

Case Borrowing

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1 Introduction

Many morphological theories are confronted with a dilemma. On one hand, any theory is supposed to be restrictive enough to make helpful predictions about possible and impossible systems. On the other hand, it is hardly feasible to propose rules that hold throughout all languages, because of the large amount of empirical data. Therefore, any theory has to strike a balance between restrictiveness and empirical coverage.

One strategy of solving this dilemma is to postulate a system of fairly strict mechanisms that can explain many but not all data sets. In addition, these theories allow special mechanisms, i. e. rules that may apply nearly unrestricted so that they can explain apparent counterexamples. This strategy is, for example, chosen by several frameworks, such as Stump's Paradigm Function Morphology and Distributed Morphology. Both theories propose a set of rules (rules of referral or impoverishment rules) that derive many syncretism patterns of the world's languages, but both systems provide for some additional rules, so that more complex patterns can be analysed. This strategy of solving the dilemma, of course, entails some problems. The major criticism probably is that these rules undermine the whole system, and their application is arbitrary and completely unpredictable. In fact, in many analyses these rules are descriptive rather than explanatory.

The main goal of this paper is to propose a mechanism that manages to control these directional rules, in that their application as well as their direction can be predicted. For this purpose, one needs to give up some assumptions made by most frameworks, but I hope to show that this need not necessarily be seen as a great disadvantage.

The first part of this paper will deal with the theoretical background, the major theses and the compatibility of the approach with other morphological theories. The second part tries to provide empirical evidence that points out the necessity of a theory like the one I present. To illustrate the advantages of the mechanism I propose, I will provide an analysis of an interesting part of Latin noun declension. Furthermore I will present an analysis of the noun inflection system of the Pama-Nyungan language Diyari and compare it to the Distributed Morphology analysis of Bierkandt(2006).

Before turning to the theoretical part, I would like to make some remarks about the terminology used throughout this paper:

The mechanism that I propose is not restricted to a certain morphological approach. As I will show later, it does not presuppose systems or entities and can thus be combined with many existing approaches. But since the mechanism can be understood as an extension of any morphological framework, one needs to follow an existing theory to demonstrate the advantages of the systems. Thus I decided to use the framework of Distributed Morphology for the analysis of the empirical data and most of the terminology. Nevertheless, it is necessary to keep in mind that the proposed system does not depend on Distributed Morphology in any way.

2 Theoretical Background

2.1 Paradigmatic Gaps

As I already indicated, the starting point of this approach is one assumption which many morphological theories are (implicitly or explicitly) based on. The one below is from Müller(2006), but there are many similar versions in the literature, including the 'Default Rule' in Stump(2001).

(1) Elsewhere (Müller(2006)):

There is always one elsewhere marker that is radically underspecified with respect to inflection class (and more generally). Other markers may be underspecified to an arbitrary degree (including not at all).

In the following, I will contradict the assumption above and postulate the opposite, namely that there need not be an elsewhere marker. Of course, many analyses in the recent literature are crucially based on the concept of a completely underspecified marker, but as far as I can see, there is no theoretical reason why every language should make use of that concept.

The most important job of an elsewhere marker is to avoid the emergence of paradigmatic gaps. It is to assure that any feature combination is assigned a phonological marker. Furthermore it is often held responsible for discontinuous syncretism with one or more paradigms, but since not all languages show such syncretism patterns, this is not a convincing argument for a cross-linguistic concept of an elsewhere marker. Denying the obligatory existence of a radically underspecified marker, I must come up with a mechanism that also serves to avoid paradigmatic gaps. This mechanism is explained in the following section.

2.2 Case Borrowing

The mechanism I propose is called Case Borrowing. It always applies when there is no suitable form for the present feature combination in the lexicon. Intuitively, the procedure is the following: If there is no specific form available, the one is chosen which comes closest

to the one that is needed. The question is what it means to come close to another form and what the criteria for deciding are. A plausible answer to that question is provided by several case hierarchies that have been frequently discussed in typological literature (e.g. Blake (1994)).

All these typologically established case hierarchies are formulated as implicational universals of one dimension. I will follow Wiese(2003,2004) who interprets these hierarchies as logical results of binary features that distinguish between several cases. On the basis of such hierarchies we can now make precise what it means to be close to another form:

(2) Nearest Neighbour Principle:

In absence of an adequate marker, the marker of the Nearest Neighbour must be chosen.

