom) you call the king of Jews?' (Mk 15: 12)

b. bugei *þiz*-ei þaurbeima
buy gen-Compl we-might-have-need-of
'Buy (that) of which we might have need' (Joh 13: 29)

If one tried to reduce the hierarchies at work here to a two-element hierarchy of, say, 'marked' and 'unmarked' (which actually could not really be called a 'hierarchy'), one would have to decide whether accusative counts as marked or as unmarked. Depending on what this decision would be, it would either be predicted that accusative cannot lose against dative or genitive (because it is marked) or that it cannot win against nominative (because it is unmarked). In these two languages, and also in German B, we are really dealing with a scale, not only with, e.g. a distinctive feature.

[17] The glosses are as given by Harbert (1983).

2.7 Modern Greek

Modern Greek shares with Icelandic that the FR pronoun always bears `m-case`:

(23) a. Agapo opjon/*opjos me agapa
love-1Sg whoever-ACC/*NOM me loves
'I love whoever loves me' (Alexiadou & Varlokosta 1995, 12)

The FR pronoun shows obligatory case attraction. If the otherwise suppressed `r-case` is an oblique dative/genitive, then there has to occur a resumptive clitic realising `r-case`:

(24) a. Tha voithiso opjon tu dosis to onoma mu
FUT help-1S whoever-ACC cl-GEN give-2S the name my
*opjou 'whoever-gen'
*s'opjon 'to whoever'
*opjou tu 'whoever-gen him-gen'
'I will help whoever you give him my name'
(Alexiadou & Varlokosta 1995, 13)

This is another way of resolving the case conflict: both cases are realised without giving up the FR structure. This option is chosen in Modern Greek, when `m-case` is nominative or accusative and `r-case` is dative/genitive.

2.8 Summary

Tableau 1 gives a summary of the typology to be accounted for. There are languages without FRs and languages with only matching FRs. And then there is a language with an overall strategy, Icelandic. The other languages are obviously sensitive to the case hierarchy. German A and Modern Greek seem to make use of the case hierarchy in a different way than the others. They only change their strategy, when their standard mode of conflict resolution would yield suppression of oblique case. German A has no FRs in this situation, while Modern Greek uses the resumptive pronoun strategy. Gothic and German A also take care of accusative-nominative conflicts. As shown above, many of these typological patterns are observed in more than one language.

Tableau 1: Typology of case conflict resolution in FRs

Conflict[18]	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

There is no need to assume that Tableau 1 is complete. On the other hand, the data suggest a certain systematicity. The conflicts are sorted into two groups: in the first three conflict types `r-case` is higher than `m-case`, the next three types have the opposite pattern. Only two languages do not seem to have a uniform strategy for the same group of conflict types. But this might be an artefact of the mode of presentation. If German A and Modern Greek only distinguish between structural and oblique case and judge the two structural cases nominative and accusative as equivalent, although they are morphologically distinct, then the pattern is quite uniform again: nominative and accusative would not conflict.

Four of the seven language types are sensitive to the case hierarchy, while they differ in whether they use a two-element hierarchy (structural vs. oblique, as in German A and Modern Greek), or a three-element hierarchy (nominative, accusative, oblique, as in German B and Gothic).

Each possible strategy to resolve case conflicts in FRs has certain problematic aspects. Neither solution is 'perfect'. So there is no a priori universal 'default'. It might not be a surprise that this quite diverse typology occurs in such a situation.

A language's preference for a certain strategy mirrors specific properties of its grammar. The tradition in generative grammar is to conceive these as language particular parametrisation of universal principles. In Optimality Theory, such a parametrisation is expressed through the ranking of constraints. The next section spells out the details of the OT account that I propose and section 4 shows how this account is able to capture the typology described here.

[18] Only those forms of nominative and accusative are taken into account that differ, so English has no conflicts between nominative and accusative forms, because these forms match. The abbreviations M, R, and RES stand for the three different types of FRs: those with the pronoun realising `r-case` (R) and `m-case` (M), and those that use the resumptive pronoun strategy (RES). These abbreviations will be used throughout the paper.

3 The OT account

The phenomenon provides at least three interesting challenges for OT-syntax:

(a) We need a way to account for the ungrammaticality of FRs in some languages.
(b) As the crucial elements are surface forms, we need a syntax model that integrates surface representations of clauses with more abstract representations.
(c) The case hierarchies that are used here seem to be language particular, because they are hierarchies of forms, not of features. OT is good at integrating universal markedness scales. But here it is less obvious, how we have to proceed.

Problem (a) is solved by a strategy called 'neutralisation': The winner is a candidate that is slightly different from the input, in our case this can be either a correlative/left dislocation construction, or a headed relative construction.

The solution for problem (c) lies in the assumption of modularity. Instead of assuming a whole array of constraints on the realisation of individual cases, I assume three general constraints on case realisation, which are differently liberal. These constraints use a language particular 'database' of case forms to determine whether the given form in an expression meets the requirements defined in the constraint. The most rigid constraint wants for each abstract case feature one surface case morpheme, and vice versa. This is only satisfied by FRs with an additional resumptive pronoun as exemplified by Modern Greek (cf. (24)). If the constraint that punishes resumptive elements is ranked high together with the just described constraint, then a language has no FRs.

A more liberal constraint allows for one case morpheme to serve as realiser of more than one abstract case. This constraint is fulfilled in matching FRs, but not in non-matching ones (except again for those with an additional resumptive pronoun). An even more liberal version of the latter constraint can be satisfied by a different case morpheme if it is higher on the case hierarchy. This constraint is important in languages with alternating strategies like Gothic, German and others. The relative ranking of these three constraints determines whether a language has no FRs, only matching ones or also non-matching ones.

The most difficult task is problem (b), not only for an OT analysis, but for any account of the phenomenon. How can the FR pronoun be sensitive to the requirements of the embedding verb and itself be located in the lower clause? Harbert (1983) already proposed that case attraction, i.e. the situation where the FR pronoun surfaces with `m-case`, is a PF phenomenon. He assumes case assignment at the level of PF. This sounds a bit strange, because PF is not a syntactic level, but case assignment is presumably a syntactic process. Instead of this, I assume that case attraction is indeed a PF phenomenon, but the case is already assigned at LF – to the whole FR clause. The FR pronoun can surface

with m-case, because the C^0 head of a FR is an agreement head.[19] The specifier-head relation between FR pronoun and C^0 can be interpreted in the process of LF-PF mapping such that the FR pronoun surfaces with m-case. I do not assume that this is possible in specifier-head relations in general, only FRs have this property and this is what makes them FRs.

On the other hand, FRs are not the only phenomenon where something like this might happen. A subordinate *wh*-clause is often assumed to be marked as interrogative by the element in its [Spec,CP] position. In the same way one could assume a FR to be marked as dative object by the dative object in its [Spec,CP]. As I said, this must be restricted to FRs, their C^0 head has this specific property, most other heads do not. Another example in case might be exceptional case marking (ECM), where the subject of an embedded infinitival clause is assigned accusative by the verb from the upper clause. Traditional analyses assume that nothing prevents this, because infinitival INFL is no intervening case governor. Alternatively, one could assume that infinitival INFL is a case assigner, and that it only has no case to assign by itself, but inherits accusative case from the upper verb. It can transfer this case to the subject, because it is in a specifier-head relation with it. This way the case assigned to the whole infinitival clause can surface in its highest specifier position.

A couple of case theoretic background assumptions are also needed. I discuss this aspect of the problem in detail in (Vogel, to appear). For the present purposes, it will be sufficient to assume the following:

(a) abstract case is assigned syntactically to maximal projections.
(b) morphological case is also a property of the PF correspondents of maximal projections, but it may surface in several ways: on the heads as inflection, as (affixal or prepositional) case markers, or, as a sort of alternative 'last resort' method, in the specifier of a maximal projection that is headed by a head with agreement functions.
(c) abstract case is assigned by lexical items (oblique case) or functional heads (like INFL for subjects and whatever functional head one assumes for direct objects).
(d) the question why which argument surfaces with which case is not touched upon at all here. See Aissen (to appear), Woolford (to appear), Wunderlich (2000) and Fanselow (2000) for such a discussion within OT, and Vogel (to appear) for a critical review.

