

# **Constraining syntagmatic interaction of grammatical categories through markedness hierarchies: The case of perfective presents**

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## **Abstract**

In this paper I propose a general approach to the study of constraints on co-occurrence of grammatical categories and present one case study of a functionally infelicitous combination from the domain of TAM categories, the present perfective. It is argued that constraints on co-occurrence of particular categories can be accounted for in terms of local markedness and markedness hierarchies. This approach lends itself naturally for formalization in Optimality Theoretic terms. It was further shown that both production optimization (OT syntax) and comprehension optimization (OT semantics) is needed to model syntagmatic interaction of grammatical categories.

## **1. Introduction: Typology of syntagmatic dependencies between grammatical categories**

Although almost any grammatical description of a language contains information about interaction between grammatical categories, there are still

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few typological studies that focus on this issue.<sup>1</sup> To my knowledge the only two studies which explicitly address this issue from a typological point of view are Xrakovskij (1996) and Aikhenvald & Dixon (1998).<sup>2</sup> Xrakovskij (1996) represents a pioneering case study of interaction of verbal categories, focusing on the interaction of mood (in particular, imperative, as opposed to indicative) with tense, aspect, voice and person agreement. He concludes that imperative frequently induces changes in the grammemes belonging to other categories, leading to the loss of a category altogether (e.g. tense), of some grammeme of a category (e.g., the passive is normally lacking an imperative), or of some function of a grammeme (as in the case of reinterpretation of aspectual values in the imperative), or else leading to a change in its formal expression (cf. the use of special forms of person agreement in imperative as compared to indicative). Further, Xrakovskij makes the important point that results of grammeme interaction may be asymmetrical: more often than not, (only) one of the grammemes changes its meaning when combined with another grammeme (the one undergoing the semantic shift is called *recessive*, the one inducing the change is called *dominant*). With regard to imperative, his conclusion is that imperative normally acts as a dominant category with respect to other categories. The paper by Aikhenvald & Dixon 1998 (henceforth A&D) is broader in scope, as it studies mutual dependencies between various grammatical categories, both verbal and nominal, in a wide range of languages. One of the most general results of this study is to show that interpretation/availability of nominal categories is more often determined by verbal categories than the other way round (for example, case marking of arguments may depend on choices in the TAM system). Some other unilateral dependencies have been noted as well; for example, negation is found to be more likely to influence availability/realization of other categories, but is hardly affected by other categories itself. However, many other dependencies have been found to be bi-directional; for example either a choice of number or a

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<sup>1</sup>Note that here we shall restrict our attention only to cases of ‘syntagmatic’ interaction of grammemes belonging to different categories (as opposed to ‘paradigmatic’ interaction of grammemes belonging to the same category), which is a traditional topic of investigation in linguistic – including typological – studies.

<sup>2</sup>Equally few are monographic studies which specifically address category interaction in individual languages or cross-linguistically: in this connection a study by Poupynin (1999) on tense/aspect interaction in Russian, and a typological study by de Haan (1997) on interaction of modality and negation should be mentioned.

choice of case system can impose restrictions on members of the other category.

Yet it seems that further cross-linguistic generalizations can be established in this field once a more fine-grained approach is adopted to category interaction. That is, it is important to distinguish between three distinct albeit related phenomena in the domain of interaction between grammatical categories, which are treated indiscriminately in Aikhenvald & Dixon (1998).

- 1) The presence of grammeme X of category x excludes category y (e.g., in imperatives/subjunctives tense distinctions are normally missing);
- 2) The choice of grammeme X of category x excludes grammeme Y of category y (for example, perfective aspect in many languages is incompatible with the present tense);
- 3) The choice of grammeme X of category x leads to formal lack of distinction between grammemes Y1 and Y2 of category y (e.g., in many languages there is a larger number of distinct case forms in singular than in plural).

Admittedly, this classification may be less clear-cut in certain cases; for example, if the number of grammemes is restricted to two, the first case is indistinguishable from the third. On the other hand, if a grammeme X may exclude (possibly, for different reasons) all grammemes of y, then the second case converges with the first one. Yet these cases should be kept distinct, since the motivation behind these types of category interaction may be different. In particular, the third case, dealing with neutralization/syncretism, has usually been related to markedness: combinations of unmarked members of categories are known to be less restricted, as compared to the marked one (see Croft 2003: 95-97 for discussion and references). This is different from the case of the 2<sup>nd</sup> type, which is – inasmuch as it is cross-linguistically recurrent – due to functional (semantic and/or pragmatic) incompatibility: here we are dealing with absolute restrictions on certain combinations rather than with relative preferences. The first case is probably the most complex, since exclusion of different members of a certain grammatical category may be due to both factors (these cases are further discussed in Malchukov, 2006).

