# Hard and Soft Person-Case Constraints

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**Roadmap of this talk**

- Emphasise and broaden Haspelmath (2004)'s claim that the typology of the Person-Case Constraint is not limited to the strong and weak versions and that it crucially follows a scalar pattern
- Show that in German, a language where all person-case combinations are grammatical, the same scalar pattern is found, but in the form of significant differences in acceptability ratings
- Put forward a unified analysis based on syntactic scale-driven impoverishment of Agree

## 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.'
c. On me montrera à lui.
one 1.ACC show.FUT 3.DAT.STRONG
'They will show me to him.'

Different versions of the PCC exist. The two versions that were mainly discussed in the minimalist literature are the *strong* and the *weak* versions of the PCC and go back to Bonet (1991, 1994).





(2) *Two different versions of the PCC*
a. *Strong version*: combinations with *local* (ie. 1st+2nd) person DOs are disallowed.
b. *Weak version*: local person DOs are disallowed, but only in the context of 3rd person indirect objects (IO).

Greek, e.g., exhibits the *strong* version of the PCC, cf. (3), whereas Italian only instantiates the *weak* version, cf. (4). The difference lies in the ungrammaticality vs. grammaticality of the <loc,loc> combinations in (3-c) vs. (4-c) (throughout, <x,y> = <person$_{IO}$,person$_{DO}$>).

(3) *Strong PCC in Greek:* (adapted from Anagnostopoulou, 2005)
a. Tha mu to stilune.
FUT 1.GEN 3.N.ACC send.3.PL
'They will send it to me.' ✓<loc,3>
b. Tha tu to stilune.
FUT 3.M.GEN 3.N.ACC send.3.PL
'They will send it to him.' ✓<3,3>
c. *Tha su me stilune.
FUT 2.GEN 1.ACC send.3.PL
'They will send me to you.' *<loc,loc>
d. *Tha tu se stilune.
FUT 3.M.GEN 2.ACC send.3.PL
'They will send me to him.' *<3,loc>

(4) *Weak PCC in Italian:*
a. Me l' ha presentato
1.DAT 3.ACC has introduced
'He introduced him to me.' ✓<loc,3>
b. Gliel' ha presentato
3.DAT:3.ACC has introduced
'He introduced him to him/her.' ✓<3,3>
c. Mi ti ha presentato
1.ACC 2.DAT has introduced
'He introduced me to you.' ✓<loc,loc>
d. *Mi gli ha presentato
1.ACC 3.DAT shown
'He introduced me to him.' *<3,loc>

**Actually, the typology is broader and follows a scalar pattern**

Haspelmath (2004) extends the typology to languages which allow only one combination, such as Kambera (Malayo-Polynesian), and languages which allow all

four combinations, such as German.[1]

Kambera instantiates what is dubbed the *super-strong* version of the PCC. Out of the four possible combinations, Kambera only allows the one where the IO is local and the DO is 3rd person, cf. (5). In comparison to the strong version, also the <3,3> combination in (5-b) is ungrammatical.

(5) *Super-strong PCC in 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.' ✓<loc,3>

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

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

In German, any combination of phon. weak objects is possible (Haspelmath 2004 and references therein), cf. (6). This version will be dubbed the *zero* version of the PCC.

(6) *Zero PCC in German:*

a. dass er ihn mir gezeigt hat
that he 3.M.ACC 1.DAT showed
'that he showed him to me.' ✓<loc,3>

b. dass er ihn ihr gezeigt hat
that he 3.M.ACC 3.F.DAT showed
'that he showed him to her.' ✓<3,3>

c. dass er mich dir gezeigt hat
that he 1.ACC 2.DAT showed
'that he showed me to you.' ✓<loc,loc>

d. dass er mich ihr gezeigt hat
that he 1.ACC 3.F.DAT showed
'that he showed me to her.' ✓<3,loc>

Finally, there are languages such as Hausa (Afro-Asiatic, West-Africa) where no combination of phon. weak objects is allowed, cf. (7). This pattern will be dubbed the *giga* version of the PCC. (Data from lecture material by Ari Awagana, University of Leipzig; pattern confirmed by him as native speaker.)