The system I am going to propose makes extensive use of the Chomskyan claim that a linguistic expression is an [LF, PF] pair. Pesetsky's (1998) version of OT-syntax uses an LF as input and several possible PFs as candidates. The model used here also assumes that an LF can be paired with different PFs – the different types of FRs differ only in their PFs, not in their LFs. In addition, however, it is also possible to have candidates with different LFs – this is

[19] Rooryck (1994) was the first one to assume that the C^0 head of an FR has agreement properties.

necessary to account for ineffability. The question that immediately arises in such an approach is how to restrict the candidate set. I will use a specific version of the candidate generating function *Gen* to reach this aim. The following subsections discuss the details of the just sketched approach.

3.1 On the Architecture of the OT-Syntax Model

The general model of an OT grammar can simply be described as follows: An input representation I is mapped onto a set of output candidates C_O by a generation function *Gen*. The elements of C_O are then evaluated according to a set of constraints *Con*. The evaluation function is called *H-Eval* – for 'harmonic evaluation'. The output O is the most harmonic candidate as determined by *H-Eval*.

We can distinguish two general ways of modelling syntax in OT. They differ in how they conceive the input and *Gen*. Let us call them the 'derivational picture' and the 'representational picture'. In the derivational picture the input is an initial stage in the syntactic derivation of the clause to be processed. Grimshaw (1997*b*) thought of it as the argument structure plus some other semantic specifications. If this is a syntactic representation at all, then it is one at a very early stage. Other derivational models are used by Heck (1998, 1999), Heck & Müller (2000) and in LFG (e.g. Bresnan 2000).

In these approaches *Gen* is a generator in two ways: it literally generates the candidates and that way forms the candidate set. *Gen* can also be defined as generating only the candidate *set*, without generating each candidate each time. This latter task can be performed by another function that is presupposed by the OT-syntax model. Let us assume that an independently existing universal sentence generation function[20] already generated the universe U_S of possible sentence or LF patterns. As U_S is not language particular, there cannot be access to lexical information. The generation of the candidate set performed by *Gen* is now a process of selecting a subset of U_S. Output candidates must pass a certain criterion that defines the competition.

The system proposed by Legendre et al. (1998) can be interpreted in that way. Here, the candidates have to be *similar* to a given *target* LF, but might depart from it minimally in a restricted, pre-determined way. This proposal shares with that of Grimshaw (1997b) and others that the input in syntax is a representation of semantic properties. However, Keer & Baković (2000) show that the input sometimes needs to contain purely formal information in order to account for phenomena like, e.g. the complementiser optionality in the following example:

(25) John thinks (that) Mary is polite

[20] This function can be seen as the 'core' of the Universal Grammar in generative syntax: The X-bar schema plus the universal inventory of syntactic categories (including their general selection restrictions, if there are any) and a combinatorial or merging mechanism.

In their proposal the verb *think* in (25) would exist in two versions, one selecting for a complementiser-introduced complement clause, and the other selecting for a clause without complementiser. That way we get two different inputs, depending on which version of *think* is chosen. Each of the two variants in (25) is more faithful to its corresponding input than the other. That way, both can be winners of their own OT competition, but they both take part in both competitions.

If it is unavoidable to assume functional material as part of the input then the input itself is already a fully elaborated syntactic structure. A representation that contains lexical information, as required by Grimshaw (1997b), scope information, as required by Legendre et al. (1998) and functional information, as required by Keer & Baković (1999), is a complete syntactic structure, e.g. the Logical Form (LF) as defined by Chomsky (1995).

In order to account for ungrammatical FRs it might be necessary to include within the candidate set at least one candidate that is not a FR.[21] This candidate is supposed to win, when a FR is ungrammatical. But it should also be as similar as possible to the structure of a FR. Good and natural candidates are sentences with correlative or left-dislocated FRs, as in (7) or in (26):

(26) German:
Wer einmal lügt, *(dem) glaubt man nicht
who-NOM once lies *(the-DAT) believes one not
'Whoever lies once, one doesn't believe him anymore'

The minimal difference to FR constructions is the occurrence of a resumptive element (the bracketed pronoun in (26)) picking up the referent introduced by the dislocated FR. But this is only a difference in the *formal or functional* inventory of the clause, not in its meaning or its (non-functional) lexical material.

There is also, on the other hand, *optionality* of this dislocation or correlative structure:

(27) German:
Wer einmal lügt, (der) lügt auch ein zweites Mal
who-NOM once (the-NOM) lies also a second time
'Whoever lies once, (he) lies a second time, too'

[21] There is another way of accounting for absolute ungrammaticality that I do not want to discuss here because of its minor theoretical appeal: assume that the 'null parse' takes part in every competition and that there is only one constraint that this candidate violates, namely a constraint 'NoNullParse'. The ranking of this constraint with respect to others which are crucial for FRs determines the possibility of FRs. A third way of accounting for ungrammaticality is 'uninterpretability'. A winning candidate might be uninterpretable, e.g. in semantics. This option will be discussed below as a possible account of German A. It cannot, however, derive optionality of FRs and correlatives.

This means in OT terms that a correlative is able to win in situations where it *is* possible to have a FR. The two clause types are not in complementary distribution. For a FR competition, we would want the FR to win against the correlative most times. But the correlative is the more frequent construction: whenever a FR is possible, it has a well-formed corresponding correlative construction, but not vice versa. This case is parallel to the one discussed by Keer & Bakovi ć (1999). In order to let the correlative win, we have to distinguish it from the FR in the input and give it some advantage via faithfulness in its own competition. But this can only be done by encoding functional material of the clause already in the input.

For this reason I will explore here a radical version of what I called the 'representational picture': the 'input' is itself the LF of an output candidate, the most faithful one. Its competitor LFs are chosen from U_S by *Gen* according to a similarity criterion.

But the LF, as element of U_S, is only one out of *three* constitutive parts of a candidate. Elements of U_S lack everything language particular: They do not contain lexical items, neither syntactic information introduced by these. The LF is paired with a language-particular 'phonetic form' (PF). Candidates are ordered [LF, PF] pairs.[22]

We only want those structures to compete that contain the same (non-functional) lexical material. So an element of U_S, conceived as input, stands for a whole family of competitions that differ in the used lexical items.

The functions of *Gen* and input in the proposed OT-syntax model can be summarised in the following way:

- U_S is the universe of sentence or LF patterns.
- Each of these patterns defines its own family of OT competitions.
- Candidates of the same competition have an LF that is 'similar' in a way to be determined to the LF pattern that defines the competition.
- In addition, candidates of the same competition have identical lexical[23] material in corresponding syntactic positions.
- Candidates are [LF, PF] pairs. PFs are derived from their corresponding LFs.

The set of universal LF patterns U_S is of central methodological importance for the current task. We want to model, how languages express FR constructions. The assumption that the FR pattern is universal guarantees that the FR constructions of different languages can be compared. If there was no U_S, we could not guarantee that the candidate sets of the FR competitions in different languages are alike, and thus would not be able to compare the competitions. In the end, we would not be able to come up with a proposal for the typology of

[22] This is the standard assumption in current generative syntax, see, for instance, Chomsky (1995).

[23] The attribute 'lexical' here refers to open class items, lexical categories, not to function words and functional categories. We want to allow for variation in the functional architecture, but keep the lexical material constant within a single competition.

this construction. Something like U_S, as I see it, is a 'conditio sine qua non' for doing typology within OT-syntax.

