The Super-Strong Person Case Constraint: Scarcity of Resources by Scale-Driven Impoverishment

Aaron Doliana*

Abstract

Kambera, a Malayo-Polynesian language, shows a new version of the Person Case Constraint (PCC), disallowing any combination of phonologically weak objects except the one where the indirect object is 1st/2nd person and the direct object is 3rd person. Recent minimalist accounts fail to capture this new pattern, which, I claim, indicates the existence of a continuum within the constraint's typology. In this paper, I am going to account for this new version as a syntactic rule-interaction effect between Agree and scale-driven Impoverishment. I claim that with this mechanism, set along the lines of an Optimality Theoretic version of the Minimalist Programm, the whole typology of the PCC can be accounted for.

1. Introduction

This paper aims to show by means of the *super-strong* version of the Person Case Constraint that there is a continuum in the typology of the PCC, and thus to account for the full typology as a syntactic rule-interaction effect between Agree and scale-driven Impoverishment. The PCC is a constraint on combinations of phonologically weak objects in ditransitive constructions, depending on their person feature specifications. The super-strong version allows only combinations of 1st/2nd person indirect object and 3rd person direct object. In spite of their ability to derive other versions, this version of the

*For valuable comments and suggestions I am grateful to the participants of the syntax colloquium at the University of Leipzig, to the audience of the *Workshop on Interaction of Syntactic Primitives* at the annual DGfS meeting 2013 in Potsdam, and especially to Anke Assmann, Doreen Georgi, Gereon Müller and Philipp Weisser, who have helped me through my previous drafts. The research was carried out in the project *Argument Encoding in Morphology and Syntax* as part of the DFG research group 742 *Grammar and Processing of Verbal Arguments*.

Rule Interaction in Grammar, 177–202
Fabian Heck & Anke Assmann (eds.)
Linguistische Arbeits Berichte 90, Universität Leipzig 2013

PCC cannot be derived in existing minimalist approaches such as Anagnostopoulou (2005), Adger and Harbour (2007), Richards (2008) or Nevins (2007). These build on the intuition that the PCC arises in "two-arguments-against-one-head situations" where the functional head entering Agree with the two arguments lacks the resources to check the features of both arguments. I will from here on call this intuition *scarcity of resources*. In this paper I will attempt to rescue this assumption by relativising it to the effects of syntactic Impoverishment following from the Harmonic Alignment of markedness scales (cf. Keine and Müller 2008, 2009, Keine 2010). With the additional assumption that the operation Agree is split up into two sub-operations, *Copy* and *Check*, the PCC follows in three derivational steps: (i) the π-features of the goals are copied and transferred onto the probe by Copy; (ii) Impoverishment applies to the probe, due to the harmonic alignment of markedness scales interacting with a faithfulness constraint protecting the copied π-features on the probe; (iii) the scarcity of resources caused by Impoverishment bleeds Check, which deletes uninterpretable features under the feature identity of probe and goal, and the derivation crashes. Consequently, the intuition of the scarcity of resources on the probe is saved (although relativised to the effects of Impoverishment), PCC effects can be linked to Hale/Silverstein hierarchy effects and the full typology of the PCC can be derived without having to assume asymmetries between the representations of 1st/2nd and 3rd person.

This paper is divided into three sections. In section 2 I will summarise the background of the Person Case Constraint, describe the super-strong version of it and discuss the pros and cons of Anagnostopoulou's (2005), Adger and Harbour's (2007) and Haspelmath's (2004) approaches to the PCC. In section 3 I will introduce the theoretical background and in section 4 I will present my assumptions, propose my approach to the PCC and show some of its consequences. In conclusion I will discuss the consequences more generally and direct to open questions that need further research.

2. The Person Case Constraint

2.1. Background

The Person Case Constraint, also known as the **me-lui* Constraint, is a restriction on possible combinations of phonologically weak elements. This restriction was first reported for French by Perlmutter (1971). A ditransitive construction is grammatical if the indirect object (IO) is local person (i.e. 1st, 2nd person and reflexive pronouns) and the direct object (DO) is 3rd person as shown in (1).

(1) On me le montrera.
one 1.DAT 3.ACC show.FUT
'They will show it to me.'[1]

However, the same sentence is ungrammatical if the indirect object is 3rd person and the direct object is local person, cf. (2).

(2) *On me lui montrera.
one 1.ACC 3.DAT show.FUT
'They will show me to him.'

The PCC was first thoroughly analysed by Bonet (1991, 1994) who noticed the following properties: (i) it applies in a large range of unrelated languages; (ii) it applies only to phonologically *weak* elements, i.e. clitics, agreement affixes and weak pronouns; (iii) it applies only to combinations of phonologically weak elements; (iv) it also applies to combinations where the DO is a reflexive element; (v) it only affects constructions with an external argument.

Apart from the super-strong version of the PCC, two further versions[2] have been found so far: the *strong* version and the *weak* version of the PCC. The former disallows local person direct objects in double-object constructions in general, whereas the latter disallows local person direct objects only when the indirect object is 3rd person.

Furthermore, the PCC is argued to pattern together with other phenomena constraining certain combinations of person features or combinations of certain person features with certain ϕ-features. On the one hand the PCC is argued to have the same syntactic origin as Dat-Nom constructions in Icelandic (Anagnostopoulou 2005), case syncretism in Kiowa and French (Adger and Harbour 2007), defective Agree in Russian (Richards 2008) or limited plural

[1] Abbreviations are as follows: ACC (accusative), DAT (dative), 1 (1st person), 2 (2nd person), 3 (3rd person), SG (singular), PL (plural), THM (theme), REC (recipient), FUT (future). I will furthermore adopt the notation <x, y>, where x = IO and y = DO.

[2] See Nevins (2007) for more versions of the PCC, which will not be discussed in this paper. Those are versions of the PCC where 1st and 2nd person do not pattern together as local person (*me-first* PCC and *strictly-descending* PCC). But see also Sturgeon et al. (2011) for an approach deriving the strictly-descending PCC as a linearisation effect.

agreement in Pazar Laz (Blix 2012). On the other hand it is argued by Haspelmath (2004, 2011) to be a reflex of Hale/Silverstein hierarchies (Hale 1972, Silverstein 1976), whose effects can best be seen in inverse systems and limited plural marking.

2.2. The Super-Strong PCC

Haspelmath (2004) introduces the super-strong version of the PCC, found in the Malayo-Polynesian language Kambera. The following data from Klamer (1997: 903-904) show that in Kambera ditransitive constructions only the configuration <1/2, 3> is allowed. Thus, in addition to the combinations prohibited in the strong PCC, the super-strong version also prohibits <3, 3> combinations as can be seen in (3-c).

(3) a. Na-wua-ngga-nya
3SG.AG-give-1SG.REC-3SG.THM
'He gives it to me.' – ✓ <1, 3>

b. Na-wua-nggau-nja
3SG.AG-give-2SG.REC-3PL.THM
'He gives them to you.' – ✓ <2, 3>

c. *Na-wua-nja-nya
3SG.AG-give-3PL.REC-3SG.THM
'He gives it to them.' – *<3, 3>

d. *Na-wua-ngga-nggau
3SG.AG-give-1SG.REC-2SG.THM
'He gives you to me.' – *<loc, loc>

In ditransitive constructions in Kambera only combinations of local person indirect objects with 3rd person direct objects are allowed[3].

