The super-strong Person-Case Constraint

Scarcity of resources by scale-driven Impoverishment

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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 scalar continuum within the constraint's typology. In this paper, I 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 Program, 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. Unlike other versions of the constraint, the *super-strong* PCC cannot be derived in existing minimalist approaches such as Anagnostopoulou (2005), Adger & Harbour (2007), Richards (2008) or Nevins (2007). These build on the notion 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 now on call this notion *scarcity of resources*. In this paper I will attempt to rescue this idea by relativising it to syntactic Impoverishment following from the harmonic alignment of markedness scales (cf. Keine & Müller 2008, 2011; 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 person features of the goals are copied and transferred onto the probe by Copy; (ii) Impoverishment applies to the probe,

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due to the harmonic alignment of markedness scales interacting with a faithfulness constraint protecting the copied person features on the probe; (iii) the scarcity of resources caused by Impoverishment bleeds Check, which deletes uninterpretable features under feature identity of the probe and the goal, and the derivation crashes.[1] Consequently, the notion of the scarcity of resources on the probe is saved (although relativised to 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 (of the kind in Anagnostopoulou 2005 and Adger & Harbour 2007).

This paper is divided into three sections. In section 2 I will summarise the background on the Person-Case Constraint, describe the super-strong version of it and discuss the pros and cons of Anagnostopoulou's (2005), Adger & 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 present 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 and 2nd person) and the direct object (DO) is 3rd person as shown in (1a).[2] However, the same sentence is ungrammatical if the indirect object is 3rd person and the direct object is local person, cf. (1b).

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

b. *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

[1] Feeding, bleeding, counter-feeding and counter-bleeding are all understood in the sense of Kiparsky (1973).

[2] Throughout this paper, the terms IO and DO will be used with no particular theoretical meaning. They shall stand for the higher and the lower internal arguments of a ditransitve verb, respectively. Furthermore, only their person- and (decomposed) case-features will be relevant, with no mention of (macro-)θ-roles.

[3] 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), AG (agent), PFV (perfective), M (masculine), F (feminine), N (neuter). I will furthermore adopt the notation <x,y>, where *x* = person feature of IO and *y* = person feature of DO and where *loc* = local person and *3* = 3rd person. So, <loc,3> is a combination of phonologically weak objects with a local person IO and a 3rd person DO.

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 introduced above, two further versions have been mainly discussed in the minimalist literature so far: the *strong* version and the *weak* version of the PCC.[4] 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. Examples covering the four possible configurations <loc,3>, <3,3>, <loc,loc> and <3,loc> are given for French (strong version) and Italian (weak version) in (2) and (3), respectively. In French both (2c) and (2d), i.e. the combinations where the DO is local person, are ungrammatical; in Italian only (3d), where the DO is local person and the IO is 3rd person, is ungrammatical.[5]

(2) *Strong PCC in French:*

a. Il me l' a montré
3.NOM 1.DAT 3.ACC has shown
'He showed it to me.'

b. Il le lui a montré
3.NOM 3.ACC 3.DAT has shown
'He showed it to him/her.'

c. *Il me t' a montré
3.NOM 1.ACC 2.DAT has shown
'He showed me to you.'

d. *Il me lui a montré
3.NOM 1.ACC 3.DAT has shown
'He showed me to him/her.'

(3) *Weak PCC in Italian:*

a. Me l' ha presentato
1.DAT 3.ACC has introduced
'He introduced him to me.'