A competition is defined by a universal LF pattern plus a 'lexical index', i.e. a set of lexical items that occupy the terminal nodes of the LF pattern. FR constructions can be (part of) such universal LF patterns.[24]

We then derive a set of candidate LFs – in our example there are only two such alternative LFs, the FR and the correlative. The candidates are then derived by pairing each LF with possible PFs. We considered three possible PFs for a FR-LF – differing in the overt case morphology of the FR pronoun and in whether an additional resumptive element 'spells out' `r-case`. We only considered one type of correlative, but there may be many of them: with the relative clause preposed, extraposed or intraposed, with or without a resumptive pronoun, with all kinds of distributions of overt case markers etc. The several stages of the *Gen* function are summed up in tableau 2.

Tableau 2: The *Gen* function

1. Select 'input' LF pattern	2. Select 'simlar' LF patterns	3. Add lexical 'index'	4. generate [LF, PF] pairs
FR	FR	FR_{LEX}	FR_{LEX} – M
			FR_{LEX} – R
			FR_{LEX} – RES
	CORR	$CORR_{LEX}$	$CORR_{LEX}$ – ...

A FR competition can be seen as 'inputless' insofar as the information attributed to the input is fully represented in at least one of the candidates, the one that contains the selected 'input LF'.[25] Candidates that contain the 'input LF' will be marked with a '⊙'.[26] The competitions for FR and correlative might have identical candidate sets and differ only in which of the LFs of the candidates is chosen as defining the competition:

[24] The term 'index' is used by Legendre et al. (1998) instead of 'input'. In much the same way as described here, the function of the index is only to define what competes. Output candidates compete, if they share a certain property, i.e. 'have the same index'. I therefore often use this notion instead of 'input' below.

[25] For a more extended discussion of why OT syntax needs no input as a genuine level of representation, see Heck et al. (2000).

[26] This is the astronomical symbol for 'sun'. It is open to the reader to find deeper reasons for why this symbol is used here. There is no formal difference between the ⊙-LF and an output-LF. The '⊙' marks those output candidates that contain the LF that is used as input or 'index' in defining the competition. ⊙-LF-to-O(utput)-LF faithfulness is only a special version of input-output faithfulness.

Tableau 3: Candidate sets for FR and CORR competitions

FR competition	CORR competition
⊙FR-M_{LEX}	FR-M_{LEX}
⊙FR-R_{LEX}	FR-R_{LEX}
⊙FR-RES_{LEX}	FR-RES_{LEX}
$CORR_{LEX}$	⊙$CORR_{LEX}$

Instead of input-output faithfulness, we will speak of '⊙-LF faithfulness' below. Candidates are evaluated with respect to their 'similarity' to the candidates that have the initial LF pattern. As the same LF may be able to be paired with more than one PF, more than one ⊙-candidate can occur. This does not matter.[27]

3.2 Ineffability and Optionality

OT offers two strategies to account for ungrammaticality: uninterpretability and neutralisation. The uninterpretability strategy lets a winner 'crash' at some interface, which could be the 'conceptual-intentional' or the 'articulatory-perceptual' interface. The neutralisation strategy lets a candidate win that is 'unfaithful' to the input. This is the strategy described above: in languages without FRs, a FR is 'neutralised' to a correlative construction. Let us have a closer look at the two strategies.

3.2.1 Ungrammaticality with Uninterpretability

Consider the following German data again (remember that *folgen* assigns dative and *bewundern* accusative to its object):

(28) a. *Ich folge wen immer ich bewundere
I follow who-ACC ever I adore

b. *Ich folge wem immer ich bewundere
I follow who-DAT ever I adore

[27] Evaluation of candidates with respect to their similarity to another candidate has first been introduced in sympathy theory for OT phonology (see McCarthy 1998). Sympathy was invented to deal with opacity phenomena. To yield the correct results we sometimes need to refer to what has been an intermediate stage in derivational phonology. In a strictly output-oriented theory like OT such intermediate stages are invisible. Sympathy has been designed to 'emulate' access to such intermediate stages. An intermediate stage is 'represented' by one of the output candidates, designated through an extra 'sympathy competition'. The present discussion has nothing to do with problems of this kind. It is the character of syntax as such that lets an approach appear attractive that may be reminiscent of sympathy.

Let us assume that under the German constraint ranking only candidates with `r-case` on the FR pronoun win. Then (28b) loses against (28a). But in (28a) an oblique case is suppressed. This, we further assume, results in an unrecoverable deletion of semantic information. As a consequence, the FR cannot be interpreted in the semantics. From this perspective, we could allow (28a) to win an OT syntax competition without predicting that it is judged as well-formed by native speakers. But now consider the following example again which is ungrammatical in German B, but well-formed in German A:

(29)	(*)Er	tötet,	wer	immer	ihm	begegnet
	He	kills	who-NOM	ever	him-DAT	meets

If the ungrammaticality of this clause in German B was also due to uninterpretability, then it should also be blocked in German A. As this is not the case, the syntax-semantics interface cannot be held responsible for the ill-formedness. In (28a), we have suppression of a presumably semantically significant oblique case, while in (29) we have suppression of a semantically relatively empty structural case. (28) can be explained by uninterpretability, but not (29)! Uninterpretability may be taken into account for some instances of ineffability, but not for all of them.

3.2.2 Ungrammaticality with Neutralisation

Neutralisation requires the inclusion of a candidate in the candidate set that is not a FR, but only minimally different from it. I showed above that correlatives or headed relatives are perfect for this task. The only difference to FRs is the occurrence of a pronoun 'heading' the relative clause that now can be interpreted as an ordinary restrictive relative clause. The structure for a headed relative clause would be roughly as in (30):

(30) [DP PRON+`m-case` [CP RELPRON+`r-case` ...]]

The advantage of this candidate is that both cases are realised – `m-case` on the 'head' pronoun and `r-case` on the relative pronoun. Its disadvantage is that it is *unfaithful* to the FR structure. The inclusion of this candidate requires a 'relaxed' definition of *Gen* and faithfulness to functional features which are specified in the input. The basic idea that I will follow here is that the FR pronoun stands for a bundle of features. In a headed construction as in (39) this feature bundle is split into two separately projecting functional heads.

The content of the features that the FR pronoun is composed of is less clear. My proposal is speculative, though perhaps plausible. I assume that the semantic property that distinguishes an ordinary relative pronoun from a FR pronoun is referentiality: a simple restrictive relative clause cannot represent or introduce a discourse referent by itself, it always has to be connected to a 'head'. A free

relative clause is referential.[28] So let us assume two features [±REF] for 'referentiality' and [±REL] for characteristics of the relative operator (these features may be further decomposable into other features, but this is a different issue). This is represented in Tableau 5.

Tableau 5: The composition of FR pronouns

	[REF]	[REL]
pronoun	+	–
relative pronoun	–	+
FR pronoun	+	+

I assume that the feature bundle of a FR is contained in the C^0 head of the FR and that the morphological properties of the FR pronoun are reflections of the SpecHead agreement between FR pronoun and FR head.

In a FR 'input' LF pattern, the feature bundle of the C^0 head contains the 'sub-bundle' [[+REF][+REL]] and maybe more features. The function *Gen* selects all structures that contain the same functional material as the 'input' FR, including those structures where the features are distributed in a different way.[29] The correlative or headed relative candidate results from splitting up the feature (sub-) bundle of the FR pronoun and letting each of the two features project on its own.

(31) *Input*: { ... [[+REF][+REL]] ... }

Output 1: [FR [C^0 [[+REF][+REL]]] ...]
Output 2: [DP [D^0 [+REF]] [CP [C^0 [+REL]] ...]]

The 'feature bundle split' strategy is only one way to 'expand' the structure of a FR without changing its functional/formal inventory. True instances of left dislocation as in the German (26), repeated below, might be different.

(32) Wer einmal lügt, *(dem) glaubt man nicht
who-NOM once lies *(the-DAT) believes one not
'Whoever lies once, one doesn't believe him anymore'

[28] Wiltschko (1999) presents many pieces of evidence that FR pronouns are semantically indefinites.