The present paper continues the typological research into category interaction initiated by Xrakovskij and Aikhenvald & Dixon. Here I shall mostly concentrate on the cases of the second kind (called hereafter ‘infelicitous combinations’, ICs), where grammemes X and Y are functionally incompatible and therefore a combination of these values is systematically excluded. The paper presents a case study of one infelicitous combination in the aspecto-temporal domain, namely restrictions on combinations of present tense with perfective aspect. However, before addressing this topic, other examples of infelicitous combinations from the domain of TAM categories are briefly discussed in section 2 to demonstrate possible “resolution” of infelicitous combinations. Section 3 addresses the way present perfectives behave cross-linguistically, focusing on the meaning shifts involved. Section 4 addresses another factor constraining syntagmatic cooccurrence of grammatical categories, namely *relevance*. Section 5 demonstrates how these two factors can be integrated into a single model through the notion of local markedness, and markedness hierarchy. Section 6 argues that constraints on syntagmatic interaction can be fruitfully approached from an optimality-theoretic perspective: it is shown that OT syntactic approaches are able to model blocking effects, but one needs to shift to an OT semantic perspective to model meaning shifts involved in infelicitous combinations. Finally, section 7 summarizes the main findings of the paper.

## **2. Types of infelicitous combinations and their outcomes: some illustrations**

Note that since ICs are infelicitous for semantic reasons, effects of grammeme conflicts will be observed independently of the mode of expression of the respective categories. Yet the outcome of a grammeme conflict may be different depending on the structural properties of the language. If the respective values are expressed cumulatively, as is typically the case in a fusional language, one should expect that the infelicitous combination will not be expressed at all, which will result in a paradigm gap. For example, in Romance languages the distinction between perfective and imperfective (aorist/imperfect) is restricted to past tense and is not found in the present (see below for further discussion). If categories are

expressed independently, as is often the case in agglutinative languages, the outcome may be more diverse.

In the latter case we can imagine three primary techniques for conflict resolution of infelicitous combinations: 1) the infelicitous combination is not available at all, due to the mutual incompatibility of the categories in question; 2) the infelicitous combination is available, but involves a change of meaning of one of the grammemes (the ‘recessive’ grammeme, in the terms of Xrakovskij 1996) 3) the infelicitous combination is available, but involves a change of meaning in both grammemes.

In the first case the resolution rules are similar to what we observed in cases of cumulative expression: semantic incompatibility leads to a gap in a paradigm. Consider, for example, the interaction between modal categories in Korean, as described in Sohn (1994). In Korean, the categories of (epistemic) mood and illocutionary force, which cross-linguistically are most often expressed cumulatively, constitute independent categories. Yet not all theoretically possible combinations of moods (indicative, retrospective, requestive and suppositive) and illocutionary force markers (declarative, interrogative, imperative and propositive) are found. While declaratives and interrogatives combine with indicative and “retrospective” (i.e. experiential) moods (see (1)-(3)), imperatives and propositives (the latter expressing the ‘let’s do V’ meaning) share the requestive mood (see (4)-(5)):

Korean (Sohn 1994: 338, 339, 342, 40, 45)

- (1) *Ka-n-ta / ka-te-ta*  
go-IND-DC/go-RETR-DC  
‘S/he goes/went (I noticed)’
- (2) *Mek-ess-n-unya*  
eat-PST-IND-INT.PLN  
‘Did (s/he) eat?’
- (3) *W-ass-te-la*  
come-PST-RETR-DC  
‘He came (I noticed)’
- (4) *Po-si-p-si-o*  
see-SH-AH-REQ-IMP.DEF  
‘Please, look’

- (5) *Wuli ilccik ttena-sip-sita*  
 we early leave-SH-AH-REQ-PROP  
 ‘Let’s leave early!’

Notably, other theoretically conceivable combinations (declaratives and interrogatives with requestive mood, or imperatives and propositives with indicative and retrospective moods) are not found (Sohn 1994). Such patterns, where only “natural” combinations of grammemes are available, while less natural combinations are avoided, will be explained as instantiations of local markedness in 6. below.