Including the super-strong version and maybe language types such as German, which, for most verbs, allow any combination,[4] we see that there is a continuum within the typology of the PCC. This can be seen in Table 1. This complicates the phenomenon, as it can no longer be analysed as a constraint

[3] It may be worth noticing that in ditransitive constructions in Kambera both objects bear the dative case (cf. Georgi 2008 for a detailed analysis of argument encoding in Kambera). Furthermore, the super-strong PCC has so far only been found in Kambera.

[4] But see also Anagnostopoulou (2008), who argues that there are PCC effects in German in non-default word orders.

IO	DO	super-strong	strong	weak	German
1/2	3	✓	✓	✓	✓
3	3	✗	✓	✓	✓
1/2	1/2	✗	✗	✓	✓
3	1/2	✗	✗	✗	✓

Table 1: Typology of the Person Case Constraint

against a certain person feature in a certain context. Hence, unless one treats the patterns in these languages as epiphenomena of further constraints, one must analyse the PCC as a continuum. This is why the minimalist accounts I have mentioned cannot derive the super-strong version of the PCC (or a zero version as in German). Nonetheless, I would like to contend that their ideas offered fundamental insight that should be maintained. Therefore, these approaches will be the basis of a new account which comprises the idea of scarcity of resources, Optimality Theoretical modelling of scales and a rule interaction effect with Agree.

2.3. Existing Approaches

2.3.1. Scarcity of Resources

Anagnostopoulou (2005) proposes scarcity of syntactic resources as the trigger for the PCC. In general this means that there is a "two arguments against one head situation". More precisely, in this approach it consists of one functional head (viz. little *v*) entering Agree with both objects, but having only one set of ϕ-features to give them, which means that only one argument can have its full set of ϕ-features (viz. its person feature) checked. The indirect object, being closer (in terms of c-command) to the functional head, undergoes Agree first and gets its person feature checked. All that is left for the direct object to agree with is number, since Anagnostopoulou assumes that the indirect object does not undergo Agree for number. Crucially, Anagnostopoulou makes another assumption. As can be seen in (4)[5], the person feature system

[5] [Participant] stands for discourse participant. [+Part] is thus local person and [–Part] 3rd person. [Author] stands for author or narrator. [+Auth] means 1st person, [–Auth] 2nd and 3rd.

she assumes exhibits an asymmetry. 1st and 2nd person are always specified for their person features, whereas 3rd person can be optionally underspecified.

(4) 1: [+Author, +Participant]
2: [−Author, +Participant]
3: [−Participant]; [ ]

Anagnostopoulou justifies this asymmetry with "contextual salience". 3rd person can be underspecified when not salient, but is required to be specified for person when salient. Thus in ditransitive constructions 3rd person indirect objects, being salient, are always specified for person, whereas 3rd person direct objects can be underspecified.

The strong version of the PCC follows because whenever the probe enters Agree with its goals, it first checks the person feature on the indirect object, leaving only number for the direct object. Local person direct objects are ruled out because they necessarily have a person feature. Since it cannot be checked, double object combinations with a local direct object lead to a crash in the derivation. Languages with the weak version of the PCC, on the other hand, are argued to have an optional Multiple Agree mechanism, which allows the probe to check the person features of the two goals simultaneously. If the two features are identical (e.g. [+Part] and [+Part]; [Auth] plays no role here) the derivation converges and <loc, loc> configurations are saved. The super-strong version of the PCC, however, cannot be accounted for: both objects would either need to be specified or underspecified for [Part] in order to derive the ungrammaticality of <3, 3>, not being able to check the person feature on the direct object or leaving an uninterpretable person feature on the probe. This is ruled out by the fact that the two objects cannot both be salient to the same degree, resulting in different feature specifications.

2.3.2. Domain-Specific Restrictions

In Adger and Harbour (2007) the PCC also arises from a "two arguments against one head situation", but the system proposed is slightly different. The two phonologically weak objects merge with an Appl-head[6]: the direct object as its complement and the indirect object as its specifier. In addition, the Appl-head has the ability to ban a feature in its complement domain and to re-

[6] Appl stands for applicative in the sense of Pylkkänen (2002).

quire the same feature in its specifier, the value of the feature being irrelevant. Adger and Harbour assume the same person feature system as Anagnostopoulou in (4). They motivate it with observations on case syncretisms. The strong version of the PCC follows if the feature banned and required by the Appl-head is [±Part]. The 3rd person can be both direct or indirect object as it can be underspecified for [Part] and escape the ban when being the complement, and be specified for [Part] and fulfil the requirement when it is the specifier. Local person, though, can only be the indirect object as it has to be specified for [Part] and can never escape the ban on its feature in the complement domain. The weak version of the PCC is not considered in Adger and Harbour's approach because there seems to bee too much variance between regions and speakers as to which combinations of <local, local> are allowed.[7] The following points remain unclear: how the ban and requirement are modelled on the head, which features can be banned and required and what lies behind the asymmetry between [Participant] and [Empathy], both entailing semantic animacy, but only [Part] being responsible for the PCC.

2.3.3. Markedness Scales

Haspelmath (2004) is a diachronic, frequency-based approach to the PCC. The focus does not lie on combinations of person and case, but on combinations of person and semantic roles; although this difference is irrelevant for what follows. Haspelmath argues for a grammaticalisation effect, where over time only the more frequent structures are grammaticalised. In this case only the more frequent pronoun combinations are grammaticalised into clitic combinations, whereas their less frequent counterparts are not and are hence ungrammatical as clitics. The frequency of the pronoun combinations is related to Silverstein/markedness scales: indirect objects (or recipients) tend to be 1st or 2nd person and direct objects (or themes) tend to be 3rd person. The unmarked combination in double object constructions is therefore <loc, 3>, which is allowed in almost all languages exhibiting the PCC. The most marked combination, on the other hand, is <3, loc>, which is forbidden in almost all

[7] Interestingly, the super-strong version of the PCC, which is also not taken into consideration in their paper, could possibly be derived in their system. If the feature banned and required by the Appl-head were [Author], the only grammatical combination would be <loc, 3>. However, this only holds if 3rd person could not bear the feature [Author] at all, a point which remains unclear in their appendix to the person feature specifications.

languages obeying the PCC. Although it does not aim to explain how the PCC works in synchronic grammars and can therefore give no answer to that question, this approach succeeds in motivating the existence of the super-strong, strong and weak versions of the PCC. It also predicts a fourth version of the PCC, disallowing <3, 3> and <3, loc>. However, to the best of my knowledge, this version has not been attested in any language so far.