[29] Different distribution must be restricted to cases where a feature projects on its own – in a 'stacking' fashion: The projection of one feature must immediately dominate that of the other feature in this case:

(i) [XP [X^0 F1+F2]]
(ii) [YP [Y^0 F1] [XP [X^0 F2]]]

Here, the structure of the FR is kept, but it is placed outside of the matrix clause. A resumptive pronoun ('dem') is inserted into the matrix clause representing the FR.

This is another way of deviating from the functional architecture of the 'input LF' without changing its contents. Let us call this strategy the 'placeholder' strategy. The 'feature bundle split' strategy would yield the following structure for the example :

(33)	Man	glaubt	einem,	der	einmal	lügt,	nicht
	one	believes	(some)one-DAT	the-NOM	once	lies	not

(32) has the advantage of keeping the feature bundle of the FR pronoun intact, but it duplicates the FR with a resumptive pronoun. The FR in the 'input LF' has two correspondents in the output LF, and it has the FR moved outside of the matrix clause. (34) splits the feature bundle of the FR pronoun, but leaves the relative clause inside the matrix clause.

Which strategy is more optimal in which language is an interesting issue, but not central for our discussion here. So I will abstract away from the difference between (32) and (33) in this paper. I will use the label 'CORR' for the non-FR candidate and leave open which one of the two options is actually chosen.[30]

3.3 Correspondence

The concept of correspondence as introduced by McCarthy & Prince (1995) is of central importance for the analysis that will be developed here. Candidates are ordered pairs of two representations LF and PF. All sorts of constraints on the correspondence of LF and PF can be imagined, and I will make use of some. The second important correspondence relation holds between the designated

[30] It is interesting that one can (marginally) use a *wh*-pronoun as head for the relative clause in (33):

(i)	?Man	glaubt	wem	nicht, der		einmal	lügt
	one	believes	(some)one-DAT	not	the-NOM	once	lies

While (i) counts as a structure with a headed relative clause where the relative clause is extraposed – a very frequent pattern in German–, the clause in (32) contains a FR. But the only difference is the distribution of the pronouns. It is interesting that the pattern in (32) is impossible with a right dislocated FR:

(ii)	*Man	glaubt	dem	nicht, wer		einmal	lügt
	one	believes	the-DAT	not	(some)one-NOM	once	lies

The distribution of *wh*- and *d*-pronoun seems to be governed by a simple rule that requires the referentially independent *wh*-pronoun to be first, and the anaphoric *d*-pronoun to occur whenever a previously introduced discourse referent is picked up again. If we abstract away from this, the difference between (i) and (32) reduces to whether the relative clause is left or right dislocated. In turn, this interpretation could mean that whether a pronoun is called 'resumptive' or 'head of a relative clause' depends on whether it follows or precedes the relative clause. Be this as it may, what interests us here is that this pronoun is obligatory in these cases, and can be omitted in other cases – the latter cases are called free relative constructions.

'input' or '⊙'-LF and the LFs of output candidates (O-LF). There is, however, no correspondence between the PF of an output candidate and the ⊙-LF.

3.3.1 ⊙-O correspondence

The objects that correspond in the ⊙-LF and an O-LF are syntactic chains. ⊙-O correspondence is crucial for the unfaithful correlative candidate(s). While there is only one chain of the FR (index 'i' in (34)) or the FR pronoun (index 'j' in (34)) in the ⊙-LF, an LF with a correlative FR contains either two chains of the FR itself, or of the ⊙-FR pronoun, depending on which of the strategies described in section 3.2.2 is chosen:

(34) a. [CP ... [FR FR-PRON$_j$ ...]$_i$ ...] ⊙-LF
b. [CP ... [DP D_j^0 [CP C_j^0 ...]]$_i$] O-LF with 'feature bundle split'
c. [FR FR-PRON$_j$ ...]$_i$ [CP ... PRON$_i$ ...] O-LF with left dislocated FR

As the indices show, in both (34b) and (34c), there is one chain in the ⊙-LF that corresponds with two chains in these candidates. The type of faithfulness constraints that is sensitive to this kind of deviation is called 'INTEGRITY' in (McCarthy & Prince 1995):

(35) INTEGRITY – 'No Breaking'
No element of S_1 has multiple correspondents in S_2.
For $x \in S_1$ and $w, z \in S_2$, if $x \Re w$ and $x \Re z$, then $w = z$.

For the present purpose, S_1 is identified with the ⊙-LF and S_2 with an O-LF. In (34b), there are two correspondents of the FR pronoun, and in (34c), there are two correspondents of the whole FR. The constraint violated here will be called 'INTEGRITY-⊙-LF'.

The opposite pattern must also be considered. (34a) could be a candidate of a different competition with (34b) as ⊙-LF. In this case (34a) violates 'UNIFORMITY' (cf. McCarthy & Prince 1995):

(36) UNIFORMITY – 'No Coalescence'
No element of S_2 has multiple correspondents in S_1.
For $x, y \in S_1$ and $z \in S_2$, if $x \Re z$ and $y \Re z$, then $x = y$.

This constraint gives the correlative candidate an advantage in a non-FR competition. High ranking of these two faithfulness constraints leads to optionality of correlative and FR – each of them wins its own competition.

3.3.2 LF-PF correspondence

Output Candidates are ordered pairs of two representations, LF and PF. Elements of these representations stand in correspondence. At LF, the elements in question are again chains. At PF, we are dealing with words and strings of words. It can occur that an LF element has two PF correspondents. This happens, for instance, when resumptive pronouns spell out traces of moved elements in addition to the PF string that spells out the head of the chain of that element, as in example (24) from Modern Greek:

(37) O-LF: XP_i ... t_i
O-PF: FR-*pronoun* ... *resumptive pronoun*

The LF chain $\{XP_i,t_i\}$ counts as one syntactic element. But there are no chains at PF: only one link of the chain should be spelled out, but in (37) we have an additional resumptive pronoun and hence two PF correspondents for a single LF chain. The constraint that is violated by such a candidate is 'INTEGRITY-LF-PF'.[31]

LF-PF correspondence is also crucial for the way case conflicts are resolved in FR constructions. We saw that the form of a FR pronoun, i.e. its PF representation, is the element that fulfills case requirements. The problem is that the FR pronoun is able to fulfil the requirements for a chain that it does not correspond to. It has its own syntactic chain.

The syntactic analysis that I proposed in section 1 relies on specifier-head agreement: The FR pronoun occupies the [Spec,CP] position and agrees with the C^0 head of the FR. This agreement configuration is assumed to be responsible for the FR pronoun's sensitivity to case requirements that are imposed on the CP and should normally be fulfilled by the PF correspondent of C^0.

The problem now is: How can we say that the PF correspondent of the FR pronoun realises the abstract case assigned to the FR, if it does not correspond to it? If `m-case` is a feature of the FR, then we want the PF-correspondent of the FR to bear the appropriate case morphology. The FR pronoun is *part* of the string that corresponds to the syntactic structure of the FR at LF, it is even the initial element, but it is not the *head* of the FR – the complementiser is the head, which has no PF correspondent at all in the FRs of many languages.

(38) LF: [$_{CP}$ XP_2 C^0 ... t_2-`r-case`]$_1$-`m-case`
PF: / /FR-pronoun(+`m/r-case`)$/_2$... $/_1$

The configuration in (38) describes a FR with a matching FR pronoun. This alternative PF realisation of a syntactic feature introduces an asymmetry: although the FR pronoun realises `m-case`, we cannot say that the PF representation of the FR has the morphology of `m-case` – the CPs in the languages

[31] Note that here the LF in question is the O-LF, and *not* the ⊙-LF.

under discussion have no case morphology. That is to say, the specifier strategy is a way of realising the case feature of a category, but it is *not* a way of case-marking it. On the other hand, at LF the FR has an abstract case feature, and this syntactic case feature has a PF correspondent within the FR. But from the perspective of PF, there is no case morphology on the FR that 'seeks for' a corresponding LF case feature.