(3) Nearness

The terminal node α is β 's Nearest Neighbour,

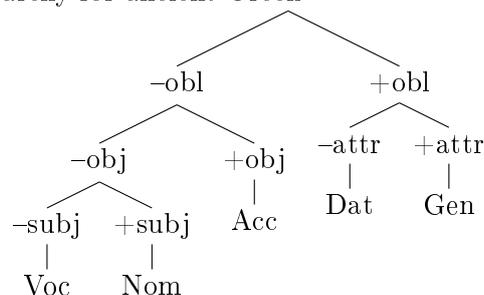
iff there is no such γ ($\gamma \neq \alpha \wedge \gamma \neq \beta$) that a) or b) hold:

a) γ is c-commanded by α and γ c-commands β

b) γ is c-commanded by β asymmetrically and the last feature within β 's hierarchy has the same value as γ 's last feature.

This definition can probably be understood best by applying it to an example. The following tree in (4) shows a possible hierarchy for a system with five cases such as Ancient Greek. The cases are distinguished by binary features, such as \pm obl which separates the structural from the oblique cases. I follow Wiese's approach to case hierarchies insofar as all negative feature values within the hierarchies that will be discussed throughout this paper branch to the left and the the positive ones to the right. Nevertheless this assumption is not important for the process of case borrowing.

(4) A possible case hierarchy for ancient Greek



Following the definition in (3), every terminal node in (4) can now be assigned a nearest neighbour:

(5) Nearest Neighbours

Terminal Node

Nearest Neighbour

Vocative	⇒	Nominative
Nominative	⇒	Vocative
Accusative	⇒	Nominative
Dative	⇒	Genitive
Genitive	⇒	Dative

As the theoretical explanation of the mechanism that I propose is complete for now, one can compare it to common directional rules, such as rules of referral (e.g. Stump (2001), Anderson (1992)). When directional rules apply, they establish a link between two cells in a paradigm, but whether these rules apply or not is not triggered in any way. Thus one cannot foresee which cells of a paradigm (i.e. which feature value combinations) will be affected. In most cases a directional rule establishes a link between two (or more) unrelated cells, but it remains unclear why exactly these cells are involved, because there had already been a satisfying result of insertion before.

By contrast, case borrowing makes it possible to control directional rules in that it allows the prediction of when and where they apply. Case borrowing always applies when the lexicon has not provided an ending for a special case, i. e. it is triggered by the lack of an available marker. Furthermore it is predictable which cells are involved, namely the empty one and its nearest neighbour. Last but not least, it is clear what the result of the whole mechanism will look like. Directional rules are stipulations which are specifically invented for this situation, whereas case borrowing is an general process that does not need to be arranged for a special case.

Before testing case borrowing on empirical data, I will complete the theoretical part of this paper by making some remarks on the two definitions in (2) and (3). The NNP in (2) is a well established algorithm in computer science, mathematical statistics and computational neuroscience and can be seen as one strategy of logically solving problems. In computer science it can also be used to compress the size of a given data set, because it enables the programs to leave out (and later recover) redundant information. And since it has always been a question how the huge amounts of inflectional data of some languages are stored, the NNP might be a relevant mechanism which might be part of the human language faculty.

Taking a closer look at the definition in (3), one realizes that nearness can also be seen as a special version of Rizzi's minimality (Rizzi (1990), but also Fanselow (1991)). In both cases the definitions limit the potential relations between two terminal nodes with in a tree such that two nodes can only establish a relation if there is no intervening element of the same kind between them. It seems that minimality, which has been attested for syntactic as well as phonological processes, also plays an essential role in morphology.

3 Empirical Evidence

Having provided the theoretical background, I will now turn to some empirical evidence. The first part of this section is concerned with the question of how this analysis might be

backed up by empirical data and what the argument encoding patterns of languages that make use of case borrowing look like. The second part deals with a small part of Latin noun declension exemplifying the practical use of a theory like case borrowing. After that I will try to provide a coherent analysis of the Diyari argument encoding system. Diyari, a Pama-Nyungan language, has a three-way system of non-oblique cases. Depending on the inflection classes, these three cases show different instantiations of syncretism that cannot be deduced with common approaches.