3. Theoretical Background

3.1. Impoverishment

Impoverishment (Halle and Marantz 1993, Noyer 1998, Keine and Müller 2008, 2009, Keine 2010, Bank, Sappir and Trommer 2012) is a post-syntactic feature deletion operation. It was first introduced within the framework of Distributed Morphology (DM, Halle and Marantz 1993), where it has the form of transformational rules and deletes certain features in certain contexts. DM operates under the assumptions of the *Subset Principle* and *Specificity*.[8] The former states that a vocabulary item V_1 is inserted in a functional head F when its features form a subset of the functional head's features and V_1 is more specific than any other compatible vocabulary item V_i. The latter standardly states that a vocabulary item V_1 is more specific than a vocabulary item V_2 iff V_1 has more features than V_2. Thus, whenever Impoverishment applies, deleting certain features, a vocabulary item, otherwise the most specific, may no longer fit, giving room for the insertion of a less specific exponent. A typical example of Impoverishment, shown in (5), is the deletion of the feature [+object] in the context of singular neuter nouns in several Indo-European languages such as German. This leads to a syncretism between the nominative and the accusative case on singular neuter nouns because the distinctive feature [+object] is deleted.

(5) $/[+\text{obj}]/ \rightarrow \varnothing$ / [−mask, −fem, −pl]

In the approach to be developed here, however, I will follow Keine and Müller (2008, 2009) and Keine (2010), who, building on the work by Aissen (1999,

[8] It also operates under the assumptions of *Late Insertion*, i.e. the morphological exponents are inserted after all syntactic processes have terminated, and *Syntactic Hierarchical Structure all the Way Down*, i.e. syntactic hierarchical structure does not stop at the word level, but rather goes down all the way to morphemes.

2003), developed a more restrictive theory of Impoverishment, ultimately driven by ranked and violable constraints in an Optimality Theoretic fashion. In this approach faithfulness constraints penalising featural changes (viz. deletion) compete with markedness constraints penalising the presence of certain features (hence demanding deletion). Consequently, the ranking between these two types of constraints determines whether or not Impoverishment applies. This is achieved in Keine and Müller (2008, 2009), who posit Harmonic Alignment of markedness scales at its base. Finally, Keine (2010) takes Impoverishment to apply in syntax, allowing it to interact freely with other syntactic operations such as Agree. Since these two assumptions play a major role in the following approach to the PCC, I shall explain briefly the mechanisms involved and give their theoretical background.

3.2. Optimality Theory and Harmonic Alignment of Scales

Optimality Theory (OT) was originally introduced as a phonological framework by Prince and Smolensky (1993, 2004). Since then it has also been adopted in syntactic analyses (cf. Kiparsky 1999, Wunderlich 2000, Stiebels and Wunderlich 2000, Stiebels 2002, Lee 2003). The main idea of OT is that grammatical constraints are *ranked*, *violable* and *universal*. Consequently, not satisfying a constraint does not strictly lead to ungrammaticality. Rather, it is the competition between different potential outputs that gives linguistic expressions grammatical status: an output is well-formed if it is optimal with respect to a given constraint ranking, i.e. it fares better than all its competitors. Whether an output *A* fares better than its competitor output *B*, depends on their constraint profiles. Output *A* has a better constraint profile if it violates a given constraint less often than its competitor and there is no higher ranked constraint which *A* violates, but *B* doesn't. This is important because constraints in OT are ranked strictly, which means that an output becomes suboptimal (and therefore ungrammatical) as soon as it violates a higher ranked constraint more often than another output, regardless of their relative violations of lower ranked constraints.

Moreover, within the framework of OT, two mechanisms to model hierarchical scales were given by Prince and Smolensky (Prince and Smolensky 2004, Smolensky 1993, 1995, 2006): *Harmonic Alignment* and *Local Conjunction*.

Harmonic alignment was first introduced to model sonority hierarchies in Phonology, but soon used to model Hale/Silverstein scales, too (cf. Aissen

1999, 2003). The two mechanisms are defined in (6) and (7). Basically, the first element of a binary scale is aligned with the elements of another scale, starting with the edge it is best associated with. Then the same is done for the second element of the binary scale, starting from the opposite edge. Two harmonically aligned scales result, with the most harmonic combination at its left edge and progressively less harmonic combinations towards the right edge. Furthermore, constraints can be gained from these scales by prohibiting the inverse order of the Harmonic alignment scales.

(6) *Harmonic alignment* (Prince and Smolensky 2004: 161)
Suppose given a binary dimension D_1 with the scale X > Y on its elements {X,Y}, and another dimension D2 with a scale a > b > …> z on its elements {a,b,…,z}. The *harmonic alignment* of D_1 and $D_2$is the pair of Harmony scales H_X, H_Y:
a. H_X: X/a ≻ X/b ≻ …≻ X/z
b. H_Y: Y/z ≻ …≻ Y/b ≻ Y/a

The *constraint alignment* is the pair of the following constraint hierarchies C_X, C_Y:

(7) a. *X/z ≫ …≫ *X/b ≫ *X/a
b. *Y/a ≫ *Y/b ≫ …≫ *Y/z

Local conjunction, on the other hand, is the creation of a new constraint, made up of the combination of two existing constraints. The new constraint is violated whenever both of the constraints which it comprises are violated within a given domain. Furthermore, it is inherently ranked higher than its combined parts.

(8) *Local conjunction* (Smolensky 1995: 4)
The local conjunction of C_1 and C_2 in domain D, C_1 & C_2, is violated when there is some domain of type D in which both C_1 and C_2 are violated.

Universally, the local conjunction of two constraints C_1 and C_2 outranks the individual constraints C_1 and C_2; in other words: C_1 & C_2 ≫ C_1, C_2.

3.3. Agree

The present approach is couched within the framework of an optimality-theoretic version of the *Minimalist Program* (Chomsky 2000, Adger 2003, Heck and Müller 2007) with realisational morphology. Agree is – along with Merge – one of the two structure-building operations of the framework. The operation Agree checks features under c-command, allowing the deletion of uninterpretable features and thus preventing a crash of the derivation. When certain features are involved – such as e.g. ϕ, case or tense – checking happens by *valuation*. The interpretable ϕ-features of the c-commanded element (goal) are copied and transferred to the functional head (probe) yielding the corresponding uninterpretable feature. The probe is valued by the transferred copy and its uninterpretable feature may delete once it has been checked.

In accordance with much recent work, where Agree (cf. Di Sciullo and Isac 2003, Arregi and Nevins to appear, Bhatt and Walkow to appear, Bobaljik 2008), Move (cf. Chomsky 1995, 2000), or syntactic operations in general (cf. Hornstein 2009) are decomposed into more fine-grained operations, I will split Agree into the two sub-operations Copy and Check, with the former copying and transferring the goal's features onto the probe (and thus valuing it), and the latter checking uninterpretable features under feature identity of probe and goal. This is necessary for Impoverishment to apply between the valuation (copying) and the checking of the probe, which is the key assumption of the new approach.

4. A New Approach

4.1. Assumptions

In what follows, I will make the following assumptions.