[1] But see also Anagnostopoulou (2008) who claims that German does exhibit the (weak version of the) PCC when the object cluster precedes the subject. I will claim the opposite with supporting data in section 2.3.





(7) *Giga PCC in Hausa:*

a. *Audù yaa kaawoo makàa ta
Audu he brought 2.M.DAT 3.F.ACC
'Audu brought you it (e.g. *ruwaa.*F 'water').' *<loc,3>

b. *Audù yaa kaawoo masàa ta
Audu he brought 3..M.DAT 3.F.ACC
'Audu brought you it.' *<3,3>

c. *Audù yaa kaawoo minìi ka
Audu he brought 1.DAT 2.M.ACC
'Audu brought you to me.' *<loc,loc>

d. *Audù yaa kaawoo masàa ki
Audu he brought 3.M.DAT 2.F.ACC
'Audu brought you to him.' *<3,loc>

**In conclusion**

- The difference between the versions is the number of ungrammatical person combinations
- Not all imaginable patterns are found (i.e. no 'anti-PCC languages' as e.g. an 'anti-strong PCC' *<loc,3>, *<3,3>, ✓<loc,loc>, ✓<3,loc> exist)
- The pattern that emerges is that of a universal implicational hierarchy as in (8) (adapted from Haspelmath, 2004)

(8) *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>.

- The updated typology of the PCC in (9) can be drawn.

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

| IO | DO | giga | super-strong | strong | weak | zero |
|---|---|---|---|---|---|---|
| 1/2 | 3 | * | ✓ | ✓ | ✓ | ✓ |
| 3 | 3 | * | * | ✓ | ✓ | ✓ |
| 1/2 | 1/2 | * | * | * | ✓ | ✓ |
| 3 | 1/2 | * | * | * | * | ✓ |

## 2 Acceptability-Rating Studies in German

Done in collaboration with Andreas Opitz; first study for BA thesis (Doliana, 2013a).

## 2.1 Goals:

- Confirm grammaticality of all combinations
- Find out whether there are significant differences between the combinations
- If differences: do they confirm the hierarchy in terms of acceptability/markedness?

## 2.2 Method

- Questionnaires of 136 sentences: 96 exp, 40 filler
- Filled out by 40 mainly first year linguistics students
- Scale from 1 to 7 for question 'How well does this sentence sound?'
- Four main conditions, corresponding to the four person-case combinations
- 24 experimental verbs each repeated in the four main conditions
- 10 filler verbs, not ditransitive, each repeated four times, in two grammatical and two ungrammatical sentences
- The subjects were 12 different full-DP subjects, all masculine, personally judged suitable for verbs
- All sentences were presented as embedded sentences
- The matrix sentences were of three different kinds
- There was a sentential adverb in the embedded sentence to assure that the objects were read as phon. weak objects (rather than strong, contrastive focussed ones)
- Two different complementizers
- Verbs chosen with a pretest
- Ordering effects were controlled for by having four pairs of different versions of the questionnaires
- Frequency of verbs was controlled (values taken from the *Wortschatz* project of the University of Leipzig)





(10) *Verbs used, ordered after frequency:*

| | | |
|---|---|---|
| gibt 'give' | verweigert 'deny' | verschweigt 'keep secret' |
| zeigt 'show' | gönnt 'grant' | anvertraut 'entrust' |
| vorstellt 'introduce' | zumutet 'ask of' | entreißt 'wrest' |
| präsentiert 'present' | vorenthält 'withhold' | zuweist 'assign' |
| anbietet 'offer' | vorführt 'demonstrate' | auftischt 'dish up' |
| überlässt 'leave to' | offenbart 'reveal' | zuteilt 'assign' |
| hinterlässt 'consign' | vorzieht 'prefer' | vermacht 'bequeath' |
| empfiehlt 'recommend' | ausliefert 'turn in' | bewusstmacht 'm. realise' |