The second case, where one grammeme (the recessive one) undergoes a semantic shift when combined with another grammeme (the dominant grammeme), is illustrated here with data from the Tungusic languages Even and Evenki. Even, like the genetically related Evenki, has a special habitual marker *-grA-* which is normally used with the past tense reference. When combined with the non-future (“aorist”) marker it induces a past tense interpretation. Compare the base form in (6) which, when derived from atelics, has a present tense reference, and the habitual form in (7), referring to the past:

Even

- (6) *Etiken nulge-n*  
 old.man nomadize-AOR.3SG  
 ‘The old man nomadizes’
- (7) *Etiken nulge-gre-n*  
 old.man nomadize-HAB-AOR.3SG  
 ‘The old man used to nomadize’

In Evenki, the combination of the past habitual aspect and future tense is, expectedly, excluded (Nedjalkov 1992). In Even, however, such a combination is possible, but the meaning of the aspectual marker is reinterpreted to mean ‘as before’ in the context of tense/mood forms referring to the future:

Even

- (8) *Nulge-gre-d’i-n*  
 nomadize-HAB-FUT-3SG  
 ‘(He) will nomadize as before’

- (9) *Nulge-gre-li*  
 nomadize-HAB-IMP.2SG  
 ‘Nomadize as before!’

The third case, where both morphemes undergo a semantic shift, can be illustrated by data from Nenets (a Samoyedic language), where a combination of future (suffix) with the past tense (enclitic) is interpreted as irrealis:

Nenets

- (10) *Manzara-nggu=s’*  
 work-FUT-PAST  
 ‘s/he would have worked (but...)’

In what follows, I shall focus on the second case of asymmetric infelicitous combinations, which involves a dominant and a recessive grammeme. Cases of the first type (blocking) will be also relevant for the following discussion, inasmuch as recurrent cross-linguistic incompatibility is a hallmark of an infelicitous combination and thus can be used as an IC diagnostic. One of the best studied cases of ICs in the aspecto-temporal domain, which is discussed in this paper, is the semantic incompatibility of perfective aspect with the present tense (other case of infelicitous combinations from the domain of verbal categories are discussed in Malchukov 2006).

### 3. Perfective presents cross-linguistically: a resolution of an infelicitous combination

As repeatedly noted in the literature (Comrie 1976; Bybee et al. 1994: 83; Bache 1995), a combination of a perfective aspect with the present tense is functionally infelicitous.<sup>3</sup> Indeed, the meaning of the perfective aspect, which imposes a bounded, ‘closed’ view of the situation, is semantically incompatible with the (central) meaning of the present tense, locating an

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<sup>3</sup>For different proposals how this incompatibility should be accounted in semantic terms, see Giorgi & Pianesi 1997, Borik 2002, Smith 2007, Ogihara 2007.

event at the moment of speech.<sup>4</sup> The effects of this semantic incompatibility can be observed irrespective of the mode of expression of tense/aspect categories. Thus, in flectional languages, where aspecto-temporal values are expressed cumulatively, this feature combination is not found; compare the situation in the Romance languages, where the perfective has past time reference only (Comrie 1976). Where categories of tense and aspect are expressed independently, as in Slavic languages, this grammeme combination is available, but involves reinterpretation of one or the other of the two grammemes.

As is well known, Slavic languages differ in the way that perfective presents are interpreted (see, e.g., Bondarko 1971: 250ff.; Comrie 1976: 66-71; Breu 1994).<sup>5</sup> In South Slavic languages, such as Bulgarian and Serbo-Croatian, the default meaning of a perfective present is generic present (narrative or habitual); see Comrie (1976: 66-71; Breu 1994). Consider the following example from Bulgarian<sup>6</sup>:

Bulgarian (Comrie 1976: 69):

- (11) *Speglednet se, pousmixnet, devojki...*  
 glance.PFV.PRES.3PL REFL smile.PFV.PRES.3PL girls  
 ‘The girls look at one another, smile at one another...’

By contrast, in East Slavic languages, such as Russian, a perfective present is normally interpreted as future:

Russian

- (12) a. *On idet* b. *On pri-det*  
 he go.IMFV.PRES.3SG he PFV-go.PRES.3SG  
 ‘He goes’ ‘He will come’

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<sup>4</sup>We abstract away from those marginal contexts (such as performative use) where the semantic incompatibility of the present tense with the perfective aspect is suspended (see Footnote 7 below).

<sup>5</sup>There is a vast literature on the interaction of tense and aspect in Slavic; my account is closest to Breu 1994 (and from a more general perspective to other “interactional” approaches to the aspecto-temporal domain, such as Bache 1995, Smith 1997, Johanson 2000).

<sup>6</sup>As an anonymous reviewer points out, the use of perfective presents in Bulgarian is more common in subordinate than in main clauses.