[A1] There is only one probe entering Agree with both phonologically weak elements in ditransitive constructions. The probe is made up of an ordered tuple of uninterpretable feature bundles (viz. <[uϕ], [uϕ]>) that need valuation and checking by entering Agree with two elements providing interpretable features. The ordered tuple is valued in an order related to c-command closeness, thus, roughly speaking, resulting in the form <IO, DO>. This is more or less as in Anagnostopoulou (2005).

[A2] 3rd person is always fully specified (Nevins 2007).

[A3] Impoverishment applies in syntax and is thus able to interact with operations such as Agree (Keine 2010).

[A4] Impoverishment is scale-driven: markedness constraints penalising less likely feature combinations interact in an optimality-theoretic fashion with a faithfulness constraint penalising the deletion of the features involved (Keine and Müller 2008, 2009, Keine 2010).

[A5] Impoverishment may target probes just as it may target goals.

[A6] Optimisation happens in a strictly derivational fashion (so-called "extremely local optimization"; Müller 2004, 2009, Heck and Müller 2007), only ever targeting one derivational step at a time. The step optimised in the present approach occurs between the applications of Copy and Check.

[A7] Crucially, Agree is made up of two sub-operations, cf. (9).

(9) *Agree*:
Agree is a process containing the following operations.
a. Copy: The operation copying and transferring the goal's features onto the probe.
b. Check: The operation deleting uninterpretable features under feature identity.

They apply in the only logical order Copy > Check.

4.2. Impoverishment of the Probe

The feature combinations interacting in the PCC are at least Case and Person.[9] I will further assume that cases are decomposed in binary features (Bierwisch 1967), e.g.: Nominative [–obl(ique), –obj(ect)]; Accusative [–obl, +obj]; Dative [+obl, +obj]; Genitive [+obl, –obj]. The decomposition of person is also possible, but not necessary for this account as I am focusing on PCC types that make a distinction only between local and 3rd person. The relevant scales are thus the case-feature scale in (10) and the person scale in (11), which will be the

[9] See Subsection 4.5 for PCC effects with further ϕ-features.

basis of the constraints at work. The first scale shows that [+obl]-arguments are more prominent than [−obl]-arguments. The second scale shows that 1st and 2nd person – patterning together as local person – are more prominent than 3rd person.

(10) *Case-feature scale*
[+oblique] > [−oblique][10]

(11) *Person scale*
$\overbrace{\text{1st person} > \text{2nd person}}^{\text{local person}}$ > 3rd person

These two scales are combined by harmonic alignment to give rise to the harmony scales in (12-a) and (12-b).The more harmonic (viz. less marked) combinations are on the left edge of the scales, whereas the less harmonic (viz. more marked) combinations are on the right edge. The OT constraints following from the prohibition against the reversed order of the harmonic scales in (12) can be seen in (13). The prohibition against less harmonic combinations is ranked higher, which in OT means that it is more difficult to violate in a well-formed output.

(12) *Harmony scales*
a. [+oblique]/local ≻ [+oblique]/3
b. [−oblique]/3 ≻ [−oblique]/local

(13) *Constraint alignment*
a. *[+oblique]/3 ≫ *[+oblique]/local
b. *[−oblique]/local ≫ *[−oblique]/3

As the PCC applies only to combinations, both the indirect and the direct object are relevant for triggering Impoverishment and the rankings in (13) have to be combined. This is achieved by local conjunction in (14). Recall that as defined in (8), local conjunction of two constraints C_1 and C_2 is violated whenever both constraints are violated within a given domain (by assumption the syntactic head, i.e. the probe).

[10] As noted in footnote 3, ditransitive constructions in Kambera actually have dative case for both objects. Therefore [−obl] does actually not apply to a dative-case object, as it bears [+obl]. This could however simply be a morphological effect. The case relevant here is the syntactically assigned case, not its morpho-phonological realisation.

(14) *Local conjunction*

a. *[+obl]/3_p & *[−obl]/loc_p ≫ *[+obl]/3_p & *[−obl]/3_p
b. *[+obl]/loc_p & *[−obl]/loc_p ≫ *[+obl]/loc_p & *[−obl]/3_p
c. *[−obl]/loc_p & *[+obl]/3_p ≫ *[−obl]/loc_p & *[+obl]/$local_p$
d. *[−obl]/3_p & *[+obl]/3_p ≫ *[−obl]/3_p & *[+obl]/loc_p

For example, the first constraint in (14-a) is violated if both a 3rd person with [+obl] case and a local person with [−obl] are present in the relevant domain. This will be the case if the two objects trigger agreement on the same verbal head, justifying the assumption that the relevant domain of the locally conjoined constraints in (14) is the probe. Furthermore, the rankings in (14) correspond to markedness in terms of Hale/Silverstein hierarchies: *[+obl]/3_p & *[−obl]/loc_p is ranked higher than *[+obl]/3_p & *[−obl]/3_p as local person direct objects are less canonical than 3rd person direct objects. This can be shown graphically in (15).

(15) *Inherent ranking of markedness constraints*:

a. *[+obl]/3_p & *[−obl]/loc_p

b. *[+obl]/3_p & *[−obl]/3_p c. *[+obl]/loc_p & *[−obl]/loc_p

d. *[+obl]/loc_p & *[−obl]/3_p

As Impoverishment arises from the interaction of markedness and faithfulness constraints, I am going to introduce the faithfulness constraint Max, which penalises deletion. More precisely, the faithfulness constraint will be relativised to the relevant feature and domain to avoid false predictions. The relevant feature is π and the relevant domain is the probe. The result is a constraint that penalises deletion of π-features on probes, cf. (16).

(16) *Max-π_{probe}*
Penalise deletion of π-features on probes.

The relative ranking of this faithfulness constraint and the markedness constraints determines whether a certain feature combination is deleted or not. It also gives rise to the different versions of the PCC, as will be demonstrated in subsection 4.3.

4.3. Derivation of the PCC

As outlined previously, the PCC is accounted for by scale-driven Impoverishment causing scarcity of resources on the probe and consequent bleeding of Check. I will illustrate this with one grammatical and one ungrammatical example of each version of the PCC. Generally, the derivation may unfold into two different directions, as I will demonstrate on the two abstract examples in (17) and (18). The first example shows why certain phonologically weak object combinations lead to a crash of the derivation; the second why, on the contrary, others lead to grammaticality.

Crash: In any case, the first step of the derivation is the copying of the goal's interpretable features onto the probe. This is triggered by the uninterpretable feature on the probe, which may only be deleted by Check if the feature identity between the probe and its goals was established. The result of copying is a valued probe with an uninterpretable feature yet to be checked, (17-a→b). The copying of certain features onto the probe may then feed Impoverishment.[11] Impoverishment of the copied features on the probe applies whenever the markedness constraint that penalises a given feature combination on the probe is ranked higher than the faithfulness constraint protecting the probe from feature deletion. This can be seen abstractly in the tableau in (17). Whenever this is the case, the copied features are deleted and the derivation continues with an empty probe. As a consequence, Check is bled, because the feature identity between the probe and its goals cannot be established. Since Check is bled, it can no longer delete the uninterpretable feature on the probe, which leads to a crash of the derivation, cf. (17-c→d).