(11) *Model templates of experimental sentences:*

a. Die Familie wollte, dass … nicht V.
the family wanted that … not V
'Wie gut klingt dieser Satz?' (how well does this sentence sound?)
☹ 1 2 3 4 5 6 7 ☺

b. Die Passanten beobachteten, dass … plötzlich V.
the passersby observed that … suddenly V

c. Alle fragten sich, warum … jetzt V.
everybody asked themselves why … now V

(12) *Full-DP subjects used:*

| | |
|---|---|
| der Junge 'the boy' | der Opa 'the grandfather' |
| der Künstler 'the artist' | der Nachbar 'the neighbour' |
| der Freund 'the friend' | der Bruder 'the brother' |
| der Vater 'the father' | der Weise 'the wise man' |
| der Chef 'the boss' | der Händler 'the merchant' |
| der Lehrer 'the teacher' | der Herr 'the man' |

(13) *Pronouns used in each condition:*

a. Acc-3 & Dat-loc *ihn dir* 'him to you', *ihn mir* 'him to me'
b. Acc-3 & Dat-3 *ihn ihr* 'him to her', *sie ihm* 'her to him'
c. Acc-loc & Dat-loc *dich mir* 'you to me', *mich dir* 'me to you'
d. Acc-loc & Dat-3 *dich ihm* 'you to him', *mich ihm* 'me to him'

(14) *Concrete filler examples:*

a. *Viele wundern sich, warum er mich plötzlich läuft.
many wonder why he.NOM me.ACC suddenly runs

b. Man besteht darauf, dass er ihm nicht hilft.
one insists that he.NOM him.DAT not helps

(15) *Concrete experimental examples:*

a. Die Passanten beobachten, dass sie ihm der Künstler
the passersby observe that her.ACC him.DAT the artist.NOM

plötzlich präsentiert.
suddenly presents

b. Die Familie will, dass der Vater mich ihm nicht
the family wants that the father.NOM me.ACC him.DAT not
gönnt.
grant

## 2.3 Results

- The fillers showed almost categorical ratings, cf. (16)

(16) *Results of filler items*

| Gramm | Mean Rating | N | Standard Deviation |
|---|---|---|---|
| no | 1,51950 | 795 | 1,094092 |
| yes | 6,27604 | 797 | 1,278579 |

- All four PCC conditions are grammatical in comparison to the fillers, cf. (17)[2]

- The relative well-formedness of the four person-case combinations reflects the hard PCC typology

(17) *Mean ratings PCC condition*

| PCC | Mean Rating | N | Standard Deviation |
|---|---|---|---|
| <loc,3> | 4,8669 | 80 | 1,26847 |
| <3,3> | 4,2823 | 80 | 1,48771 |
| <loc,loc> | 4,0536 | 80 | 1,11441 |
| <3,loc> | 3,5679 | 80 | 1,27965 |

**ANOVA**

- Main effect for the PCC conditions, i.e. the combination of the factors Dative-Person with Accusative-Person
  (F1(3,117)=47.4, p<.001; F2(3, 69)=33.5, p<.001)

In addition, post-hoc tests (Scheffé and Tukey) revealed that the <loc,3> combination was rated best and the <3,loc> combination was rated worst on average. However, there was no significant difference between the average ratings of the two middle conditions.

[2] Anagnostopoulou (2008) claims that the <3,loc> combination is ungrammatical in the OS word order. However, although the results suggest that it is highly marked, I claim that the combination is nonetheless generally grammatical, cf. (19).





(18) *Post-hoc tests on PCC conditions*

| | | | Mean Rating Subgroups | | |
|---|---|---|---|---|---|
| Test | PCC | N | 1 | 2 | 3 |
| Tukey-HSD | <3,loc> | 80 | 3,5679 | | |
| | <loc,loc> | 80 | | 4,0536 | |
| | <3,3> | 80 | | 4,2823 | |
| | <loc,3> | 80 | | | 4,8669 |
| | Significance | | 1,000 | ,508 | 1,000 |
| Scheffé | <3,loc> | 80 | 3,5679 | | |
| | <loc,loc> | 80 | | 4,0536 | |
| | <3,3> | 80 | | 4,2823 | |
| | <loc,3> | 80 | | | 4,8669 |
| | Significance | | 1,000 | ,589 | 1,000 |

**Problem**

- No significant difference between <3,3> and <loc,loc>

- Interaction between PCC condition and word order condition (ANOVA F1(3,117) = 11.3, p<.001; F2(3,69) = 8.3, p<.001)