This asymmetry is an intrinsic 'structural defect' of FRs. It might be formulated in terms of feature identity, again a family of constraints introduced by McCarthy & Prince (1995):[32]

(39) IDENT(F)
Correspondent segments have identical values for the feature F.
If x$\Re$y and x is [γF], then y is [γF].

If we replace x with the LF representation of a FR and y with its PF representation, and further assume the feature F to be case, then we get what we want:

(40) IDENT(CASE)-LF-PF
Correspondent LF chains and PF strings have identical values for the feature case.
If x$\Re$y and x is [γcase], then y is [γcase].

This constraint is violated by FRs in general, except that they are CPs that are inflected for case. It is also violated by non-matching FRs with case attraction, i.e. where the FR pronoun surfaces with `m-case`. In this case, the abstract case feature of the chain of the FR pronoun, i.e. `r-case`, is different from its overt case morphology, i.e. `m-case`.

The FR candidates with case attraction violate IDENT(case)-LF-PF twice[33] (see tableau 6).

[32] An anonymous reviewer remarks that this constraint should be a MAX constraint rather than an IDENT constraint. I think that this would be misleading. A MAX constraint, as defined by McCarthy & Prince (1995) talks about existing correspondence relations, i.e. MAX is fulfilled for an element of LF iff it has a correspondent at PF. IDENT constraints talk about existing correspondence relations and evaluate whether corresponding elements are identical. What has to be clarified is whether a case feature is an element of LF in this sense or whether it is just a property or feature of an element. The standard assumption would be the latter: elements of syntactic representations are syntactic categories (NP, VP, N^0 etc.), or, as I assume here, *chains* of syntactic categories. Syntactic categories can be composed of features like case features, but these features are not syntactic elements by themselves. However, much of the current work in generative syntax tends to give up this distinction and treats many syntactic features as heads that project on their own. From this perspective, the anonymous reviewer would be right. The 'unanswered question' that lies behind this problem is how to deal with the periphrastic/synthetic distinction: case can be expressed in many ways, by prepositions, as well as by morphological affigation of nominal stems. What should a uniform account look like? In this paper, I take the more conservative point of view. In the resumptive pronoun FRs of Modern Greek a pronoun occurs in the position of the trace of the FR pronoun to spell out the case assigned to it. If only the case needs to be spelled out, why does there not occur a pure case morpheme? Why do we have a pronoun? The answer is: because case does not project by itself, it is a feature of NPs, not their governor, so it takes an NP to 'spell out' a case feature.

Tableau 6: Violations of IDENT (CASE)-LF-PF in non-matching FRs

Candidate	IDENT(CASE)-LF-PF
⊙FR-R	*
⊙FR-M	**
⊙FR-RES	**
CORR	

A language like German seems to make a distinction between single or double violation of this constraint. While it tolerates single violation, allowing for FRs with the FR pronoun realising `r-case`, it does not allow case attraction, where IDENT(CASE)-LF-PF is violated twice. This difference cannot be captured by simply counting the violations. We will need a second constraint that punishes double violation of IDENT(CASE)-LF-PF. The technique of constraint conjunction has already been used for syntax, e.g. by Legendre et al. (1998). The constraint we assume can be defined as in (41):

(41) IDENT(CASE)-LF-PF$^2_{CP}$
No double violation of IDENT(CASE)-LF-PF within the same CP.

Tableau 7 shows the violations of this constraint. It is generally assumed that conjoined constraints must be ranked higher than the constraints they are composed of, but this might be a neglectable convention.[34]

[33] Interestingly, the two ways of violating this constraint differ. The FR pronoun realises the wrong case in case attraction. The FR-CP realises no case at all. An alternative account might use this difference to formulate two different constraints.

[34] This assumption can be seen as a relict of connectionist modelling: if violations of constraints are interpreted as 'weights' in a connectionist model, then it can be assumed that double violation of a constraint results in a heavier weight than a single violation. But this translation into the connectionist perspective might be too literal: If a candidate violates a conjoined constraint A&B, then its overall constraint profile is worse than that of another candidate that does not violate A&B, no matter where A&B is ranked. The 'overall (negative) weight' of the candidate is increased. Assume the following table:

	A	B	C	A&B
cand.1	*	*		*
cand.2	...			

If candidate 1 is still in the competition when the evaluation comes to the constraint 'A&B', then there is no co-competitor that performs better or worse than candidate 1 on the constraints A and B. But this could mean that A&B cannot be decisive either, because the candidates should again have identical numbers of violations here. Note on the other hand that conjoined constraints are always relativised to a domain (in (41) this domain is CP). This need not hold of its constituent parts. We might then have a situation, where two candidates both violate A and B, but one candidate has these violations within the same domain and the other in different domains. In this case, only the first candidate also violates A&B. Thus, A&B would be decisive, although it is ranked below its constituent constraints. I see no reason why this should be ruled out.

Consider another situation: the table above also says that it is worse to violate A twice than to violate A and B only once (within a certain domain). If A&B was ranked higher than A, then we would need another higher ranked constraint A&A to emulate this effect. The convention in question might only produce notational variants. For an interesting exploration of the power of constraint conjunction see Fischer (2001). Note, finally, that connectionist models in principle could allow for inhibitory effects: a violation of A might be less problematic if B is also violated. This

Tableau 7: Violations of IDENT(CASE)-LF-PF^2_{CP} in non-matching FRs

Candidate	IDENT(CASE)-LF-PF^2_{CP}
⊙FR-R	
⊙FR-M	*
⊙FR-RES	*
CORR	

3.3.3 Case

If the constraint IDENT(CASE)-LF-PF was the only constraint affected by case conflicts in FR constructions, then the contrast of 'matching' and 'non-matching' languages would be a surprising fact. Although the FR pronoun cannot 'case-mark' the FR, it is nevertheless a possible 'realiser' for `m-case` and this has not yet been rewarded. Let us assume a constraint 'REALISE CASE' that is defined in the following way:

(42) REALISE CASE:
If γ is the abstract case feature of XP at an LF_i, then its corresponding PF_i contains an element *x* that bears the case morphology of γ. *x* has to be a correspondent of either a., b. or c.:
a. XP
b. X^0
c. YP, the element occupying [Spec,XP] at LF, if X is an AGR-head.

Languages have different strategies of making case features morphologically visible. Some use extra markers that are attached to the phrase they mark, like prepositions or postpositions. In other languages the case feature is 'reflected' by inflection of the words contained in a case marked phrase, in others it is only the determiner that realises the case of an NP. The really exceptional and unusual way of realising case is the specifier strategy that is chosen in FR constructions. But remember that a candidate fulfilling (42c) is only generated if X is an agreement head, as I assume this for the C^0-head of FRs to be the case. One other instance of (42c) might be exceptional case marking as in:

(43) John expects [$_{IP}$ Mary to win the game]

Under the traditional analysis, the NP *Mary* occupies SpecIP and is assigned case by *expect*, i.e. from outside of its host IP. It might not be unreasonable to subsume ECM under the matching effect in a parallel fashion: *expect* assigns case to IP and the element in [Spec,IP] realises that case feature, another instance of case attraction.

does not seem to be expressible at all in OT, as it stands.

REALISE CASE is obeyed in matching FRs. It rules out non-matching FRs. Thus, it is ranked high in, e.g. English, and low in the non-matching languages.

The next issue is the question of how to implement case hierarchies. We could replace the general constraint in (42) by a series of constraints for each case in a universally fixed ranking:

(44) REALISE OBLIQUE >> REALISE ACCUSATIVE >> REALISE NOMINATIVE

We can check whether the case hierarchy should be encoded directly in the constraint set of the grammar by the predictions of this method for case conflicts in FRs. For the sake of the example, let us assume the fixed hierarchy in (44) as given.