(17) a. [$_{v}$ [uPers: <□, □>]] [$_{\text{IO}}$ [Pers: x]] [$_{\text{DO}}$ [Pers: y]] Copy →

b. [$_{v}$ [uPers: <x, y>]] [$_{\text{IO}}$ [Pers: x]] [$_{\text{DO}}$ [Pers: y]] impov. fed →

	[$_{v}$ [uPers: <x, y>]]	*<x, y>$_{\text{P}}$	Max-π_{P}
	[$_{v}$ [uPers: <x, y>]]	*!	
☞	[$_{v}$ [uPers: < , >]]		*

c. [$_{v}$ [**uPers**: < , >]] [$_{\text{IO}}$ [Pers: x]] [$_{\text{DO}}$ [Pers: y]] Check bled →

d. Ungrammaticality

[11] Feeding, bleeding, counter-feeding and counter-bleeding are all understood as in the sense of Kiparsky (1976).

Convergence: On the other hand, if the faithfulness constraint is ranked higher than the markedness constraint, Impoverishment is not triggered. As a result, the probe maintains its valued features, cf. the tableau in (18). This has the consequence that Check may apply, because the feature identity between the probe and its goals can be established, cf. (18-c). Hence, Check deletes the uninterpretable feature on the probe and the derivation converges, cf. (18-c→d).

(18) a. [$_v$ [uPers: <□, □>]] [$_{IO}$ [Pers: x]] [$_{DO}$ [Pers: y]] Copy →

b. [$_v$ [uPers: <x, y>]] [$_{IO}$ [Pers: x]] [$_{DO}$ [Pers: y]] impov. bled →

	[$_v$ [uPers: <x, y>]]	Max-π_p	$^*\langle x, y\rangle_p$
☞	[$_v$ [uPers: <x, y>]]		*
	[$_v$ [uPers: < , >]]	*!	

c. [$_v$ [~~uPers~~: <x, y>]] [$_{IO}$ [Pers: x]] [$_{DO}$ [Pers: y]] Check fed →

d. Grammaticality

4.3.1. *The Super-Strong Version of the PCC*

The ranking specific to languages instantiating the super-strong version is the one in (19) (where $^*\langle x, y\rangle_d$ stands for $^*[+obl]/x_p$ & $^*[-obl]/y_p$). The faithfulness constraint is ranked lower than the markedness constraints penalising the ungrammatical combinations, but higher than the markedness constraint penalising the grammatical combination <loc, 3>.

(19) *Super-strong PCC Impoverishment ranking:*

$^*\langle 3, loc\rangle_p \gg {}^*\langle loc, loc\rangle_p \gg {}^*\langle 3, 3\rangle_p \gg$ **Max-π_p** $\gg {}^*\langle loc, 3\rangle_p$

The derivation unfolds as previously described. In the first case, the markedness constraint prohibiting the combination involved is ranked higher than the faithfulness constraint. This triggers deletion because the empty probe is optimal – as shown by the pointing finger in front of the optimal candidate and the exclamation mark signalling that the constraint violation caused by the competitor was fatal. As a consequence, the feature identity of goal and probe cannot be established and Check is bled, leading to ungrammaticality.

(20) *Deriving* *<3, 3>:

a. [$_v$ [uPers: <□, □>]] [$_{IO}$ [Pers: 3]] [$_{DO}$ [Pers: 3]] Copy →
b. [$_v$ [uPers: <3, 3>]] [$_{IO}$ [Pers: 3]] [$_{DO}$ [Pers: 3]] impov. fed →

	[$_v$ [uPers: <3, 3>]]	*<3, loc>$_p$	*<loc, loc>$_p$	*<3, 3>$_p$	Max-π_p	*<loc, 3>$_p$
	[$_v$ [uPers: <3, 3>]]			*!		
☞	[$_v$ [uPers: < , >]]				*	

c. [$_v$ [**uPers**: < , >]] [$_{IO}$ [Pers: 3]] [$_{DO}$ [Pers: 3]] Check bled →
d. Ungrammaticality

In the second case, the copying of the features <loc, 3> does not lead to their deletion, because the faithfulness constraint Max-π_p is ranked higher than the markedness constraint *<loc, 3>$_p$. Therefore, the output with the full probe is optimal, which means that Check may apply and that the derivation converges.

(21) *Deriving ✓<loc, 3>:*

a. [$_v$ [uPers: <□, □>]] [$_{IO}$ [Pers: loc]] [$_{DO}$ [Pers: 3]] Copy →
b. [$_v$ [uPers: <loc, 3>]] [$_{IO}$ [Pers: loc]] [$_{DO}$ [Pers: 3]] impov. bled →

	[$_v$ [uPers: <loc, 3>]]	*<3, loc>$_p$	*<loc, loc>$_p$	*<3, 3>$_p$	Max-π_p	*<loc, 3>$_p$
☞	[$_v$ [uPers: <loc, 3>]]					*
	[$_v$ [uPers: < , >]]				*!	

c. [$_v$ [~~uPers~~: < loc, 3>]] [$_{IO}$ [Pers: loc]] [$_{DO}$ [Pers: 3]] Check fed →
d. Grammaticality

4.3.2. The Strong Version of the PCC

The ranking specific to languages obeying the strong version of the PCC is the one in (22): the faithfulness constraint is ranked lower than the markedness constraints penalising the ungrammatical combinations, but higher than those penalising the grammatical combinations.

(22) *Strong PCC Impoverishment ranking:*
*<3, loc>$_p$ ≫ *<loc, loc>$_p$ ≫ **Max**-π_p ≫ *<3, 3>$_p$ ≫ *<loc, 3>$_p$

The derivation of the strong version of the PCC behaves just like the previous one. The first example shows how <loc, loc> combinations are ruled out; the second how <3, 3> combinations can emerge as grammatical.

(23) *Deriving *<loc, loc>*:

a. [$_v$ [uPers: <□, □>]] [$_{IO}$ [Pers: loc]] [$_{DO}$ [Pers: loc]] COPY →
b. [$_v$ [uPers: <loc, loc>]] [$_{IO}$ [Pers: loc]] [$_{DO}$ [Pers: loc]] impov. fed →

	[$_v$ [uPers: <loc, loc>]]	*<3, loc>$_p$	*<loc, loc>$_p$	MAX-π_p	*<3, 3>$_p$	*<loc, 3>$_p$
	[$_v$ [uPers: <loc, loc>]]		*!			
☞	[$_v$ [uPers: < , >]]			*		

c. [$_v$ [**uPers**: < , >]] [$_{IO}$ [Pers: loc]] [$_{DO}$ [Pers: loc]] CHECK bled →
d. Ungrammaticality

(24) *Deriving ✓<3, 3>*:

a. [$_v$ [uPers: <□, □>]] [$_{IO}$ [Pers: 3]] [$_{DO}$ [Pers: 3]] COPY →
b. [$_v$ [uPers: <3, 3>]] [$_{IO}$ [Pers: 3]] [$_{DO}$ [Pers: 3]] impov. bled →

	[$_v$ [uPers: <3, 3>]]	*<3, loc>$_p$	*<loc, loc>$_p$	MAX-π_p	*<3, 3>$_p$	*<loc, 3>$_p$
☞	[$_v$ [uPers: <3, 3>]]				*	
	[$_v$ [uPers: < , >]]			*!		

c. [$_v$ [~~**uPers**~~: < 3, 3>]] [$_{IO}$ [Pers: 3]] [$_{DO}$ [Pers: 3]] CHECK fed →
d. Grammaticality

4.3.3. *The Weak Version of the PCC*

The ranking specific to languages exhibiting the weak version of the PCC is the ranking in (25). Once more, the faithfulness constraint is ranked higher than the constraints against the grammatical combinations <loc, 3>, <3, 3> and <loc, loc>, and lower than the constraint against the only ungrammatical combination <3, loc>.