- **Explanation:** the case ambiguity between accusative and nominative of *sie* 'her/she/they/them' lowered the ratings of the <3,3> (and <loc,3>) combinations in the OS word order condition

- When the sentences begin with *sie* 'she/her/they/them', it is first interpreted as a nominative 3PL.NOM/3.SG.F.NOM, which must subsequently be re-analysed as an accusative when the unambiguously nominative determiner *der* 'the.M.NOM' heading the full DP subject is encountered

(19) *Mean ratings PCC conditions crossed with word order*

| Word Order | PCC | Mean Rating | N | Standard Deviation |
|---|---|---|---|---|
| OS | <loc,3> | 4,1273 | 40 | 1,05628 |
| | <3,3> | 3,3083 | 40 | 1,21088 |
| | <loc,loc> | 3,5227 | 40 | 1,02676 |
| | <3,loc> | 2,7921 | 40 | 1,04987 |
| SO | <loc,3> | 5,6064 | 40 | 1,01072 |
| | <3,3> | 5,2563 | 40 | 1,03498 |
| | <loc,loc> | 4,5846 | 40 | ,93978 |
| | <3,loc> | 4,3438 | 40 | ,99001 |

### 2.4 Interim Summary: Empirical Claims

- More language types than the strong and the weak exist
- The pattern of the typology is scalar: it follows two implicational hierarchies
- Main effect for and significant differences between the four PCC conditions in the acceptability-rating study in German
- **Crucially:** The pattern of the relative acceptability of the four conditions reflects the typology of languages where the PCC is fully grammaticalised, i.e. the same constraint is hard in some languages and soft in others

(20) *Typology of the Person-Case Constraint:* (= (9))

| IO | DO | giga | super-strong | strong | weak | zero |
|---|---|---|---|---|---|---|
| 1/2 | 3 | * | ✓ | ✓ | ✓ | ✓ |
| 3 | 3 | * | * | ✓ | ✓ | ✓ |
| 1/2 | 1/2 | * | * | * | ✓ | ✓ |
| 3 | 1/2 | * | * | * | * | ✓ |

## 3 Analysis of the Person-Case Constraint

The Typology in (20) is predicted and accounted for by a syntactic scale-driven impoverishment approach (Doliana, 2013b). This is an improvement over the *standard accounts, such as Anagnostopoulou (2005); Adger and Harbour (2007); Richards (2008)* (and Nevins (2007)), which cannot easily derive the giga or the weak PCC, but mainly *predict <3,3> combinations always to be grammatical, i.e. a super-strong PCC should not exist*.

### 3.1 Assumptions

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

- Clitics are the direct spell-out of agreement between a verb and its argument(s) (Borer, 1984).
- There is only one functional head entering Agree with both objects (Anagnostopoulou, 2005).
- The probe is made up of an ordered pair of uninterpretable feature bundles (viz. <[u$\phi$], [u$\phi$]>) that need valuation and checking by entering Agree with two elements providing interpretable features. The ordered pair is valued in an order related to closest c-command, thus, roughly speaking, resulting in the form <IO, DO> (more or less as in Anagnostopoulou 2005).





- 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 (for other proposals splitting up Agree see Di Sciullo and Isac 2003; Arregi and Nevins 2012; Bhatt and Walkow 2013; Bobaljik 2008).

(21) *Agree*
AGREE is the process containing the following operations.[3]
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 Syntactic Scale-Driven Impoverishment

The main question behind Keine (2010) is how to make Aissen (2003)'s work even more principled. The answer is by substituting the morphological marker-choosing constraints with (syntactic) scale-driven impoverishment.

**Mechanisms involved:**

(22) *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 $\succ$ X/b $\succ$ ... $\succ$ X/z
b. $H_Y$: Y/z $\succ$ ... $\succ$ Y/b $\succ$ Y/a

[3] A suboperation like *Match*, that finds a structure with a matching interpretable feature, and possibly more are implied here.

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

(23) *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, $C_1$ & $C_2 \gg C_1, C_2$.