The system that we explore has two candidates: a free relative structure with the pronoun realising `r-case` and a correlative structure. Ungrammaticality of a FR in this system means that the correlative wins. In order for the correlative not to always win, there must be a constraint that bans correlatives. We use the constraint 'Integrity-⊙-LF' as introduced in section 3.3.1.

Correlatives have the advantage that all cases can be realised, while in non-matching FRs only one of them is realised. This, together with the constraint hierarchy in (44) should suffice for the data of German B as introduced in section 2.5. Let us assume the following ranking for German B:

(45) REALdat >> REALacc >> INT-⊙-LF >> REALnom

This ranking makes the correct prediction for non-matching FRs with accusative and nominative, see (46) – (47).

The problem arises with accusative and dative. Because both REALdat and REALacc are higher than INT-⊙-LF, the correlative is always better than the FR. But such a FR is well-formed, if `m-case` is accusative and `r-case` is dative. The FR pronoun carries dative morphology here, and this is in accordance with the case hierarchy. So here we get a wrong prediction, see (48).

(46) The 'index':
`m-case` = NOM ; `r-case` = ACC
is correctly predicted to yield a well-formed FR:

NOM – ACC	REAL dat	REAL acc	INT-⊙-LF	REAL nom
☞ ⊙FR *wen* ('who-ACC')				*
Correlative			*	

(47) The 'index':
m-case = ACC ; r-case = NOM
is correctly predicted to yield an ill-formed FR:

ACC – NOM	REAL dat	REAL acc	INT-⊙-LF	REAL nom
⊙FR *wen* ('who-ACC')		*		
☞ Correlative			*	

(48) The 'index':
m-case = acc ; r-case = dat
is wrongly predicted to yield an ill-formed FR:

acc – dat	REAL dat	REAL acc	INT-⊙-LF	REAL nom
☹ ⊙FR wen ('who-acc')		*		
☞ Correlative			*	

With a different ranking, we would get the correct result for (48): INT-⊙-LF should be higher than REALacc. But this would now wrongly predict a well-formed FR for the pattern in (47). We have a so-called 'ranking paradox', which is a major way of proving the falsehood of a particular OT analysis. The crucial problem of the proposed model is that we encoded the case hierarchy directly into constraints. This set of constraints does not express the relative markedness of accusative. The constraint INT-⊙-LF constitutes a split within the case hierarchy that in fact divides the case forms into two groups of unmarked and marked cases. The system does not express relative, but absolute markedness. The solution of this problem that I want to propose consists of two crucial steps:

(a) Language particular hierarchies of case forms are determined in a separate module of the grammar. They are presupposed by the core OT-syntax system. This 'case module' might have an OT architecture, but it does not need to.[35]

(b) In addition to 'REALISE CASE' there is a second constraint 'REALISE CASE (relativised)' that is sensitive to the case hierarchy. For this constraint, a case x counts as 'realised' not only, when a PF element has the case morphology of x, but also, when it bears the morphology of a case that is higher than x on the case hierarchy.

(49) REALISE CASE (relativised):
If γ is the abstract case feature of XP at an LFi, then the corresponding PFi contains an element x that bears the case morphology of γ or the case morphology of another case δ for which holds that γ < δ on the

[35] For a more detailed discussion of this matter see Vogel (to appear).

language particular hierarchy of case forms. x has to be a correspondent of either a., b. or c.:
a. XP
b. X^0
c. YP, the element occupying [Spec,XP] at LF, if X is an AGR-head.

While REALISE CASE distinguishes between matching and non-matching FRs, REALISE CASE (relativised) distinguishes between non-matching FRs that are in accordance with the case hierarchy and non-matching FRs that are not. To account for the complete typology, we need both constraints:

(50) a. English FRs violate neither REALISE CASE nor REALISE CASE (relativised)
b. German B and Gothic FRs can violate REALISE CASE, but not REALISE CASE (relativised)
c. Icelandic FRs can violate both REALISE CASE and REALISE CASE (relativised)

3.3.4 What we have so far and why Icelandic is missing

Tableau 8 gives an overview of the constraints we introduced up to now and shows for each of them the violations in each of the three FR competition types.

We can see in this tableau whether there are any candidates that are 'harmonically bounded', i.e. candidates that can never win because their constraint violations are supersets of the constraint violations of another candidate. This is indeed the case: candidate M can never win the 'm-case < r-case' competition. It is bounded by candidate R. This is an unwanted result, because in Icelandic (and in Modern Greek, if m-case is nominative and r-case accusative) candidate M wins this competition.

In order to let candidate M win the 'm-case < r-case' competition, we need an additional constraint that favours realising m-case on the FR pronoun as such. If there was no general advantage of doing so, it would be mysterious, why Icelandic chooses this option in all instances.

I cannot come up with a conclusion that I find fully satisfactory. What I propose is a bit speculative, though there are some interesting facts that can be related to the proposal I want to make.

The advantage of realising m-case is that the grammatical function of the FR within the matrix clause is made explicit. Especially non-matching FRs where the FR pronoun realises r-case can pose problems. German native speakers tend to judge (51b) worse than (51a), although they differ only in the order of FR and matrix clause.

Tableau 8: Preliminary Summary of constraints, competitions and violations

	INT⊙-LF	INT-LF-PF	IDC	IDC^2_{CP}	RC	RCr
m-case < r-case						
⊙R			1		1	
⊙M			2	1	1	1
⊙RES		1	2	1		
CORR	1					
m-case > r-case						
⊙R			1		1	1
⊙M			2	1	1	
⊙RES		1	2	1		
CORR	1					
m-case = r-case						
⊙R/M			1			
⊙RES		1	1			
CORR	1					

Abbreviations: INT-⊙-LF: INTEGRITY-⊙-LF; INT-LF-PF: INTEGRITY-LF-PF; IDC: IDENT(CASE)-LF-PF; IDC^2_{CP}: IDENT(CASE)-LF-PF^2_{CP} ; RC: REALISE CASE; RCr: REALISE CASE (relativised)

(51) a. Ich besuche oft, mit wem ich mich gut verstehe
I visit often with who I myself well understand

b. ?? Mit wem ich mich gut verstehe, besuche ich oft
with who I myself well understand visit I often
'I visit often who I get on well with'

A plausible explanation for this contrast might lie in the fact that nothing in the FR tells us about its grammatical function in the matrix clause. In (51a) the matrix clause is already parsed when the FR occurs and so the parser 'knows' that there is only the direct object 'slot' to fill and the FR can easily be connected to it. (51b), however, starts with the FR, which has a PP in [Spec,CP] and the parser has to hypothesise its grammatical function within the matrix clause. Most likely, it will assume that it is matching or perhaps the subject of the clause. Direct object is certainly not the default. This reasoning predicts a kind of a garden path effect with clauses like (51b). The constraint that I want to assume reflects this disadvantage of non-matching FRs realising r-case:

(52) Matrix Integration (MI):
This constraint is violated by constituents that contain no indication about how they are integrated into their clause.

One might wonder, whether there is an equivalent kind of restriction on subordinate clauses. This may or may not be, but it cannot have the same 'weight' as MI. Omitted arguments and empty operators are very frequent in, e.g. infinitival subordinate clauses and relative clauses of many languages. Dropping of Matrix arguments is comparatively rare. Topic-drop and pro-drop are frequent phenomena. But these are mostly restricted by discourse requirements: a subject or topic can only be dropped, if it is recoverable from the previous discourse. And, of course, these phenomena are optional.

MI is only violated by candidate R under non-matching. Candidate M is no longer harmonically bounded in the 'm-case < r-case' competition, as can be seen in tableau 9. Candidate RES is still harmonically bounded by candidate R/M in a matching competition. As we have no empirical counter-evidence up to now, this may be a wanted result.