3.1 Preliminary thoughts on finding empirical evidence

The major question if one wants to find evidence for case borrowing is how an argument encoding pattern with gaps and case borrowing can be distinguished from one without. Whatever case hierarchy one assumes to explain borrowing domains, it is quite likely that cases that are close enough to exchange markers, also share feature values in an analysis that uses the concept of decomposition. For example, there is the well-known fact that nearly all neuter nouns in Indo-European languages have identical forms for nominative and accusative, but whether this is a result of case borrowing (8) or an underspecified (7) vocabulary item can hardly be proved.

(6) Latin noun declension

SG	fatum	(fate)	
Nom	fat-um		(7) (-oblique, +neuter) \Leftrightarrow /-um/
Acc	fat-um		(8) (Acc, +neuter) \Leftrightarrow /-um/

Paradigms like (6) cannot be seen as good evidence for or against a concept like case borrowing, since common theories also provide good theoretical methods to capture the phenomenon. Neither can a paradigm like (9) be seen as an improvement.

(9) Croatian noun declension

	masc	fem		(10)	(+masc, +nom, +sg)	\Leftrightarrow	/-i/
Nom	- i	- e			(-oblique, -neuter, +sg)	\Leftrightarrow	/-e/
Acc	- e	- e		(11)	(+masc, +nom, +sg)	\Leftrightarrow	/-i/
					(-neuter, +acc, +sg)	\Leftrightarrow	/-e/

Again, both theories can coherently analyse the given data. The former analysis (10) makes use of the concepts of a marker order and the Subset Principle.¹ The latter (11) assumes that the /-e/ in the nominative feminine is borrowed from accusative for want of a specific nominative form.

¹For definition see: Halle and Marantz (1993), Halle and Marantz (1994) and Harley and Noyer (1999)

3.2 The Latin noun declension

The following paradigm in (12), however, looks different.

(12) Latin (Baerman, Brown, Corbett (2005))

	Class 1 bellum (war) neuter	Class 2 servus (slave) masculine	Class 3 vulgus (people) neuter
Nominative	-um	-us	-us
Accusative	-um	-um	-us
Genitive	-i	-i	-i
Dative	-o	-o	-o
Ablative	-o	-o	-o

The part of these paradigms on which I want to focus are the non-oblique cases. Besides these, all cells are assigned their phonological form only depending on case. These cells do not pose a problem for any morphological theory. But the nominative/accusative syncretisms in class I and III are not easy to handle. Within the first class ('bellum'), it seems as if the /-um/, which could be analysed as a prototypically accusative marker, has expanded to the nominative. The pattern of the third class ('vulgus')² is vice versa: /-us/ which is often called a nominative marker has expanded to accusative. In these cases it seems really intuitive that one phonological form represents one marker. Nevertheless, in common morphological theories this is difficult to model.

The Distributed Morphology approach can only declare one elsewhere-marker for the non-oblique cases, since the marker order is (intrinsically or extrinsically) determined. Ergo, at least one of the markers must be analysed as a coincidence of two different vocabulary items, which accidentally bear the same phonological form. Elaborate approaches in Distributed Morphology would probably have used the concept of impoverishment (Bonet (1991), Noyer (1992, 1998), Halle and Marantz (1993, 1994), Bobaljik (2002), Frampton (2002)) to enable their analyses to treat each syncretism as one vocabulary item. But in my opinion this does not entirely capture the phenomenon. This paradigm is not generated by an exceptional mechanism that manipulates or deletes features in a specific context, since this theory would entail making some assumptions that do not seem plausible. Either one would have to assume more than one impoverishment rule, which does not, in my opinion, reflect that this paradigm shows mirror images of the same phenomenon, or one would have to assume that it is one of the servus-forms that is impoverished, and I think that this would ignore the fact that this class can be seen as the prototypical one. Moreover, both ways of forcing this paradigm into the theoretical approach need more steps than following theory.

If one assumes the case hierarchy which Wiese(2003) has motivated for Latin and the major thesis of section 1, one can analyse the paradigms in (12) without any difficulties.

²One has to remark that Class 3 is a rather marginal class containing only five nouns, which are all neuter

It seems that the assigned marker predominantly depends on case. Throughout the whole paradigm, there are only two cells that cannot be assigned a marker, if one only refers to case. All one has to ensure is that these two cells can stay empty. After vocabulary insertion, these cells obtain their forms from their nearest neighbours within the hierarchy. In (13) one can see that a feature decomposition might not be very descriptive for a complete analysis of Latin argument encoding but for present purposes it seems appropriate.