Only in certain contexts (e.g., in the presence of the habitual particle *byvalo* or modal negation *nikak ne* (see Bondarko 1993 for other contexts)) can the present perfective forms have a generic interpretation:

### Russian

- (13) *On byvalo pri-det,                               skazhet*  
he PTCL PFV-go.PRES.3SG say.PFV.PRES.3SG  
'He used to come and say'

As the tense form in (12)-(13) is used to refer to the present when derived from imperfective verbs, and to the future or generic present when combined with perfectives, the meaning of this form in Russian is traditionally defined as non-past or as ambiguous between present and future (see Bondarko 1971). Yet formally, we are dealing here with a present form, which is completely parallel to the present forms in South Slavic. Note also that while perfective presents can refer to the (generic) present,<sup>7</sup> imperfective presents cannot (cases of temporal transposition aside<sup>8</sup>) refer to the future. Also in diachronic perspective it is clear that the present was originally the basic meaning of this form (Bondarko 1971: 51; Comrie 1976); hence the rise of the future meaning can be attributed to the clash with the perfective value within an emerging aspectual opposition. Thus, the general pattern cannot be overlooked: the future meaning arises exactly in contexts where the present meaning is blocked. This is then a mirror image of a situation in Bulgarian, where the perfective shifts from encoding of a single event to series of events in the context of present. For the latter cases the analysis in terms of underspecification or ambiguity on the part of the perfective is still less attractive. In fact, the cases of the latter kind have been described in the literature in terms of shifts or coercion: perfective being coerced into iterative meaning in the context of present tense (Michaelis 2004; see also de Swart 1998 for a general discussion of

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<sup>7</sup>And even to actual present when the incompatibility between present and perfective is suspended in special contexts, such as in performative use: *Poproshu vyjti* [ask.PFV.ISG leave] 'I ask you to leave'.

<sup>8</sup>Thus we do not consider here cases of temporal transposition involving the present imperfective forms as when this form is used, in an appropriate temporal context, as a historical present (cf. *Idu ja včera domoj* '(As) I went (lit go) home yesterday'), or as a scheduled future (cf. *Zavtra ja idu k vraču* lit. 'Tomorrow I go to the doctor').

“aspectual coercion”). Indeed, on the assumption that presents intrinsically select for an unbounded (imperfective) event, its application to a bounded (perfective) event will coerce the habitual operator (cf. Michaelis 2004: 60: “present constructions are intrinsically state selectors”).<sup>9</sup>

Breu (1994) also attributes the difference between South Slavic and East Slavic languages to the fact that in South Slavic the (present) tense is dominant with respect to the aspect, while in East Slavic the aspectual meaning (perfective) is dominant with respect to the temporal one. In our terms, the difference between Slavic languages relates to the fact that in Bulgarian the (present) tense is a dominant category and the (perfective) aspect is a recessive category, while in Russian the aspectual grammeme (perfective) is dominant while the temporal one is recessive.

Since the infelicity of the perfective present combination is semantically motivated, IC effects will be observed independently of the concrete mode of expression of tense and aspect categories in the particular language. In this context it is instructive to compare Russian to Finnish, as the outcome of the grammeme conflict is similar in these two languages, even though Finnish differs radically from Russian in the expression of aspectual distinctions. As is well known, Finnish lacks verbal aspect, but an aspectual distinction can be rendered through a case alternation on the object (therefore one sometimes speaks of “aspectual case” in Finnish). The accusative marking of the object as in (14) is used to express perfective (‘bounded’) meaning, while the use of the partitive case as in (15) is used to express imperfective (‘unbounded’) meaning (see Kiparsky 1998 for a detailed discussion) :

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<sup>9</sup>As pointed out by an anonymous reviewer an analysis of habitual meaning in terms of coercion is not completely straightforward as perfective presents in the iterative function denote repeated but completed acts, so it is not clear whether the meaning is imperfective. While this is true what counts here is that the complex event referring a series of action is viewed as unbounded rather than bounded, therefore a conventional analysis of iterative as a variety of imperfective rather than perfective (Comrie 1976) seems to be justified. More generally, an analysis in terms of coercion does not imply that the “input” category is eliminated, rather its meaning is augmented (to meet the requirements of the context) in such a way that the output category does not match the input. Thus, when a state is coerced into an inchoative state in the context of a perfective operator (perfective aspect or an aspectually sensitive tense maker) the resultant category qualifies as an event rather than a state (de Swart 1998).

Finnish (Sulkala & Karjalainen 1992: 306,308)

- (14) *Outi luki kirjan*  
 Outi read.PAST.3SG book.ACC  
 ‘Outi read a book’
- (15) *Outi luki kirjaa*  
 Outi read.PAST.3SG book.PART  
 ‘Outi was reading a book’

Notably, if a verb is in the (unmarked) present, rather than in the imperfect (past) as in the above examples, the combination with perfective yields the future meaning, similarly to what we observed for Russian:

Finnish (Sulkala & Karjalainen 1992: 308, 306)

- (16) *Outi lukee kirjaa*  
 Outi read.PRES.3SG book.PART  
 ‘Outi reads/is reading a book’
- (17) *Outi lukee kirjaa*  
 Outi read.PRES.3SG book.ACC  
 ‘Outi will read a book’

Thus, resolution of the perfective present combination in Finnish proceeds similarly to Russian, even though aspect is expressed by a syntactic construction in Finnish rather than an inflectional category as in Russian: in both cases tense is a recessive category, and aspect is dominant.