(25) *Weak PCC Impoverishment ranking:*
*<3, loc>$_p$ ≫ **MAX-π_p** ≫ *<loc, loc>$_p$ ≫ *<3, 3>$_p$ ≫ *<loc, 3>$_p$

The derivation of the weak version of the PCC unfolds as in the other versions. In the first case, the copying of features onto the probe leads to their deletion, to a bleeding of Check and thus to ungrammaticality. In the second case, the markedness constraint prohibiting the combination involved is ranked lower than the faithfulness constraint: deletion by Impoverishment is avoided and Check may apply, leading to grammaticality.

(26) *Deriving *<3, loc>*:

a. [$_v$ [uPers: <□, □>]] [$_{IO}$ [Pers: 3]] [$_{DO}$ [Pers: loc]] Copy →
b. [$_v$ [uPers: <3, loc>]] [$_{IO}$ [Pers: 3]] [$_{DO}$ [Pers: loc]] impov. fed →

	[$_v$ [uPers: <3, loc>]]	*<3, loc>$_p$	Max-π_p	*<loc, loc>$_p$	*<3, 3>$_p$	*<loc, 3>$_p$
	[$_v$ [uPers: <3, loc>]]	*!				
☞	[$_v$ [uPers: < , >]]		*			

c. [$_v$ [**uPers**: < , >]] [$_{IO}$ [Pers: 3]] [$_{DO}$ [Pers: loc]] Check bled →
d. Ungrammaticality

(27) *Deriving ✓<loc, loc>*:

a. [$_v$ [uPers: <□, □>]] [$_{IO}$ [Pers: loc]] [$_{DO}$ [Pers: loc]] Copy →
b. [$_v$ [uPers: <loc, loc>]] [$_{IO}$ [Pers: loc]] [$_{DO}$ [Pers: loc]] impov. bled →

	[$_v$ [uPers: <loc, loc>]]	*<3, loc>$_p$	Max-π_p	*<loc, loc>$_p$	*<3, 3>$_p$	*<loc, 3>$_p$
☞	[$_v$ [uPers: <loc, loc>]]			*		
	[$_v$ [uPers: < , >]]		*!			

c. [$_v$ [~~uPers~~: < loc, loc>]] [$_{IO}$ [Pers: loc]] [$_{DO}$ [Pers: loc]] Check fed →
d. Grammaticality

4.4. Rule Interaction

As shown in the previous subsection, there are two paths that the derivation can take:

1. The features copied onto the probe are penalised by a constraint ranked higher than the faithfulness constraint. The context for feeding Impoverishment is given because the output with the empty probe is optimal. As a consequence Check is bled, leading to ungrammaticality.

2. The features copied onto the probe are penalised by a constraint ranked lower than the faithfulness constraint. The context for Impoverishment is not given and the output with the full probe is optimal. As a consequence Check is fed, leading to grammaticality.

As a consequence, the following two general patterns in (28) emerge.

(28) *Consequent ordering of processes and interaction:*

a. Copy —feeds → deletion —bleeds → Check ⟹ ✗
b. Copy —feeds → Check ⟹ ✓

Moreover, the ordering of the three operations adopted so far (Copy > Impoverishment > Check) is the only logical one if PCC effects are to be explained this way. In fact, if the rule ordering were different – and Agree must be split for this ordering to be possible – no PCC effects would follow. Since there is only one logical ordering of Copy and Check, there are two further possible orderings involving Impoverishment: (29-b) and (29-c).

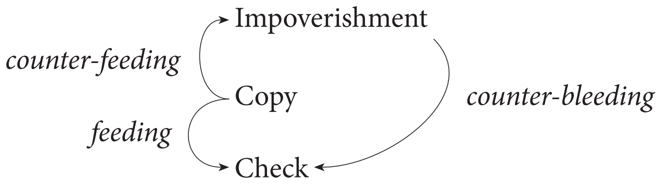
(29) *Possible rule orderings:*

a. Copy > Impoverishment > Check
b. Impoverishment > Copy > Check
c. Copy > Check > Impoverishment

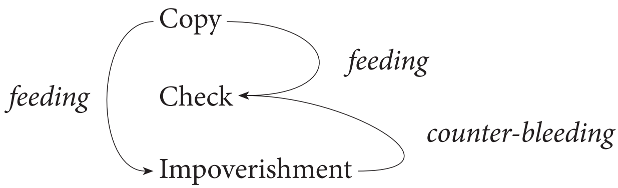
If (29-b) holds, Impoverishment will never take place. In fact, the probe would still be empty as Copy has not applied yet, meaning that the context for Impoverishment is not given yet. This would create an opaque case of rule interaction: at the surface we would ask ourselves why Impoverishment was not triggered by what appears to be a suitable context in the surface structure. The answer would be that Impoverishment may only apply at a point where the context is not given yet: a classic case of counter-feeding. Furthermore, exactly the same logic is applicable to the interaction between Impoverishment and Check. Since Impoverishment may only apply at a point where there are no features on the probe, nothing can be deleted, and with no deletion Check will never be bled. Therefore, with the rule ordering of (29-b) we have counter-feeding between Impoverishment and Copy, and counter-bleeding between Impoverishment and Check, causing no PCC effects at all.

If (29-c) holds, Impoverishment will behave just as in the rule ordering I assume for all well-formed cases in (29-a): there is no opaque interaction between Copy and Impoverishment. However, Check can no longer be bled by Impoverishment because it may only apply too late. This is a case of counter-bleeding between Impoverishment and Check and their interaction is thus opaque. In fact, the features on the probe may be deleted in certain contexts and the derivation would still converge – with the consequences for the morphology or semantics interfaces remaining unclear. Still, no PCC effects would follow. The rule interaction effects resulting from these two different rule orderings can be shown graphically as in (30-a) and (30-b) respectively.

(30) a. *Rule interaction under ordering Impoverishment > Copy > Check:*



b. *Rule interaction under ordering Copy > Check > Impoverishment:*



In sum, I tried to show here that only one of the three possible rule orderings of Copy, Check and Impoverishment leads to a successful application of Impoverishment: only in that rule ordering can Impoverishment differentiate between the ungrammatical and the grammatical combinations of agreeing objects in the languages obeying the PCC. On the contrary, in the other two orderings, and especially the one in (30-a), Impoverishment does not seem to serve any purpose. This is why I exclude those two rule orderings from playing a role in PCC effects. However, I do not exclude their existence completely, as Impoverishment might show further interactions with other operations. This may well give sense to a rule ordering such as in (30-a). In conclusion, in the case of languages exhibiting the PCC, Impoverishment must apply as soon as it can, i.e. just after Copy. In fact, this is necessary for Impoverishment to bleed Check in the right contexts and differentiate between grammatical and ungrammatical Person-Case combinations.