Before presenting the explicit analysis, I need to introduce some technical details. As with many other common morphological theories, I make use of the concept of decomposition. The concept of decomposition of morphological categories goes back to Jakobson(1962), (but also: Bierwisch(1967)) who decomposed case into smaller units. By means of decomposition, it is possible to derive occurrences of syncretism, because one can postulate abstract features that allow natural classes to be referred to. For the analysis of the Latin paradigms, I decided to decompose case and inflection class features into more primitive features:

(13) Decomposition

Case:	Inflection Class:	
Nom [-obl, +subj]	Class 1 (bellum):	-x, +y
Acc [-obl, +obj]	Class 2 (servus):	+x, +y
Gen [+obl, +attr]	Class 3 (vulgus):	+x, -y
Dat [+obl, +obj]		
Abl [+obl, -obj]		

Having decomposed classes and cases into smaller feature sets, I can now propose four vocabulary items that can explain the marker distribution of the paradigms:

(14) Vocabulary Items

- (1)[-obl, +subj, +x] \Leftrightarrow /-us/
- (2)[-obl, +obj, +y] \Leftrightarrow /-um/
- (3)[+obl, +subj] \Leftrightarrow /-i/
- (4)[+obl] \Leftrightarrow /-o/

After vocabulary insertion has applied, two cells remain without an exponent:

(15) Empty cells after vocabulary insertion

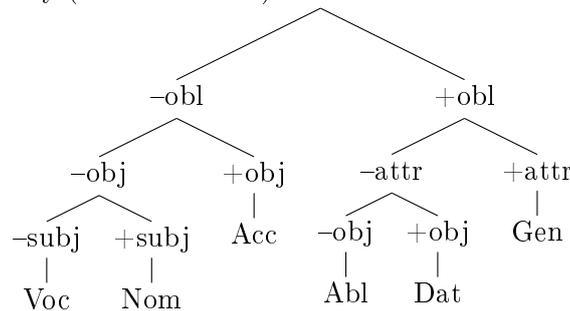
- Nominative class I (bellum)
- Accusative class III (vulgus)

(16) Latin paradigm with gaps

		Class 1 bellum -x, +y	Class 2 servus +x, +y	Class 3 vulgus +x, -y
Nominative	-obl, +subj		-us	-us
Accusative	-obl, +obj	-um	-um	
Genitive	+obl, +attr	-i	-i	-i
Dative	+obl, +obj	-o	-o	-o
Ablative	+obl, -obj	-o	-o	-o

These gaps within the paradigm will now be filled by the process of intraparadigmatic case borrowing. I adopt the following hierarchy for the Latin cases.

(17) Latin case hierarchy (cf. Wiese 2003)



The two gaps can now be filled by borrowing the form of their nearest neighbours:

- Nominative class I obtains its form by borrowing it from the accusative of its class ³
- Accusative class III obtains its form by borrowing it from the nominative of its class

This example shows how the Case Borrowing approach can be backed up by empirical evidence. Compared to other morphological theories the present analysis manages to describe the patterns with fewer steps. In the following part, I will present a complete analysis of the argument encoding system of Diyari, an Australian language of the Pama-Nyungan family. Furthermore I will compare the analysis proposed here to a Distributed Morphology analysis of the same system to argue for the necessity of the operations I introduced above.

3.3 Dixari declension

3.3.1 Analysis

Diyari (Dieri) is a Australian language of the Pama-Nyungan family. Diyari has seven cases, of which four are oblique (dative, allative, locative, ablative). Like other languages of the Pama-Nyungan family Diyari has a split system for structural cases: nouns in

³Since class I is characterised by inanimate items, I assume that there is no vocative, or that the vocative is not assigned a form as well and therefore cannot lend it. Thus, the nominative borrows its form from the only other structural case: the accusative.

singular and male proper names show an ergative alignment (which means that, S and P arguments are equally marked) and pronouns of 1st and 2nd person plural accusative alignment (S and A arguments have the same marker). All other categories have a three-way system, where all argument types (S, A, P) are distinguished. For further discussion of the case system see Austin(1981) and Bierkandt(2006) I will for the present analysis adopt the transcription, the analysis as an three-way case system and the simplification of the class system in Bierkandt(2006). After sorting out several redundant inflection classes, one can end up with the following paradigm for the structural cases (18)

(18) Diyari structural cases (Bierkandt (2006))