The same effects can also be observed in languages which have a category of aspect but lack a category of tense altogether. In these languages, a category with the perfective meaning cannot be interpreted as referring to present even in strong contexts. (Maltese) Arabic is instructive in this respect. Maltese lacks tense, but uses aspectual (perfective/imperfective) forms to render tense distinctions. Notably, the perfective normally refers to the past, in strong contexts it can refer to the future, but it never refers to the present (Borg & Azzopardi-Alexander 1997: 234). Also in Lango, which distinguishes between perfective, habitual and progressive aspects, the perfective aspect may refer to either past or future, but not to the present (Noonan 1992: 138).

#### 4. Other factors underlying grammeme (in)compatibility: Relevance

Above we have considered one factor underlying grammeme (in)compatibility, focusing on cases in which compatibility is semantically motivated. However, semantic compatibility is clearly not the only factor constraining syntagmatic combinability between categories. There are other factors as well, both formal and functional (Malchukov 2006). Form related constraints pertain to individual languages (e.g. distribution of grammemes across morpheme slots in languages with a templatic morphology, which is often idiosyncratic) and will not be discussed here.<sup>10</sup> Among other functional factors to be discussed we single out one factor dubbed ‘relevance’ here:

*Regularity of co-occurrence between the members of grammatical categories reflects the degree of their mutual relevance.*

The role of this factor can be also illustrated from the domain of tense-aspect interaction. A well-known cross-linguistic generalization states that aspectual distinctions are more often observed in the domain of past tenses (Comrie 1976; Dahl 1985). In particular, Comrie (1976: 71-72) cites example from Romance languages where the aspectual distinction between perfective and imperfective is restricted to the past (aorist vs. imperfect). Other examples are not difficult to come by. For example, in Hixkaryana the tense/aspect system includes, apart from the nonpast in *-yaha*, three different forms referring to the past: immediate past in *-no*, recent past completive in *-yako* and recent past continuative in *-yakonano* (Derbyshire 1979). In Mangarayi, the aspectual distinction (punctual/continuous) is also restricted to the past (Merlan 1982). Comrie’s explanation for this asymmetry invokes the notion of relevance: aspectual qualification is less relevant for actions that have not (yet) occurred (Comrie 1976).

Note that explanation in terms of relevance is more general than an explanation in terms of semantic compatibility. Indeed, while restrictions on the use of aspects with the present tense can be explained in terms of (in)compatibility, this explanation does not carry over to the future tense,

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<sup>10</sup>As an example of a formal constraint, Malchukov (2006) cites an example from Ika (Chibchan; Frank 1985), where none of the verbal categories can co-occur due to a “one-suffix per word constraint” operating in this language.

which is conceptually compatible with both aspects. Yet we can still follow Comrie in his conclusion that aspectual qualification is less relevant for future non-factive events than for past actions, for which it is often important whether an action has been completed or not. This explanation carries over to the frequent lack/neutralization of tense and aspect distinctions in negative clauses and irrealis moods, as documented by Aikhenvald & Dixon (1998). Similarly, tense distinctions are frequently found only in the indicative mood. By way of illustration consider the case of Nkore-Kiga, where seven different tenses are distinguished in the indicative, while in the subjunctive the tense paradigm is reduced to two, and in the imperative is lost altogether (Taylor 1985: 154). In fact, mutual incompatibility of tense with non-indicative (irrealis) moods, observed in many languages, has led some authors to suggest that tense and mood should be subsumed under one category (Xrakovskij & Volodin 1979). The same observation holds for aspectual distinctions, although the restrictions are less regular here. This case deserves special attention since it is less well documented in the literature (interaction of mood with other categories is not addressed in Aikhenvald & Dixon 1998). Thus, in Koromfe (Rennison 1997), the indicative has a four way tense/aspect opposition (between aorist, past, durative and progressive), while in the imperative only an unmarked/durative opposition survives. In Sanskrit, imperative and optative forms derive from present/imperfective stems. Originally, irrealis moods could be also formed from stems of the aorist and perfect, but later the latter forms disappeared, leading to neutralization of the aspectual distinction. In Basque, the subjunctive mood does not distinguish aspects either (Saltarelli 1988: 230). And in Tsakhur (Daghestanian), the aspectual opposition is obligatory in realis ('referential') moods, is optional in hypothetical moods and is absent in counterfactual moods (Majsak & Tatevosov 1998). Significantly, Majsak & Tatevosov also invoke the notion of relevance to account for this gradual reduction of aspectual distinctions in Tsakhur.