Tableau 9: Summary of constraints, competitions and violations

	INT⊙-LF	INT-LF-PF	IDC	IDC^2_{CP}	RC	RCr	MI
m-case < r-case							
⊙R			1		1		1
⊙M			2	1	1	1	
⊙RES		1	2	1			
CORR	1						
m-case > r-case							
⊙R			1		1	1	1
⊙M			2	1	1		
⊙RES		1	2	1			
CORR	1						
m-case = r-case							
R/M			1				
RES		1	1				
CORR	1						

4 Results: The Factorial Typology

We distinguish three competition types, two competitions for non-matching FRs, each with four candidates, and a competition with matching FRs with three candidates. Each of the candidates, except for ⊙RES in the matching competition, is a possible winner. So the total number of logically possible outcomes is $4 \times 4 \times 2 = 32$. The proposed system of constraints shrinks the number of predicted outcomes down to 10. 22 logically possible languages are

predicted never to occur.[36] Tableau 10 gives an overview of the seven existing and predicted language types. All the languages contained in the typology discussed in section 2 are predicted (cf. tableau 1).

Tableau 10: Predicted typology of case conflict resolution in FRs

Conflict	Hindi	Engl.	Icel.	Ger. A	Ger. B	Gothic	M. Greek
m-case < r-case	CORR	CORR	M	R	R	R	RES
m-case > r-case	CORR	CORR	M	R	CORR	M	M
m-case = r-case	CORR	R/M	R/M	R/M	R/M	R/M	R/M

These seven attested outcomes are produced by the following (families of) constraint rankings:

(53) Hindi: IDC (INT-LF-PF) (IDC^2_{CP}) (RC) (RCr) (MI) >> INT⊙-LF
English: INT-LF-PF RC (IDC^2_{CP}) (RCr) (MI) >> INT⊙-LF >> IDC
Icelandic: INT⊙-LF INT-LF-PF MI >> IDC^2_{CP} RC RCr IDC
German A: INT⊙-LF INT-LF-PF IDC^2_{CP} >> IDC RC RCr MI
German B: INT-LF-PF IDC^2_{CP} RCr >> INT⊙-LF >> RC IDC MI
Gothic: INT⊙-LF INT-LF-PF RCr >> IDC^2_{CP} RC IDC MI
Modern Greek: INT⊙-LF RCr MI >> INT-LF-PF (IDC2CP) (IDC) >>RC

Only the crucial rankings are indicated. Constraints that occur in brackets are ranked as high as possible, but could also be ranked lower. Three of the four candidates have a constraint that 'switches it off': MI is only violated by the R candidate, INT-LF-PF is only violated by the RES candidate and only the CORR candidate violates INT-⊙-LF.

A language like Hindi that has no FRs, has INT-⊙-LF ranked low. Because CORR violates no other constraints, it is sufficient to rank INT-⊙-LF below a constraint that is violated by all other candidates, like, e.g. IDC. MI is only relevant for Icelandic. It does not seem to play a role in the other languages (but see the discussion above about possible effects of MI with fronted FRs in German).

English has only matching FRs. This results from the sub-ranking 'RC INT-LF-PF >> INT-⊙-LF >> IDC». RC is violated by non-matching FRs, except for candidate RES which violates INT-LF-PF. Ranking either RC or INT-LF-PF or both of them lower than INT-⊙-LF allows for non-matching FRs.

[36] The factorial typology was calculated with the assistance of the constraint ranking software OTSOFT, developed by Bruce Hayes (1998).

Tableau 11: The FR competitions in German B

	INT-LF-PF	IDC^2_{CP}	RCr	INT-⊙-LF	RC	IDC	MI
m-case < r-case							
☞ ⊙R					1	1	1
⊙M		1!	1		1	2	
⊙RES	1!	1				2	
CORR				1!			
m-case > r-case							
⊙R			1!			1	
⊙M		1!				2	
⊙RES	1!	1				2	
☞ CORR				1			
m-case = r-case							
☞ ⊙R/M						1	
⊙RES	1!					1	
CORR				1!			

The constraint IDC^2_{CP} is only relevant for German B. Tableau 11 displays the paradigm for German B. In order to have FRs at all, IDC has to be ranked below INT-⊙-LF. RC also has to be ranked low to allow non-matching FRs. If IDC^2_{CP} was not there, then candidate M would wrongly win the 'm-case > r-case' competition. German A differs from German B in that RCr is also ranked below INT-⊙-LF. This means that in German A candidate R always wins. As already discussed in section 2.4, this wrongly predicts that a clause with suppressed dative case is well-formed:

(54) *Ich helfe wen ich mag
I help who-ACC I like

The verb *helfen* requires a dative object. An explanation in terms of uninterpretability is possible, as indicated in section 3.2.1: the clause in (54) may win the syntax competition, but 'crash' in the semantics component of the grammar.

The difference between German A and German B can also be explained by attributing it to differences in the case hierarchies of these two variants of German, instead of differences in their constraint rankings. Assume that German A has the ranking of German B. Assume further that nominative and accusative, though morphologically distinct, do not count as distinct for the case hierarchy and the constraint RCr in German A. Nominative and accusative can then 'realise' each other alternatively. In this case, there would be no violation of RCr, even when accusative is suppressed in favour of nominative.

Modern Greek poses a similar problem: It is correctly predicted that in Modern Greek a resumptive dative pronoun occurs, if m-case is nominative or accusative, and r-case is dative. But the same thing should also happen, if

m-case is nominative and r-case is accusative. But we have no resumptive pronoun in this case. If nominative and accusative are treated as equivalent by the case hierarchy of Modern Greek, then no violation of RCr would occur, and candidate M would correctly be predicted to win.

Three further languages are predicted to exist that have not yet been attested:

Tableau 12: Predicted, but not attested patterns of case conflict resolution in FRs

Conflict	Unattested #1	Unattested #2	Unattested #3
m-case < r-case	R	RES	CORR
m-case > r-case	RES	RES	M
m-case = r-case	R/M	R/M	R/M

These three unattested outcomes are produced by the following (families of) constraint rankings:

(55) Unattested #1: INT-⊙-LF RCr >> IDC^2_{CP} (IDC) >> RC (MI) >> INT-LF-PF
Unattested #2: INT-⊙-LF RC (RCr) (MI) >> INT-LF-PF IDC IDC^2_{CP}
Unattested #3: INT-LF-PF RCr MI >> INT-⊙-LF >> RC IDC IDC^2_{CP}

None of these grammars is unreasonable. The first language is a mirror image of Modern Greek in that its default strategy is realising r-case on the pronoun. It switches to the resumptive pronoun strategy, when m-case is higher than r-case. A mirror image of German B is the third language. Its default is realising the FR pronoun with m-case. If r-case is the higher case, an FR is impossible. The second language uses resumptives for both non-matching FR types. This is also a reasonable strategy. Future research will show, whether these languages exist, and whether there are other languages that are predicted not to exist in this typology.

The format of the constraints used in this paper is very general. It should be possible to verify the proposed rankings by applying them to further phenomena. The OT syntax system developed here might be an alternative model for capturing the relation between LF and PF. The phenomenon of 'case attraction' found in FRs and other relative constructions of many languages was often considered to be a PF phenomenon precisely because it seemed to violate syntactic constraints (cf. Harbert 1983). An account within the classical principles and parameters framework, let alone minimalism, was never really in sight. OT can allow for LF-PF mismatches and at the same time restrict these mismatches to a minimum. Other properties of PF, like linear ordering or the interaction of syntactic movement and intonation patterns, might also be a topic of further research on LF-PF correspondence that can be done in a very systematic and

fruitful way in OT correspondence theory.[37] The way in which we integrated markedness scales of case forms presupposes a 'case module'. Thus, this paper argues for a revival of the idea of modularity. Whether the non-derivational 'inventory perspective' proposed in this paper is the optimal choice for OT-syntax is a matter of future research.