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

[5] As an anonymous reviewer notes, French and Italian differ slightly in the word order of the <3,3> combination, cf. (2b) vs. (3b), respectively. There are also differences in word order within the languages. In Italian, for instance, (3a-b) have a DAT > ACC order, while (3c-d) have an ACC > DAT order. The reader is referred to Anagnostopoulou (2008) for an overview of Germanic languages where the word order of weak pronouns does have an effect on the PCC. Namely, in the DO>IO word order the PCC ceases to hold in these languages (Swiss German, Dutch, Swedish and possibly German). The differences in word order in French and Italian, however, can be safely claimed to be of morphological nature: person and other features of the clitics drive their relative linearisation to an order of 1st > 2nd > 3rd (cf. Anagnostopoulou 2008:39–40). In fact, while in Italian the sentence in (3c) is ungrammatical with the clitic order 2nd > 1st (**Ti mi ha presentato*), both meanings are preserved from the 1st > 2nd linearisation (viz. 'He introduced me to you' and 'He introduced you to me'). This suggests that there is morphological readjustment, always neutralising *ti mi* '2nd > 1st' to *me ti* '1st > 2nd' at PF.

b. Gliel' ha presentato
3.DAT:3.ACC has introduced
'He introduced him to him/her.'
c. Mi ti ha presentato
1.ACC 2.DAT has introduced
'He introduced me to you.'
d. *Mi gli ha presentato
1.ACC 3.DAT has introduced
'He introduced me to him.'

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 & Harbour 2007), defective Agree in Russian (Richards 2008) or limited plural 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 <loc,3> is allowed.[6] 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 (4c).

(4) *Super-strong PCC in Kambera:*

a. Na-wua-ngga-nya
3SG.AG-give-1SG.REC-3SG.THM
'He gives it to me.'
b. *Na-wua-nja-nya
3SG.AG-give-3PL.REC-3SG.THM
'He gives it to them.'
c. *Na-wua-ngga-nggau
3SG.AG-give-1SG.REC-2SG.THM
'He gives you to me.'

[6] So far, the super-strong PCC has only been found in Kambera. The example for the ungrammatical <3,loc> combination to complete the paradigm is not available, but Haspelmath quotes Klamer (1997:903) in that "two object clitics can occur in sequence if the inner clitic [i.e. the Recipient] is first or second person and the outer clitic is third person". Finally, it may be worth noting that in ditransitive constructions in Kambera both the objects bear the dative case (cf. Georgi 2006 for a detailed analysis of argument encoding in Kambera). This will be ignored as only syntactic case is taken to be relevant here.

Taking into account the super-strong version and language types such as German, which allow any person-case combination, we see that there is a continuum within the typology of the PCC.[7] This can be seen in the overview in (5) and stated as a two-way universal implicational hierarchy as in (6).

(5) *Typology of the Person-Case Constraint:*

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

(6) *PCC implications:*

a. If a language disallows only one object combination, then that combination is <3,loc>.

b. If a language allows only one object combination, then that combination is <loc,3>.

This insight from Haspelmath (2004) is crucial for the understanding of the PCC. It complicates the phenomenon, as it can no longer be analysed as a constraint against a certain person feature in a given context (viz. against the Person/Participant feature, inherent to local person to the exclusion of 3rd person, in the context of the first mover to little v, to be discussed in the following sections). Hence, unless one treats these other 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. Nonetheless, I would like to contend that their ideas afford fundamental insight that should be maintained. Therefore, these approaches will be the basis for 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 in one functional head (viz. little v) entering Agree with both objects. However, the probe on little v is assumed to have only one set of ϕ-features when it enters Agree with two goals. More precisely, split feature checking is assumed to occur. This means that the indirect object, being closer (in terms of c-command) to the functional head, undergoes Agree first and checks person, after which the direct object checks the remaining number feature.[8] Crucially, in order to derive PCC effects, Anagnostopoulou follows Adger (2003)'s representation

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

[8] Here, indirect objects are taken to bear lexical case, but are nonetheless able to enter Agree with a functional head, as Anagnostopoulou follows Taraldsen (1995) in that datives in Icelandic have a default person feature.

of person. As can be seen in (7), the system bears an asymmetry.[9] 1st and 2nd person are always specified for their person features, whereas 3rd person is underspecified by default, but specified for the absence of person in 'salient' contexts such as datives/genitives/IOs. The concept of salience can be linked to Hale/Silverstein scales, but does not find a theoretical implementation in this approach.