Note that some of the restrictions noted above discussed above have been interpreted in terms of markedness in the earlier literature. For example, A&D attribute the frequent lack of TAM in negative forms to markedness. Yet, this vague use of the notion of markedness has been recently criticized by Haspelmath (2006), who showed that this term covers a heterogeneous set of phenomena, which should be better kept apart (formal complexity, semantic specificity, etc). He further argues that many of the alleged markedness effects are due to frequency. It is likely that also

with respect to the domain of aspect-tense interaction a frequency explanation is appropriate. Thus, it is less relevant to encode aspectual distinctions for events which have not yet happened, hence such encoding would be less frequent in natural languages and less frequently grammaticalized. Moreover, the approach relying on frequency (or “naturalness” of individual combinations as manifested in frequency) can be extended to the domain of infelicitous combinations. By definition, the latter are semantically and/or pragmatically unnatural; hence these combinations are expected to be highly infrequent, and least likely to be grammaticalized. Since this concept of markedness pertains to naturalness of particular combinations, we are dealing here with the phenomenon of local markedness rather than general markedness (see Tiersma 1982; Croft 1990: 144-146 on local (un)markedness). Indeed, general markedness is often unable to explain co-occurrence restrictions between different grammemes, as a particular combination may be “marked” (i.e. less natural) for some members of a grammatical category but “unmarked” (natural) for others. Below, the relation of local markedness which obtain between particular grammemes will be captured in the form of markedness hierarchies.

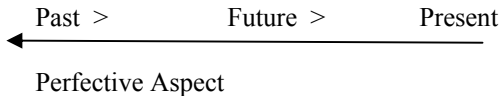
## 5. Functional factors in interaction: markedness hierarchies

As noted above, the phenomenon of local markedness is particularly relevant for the study of the interaction between verbal categories, as it pertains to markedness of certain grammeme **combinations**, rather than to markedness of grammemes *per se* in absolute terms. In the literature, local markedness is also known under the name of “markedness reversal” (Croft 1990). However, given that some categories involve more than one member, patterns of local markedness are better viewed as markedness hierarchies, reflecting the relative naturalness of certain grammeme combinations. This is consistent with Croft’s (1990: 150) observation that many markedness reversal patterns turn out on closer inspection to be multivalued hierarchies. These hierarchies extend from most natural (unmarked) combinations, where grammemes are both compatible and highly relevant to each other’s content, at the one end, to combinations which are functionally incompatible and hence irrelevant, at the other end. In between we find combinations of categories which, although functionally

compatible, are less relevant to one another. On this account the infelicitous combinations discussed in this paper represent the most marked combination of grammemes on the markedness hierarchies.

Drawing on the previous discussion as well as on observations in the earlier literature, we can set up the following markedness hierarchy for the domain of tense-aspect interaction.

*Fig. 1. Tense Hierarchy for perfective aspect*



As observed by Comrie (1976: 73) and Dahl (1985: 80), the perfective grammeme (and, more generally, aspectual distinctions involving perfective as a marked member) is not equally compatible with different tenses: it is more often found in the past, less often in the future, and is usually lacking in the present, or else is reinterpreted. As noted above, in Romance languages the aspectual opposition obtains only in the past, while in Greek it is found in both past and future, but not in the present. In the Slavic languages it is extended to the present as well but the present perfective combination is reinterpreted (recall the discussion in 3 above). Evidence for all parts of the hierarchy can also be found together in one single language. Thus, in ChiBemba (Bantu), the aspectual distinctions (between perfective, imperfective and perfect) found in the past are somewhat reduced in the future (future perfect is lacking), and are completely neutralized in the present, which exists only in the imperfective (Chung & Timberlake 1985: 227-228 citing Givón). This pattern is expected, given that aspectual distinctions are most relevant for the past, less relevant for the future, and irrelevant for the present, as the present perfective combination is semantically infelicitous. For imperfective aspect this hierarchy is partially reversed, as imperfective naturally correlates with the present,<sup>11</sup> but is partially retained. As noted by Dahl (1985:110) past imperfective forms are more frequent cross-linguistically than future imperfective forms; this is clearly due to relevance.

<sup>11</sup>Mel'čuk (1998: 106) notes, for example, that in Uzbek the imperfective/progressive is restricted to the present tense. More examples of progressives restricted to present tense can be found in Dahl (1985: 94).