	Class 1 Nouns SG	Class 2 Nouns nSG	Class 3 Names Male	Class 4 Names Female
Erg	-li	-li	-li	-ndu
Nom	-∅	-∅	-na	-ni
Acc	-∅	-na	-na	-na
	Class 5 Pronoun 1,2,3(F)	Class 6 Pronoun 3(nF)	Class 7 Pronoun 1,2 nSG	Class 8 Pronoun 3 nSG
Erg	-ndu	-li	-∅	-li
Nom	-ni	-∅	-∅	-∅
Acc	-na	-na	-na	-na

It is noticeable that these paradigms only consist of a few markers and their distribution is restricted. /-li/, for example, is confined to the ergative case, /-na/ is nearly almost found in the accusative and /-∅/ is the predominant marker for nominative. Nevertheless, there are some markers that really complicate a straightforward analysis. Attributed to the different alignment systems within this language there are some cells, where a specific marker shifts into another row. Since these shifts occur somehow entwined, (which means, that /-∅/ once shifts to accusative, whereas /-na/ also shifts to absolutive once) a Distributed Morphology approach cannot analyse them without great theoretical (and sometimes not really plausible) effort.

Assuming a theory with case borrowing, an analysis of these paradigms becomes much easier. The only thing one has to ensure is that the cells, where the problematic forms will be found later on, must stay empty. In what follows, I will present a method of how to derive every syncretism from one form.

(19) Vocabulary Items

- (1) /ndu/ ⇔ [Erg, (4 , 5)]
- (2) /ni/ ⇔ [Abs, (4 , 5)]
- (3) /na/ ⇔ [Acc, (-1)]

- (4) /li/ ⇔ [Erg, (-7)]
(5) /∅/ ⇔ [Abs, (-3)]

I decided not to complicate the analysis by introducing abstract features. Looking at the proposed vocabulary items, one can see that probably the classes IV and V form a natural class. Differences between these two arise only in oblique contexts. Moreover one can observe that the negations of the VIs (3), (4) and (5) exactly rule out those classes which show ergative or accusative alignment. This problem could be solved by making the alignment information part of the distinctive feature structure of the inflection classes. One could assume binary features like \pm ErgAl (ergative alignment) and \pm AccAl (accusative alignment) to which the rules in (3), (4) and (5) could refer. In this manner one could reformulate rule (4), for example, as (20). However, for the sake of simplicity, I refrain from doing so here.

- (20) /li/ ⇔ [Erg, -AccAl]

After the insertion has taken place, one ends up with the paradigm:

(21) Diyari paradigm with gaps

	Class 1 Nouns SG	Class 2 Nouns nSG	Class 3 Names Male	Class 4 Names Female
Erg	-li	-li	-li	-ndu
Nom	-∅	-∅		-ni
Acc		-na	-na	-na
	Class 5 Pronoun 1,2,3(F)	Class 6 Pronoun 3(nF)	Class 7 Pronoun 1,2 nSG	Class 8 Pronoun 3 nSG
Erg	-ndu	-li		-li
Nom	-ni	-∅	-∅	-∅
Acc	-na	-na	-na	-na

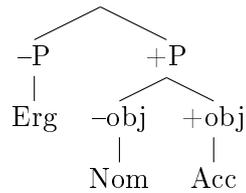
The cells yet to be filled can be found in all classes that do not show a three-way alignment:

- (i) Accusative Class 1
- (ii) Nominative Class 3
- (iii) Ergative Class 7

The Case Hierarchy one has to assume to get the expected results is the following:

- (22) Case Hierarchy of Diyari for non-oblique cases⁴

⁴In absence of a suitable feature that is to distinguish the ergative from the nominative and the accu-



This hierarchy ensures the right directions for case borrowing. Absolutive and accusative can mutually assign their form, whenever one of both is in need and ergative always obtains its form from the nearer absolutive. Thus the empty cells in (21) can now finally receive their correct forms:

- Accusative Class I obtains its form from the Absolutive
- Absolutive Class III obtains its form from the Accusative
- Ergative Class VII obtains its form from the Absolutive

Compared to an analysis that makes use of approaches like Distributed Morphology or Paradigm Function Morphology without gaps and case borrowing this one can explain the data with fewer insertion rules (vocabulary items). Furthermore it does not need to assume rules of referral or impoverishment rules, which treat systematic exceptions just like accidental syncretism.