(7) 1/2: [+Person/Participant]
3: [–Person/Participant] / DAT,GEN; [ ] / *elsewhere*

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 as it is closer in terms of c-command, leaving only number for the direct object. Local person direct objects are therefore ruled out because they necessarily have a person feature that needs to be checked to receive structural case. 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 be parametrically different in that they can employ Multiple Agree (rather than only Cyclic Agree). Multiple Agree allows the probe to check two goals simultaneously as long as they do not have any conflicting features (e.g. [+F] and [–F]). Derivations with two local person objects therefore converge as both objects have the feature [+Person/Participant] and can be checked simultaneously against the one person feature on the probe. <3,loc> derivations, on the other hand, still crash because neither cyclic nor Multiple Agree can check the person feature on the DO. So the weak and strong versions of the PCC are accounted for in this system. The super-strong version of the PCC, however, cannot be accounted for: in order to derive the ungrammaticality of <3,3> in this system, either both objects would need to be specified for [–Person/Participant] with the option of Multiple Agree unavailable in this language, or both objects need to be left underspecified for [Person/Participant]. In the former case, <3,3> is ruled out because the person feature on the DO cannot be checked. By the same logic, also <loc,3> should be ungrammatical in this language, but this is not the case. In the latter case, <3,3> derivations crash because the uninterpretable person feature on the probe is not discharged. This solution, too, makes the wrong predictions because <3,loc> combinations in the same language would be grammatical as the IO would not prevent the DO from getting its person feature checked. The problem clearly lies in the asymmetry of the representation of person, which cannot be reconciled with the super-strong PCC facts in Kambera. I conclude that this approach must be abandoned.

2.3.2. Domain-specific restrictions

In Adger & 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(icative)-head (in the sense of Pylkkänen 2002): 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 require the same feature in its specifier, the value of the feature being irrelevant. As for the representation of person, Adger and Harbour assume basically the

[9] The [Author] feature, which distinguishes between 1st and 2nd person, is omitted here as it plays no role for the languages considered here.

same kind of system as Anagnostopoulou in (7) with compulsory person-feature specification for local person (viz. [+Participant] here) and two possible ways of representing 3rd person: by default, i.e. without any specification ([ ]) or by negative specification of the person feature (viz. [–Participant] here).[10] The two different representations of 3rd person are linked to the special semantics of datives/IOs, which are construed as animates(/humans/receiver of empathy) and show more consistent syncretisms with inherently animate accusatives. The strong version of the PCC follows if the feature banned and required by the Appl-head is [±Participant]. The 3rd person can be both direct or indirect object as it can be underspecified for [Participant] and escape the ban when being the complement, and be specified for [Participant] 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 [Participant] 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 be too much variation between regions and speakers as to which combinations of <loc,loc> are allowed.[11]

2.3.3. Markedness scales

Haspelmath (2004) proposes a diachronic, frequency-based approach to the PCC. The focus lies not 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/Hale 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 languages obeying the PCC.[12] 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 logical version of the PCC, disallowing <3,3> and <3,loc> while allowing <loc,3> and <loc,loc>, which I will call the *other-strong* version of the PCC. Although I will tentatively link Spanish to this version further in this article, to the best of my knowledge no language exhibiting this pattern has been attested so far.

[10] Specifically, they break the feature [±Person] down into two binary features: [±Author], which stands for the speaker/writer of the speech act, and [±Participant], which stands for a direct participant in the speech act, i.e. the hearer or the speaker. 2nd person is thus specified as [–Author, +Participant] in this system. 3rd person is either negatively specified for [Participant] – which entails negative specification for [Author] – or not specified at all, functioning as a default marker.

[11] 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], and 3rd person could not bear this feature at all, then the only grammatical combination would be <loc,3>.

[12] The exceptions are the *total* and the *zero* versions of the PCC, respectively, discussed in section 4.5.

