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

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1 Introduction

The Person-Case Constraint (PCC) is a constraint on possible combinations of phonologically weak objects in ditransitive constructions, depending on their person-feature specifications. It was first shown to apply in French by Perlmutter (1971):

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

Different versions of the PCC exist:

(2) a. *Strong version*: combinations with local person (i.e. 1st and 2nd person) direct objects (DO) are disallowed.
b. *Weak version*: local person DOs are disallowed, but only in the context of 3rd person indirect objects (IO).

Problem:
Haspelmath (2004) shows a new version exists:

(3) *Super-strong version*: Only the combination where the IO is local person and the DO is 3rd person is allowed.

This holds in Kambera, where (4-a-b) are the only grammatical combinations.

(4) Kambera, Klamer (1997: 903-904) from Haspelmath (2004)
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.' – *<1/2, 1/2>

Theoretical problems:
Recent minimalist approaches based on the assumption of what I call *scarcity of resources*, such as Anagnostopoulou (2005), Adger and Harbour (2007), Richards (2008) and to some extent Nevins (2007), fail to account for the super-strong version of the PCC. In fact, they predict the combination <3, 3> always to be grammatical, whereas it is ungrammatical in Kambera.

(5) *Scarcity of resources*:
The one functional head entering Agree with both objects fails to agree with all features of both arguments.

Not all logically possible PCC language-types exist: the typology of the PCC shows a pattern following Silverstein/markedness-scales (Haspelmath, 2004; Silverstein, 1976).

(6) *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	✗	✗	✗	✓

Claim:
Scarcity-of-resources accounts can be extended to capture the data from Kambera. Practically, scarcity of resources will no longer be a postulated fact, but rather a consequence of syntactic scale-driven impoverishment of the probe checking the person-features of the two phon. weak objects.

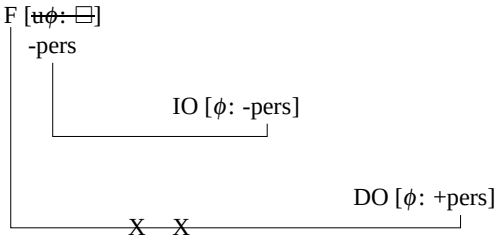
2 Previous analyses

2.1 Anagnostopoulou (2005)

The one functional head entering Agree with both phon. weak objects does not have enough resources. It may only agree once for [person]. In her approach, the functional head checks the IO first, because it is closer, then the DO. Local person bears [+person] and third person bears [–person] in 'salient' contexts (as IO in

comparison to DO), [ ] elsewhere. The strong version of the PCC arises because the combinations <loc, loc> and <3, loc> have two [person]-features that must be checked, cf. (7). Languages with the weak version have an optional mechanism 'Multiple Agree' which allows them to check two [person]-features if they are the same.

(7) *Combination *<3, loc>*, cf. (1-b)



+ Both the strong and the weak versions of the PCC are accounted for.

+ No non-existing language type predicted.

– <3, 3> is always grammatical because 3 DO never needs to be checked.

2.2 Adger and Harbour (2007)

Adger and Harbour also suggest there is one functional head entering Agree with both phon. weak objects. They argue the strong version of the PCC arises from a constraint that prohibits the feature [Participant] in its complement domain, but demands it in its specifier. The strong version is derived since the feature specification of local person necessarily contains [+Participant], whereas the one of third person may be underspecified. The weak version is not considered because of regional and speaker variations in those languages. In fact, it seems that in the languages with the weak version of the PCC not all speakers agree on which combinations of <loc, loc> are grammatical (viz. <1, 2>, <2, 1>, both, or neither).

– Only strong version accounted for.

+ No non-existing language type predicted.

2.3 Haspelmath (2004)

Haspelmath (2004) proposes a functional/historical analysis. He argues for a grammaticalisation principle saying that more frequent expressions are more likely to be grammaticalised. In the case of the PCC, the frequency depends on markedness-scales. This account gives an explanation of how the PCC originated. However, it does not say how these pattern are then implemented/modelled in synchronic grammars.

+ Accounts for weak, strong and super-strong versions (diachronically).

– Predicts one non-existing language-type, disallowing combinations with third person IO. This is due to the fact, that from the combination of two binary scales (IO–DO and local–3rd person) four language types arise. Concretely, ✓<loc, 3>, *<3, 3>, ✓<loc, loc>, *<3, loc> is the language type completing the table in (6).

3 Analysis

My analysis is set within the framework of an optimality-theoretic version of the minimalist program (Chomsky, 2000; Heck and Müller, 2007) with realisational morphology.