5 Epilogue: On Neutralisation

In section 3.2, I showed two possible ways of accounting for ungrammaticality in OT syntax, uninterpretability and neutralisation. The two strategies are kept separate throughout the paper and I made use of both of them in accounting for the typology of FRs. In this section, I will briefly show how the two strategies can be united in a different account that is based on *neutralisation to an uninterpretable candidate*.[38] Consider the following German clause that is usually judged as ungrammatical:

(56)	*Ich	helfe	mit	wem	ich	gut	arbeiten	kann
	I	help	with	whom	I	well	work	can

The explanation for the oddity of (56) that I gave in this paper was that *helfen* requires a dative object and that the FR stands in place of the dative object. The dative case feature, however, is semantic information that is not recoverable, if it does not surface – so the clause is uninterpretable. A conceptual oddity of this reasoning is that in the present account the dative feature is still present at LF, but not at PF. In order for the argument to hold, the PF must be assumed to be interpreted, and the case information of the PF must somehow 'override' the case information of the LF at the syntax-semantics interface.

If this is so, why should we assume that the clause in (56) contains a dative feature at all? Note the following two facts about *helfen* that can be repeated for many other verbs with oblique complements, at least in German. First, it is not impossible to have *helfen* without a dative object (57a), and second, it is possible to have a *mit*-PP on the side of *helfen* (57b):

(57)	a. Ich	half	bei	der	Ernte		
	I	helped	at	the	harvesting		
	b. Ich	half	mit	Peter	bei	der	Ernte
	I	helped	with	Peter	at	the	harvesting

[37] Büring (2001) developed an account of word order in German with an OT-syntax model that integrates syntax and prosodic structure.

[38] Neutralisation to a candidate with a slightly different meaning is the strategy that is also chosen by Legendre et al. (1998).

We are neither forced to assume that *helfen* obligatorily needs a dative object to yield a well-formed clause, nor that it must not be accompanied by a *mit*-PP. We know that matching FRs are well-formed in German. So the clause in (56) should be well-formed syntactically with a matching FR. In fact, it might be possible to get such a reading in a suitable context:

(58) ?Ich helfe bei der Ernte nur, mit wem ich gut arbeiten kann
I help at the harvesting only with whom I well work can
'I only help at the harvesting together with someone who I can work well with'

This reading might be hard to get, also for pragmatic reasons. But it is possible in principle, and this is what counts here: the oddity of (58) depends on whether we get a reading for the clause. With respect to syntax it is well-formed. If (58), and likewise (56), 'crashes', then it crashes in the semantic component of the grammar.[39]

We can use this insight to change the way we accounted for ungrammaticality in this paper. Instead of assuming that in the case of ungrammatical FRs the competition is neutralised to a formally unfaithful non-FR candidate, we can assume that it is neutralised to a FR with a different intended interpretation. We can then eliminate the CORR candidate from our candidate sets and keep *Gen* more restrictive than we did before: the candidate set only contains candidates with the syntactic structure of FRs.

For instances of ill-formed non-matching FRs, the neutralisation candidate that replaces the CORR candidate is a *matching* FR. Let us discuss the example that makes a difference between German A and German B:

(59) German B:

*Ich	lade ein	wer	mir	begegnet
I-NOM	invite	who-NOM	me-DAT	meets

'In invite whoever meets me'

The FR has the abstract case feature ACC here. It serves as direct object of the matrix verb:

(60) I-NOM invite [CP who-NOM me-DAT meets]-ACC

In the original analysis with the constraints ranked as in (61), the candidate with the form in (60) loses against the neutralisation candidate, because it violates RCr, which is ranked higher than the highest ranked constraint violated by the CORR candidate, which is INT-⊙-LF.

[39] This presupposes that subcategorization information provided by the verb can be erased. See Vogel (2000) for further arguments for why lexeme specific subcategorization should be dispensed with as much as possible on independent grounds.

(61) German B: INT-LF-PF RCr >> INT-⊙-LF >> RC IDC MI

Assume that instead of CORR we have a FR with different abstract case features, i.e. *Gen* may not allow for variation in the functional heads or feature distribution, but it may allow for variation in the values of features. The candidate I have in mind is a matching candidate with exactly the same 'surface structure' as in (60), but with the abstract case feature nominative on the FR, as in (62):

(62) I-NOM invite [CP who-NOM me-DAT meets]-NOM

This candidate does not violate RCr or RC, because it is matching, so there is no problem with case realisation at all (remember that the constraints on case realisation are constraints on output candidates without any reference to the ⊙-LF). This clause is odd, because the FR cannot be interpreted now. It cannot be the subject of the clause, because 'I' is the subject, and it cannot receive nominative by means of, e.g. a comparative structure, as in (63), because there is no comparative or other structure that would 'license' a second nominative case marked constituent besides the subject.

(63)	Die Maria	ist	größer	als	der	Peter
	the Maria-NOM	is	taller	than	the	Peter-NOM

So there is no way to make sense out of (62), it 'crashes' in the semantics. It probably does not crash at the syntax-semantics interface. The oddity of (62) is purely semantics-internal. But (62) nevertheless wins the OT syntax competition.

All we have to do is replace the now useless constraint INT-⊙-LF with another ⊙-LF faithfulness constraint that is sensitive for the change from (60) to (62). It is quite obvious that it is IDENT(CASE)-⊙-LF, because it is a case feature that changes:[40]

(64) IDENT(CASE)-⊙-LF
Correspondent ⊙-LF and output LF chains have identical values for the feature case.
If x$\Re$y and x is [γCASE], then y is [γCASE].

[40] Note that we now have to assume that the ⊙-representation that a clause is faithful to is an element of U_S with a specific language particular lexical index, because case has to be considered as partly language particular, at least with respect to some of the oblique cases and PPs that also have to be taken into account here. The use of the notion 'index' is now the same as in (Legendre et al. 1998), where 'index', more or less a 'criterion' defining the (finite) candidate set, replaces 'input'. If the structural accusative case feature is assumed to be assigned in a specific syntactic position, then the candidate in (62) also departs from the faithful candidates in that the FR may no longer occupy or be otherwise connected to this position. It has to be represented as an adjunct syntactically.

The constraint takes the position of INT-⊙-LF in the rankings:

(65) German B: INT-LF-PF IDC-LF-PF$^2_{CP}$ RCr >> IDC-⊙-LF >> RC IDC-LF-PF MI

This accounts for languages that have some well-formed and some ill-formed FRs. But how can we treat languages without any FRs like Hindi and Tok Pisin? The answer is again 'neutralisation to a candidate with a different meaning'. But now we do not change a feature, as we did above with abstract case, but rather *delete* a feature. The FR may be turned into a subordinate interrogative clause (deletion of the `m-case` feature and/or the REL feature of the FR) or an ordinary restrictive relative clause (deletion of the 'referentiality feature' of the FR). In either case the result should be uninterpretable. Either a verb selecting for a [*–wh*] complement is accompanied by a [*+wh*] complement clause, or there occurs a restrictive relative clause without a head noun. These candidates again imply no violations of the kind induced by FRs and may win the FR competition if IDC-⊙-LF or another suitable faithfulness constraint is ranked very low.

If the approach sketched in this section is reasonable, then we have two alternative theories. How can we decide between the neutralisation strategy developed in section 3.2.2 and the one developed in this section? There may be no need for such a decision. The two strategies are complementary and answer different questions. When we ask: "How does a language express what is meant by a given FR input?", we optimise the form and may get a correlative construction as output. And when we ask: "How is the structure of a (particular) FR interpreted in a given language?", we might sometimes get no ('crash' in the semantics) or a non-FR interpretation. The two strategies can also be considered as two sides of the same coin, combined in a more complex perspective on OT-syntax known as *bidirectional optimisation*.[41] Whether this is the best path to follow in OT-syntax, or not, is an open issue. As it stands, the optimal architecture of the OT-syntax model is still to be found.

[41] For a serial conception of bidirectional optimisation see Wilson (to appear); for a parallel conception see Blutner (2000). Smolensky & Wilson (2000) sketch a model of 'dual optimisation' that assumes that the selection of the candidate set is itself an OT competition – in some respect an extension of Wilson (to appear).

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