3. Theoretical background

3.1. Impoverishment

Impoverishment (Halle & Marantz 1993; Noyer 1998; Keine & Müller 2008, 2011; Keine 2010; Bank et al. 2012) is a post-syntactic feature-deletion operation. It was first introduced within the framework of Distributed Morphology (DM, Halle & 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*.[13] 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 (8), 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.

(8) /[+obj]/ $\rightarrow \emptyset$ / [–masc, –fem, –pl]

In the approach to be developed here, however, I will follow Keine & Müller (2008, 2011) and Keine (2010), who, building on the work of Aissen (1999, 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 & Müller (2008, 2011), 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, Prince & Smolensky 1993) is widely known as a phonological framework. However, even though it features less prominently in the domain of syntax, it has also been adopted in syntactic analyses (see e.g. Kiparsky 1999; Wunderlich 2000; Stiebels & Wunderlich 2000; Stiebels 2002; Woolford 2001; Lee 2002). 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 poten-

[13] 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.

tial 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. if 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* does not. 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 & Smolensky 1993; 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, as well (cf. Aissen 1999, 2003). The mechanism is defined in (9) and (10). 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 obtained from these scales by prohibiting the inverse order of the harmonic alignment scales, cf. (10).

(9) *Harmonic alignment:* (Prince & Smolensky 1993:161)
Suppose given a binary dimension D_1 with the scale $X > Y$ on its elements $\{X,Y\}$, and another dimension D_2 with a scale $a > b > \ldots > z$ on its elements $\{a,b,\ldots,z\}$. The *harmonic alignment* of D_1 and D_2 is the pair of Harmony scales H_X, H_Y:
a. H_X: X/a $\succ$ X/b $\succ \ldots \succ$ X/z
b. H_Y: Y/z $\succ \ldots \succ$ Y/b $\succ$ Y/a

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

(10) a. *X/z $\gg \ldots \gg$ *X/b $\gg$ *X/a
b. *Y/a $\gg$ *Y/b $\gg \ldots \gg$ *Y/z

Local conjunction, on the other hand, is the creation of a new constraint, by means of combining 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. 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 & $C_2 \gg C_1, C_2$.

(11) *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.

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 & 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 deletion of uninterpretable features which would otherwise cause a crash of the derivation at the semantic interface (LF). When certain features are involved – such as 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 & Isac 2003; Arregi & Nevins 2013; Bhatt & Walkow 2013; 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 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 the probe and the 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 such operations 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 & Müller 2008, 2011; Keine 2010).

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

[A6] Crucially, Agree is made up of two sub-operations, Copy and Check, cf. (12).

[A7] Optimisation happens in a strictly derivational fashion (the so-called 'extremely local optimisation', cf. Müller 2004, 2009; Heck & Müller 2007), only ever targeting one derivational step at a time. The step optimised in the present approach occurs between the application of the two sub-operations of Agree, Copy and Check.

(12) *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.[14] I will further assume that cases are decomposed into binary features (Bierwisch 1967), e.g.: nominative [–obl(ique), –obj(ect)]; accusative [–obl, +obj]; dative [+obl, +obj]; genitive [+obl, –obj]. The decomposition of person features is also possible. The difference between local and 3rd person can be taken to be something like [+Participant] $>$ [–Participant]. The relevant scales are thus the case-feature scale in (13) and the person-feature scale in (14), which will be the 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.

(13) *Case-feature scale:*
[+oblique] $>$ [–oblique][15]

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

These two scales are combined by harmonic alignment to give rise to the harmony scales in (15a) and (15b). The more harmonic (viz. less marked) combinations are at the left edge of the scales, whereas the less harmonic (viz. more marked) combinations are at the right edge. The OT constraints following from the prohibition of the reversed order of the harmonic scales in (15) can be seen in (16). The prohibition of less harmonic combinations is ranked higher, which in OT means that it is more difficult to violate in a well-formed output.

(15) *Harmony scales:*
a. [+oblique]/local $\succ$ [+oblique]/3
b. [–oblique]/3 $\succ$ [–oblique]/local

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

[15] As noted in footnote 6, ditransitive constructions in Kambera actually have dative case on both objects. Therefore, [–obl] does not actually 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.