3.1 Assumptions

- There is only one functional head entering Agree with both objects (scarcity-of-resources approaches).
- Third person is always fully specified (Nevins, 2007).
- Impoverishment – originally a post-syntactic operation of Distributed Morphology (Halle and Marantz, 1993) deleting certain features in certain contexts – applies in syntax, and is thus able to interact with operations such as Agree (Keine, 2010).
- 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).
- Optimisation happens in a strictly derivational fashion (so-called *Extremely Local Optimization* (Heck and Müller, 2007)), only ever targeting one derivational step at a time.
- Crucially, AGREE is made up of two sub-operations (cf. Di Sciullo and Isac, 2003; Arregi and Nevins, 2012; Bhatt and Walkow, t.a.; Bobaljik, 2008).

(8) *Agree*:
AGREE is the 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.

3.2 Plot

- Little *v* enters Agreement with the objects.
- The person-features of the two objects are copied onto the probe.
- Impoverishment may be triggered by certain feature combinations.
- Feature identity of probe and goal is checked.

3.3 Syntactic scale-driven impoverishment

The main question behind Keine (2010) is how they can get Aissen (2003)'s work into syntax. The answer is by substituting the morphological marker-choosing constraints with syntactic Impoverishment.
Mechanisms involved:

(9) *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 constraint hierarchies C_X, C_Y:

a. *X/z ≫ … ≫ *X/b ≫ *X/a
b. *Y/a ≫ *Y/b ≫ … ≫ *Y/z

(10) *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, C_1 & C_2 ≫ C_1, C_2.

Deriving the constraints for the PCC:
The feature combinations interacting in the PCC are at least Case and Person. Thus I will start with the markedness-scales for the case-features and person in (11). The left edge is more marked. 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 the distinction between local and third person is enough.

(11) a. *Case-features scale*
[+oblique] > [–oblique]

b. *Person scale*
$\underbrace{\text{1st person} > \text{2nd person}}_{\text{loc(al person)}}$ > 3rd person

These two scales can be combined by Harmonic Alignment to form the constraints in (13). These are inherently ranked, reflecting the markedness-scales they are derived from.

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

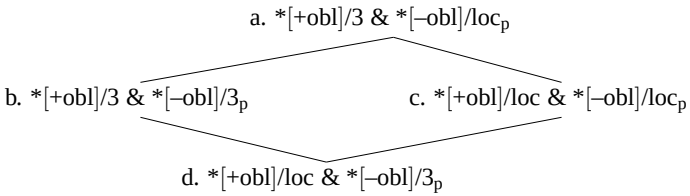
(13) *Constraint alignment*
a. *[+oblique]/3 ≫ *[+oblique]/local
b. *[–oblique]/local ≫ *[–oblique]/3

As the PCC affects only combinations, the constraints must be combined by Local Conjunction. The domain is the probe on the functional head agreeing with both phon. weak objects.

(14) *Local conjunction*
a. *[+obl]/3 & *[–obl]/loc_p ≫ *[+obl]/3 & *[–obl]/3_p
b. *[+obl]/loc & *[–obl]/loc_p ≫ *[+obl]/loc & *[–obl]/3_p
c. *[–obl]/loc & *[+obl]/3_p ≫ *[–obl]/loc & *[+obl]/$local_p$
d. *[–obl]/3 & *[+obl]/3_p ≫ *[–obl]/3 & *[+obl]/loc_p

Like the Constraints derived from Harmonic Alignment, the constraints resulting from Local Conjunction show an inherent ranking:

(15) *Inherent ranking of markedness constraints*



Finally, impoverishment is the result of these markedness constraints interacting in an optimality-theoretic fashion with a conflicting faithfulness constraint. The markedness constraints penalise certain output-structures, pushing repair strategies such as deletion, insertion or modification to apply. Faithfulness constraints penalise differences between input and output. Hence, the faithfulness constraint in conflict with the markedness constraints in (15), is one penalising the deletion of the copied (person-)features on the probe. The relative ranking of the faithfulness constraint to the markedness constraints determines the contexts of application of Impoverishment.

(16) MAX-π_p
Penalise the deletion of person-features on probes.

3.4 Derivation of the Person-Case Constraint

The first step is the copying of the goal's interpretable features onto the probe, in order for Check to delete the uninterpretable feature under the feature identity of goal and probe, cf. (17-a→b). The copying of certain features onto the probe may, however, feed Impoverishment. Impoverishment of the copied features on the probe applies whenever the markedness constraint prohibiting a given feature combination on the probe is ranked higher than the faithfulness constraint protecting the probe from feature deletion. Whenever this is the case, the copied features are deleted, cf. (17-c). As a consequence, Check is bled, because the feature identity between the probe and the goal could not be established. As Check is bled, it can no longer delete the uninterpretable feature on the probe, leading to ungrammaticality, cf. (17-d).

The super-strong version of the PCC:

(17) *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 →

c.

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

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

e. Ungrammaticality

(18) *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 →

c.

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

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

e. Grammaticality

The strong version of the PCC:

(19) *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 →

c.

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

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

e. 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. bled →

c.