As shown in Malchukov 2006, similar hierarchies can be proposed for other types of infelicitous combinations. Thus a semantic map for imperatives, as proposed by van der Auwera et. al. (2004) can be read as a markedness hierarchy of the following form (cf. Gusev 2005): 2sg > 2pl > 1pl > 3 > 1sg. This hierarchy predicts that the 2nd person singular forms will be universally available for imperatives, 2pl less so, etc. The 1st person singular forms (and 1st person plural exclusive forms, as opposed to 1st person plural inclusive forms) are least likely to be found in the imperative paradigms. These combinations are functionally infelicitous and therefore either blocked (absent from the paradigms), or reinterpreted. For example, in Even (Tungusic), the functionally infelicitous 1st person singular imperative combination is reinterpreted as future indicative (i.e. the mood category is recessive), while the 1st person exclusive imperative forms are reinterpreted as inclusive (i.e. the mood category is recessive); Malchukov 2001. In all such cases, the same functional principles underlying relations of local markedness, such as relevance and semantic compatibility, jointly shape the markedness hierarchies. It is possible, as suggested in the functional-typological literature (Greenberg 1966, Croft 1990, Haspelmath 2006), that frequency is ultimately the driving force behind markedness relations and more generally behind markedness as a multidimensional correlation.

## **6. Constraining interaction of grammatical categories: an optimality-theoretic approach**

One natural way to formally model (restrictions on) syntagmatic interaction between grammatical categories is through adapting an optimality-theoretic perspective. As is well known, OT syntactic approaches view grammar as resulting from competition of forms/constructions encoding certain semantic input against a system of ranked constraints. The two most general types of constraints used in the literature are Faithfulness constraints forcing a faithful expression of the input information in the output, and the markedness constraints, favouring a more economical expression. For the case at hand, we can assume general Faithfulness constraints forcing faithful encoding of features of aspect and tense in the output. On this view ranking of Faithfulness constraints (FAITH(tense), FAITH(aspect)) over markedness constraint yields a language with a grammatical categories of



tense and aspect, while the opposite ranking yields a language lacking the respective categories (cf. Fong 2005 for a similar account).

Also markedness hierarchies discussed above can be easily incorporated into the OT approaches. For example, Aissen (1999; 2003) in her study of differential case marking recasts person hierarchies established by Silverstein, Comrie and others as constraint hierarchies disallowing alignment of prominent (animate/definite) arguments with objects rather than subjects. Thus, differential object marking is modelled through interpolation of economy constraints (prohibiting overt case: \*Struc<sub>c</sub>) into the markedness constraint hierarchies. Markedness hierarchies in their turn are represented through a constraint conjunction of \*øc ('star zero case') with the constraint hierarchies, forcing overt case on most marked combinations more forcefully. For example, the following constraint ranking would produce (obligatory) case-marking of pronominal and human objects (as in Hindi):

- (18) \*Oj/Pro & \*ø<sub>c</sub> >> \* Oj/Hum & \*ø<sub>c</sub> >> \*Struc<sub>c</sub> >> \*Oj/Anim & \*ø<sub>c</sub>  
>> \*Oj/Inan & \*ø<sub>c</sub>

Note that Aissen's analysis makes a crucial use of the notions of *harmonic alignment* (here, alignment of role and person/animacy hierarchies) and *constraint conjunction*, where a certain combination of values is seen as more marked (less natural).

At this point it should be clear that the same tools can be used to model any markedness hierarchy, as proposed in the functional-typological literature. Thus, hierarchy constraining tense aspect interaction can be recast as the following constraint hierarchy:

- (19) \*PFv&Pres >> \* PFv&FUT >> \*PFv&Past

This constraint hierarchy captures the generalization that a combination of the values [present] for tense and [perfective] for aspect is most marked (least natural), hence this constraint is stronger than the constraints against combinations of other values for tense and aspect. The ranking of constraints in the hierarchy (19) is determined by relevance (as defined above), which in its turn may reflect the frequency of certain combinations. This is consistent with the general assumption that more frequent combinations of categories are more readily grammaticalized. The

constraint hierarchy further interacts with Faith constraints, requiring faithful marking of the verb for the features of aspect (perfective) and tense (present). In such a way, blocking of infelicitous combinations can be accounted for by interpolating Faith constraints below an infelicitous combination of values:

- (20) \*PFv&Pres >> FAITH(pfv), FAITH(pres) >>\* PFv&FUT >>  
\*PFv&Past

Yet, OT syntax cannot account in a principled way for this ranking, or predict possible meaning shifts in an IC. The first problem is probably not so severe. Indeed, one could argue that the ranking in (20) has a principled reason, namely that the semantic input for the IC is not well-formed, hence IC would be universally blocked. The second, problem however cannot be resolved in a unidirectional OT syntactic approach. For that we shall combine it with an OT semantic approach.