(16) *Constraint alignment:*

a. *[+oblique]/3 ≫ *[+oblique]/local
b. *[–oblique]/local ≫ *[–oblique]/3

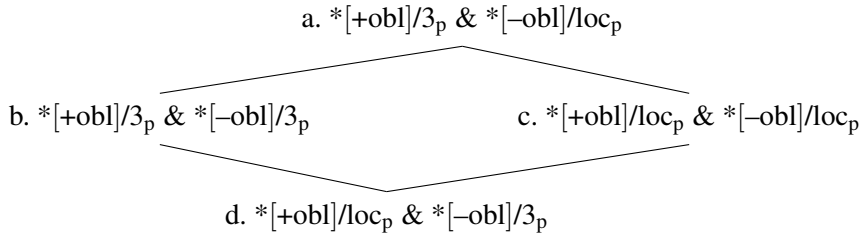
As the PCC applies only to combinations, both the indirect and the direct object are relevant for triggering Impoverishment and the rankings in (16) have to be combined. This is achieved by local conjunction in (17). Recall that, as defined in (11), local conjunction of two constraints C_1 and C_2 is violated whenever both constraints are violated within a given domain (by assumption, the syntactic head, i.e. the probe on little v).

(17) *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]/loc_p
d. *[–obl]/3_p & *[+obl]/3_p ≫ *[–obl]/3_p & *[+obl]/loc_p

For example, the first constraint in (17a) 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 (17) is the probe, which is made explicit by using subscript p. Furthermore, the rankings in (17) 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 is shown graphically in (18).

(18) *Inherent ranking of markedness constraints:*



As Impoverishment arises from the interaction of markedness and faithfulness constraints, I am going to introduce a faithfulness constraint – MAX – penalising deletion. More precisely, the faithfulness constraint will be relativised to the relevant feature and domain. 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. (19). The relative ranking of this faithfulness constraint to the markedness constraints is crucial, as it 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.

(19) MAX-π_{probe}*:*
Penalise deletion of person features on probes.

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 for each version of the PCC. Generally, the derivation may unfold in two different directions, as I will demonstrate on two abstract examples in (20) and (21). The first example shows why certain phon. 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 the copying is a valued probe with an uninterpretable feature yet to be checked, (20a→b). The copying of certain features onto the probe may then feed Impoverishment. 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 (20). 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. (20c→d).

(20) a. $[_{v}$ [uPers: $< \square,\square >$]] $[_{IO}$ [Pers: x]] $[_{DO}$ [Pers: y]] COPY →

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

	$[_{v}$ [uPers: <x,y>]]	*<x,y>$_{p}$	MAX-π_{p}
	$[_{v}$ [uPers: <x,y>]]	*!	
☞	$[_{v}$ [uPers: < , >]]		*

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

d. Ungrammaticality

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 (21). This has the consequence that Check may apply, because the feature identity between the probe and its goals can be established, cf. (21c). Hence, Check deletes the uninterpretable feature on the probe and the derivation converges, cf. (21c→d).

(21) a. $[_{v}$ [uPers: $< \square,\square >$]] $[_{IO}$ [Pers: x]] $[_{DO}$ [Pers: y]] COPY →

b. $[_{v}$ [uPers: <x,y>]] $[_{IO}$ [Pers: x]] $[_{DO}$ [Pers: y]] no impov. →

	$[_{v}$ [uPers: <x,y>]]	MAX-π_{p}	*<x,y>$_{p}$
☞	$[_{v}$ [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 (22) (where *<x,y>$_p$ 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>.

(22) *Super-strong PCC Impoverishment ranking:*
*<3,loc>$_p$ ≫ *<loc,loc>$_p$ ≫ *<3,3>$_p$ ≫ **MAX-π_p** ≫ *<loc,3>$_p$

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 competitor's violation was fatal. As a consequence, the feature identity of the goal and the probe cannot be established and Check is bled, leading to ungrammaticality.