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

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

e. Grammaticality

The weak version of the PCC:

(21) *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 →

c.

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

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

e. Ungrammaticality

(22) *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 →

c.

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

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

e. Grammaticality

3.5 Rule interaction

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 empty output 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. As a consequence Check is fed, leading to grammaticality.

(23) *Consequent ordering of processes and interaction*

a. COPY —feeds→ deletion —bleeds→ CHECK ⟹ ✗
b. COPY —feeds→ CHECK ⟹ ✓

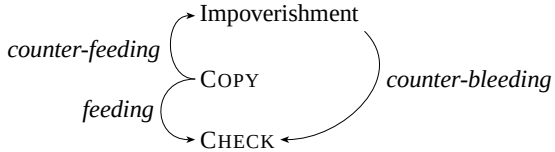
Moreover, the ordering of the three processes adopted so far (COPY > Impoverishment > CHECK) is the only logical one if PCC-effects are to be explained this way. In fact, if the rule ordering were different – and Agree must be split for this ordering to be possible – no PCC-effects would follow.

(24) *Possible rule orderings:*

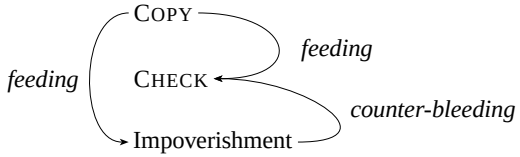
a. COPY > Impoverishment > CHECK
b. Impoverishment > COPY > CHECK
c. COPY > CHECK > Impoverishment

(24-b) produces counter-feeding between Copy and Impoverishment and counter-bleeding between Impoverishment and Check (in the sense of Kiparsky, 1973), as Impoverishment applies too early, both for Copy to feed it and for Check to be bled by it. As a consequence, Impoverishment would not apply at all on the probe meaning that no ungrammatical combinations would not be ruled out.
(24-c), on the other hand, produces counter-bleeding between Impoverishment and Check, because Impoverishment applies after Check, still deleting the probe's feature in the right context, but without triggering ungrammaticality. The result would be that any combination, regardless of whether the probe is full or empty, is grammatical.

(25) a. *Rule interactions of the ordering* Impoverishment > AGREE*:*



b. *Rule interactions of the ordering* AGREE > Impoverishment*:*



In conclusion, Impoverishment must apply as soon as it can, viz. just after Copy, or no PCC-effects or any sensible effect at all will follow.

4 Consequences

The advantage of this approach is that the constraint typology of impoverishment automatically and restrictively determines the typology of the PCC as well, cf. (26). Therefore all existing PCC language types are accounted for, with a mechanism able to derive other ϕ-feature sensitive phenomena (Keine, 2010). However, (26-a) and (26-d) are predicted to be accidental gaps, although they have not been documented so far. (26-f), on the other hand, would fit German, where all combinations are grammatical.

(26) *Constraint/PCC typology*

a. Giga version of the PCC:
*<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>$_p$
e. Weak version of the PCC: Italian, Catalan
*<3, loc>$_p$ ≫ **MAX-π_p** ≫ *<loc, loc>$_p$ ≫ *<3, 3>$_p$ ≫ *<loc, 3>$_p$
f. Zero version of the PCC: German, Dutch
MAX-π_p ≫ *<3, loc>$_p$ ≫ *<3, 3>$_p$ ≫ *<loc, loc>$_p$ ≫ *<loc, 3>$_p$

5 Open issues

- In Kambera lower internal arguments of transitive verbs are marked accusative and higher ones with dative. However, in ditransitive contexts, both internal arguments are marked dative (Georgi, 2007). With the case-features I propose to combine with the person-features to form markedness constraint, the dative case on the DO must be taken as a morphological effect. This is not unreasonable, though, as my analysis takes into consideration syntactic case-features rather than morphological ones.

- The consequences of splitting Agree in two operations of their own are unclear yet in regard of other syntactic operations such as *Move*.

6 Outlook

- Spanish may be identified as the other-strong version of the PCC prohibiting the combinations *<3, 3> and *<3, loc> if the *spurious se* is analysed as a repair strategy (reflexive elements pattern together with local person).

- There are further ϕ-features, such as Gender, Number and Animacy, involved in PCC-effects. For example, in Italian both a masculine and a feminine third 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]>). These phenomena, I believe, are the result of the same mechanism applied to a larger range of feature scales as I am going to demonstrate with further research.
- Any other two-arguments-against-one-head situation with similar restrictions to those of the PCC, as e.g. Icelandic infinitives, unaccusatives and passives, should be accountable for by the interaction between scale-driven Impoverishment and Agree.

7 Conclusion

- Scarcity of resources approach can be extended to capture the super-strong version of the PCC if:
  - syntactic scale-driven Impoverishment is assumed
  - Agree is split into Copy and Check for Impoverishment to apply
- That way not only the super-strong version but the full typology of the PCC can be accounted for.

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