While OT syntax is concerned with a production (meaning-to-form) optimization, OT semantics is concerned with comprehension (form-to-meaning) optimization (Hendriks & de Hoop 2001; de Hoop & de Swart 2000). Thus, it involves evaluation of interpretations of certain forms/constructions by a system of ranked constraints. For the present discussion two general constraints would suffice:

- a) FAITH-INT: penalizes unfaithful interpretation of a given form (in particular, penalizing meaning shifts)
- b) FIT: interpretation should be consistent with the context (in particular, with the context of co-occurring categories).

Both constraints types are well known from the literature (cf., e.g., Zeevat 2000). Here it is assumed that FIT (penalizing an infelicitous combination) is the highest ranking constraint. The meaning shifts are modeled through the ranking of the faithfulness constraints penalizing meaning shifts for the aspectual and temporal categories. Faithfulness is represented in a simplified way in terms of (binary) features, so that a faithful interpretation for a perfective form would be the perfective value (roughly, representation of an event in its totality), rather than the imperfective value. The (most) faithful interpretation of the present tense would be the meaning of (actual) present (roughly, co-occurrence of an event with the moment of speech).

By way of exemplification consider the interpretation of a felicitous (present imperfective) and an infelicitous (present perfective) combination of tense and aspect in Russian (cf. section 3 above).

Tableau 1: Optimal interpretation of the present imperfective forms in Russian

Input: <i>delaet</i> [pres; impfv]	FIT	FAITH(asp)	FAITH(tense)
☞ <PRES; -PFV>			
<-PRES; ; -PFV >			*
<PRES; PFV>		*	
<-PRES; PFV>		*	*

As shown in Tableaux 1, the interpretation of the present imperfective form is unproblematic. FIT is satisfied here by all candidates, hence the most faithful interpretation wins.

Tableau 2: Optimal interpretation of the present perfective forms in Russian

Input: <i>s-delaet</i> [pres; pfv]	FIT	FAITH(asp)	FAITH(tense)
<PRES; PFV>	*		
☞ <-PRES; PFV>			*
<PRES; -PFV>		*	
<-PRES; -PFV>		*	*

In case of perfective presents, the evaluation is more complex. As shown in Tableaux 2, the most faithful interpretation loses due to a violation of a higher ranking FIT. The optimal candidate is decided by the ranking of the Faith Constraints. Higher ranking of FAITH(asp) over FAITH(tense) captures the fact that aspect is a dominant and tense is a recessive category in Russian. The opposite situation, where tense is dominant and aspect is

recessive (as in Bulgarian), can be straightforwardly captured through reranking of the faithfulness constraints.<sup>12</sup>

While OT syntax can account for blocking (through a higher ranking of the markedness constraints with respect to FAITH constraints), it cannot account for reinterpretation of forms in infelicitous combinations. The latter can be better accounted from an OT semantic perspective through interaction of FIT and FAITH-INT constraints. On the other hand, OT-semantics has difficulties with modeling blocking, as it takes given forms as its input. Clearly, to account for different outcomes of infelicitous combination (and constraint interaction, in general), combining both optimization perspectives is crucial. For the time being, I assume that this is achieved in a model, as proposed by Zeevat (2000), where constraints on interpretation are used as a filter on top of OT production constraints (an ‘asymmetric bidirectional model’). Another natural way of combining the two optimization perspectives is a (weak) bidirectional OT, as proposed by Blutner (Blutner 2000). The choice between different OT approaches to model syntagmatic interaction between categories is a matter of future research, yet it should be clear that these approaches provide a natural tool for modeling this interaction.

## 7. Conclusion

In this paper I outlined a general approach to the study of syntagmatic interaction of grammatical categories. In particular, I presented a case study of one infelicitous grammeme combination from an aspecto-temporal domain, the case of perfective presents. As shown above, functionally infelicitous combinations, such as present perfectives, are either blocked or reinterpreted. Apart from functional incompatibility, Relevance (probably derived from frequency) has been argued to be another functional factor constraining grammeme co-occurrence. It is further shown how the two factors can be integrated into a single model, relying on the concepts of

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<sup>12</sup>The analysis as it stands cannot (and is not intended to) account for interpretation of aspecto-temporal forms in case of temporal transposition, as when present imperfective forms have a historical present or scheduled future reading mentioned in Footnote 8. To account for such cases the model should be extended through introduction of the notion of reference time, or, maybe, ‘topic time’ along the lines of W. Klein (see Klein 1994/9: 133-141 for a discussion of transposition involving historical presents, and Vet 1994 for a discussion of scheduled futures).

local markedness and markedness hierarchy. This approach lends itself naturally for formalization in Optimality Theoretic terms. It was further shown that both production optimization (OT syntax) and comprehension optimization (OT semantics) is needed to model syntagmatic interaction of grammatical categories.

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