(23) *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.

(24) *Deriving ✓ <loc,3>:*

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

b. [$_v$ [uPers: <loc,3>]] [$_{IO}$ [Pers: loc]] [$_{DO}$ [Pers: 3]] no impov. →

	[$_v$ [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 (25): the faithfulness constraint is ranked lower than the markedness constraints penalising the ungrammatical combinations, but higher than those penalising the grammatical combinations.

(25) *Strong PCC Impoverishment ranking:*
$*\langle 3,loc\rangle_p \gg *\langle loc,loc\rangle_p \gg$ **MAX-π_p** $\gg *\langle 3,3\rangle_p \gg *\langle loc,3\rangle_p$

The derivation of the strong verion of the PCC proceeds 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.

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

a. $[_v$ [uPers: $< \square,\square >]]$ $[_{IO}$ [Pers: loc]] $[_{DO}$ [Pers: loc]] COPY →

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

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

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

d. Ungrammaticality

(27) *Deriving ✓ <3,3>:*

a. $[_v$ [uPers: $< \square,\square >]]$ $[_{IO}$ [Pers: 3]] $[_{DO}$ [Pers: 3]] COPY →

b. $[_v$ [uPers: <3,3>]] $[_{IO}$ [Pers: 3]] $[_{DO}$ [Pers: 3]] no impov. →

	$[_v$ [uPers: <3,3>]]	$*\langle 3,loc\rangle_p$	$*\langle loc,loc\rangle_p$	MAX-π_p	$*\langle 3,3\rangle_p$	$*\langle loc,3\rangle_p$
☞	$[_v$ [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 (28). Once again, 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>.

(28) *Weak PCC Impoverishment ranking:*
$*\langle 3,loc\rangle_p \gg$ **MAX-π_p** $\gg *\langle loc,loc\rangle_p \gg *\langle 3,3\rangle_p \gg *\langle loc,3\rangle_p$

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: thus deletion by Impoverishment is avoided and Check may apply, leading to grammaticality.

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

a. [$_{v}$ [uPers: < □,□ >]] [$_{IO}$ [Pers: 3]] [$_{DO}$ [Pers: L]] 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

(30) *Deriving ✓ <loc,loc>:*

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

b. [$_{v}$ [uPers: <loc,loc>]] [$_{IO}$ [Pers: loc]] [$_{DO}$ [Pers: loc]] no impov. →

	[$_{v}$ [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 section, 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 feeding Impoverishment is not given and the output with the full probe is optimal. As a consequence Check is fed, leading to grammaticality.

Thus, the following two general patterns in (31) emerge.

(31) *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: (32b) and (32c).

(32) *Logically possible rule orderings:*
  a. Copy > Impoverishment > Check
  b. Impoverishment > Copy > Check
  c. Copy > Check > Impoverishment

If (32b) 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 to apply is not given. If (32c) holds, Impoverishment will behave just as in the rule ordering I assume for all well-formed cases in (32a): Check can never be bled by Impoverishment because the latter may only apply too late. Generally, in this case, the features on the probe may still be deleted in certain contexts, but the derivation would still converge as Check will already have deleted the probe's uninterpretable feature – with the consequences for the interfaces remaining unclear. Anyway, no PCC effects would follow.

In sum, I have 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 ordering of rules 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 (32b), Impoverishment does not seem to serve any purpose. This is why I exclude those two rule orderings from playing a role in person-case effects; also they can arguably be excluded from being learnable in these languages as Impoverishment is vacuous in (32b) and creates strong syntax-interface mismatches in (32c). However, I do not exclude their existence completely, as Impoverishment might show further interactions with other operations, in which case these orderings of rules may make sense again, as they would bear consequences for different derivations. In conclusion of this section, 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 and, as I claim, the advantage that the constraint typology of Impoverishment automatically and restrictively determines the typology of the PCC. This way, clear predictions can be made about possible and impossible PCC language types. In fact, the total amout of variation that is predicted by this system is given in (35). All existing PCC language types are accounted for with a mechanism that finds independent support from an extensive work on Agreement and the interaction between ϕ-features and (syntactic and morphological) case (cf. Keine 2010). Three versions of the PCC that have not been discussed in this paper so far are predicted: what might be called the *total* version in (35a), the *other-strong* version in (35d) and the *zero* version in (35f). A lan-