4.5. Consequences

Positing scale-driven Impoverishment at the basis of the PCC has the consequence that the constraint typology of Impoverishment automatically and restrictively determines the typology of the PCC as well, cf. (31). Therefore all existing PCC language types are accounted for, with a mechanism able to derive other ϕ-feature sensitive phenomena (cf. Keine 2010). However, three versions of the PCC, that have not been discussed in this paper, arise: what might be called the giga version in (31-a), the other-strong version in (31-d) and the zero version in (31-f). A language instantiating the giga version would have an absolute prohibition against double-object constructions with two phonologically weak elements. As pointed out to me by Thomas Graf (p.c.), Cairene Arabic (Shlonsky 1997: 207) is one of those languages.[12] A language with the zero version is one allowing any combination, such as German. A language with the other-strong version, on the other hand, would prohibit only the phonologically weak combinations <3, 3> and <3, loc>. Given the present assumptions, this version has to be treated as an accidental gap, as no language with that pattern has been attested so far, unless Spanish might be identified as an other-strong language, but I leave a definite answer to this question to further research. In fact, <3, 3> combinations in Spanish are only grammatical if the IO is expressed by the reflexive clitic *se* – also known as the *spurious se*. As mentioned in the background section, reflexive elements pattern together with local person. The <se, 3> combination could thus also be analysed as a repair strategy to avoid the combination *<3, 3> by replacing it with a <loc, 3> combination of the same meaning. If this were the case, Spanish would fit the other-strong version of the PCC for those speakers who allow <loc, loc> combinations. All in all, the following typology is predicted:

(31) *Rankings*

a. Giga version of the PCC: (Cairene Arabic)
*<3, loc>$_p$ ≫ *<loc, loc>$_p$ ≫ *<3, 3>$_p$ ≫ *<loc, 3>$_p$ ≫ **Max**-π_p

b. Super-strong version of the PCC: (Kambera)
*<3, loc>$_p$ ≫ *<loc, loc>$_p$ ≫ *<3, 3>$_p$ ≫ **Max**-π_p ≫ *<loc, 3>$_p$

c. Strong version of the PCC: (French, Greek, Kiowa)
*<3, loc>$_p$ ≫ *<loc, loc>$_p$ ≫ **Max**-π_p ≫ *<3, 3>$_p$ ≫ *<loc, 3>$_p$

d. Other-strong version of the PCC: (Spanish?)
*<3, loc>$_p$ ≫ *<3, 3>$_p$ ≫ **Max**-π_p ≫ *<loc, loc>$_p$ ≫ *<loc, 3>$_p$

[12] See also Graf (2012) for an algebraic account of the PCC, which also predicts the existence of a giga version.

e. Weak version of the PCC: (Italian, Catalan, Old Occitan)
$*\langle 3, loc\rangle_p \gg$ **Max**-$\pi_\mathbf{p}$ $\gg *\langle loc, loc\rangle_p \gg *\langle 3, 3\rangle_p \gg *\langle loc, 3\rangle_p$

f. Zero version of the PCC: (German, Dutch)
Max-$\pi_\mathbf{p}$ $\gg *\langle 3, loc\rangle_p \gg *\langle 3, 3\rangle_p \gg *\langle loc, loc\rangle_p \gg *\langle loc, 3\rangle_p$

Furthermore, the analysis may be extended to capture PCC effects involving other ϕ-features, such as gender, animacy and number. In Italian both a masculine and a feminine 3rd person dative clitic exist. However, only the masculine one is grammatical in a clitic cluster (✓<3[−fem, +obl], 3[−obl]>; *<3[+fem, +obl], 3[−obl]>); in the Leísta dialects in Spanish the combination <loc, 3> is generally grammatical, unless the DO is animate (*<loc, 3[+anim]>, where 3[+anim, −obl] is syncretic with 3[+obl]).

5. Conclusion

In this paper I have shown that the scarcity-of-resources approaches can be extended to capture not only the super-strong version but the full typology of the PCC by splitting Agree into Copy and Check and letting them interact with scale-driven Impoverishment. This has the consequences that (i) the Person Case Constraint can be linked to the Hale/Silverstein scales as they are the trigger of Impoverishment; (ii) no asymmetry between the representations of 3rd and local person is needed, meaning that 3rd person is always specified in syntax, which in turn avoids complications for morphology; (iii) Agree, split into Copy and Check, can interact freely with other operations, resulting e.g. in Impoverishment of probes as has been shown. Finally, it should be noted that PCC effects involving other ϕ-features might also be accounted for with the same mechanism. I leave this issue to further research.

References

Adger, David (2003): *Core Syntax: A Minimalist Approach*. Oxford University Press, New York.

Adger, David and Daniel Harbour (2007): 'Syntax and Syncretisms of the Person Case Constraint', *Syntax* **10**, 2–37.

Aissen, Judith (1999): 'Markedness and Subject Choice in Optimality Theory', *Natural Language and Linguistic Theory* **17**, 673–711.

Aissen, Judith (2003): 'Differential Object Marking: Iconicity vs. Economy', *Natural Language and Linguistic Theory* **21**, 435–483.

Anagnostopoulou, Elena (2005): Strong and Weak Person Restrictions: A Feature Checking Analysis. *In:* H. Ordoñez and F. Ordoñez, eds, *Clitic and Affix Combinations*. John Benjamins Publishing Company, Amsterdam/Philadelphia, pp. 199–235.

Anagnostopoulou, Elena (2008): Notes on the Person Case Constraint in Germanic (with special reference to German). *In:* R. D'Alessandro, S. Fischer and G. H. Hrafnbjarganson, eds, *Agreement Restrictions*. Mouton de Gruyter, Berlin/New York, pp. 15–47.

Arregi, Karlos and Andrew Ira Nevins (to appear): Contextual Neutralization and the Elsewhere Principle. *In:* O. Matushansky and A. Marantz, eds, *Distributed Morphology Today: Morphemes for Morris Halle*. MIT Press, Cambridge, Massachusetts.

Bank, Sebastian, Michael Sappir and Jochen Trommer (2012): A User's Guide to Distributed Morphology. Ms., Universität Leipzig.

Bhatt, Rajesh and Martin Walkow (to appear): 'Locating Agreement in Grammar: An Argument from Agreement in Conjunctions'.

Bierwisch, Manfred (1967): Syntactic Features in Morphology: General Problems of So-Called Pronominal Inflection in German. In: *To honour Roman Jakobson*. Mouton, The Hague, pp. 239–270.

Blix, Hagen (2012): 'The Shallowness of Being Third: Beyond Not Participating'. University of Leipzig (B.A. thesis).