3.4 Further evidence

The two previous sections have shown, how Case Borrowing can be backed up with empirical evidence. Using these concepts, one could analyse the peculiar syncretism pattern in Latin and the split system of the Pama-Nyungan language Diyari. One could probably find many more syncretism patterns that demonstrate the advantages of the theory I proposed. Another argument that supports the thesis that especially case borrowing is an intuitive process can be brought forward when looking at a well-known phenomenon in the Latin case system. The existence of the vocative case in Latin is rather marginal. Only one inflection class, namely the male nouns ending on /-us/ in the nominative, possess a distinct phonological marker (/e/) for the vocative singular. In all other cases the vocative and the nominative form are identical.

(23) Latin vocative

	Case	/o/-decl (m)	/a/-decl (f)	cons-decl	...
SG	Nominative	serv -us	femin -a	mercator -∅	...
	Vocative	serv - e	femin -a	mercator -∅	...
PL	Nominative	serv -i	femin -ae	mercator -es	...
	Vocative	serv -i	femin -ae	mercator -es	...

sative, I decided to label it $\pm P$, as ergative does not occur as a patient role, whereas accusative and nominative (in unaccusative intransitives) do. It has been argued (e.g. Woolford (2006)) that it is its obliqueness that distinguishes the ergative from other structural cases, but in the case of Diyari, ergative bears much greater resemblance to the other structural cases.

This pattern can easily be analysed by most morphological theories. The Distributed Morphology approach, for example, makes use of the concept of underspecification to analyse these data. Intuitively, there is no nominative marker, but a marker that fits in both cases, nominative and vocative. Traditional Latin grammarians hold a different view on this phenomenon. The traditional explanation for the dominant nominative-vocative syncretism has been that the vocative inherits the ending of the nominative. This perspective corresponds to the concept of this paper. No declension class but rather the masculine /-us/-class is assigned a specific vocative marker. And since the vocative's nearest neighbour is the nominative, nearly all inflection classes show this syncretism. Of course, this is not a perfectly valid argument for the existence of the mechanisms I proposed, but it suggests that this concept comes close to a speaker's intuitions.

3.5 Problems and work to be done

The previous section on empirical data hopefully showed some clear arguments for a concept like case borrowing. In this section I will mainly dwell on some problems that this approach entails. One of the central arguments was the possibility of smoothly deriving such syncretism patterns as the Latin case. The whole concept, however, faces problems when the paradigm is slightly different. Baerman et al. present a paradigm from the Altaic language Bonan:

Bonan noun declension (Baerman et al. 2005)

	noun	pronoun
Gen	-ne	-ne
Acc	-ne	-de
Dat	-de	-de

It is clear that the present approach cannot come up with a plausible explanation for these paradigms. A system based on a case hierarchy would fail because one could not explain why the accusative is sometimes (in case of proper nouns) closer to the genitive and sometimes (in case of pronouns) closer to the dative. The only possible explanation for these phenomena is that case borrowing in Bonan does not apply on the basis of a case hierarchy but of the animacy hierarchy (Silverstein 1972). One would have to assume that the dative of proper nouns is borrowed from the dative form of a pronoun and the genitive of a pronoun is borrowed from a proper noun genitive form. Whether this explanation can derive the rest of the Bonan inflection system and whether it entails critical problems or not would need to be examined. Another thing that is not yet clear is whether the whole concept I proposed can successfully be applied to verbal inflection as well. If this approach is on the right track, one might assume that verbal inflection can also make use of case borrowing. This, however, is not easy to examine, because it is not clear what the relevant hierarchies look like and whether they are cross-linguistically attested.

4 Conclusion

In the above, I have presented a mechanism that can be combined with most current morphological theories, as it does not refer to any specific concepts of a certain theory. There are only a few relevant assumptions that one has to make, such as the assumption that there need not be an elsewhere marker, or the existence of case hierarchies. A central advantage that this concept entails is that it makes it possible to derive special syncretism patterns which probably have been problematic before.

More generally, this approach is a preliminary attempt to derive a less controversial concept of directional rules by making the rules predictive and, therefore, less stipulated. Case Borrowing is an automatic mechanism that does not need to be adapted to specific contexts.

In the course of this approach I made use of several concepts, which at least to some extent have already been accepted in scientific literature. The essential concepts I used in order to create this mechanism are the Nearest Neighbour Principle and typologically well-known case hierarchies.

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