guage instantiating the total version would have an absolute prohibition against double-object constructions with two phonologically weak objects. Cairene Arabic (Shlonsky 1997:207), as pointed out to me by Thomas Graf (p.c.), and also Hausa, an Afro-Asiatic language spoken in West-Africa, are two languages of that type.[16] In (33) this is illustrated for Hausa. In (33a) and (33b), respectively, one can see that both weak DOs and IOs can be realised on their own. In (33c), however, one can see that a combination of both is not possible: one of the objects has to be realised as phonologically strong, as e.g. the DO in (33d).[17] This means that Agreement with two weak objects is not possible for any person combination.

(33) *Total version in Hausa* (data from lecture material by Ari Awagana, Universität Leipzig):

a. Audù yaa kaawoo tà
Audu 3.M.PFV bring 3.F.ACC
'Audu brought it (e.g. the water).'

b. Audù yaa dafàa makà
Audu 3.M.PFV cook 2.M.DAT
'Audu cooked for you.'

c. *Audù yaa kaawoo makà ta
Audu 3.M.PFV bring 2.M.DAT 3.F.ACC
'Audu brought you it.'

d. Audù yaa kaawoo makà ita
Audu 3.M.PFV bring 2.M.DAT 3.F.ACC.STRONG
'Audu brought it to you.'

A language with the zero version is one allowing all four combinations, such as German, cf. (34).[18]

(34) *Zero version in German:*

a. dass er es dir gestern gezeigt hat.
that 3.M.NOM 3.N.ACC 2.DAT yesterday shown has
'that he showed it to you yesterday.'

b. dass er es ihr gestern gezeigt hat.
that 3.M.NOM 3.N.ACC 3.F.DAT yesterday shown has
'that he showed it to her yesterday.'

c. dass er mich dir gestern gezeigt hat.
that 3.M.NOM 1.ACC 2.DAT yesterday shown has
'that he showed me to you yesterday.'

[16] See also Graf (2012) for an algebraic account of the PCC, also expecting a total version to exist.

[17] The weak form of the 3rd person feminine DO is *ta* with a polar tone; the strong form is just *ita*.

[18] Anagnostopoulou (2008) argues that German exhibits the (weak version of the) PCC, but only in contexts where the object cluster occurs before a full-DP subject. Regardless of German, Haspelmath (2004:10) cites Polish, Haya (Bantu-J, Tanzania), Noon (Northern Atlantic, Senegal), Lakhota and Kabardian as languages with phonologically weak object clusters that escape the PCC. However, it has to be checked for Noon, Lakhota and Kabardian, which are shown to allow <3,2> combinations, whether they also allow <3,1> combinations. If not, they could still be well-behaved languages that differentiate between 1st and 2nd person, instantiating what is called the *me-first* PCC (Nevins 2007).

d. dass er dich ihr gestern gezeigt hat.
that 3.M.NOM 2.ACC 3.F.DAT yesterday shown has
'that he showed you to her yesterday.'