Bobaljik, Jonathan David (2008): Where's Phi? Agreement as a Post-Syntactic Operation. *In:* D. Harbour, D. Adger and S. Béjar, eds, *Phi-Theory*. Oxford University Press, pp. 295–328.

Bonet, Eulália (1991): Morphology after Syntax: Pronominal clitics in Romance languages. PhD thesis, MIT.

Bonet, Eulália (1994): The Person-Case Constraint: A Morphological Approach. *In:* H. Harley and C. Philipps, eds, *MIT Working Papers in Linguistics 22. The Morphology-Syntax Connection*. MIT Press, pp. 33–52.

Chomsky, Noam (1995): *The Minimalist Program*. MIT Press, Cambridge Mass.

Chomsky, Noam (2000): Minimalist Inquiries: The Framework. *In:* R. Martin, D. Michaels and J. Uriagereka, eds, *Step by step*. MIT Press, Cambridge/Mass, pp. 89–155.

Di Sciullo, Anna Maria and Daniela Isac (2003): Ways of Agreeing, Phrases, and Interfaces. *Lisbon Workshop on Agreement*. New University of Lisbon and Portugal.

Georgi, Doreen (2008): 'A Distributed Morphology Approach to Argument Encoding in Kambera', *Linguistische Berichte* 213, 45–63.

Graf, Thomas (2012): An Algebraic Perspective on the Person Case Constraint. *In:* T. Graf, D. Paperno, A. Szabolcsi and J. Tellings, eds, *Theories of Everything. In Honor of Ed Keenan*. Vol. 17 of *UCLA Working Papers in Linguistics*, pp. 85–90.

Hale, Ken (1972): A New Perspective on American Indian Linguistics. *In:* A. Ortiz, ed., *New Perspectives on the Pueblos*. University of New Mexico Press, Albuquerque, pp. 87–103.

Halle, Morris and Alec Marantz (1993): Distributed Morphology and the Pieces of Inflection. *In:* K. Hale and S. J. Keyser, eds, *The View from Building 20*. MIT Press, Cambridge/Mass, pp. 111–176.

Haspelmath, Martin (2004): 'Explaining the Ditransitive Person-Role Constraint: A Usage-Based Account', *Constructions* 2. Available at http://www.constructions-online.de.

Haspelmath, Martin (2011): Occurrence of Nominal Plurality. *In:* M. Dryer and M. Haspelmath, eds, *The World Atlas of Language Structures Online*. Max Planck Digital Library, München.

Heck, Fabian and Gereon Müller (2007): Extremely Local Optimization. *In:* E. Brainbridge and B. Agbayani, eds, *Proceedings of the 34th Western Conference on Linguistics (WECOL 34)*. California State University, Fresno, pp. 170–183.

Hornstein, Norbert (2009): *A Theory of Syntax: Minimal Operations and Universal Grammar*. Cambridge University Press, Cambridge and UK and New York.

Keine, Stefan (2010): *Case and Agreement from Fringe to Core: A Minimalist Approach*. de Gruyter, Berlin.

Keine, Stefan and Gereon Müller (2008): Differential Argument Encoding by Impoverishment. *In:* M. Richards and A. Malchukov, eds, *Scales*. Vol. 86 of *Linguistische Arbeitsberichte*, Universität Leipzig, Leipzig, pp. 83–136.

Keine, Stefan and Gereon Müller (2009): 'Non-Zero/Non-Zero Alternations in Differential Object Marking'. Universität Leipzig.

Kiparsky, Paul (1976): Abstractness, Opacity, and Global Rules. *In:* A. Koutsoudas, ed., *The Ordering and Application of Rules*. Mouton.

Kiparsky, Paul (1999): 'Analogy and OT: Morphological Change as Emergence of the Unmarked'. Stanford University.

Klamer, Marian (1997): 'Spelling out Clitics in Kambera', *Linguistics* 35, 895–927.

Lee, Hanjung (2003): 'Parallel Optimization in Case Systems'. University of Minnesota.

Müller, Gereon (2004): 'Argument Encoding and the Order of Elementary Operations'. IDS Mannheim.

Müller, Gereon (2009): Ergativity, Accusativity, and the Order of Merge and Agree. *In:* K. Grohmann, ed., *Explorations of Phase Theory*. Mouton de Gruyter, Berlin, pp. 269–308.

Nevins, Andrew Ira (2007): 'The Representation of Third Person and its Consequences for Person-Case Effects', *Natural Language & Linguistic Theory* 25(2), 273–313.

Noyer, Rolf (1998): Impoverishment Theory and Morphosyntactic Markedness. *In:* S. Lapointe, D. Brentari and P. Farrell, eds, *Morphology and its Relation to Phonology and Syntax*. CSLI, Palo Alto, pp. 264–285.

Perlmutter, David (1971): *Deep and Surface Structure Constraints in Syntax*. Holt, Rinehart and Winston, New York.

Prince, Alan and Paul Smolensky (1993): 'Optimality Theory: Constraint Interaction in Generative Grammar'. Rutgers University.

Prince, Alan and Paul Smolensky (2004): 'Optimality Theory: Constraint Interaction in Generative Grammar'. Oxford.

Pylkkänen, Lina (2002): Introducing Arguments. PhD thesis, MIT, Cambridge Mass.

Richards, Marc (2008): Defective Agree, Case Alternations, and the Prominence of Person. *In:* M. Richards and A. Malchukov, eds, *Scales*. Vol. 86 of *Linguistische Arbeitsberichte*, Universität Leipzig, Leipzig, pp. 137–161.

Shlonsky, Ur (1997): *Clause Structure and Word Order in Hebrew and Arabic*. Oxford University Press, Oxford.

Silverstein, Michael (1976): Hierarchy of Features and Ergativity. *In:* R. M. W. Dixon, ed., *Grammatical Categories in Australian Languages*. Australian Institutes of Aboriginal Studies, Canberra, pp. 112–171.

Smolensky, Paul (1993): 'Harmony, Markedness, and Phonological Activity'. University of Colorado.

Smolensky, Paul (1995): 'On the Internal Structure of the Constraint Component *Con* of UG'. John Hopkins University.

Smolensky, Paul (2006): Harmonic Completeness, Local Constraint Conjunction, and Feature Domain Markedness. *In:* P. Smolensky and G. Legendre, eds, *The Harmonic Mind*. MIT Press, Cambridge/Mass, pp. 27–160.

Stiebels, Barbara (2002): *Typologie des Argumentlinkings: Ökonomie und Expressivität*. Akademie-Verlag, Berlin.

Stiebels, Barbara and Dieter Wunderlich, eds (2000): *Lexicon in Focus*. Akademie-Verlag, Berlin.

Sturgeon, Anne, Boris Harizanov, Maria Polinsky, Ekaterina Kravtchenko, Carlos Gómez Gallo, Lucie Medová and Václav Koula (2011): 'Revisiting the Person Case Constraint in Czech'. Ms., Harvard University.

Wunderlich, Dieter (2000): 'Optimal Case in Hindi'. Ms., Universität Düsseldorf.