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 with 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*. If reflexive elements pattern together with local person (as they seem to do in French, e.g., where combinations of *<local,3.reflexive> are ungrammatical; see Anagnostopoulou 2005:204 and references therein) the <se,3> combination could 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:

(35) *Constraint typology:*

a. Total version of the PCC: (Cairene Arabic, Hausa)
*<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>$_p$ ≫ *<L, 3>$_p$

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

e. Weak version of the PCC: (Italian, Catalan, Old Occitan)
*<3,loc>$_p$ ≫ **MAX-π_p** ≫ *<L, L>$_p$ ≫ *<3,3>$_p$ ≫ *<loc,3>$_p$

f. Zero version of the PCC: (German, Dutch, Haya)
MAX-π_p ≫ *<3,loc>$_p$ ≫ *<3, 3>$_p$ ≫ *<loc,loc>$_p$ ≫ *<loc,3>$_p$

Finally, 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]). However, as pointed out to me by Elena Anagnostopoulou (p.c.), the present account cannot capture correlations between the strength of the PCC a given language is subject to and the kind of weak objects that language has (i.e. weak pronouns vs. clitics vs. agreement).[19] The observation behind this is that languages with agreement affixes always have (at least) the strong version of the PCC, while languages with weak pronouns have at most the weak version. This correlation, however, is at best a tendency. In fact, Polish and Haya (Bantu-J, Tanzania) have the zero version of the PCC in spite of having clitics and agree-

[19] For proposals and background on that matter, see the review by Rezac (2010).

ment affixes, respectively (Haspelmath 2004:10). This is shown with example (36) for Polish and (37) for Haya, where the least canonical combination <3,loc> is grammatical.[20,21]

(36) Dałbym mu cię za żonę bez wahania.
give.COND.1SG 3.M.DAT 2.ACC for wife without hesitation
'I would give you to him as a wife without hesitation.' *Polish*

(37) A-ka-mu-n-deet-ela.
3SG.SUBJ-PAST-3SG.REC-1SG.THM-bring-APPL
'S/he brought me to him.' (or: 'S/he brought him/her to me.') *Haya*

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 if the scarcity-of-resources on the probe is not postulated as such, but rather is taken to incur in the course of those derivations that lead to ungrammatical object combinations. This is ensured by the mechanism of syntactic scale-driven Impoverishment and the way it interacts with Agree. Impoverishment is taken to be a local step of optimisation of the derivation, precisely of the step where the objects' features were transferred to the probe on transitive v. It is further taken to result from the interaction between a set of markedness constraints that penalise the presence of certain person-case feature combinations on the probe with a faithfulness constraint that protects the probe from feature deletion. In that sense, Impoverishment determines the optimal output for the continuation of the derivation, namely either an unharmed probe with its features or an impoverished probe without its features. The restrictiveness of the mechanism is ensured by deriving the markedness constraints from the harmonic alignment and local conjunction of the person- and case-feature scales, producing a total amount of four inherently ranked markedness constraints. The only degree of variation possible in this system is the relative ranking of the faithfulness constraint with respect to the markedness constraints, predicting and generating six language types: the total, super-strong, strong, weak and zero versions of the PCC, which are all attested, and the other-strong version, which was tentatively identified in Spanish. In order for Impoverishment to interact correctly with Agree, in line with much recent work breaking down syntactic operations into more fine-grained sub-operations, Agree was postulated to consist of the sub-operations Copy and Check and the order of application was set to be Copy $>$ Impoverishment $>$ Check, as this is the only order where Impoverishment can cause a tangible effect. Ungrammaticality is then the result of failed completion of Agree whenever Impoverishment bleeds its final step Check because the feature identity of the probe with its goal is not met and the uninterpretable feature on the probe cannot be deleted. All in all, the consequences of this approach are that (i) the Person-Case Constraint can be linked to Hale/Silverstein scales and analysed as a uniform phenomenon as the scales are the driving force of Impoverishment; (ii) no asymmetry between the representations of 3rd and local person is needed, meaning that 3rd

[20] The <3,1> combination cannot be tested in Polish as there is no clitic form of the 1st person accusative.

[21] In (37), both the more and the less canonical readings, i.e. <1,3> and <3,1>, are available for the same string. Under the Y-model of grammar adopted here, this suggests that both structures exist syntactically.

person is always specified in syntax which 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; (iv) PCC effects involving further ϕ-features, and similar phenomena involving one probe for two arguments, can follow from the same mechanism.

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