**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 (24). 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.

(24) a. *Case-features scale*: [+oblique] > [–oblique]
b. *Person scale*: $\underbrace{\text{1st person} > \text{2nd person}}_{\text{loc(al person)}} > \text{3rd person}$

These two scales can be combined by Harmonic Alignment to form the constraints in (26). These are inherently ranked, reflecting the markedness-scales they are derived from.

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

(26) *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.

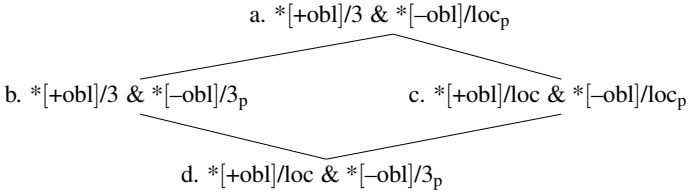
(27) *Local conjunction*
a. *[+obl]/3 & *[–obl]/$loc_p$ ≫ *[+obl]/3 & *[–obl]/$3_p$
b. *[+obl]/loc & *[–obl]/$loc_p$ ≫ *[+obl]/loc & *[–obl]/$3_p$
c. *[–obl]/loc & *[+obl]/$3_p$ ≫ *[–obl]/loc & *[+obl]/$local_p$
d. *[–obl]/3 & *[+obl]/$3_p$ ≫ *[–obl]/3 & *[+obl]/$loc_p$

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





(28) *Inherent ranking of markedness constraints*




- Impoverishment is the result an optimisation step, where these markedness constraints interact 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 (28), is one penalising the deletion of the copied (person-)features on the probe, cf. (29)

☞ Ultimately, the relative ranking of the faithfulness constraint to the markedness constraints determines:

  – the contexts of application of impoverishment
  – and therefore the version of the PCC a given language instantiates

(29) MAX-$\pi_p$
Penalise the deletion of person-features on probes.

## 3.3 Derivation of the Person-Case Constraint

**Convergent derivations:**

1. Copy applies: the goal's interpretable features are copied onto the probe, cf. (30-a→b)
2. The step of the derivation is optimised
3. The probe remains unharmed because the faithfulness constraint is ranked higher than the markedness constraint penalising the given feature combination on the probe, i.e. the output with the full probe is selected for the continuation of the derivation cf. (31-b→c)
4. Check applies successfully because the feature identity between the probe and the goal are given

5. The derivation converges because the uninterpretable feature on the probe can be deleted ⇒ grammaticality of the person-case combination, cf. (30-d)

(30) a. [$_v$ [uPers: <□,□>]] [$_{IO}$ [Pers: x]] [$_{DO}$ [Pers: y]] COPY →
b. [$_v$ [uPers: <x,y>]] [$_{IO}$ [Pers: x]] [$_{DO}$ [Pers: y]] no impov. →

| | [$_v$ [uPers: <x,y>] ] | MAX-$\pi_p$ | *<x,y>$_p$ |
|---|---|---|---|
| ☞ | [$_v$ [uPers: <x,y>]] | | * |
| | [$_v$ [uPers: < , >]] | *! | |

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

**Crashing derivations:**

1. Copy applies: the goal's interpretable features are copied onto the probe, cf. (31-a→b)

2. The step of the derivation is optimised

3. The probe is impoverished because the faithfulness constraint is ranked lower than the markedness constraint penalising the given feature combination on the probe, i.e. the output with the impoverished probe is selected for the continuation of the derivation, cf. (31-b→c)

4. Check wants to apply but fails because the feature identity between the probe and the goal could not be established.

5. The derivation ultimately crashes because the uninterpretable feature on the probe could not be deleted ⇒ ungrammaticality of the person-case combination, cf. (31-d)

(31) a. [$_v$ [uPers: <□,□>]] [$_{IO}$ [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-$\pi_p$ |
|---|---|---|---|
| | [$_v$ [uPers: <x,y>]] | *! | |
| ☞ | [$_v$ [uPers: < , >]] | | * |

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

**The super-strong version of the PCC:**

(32) *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-$\pi_p$ | *<loc,3>$_p$ |
|---|---|---|---|---|---|
| [$_v$ [uPers: <3,3>]] | | | *! | | |
| ☞[$_v$ [uPers: < , >]] | | | | * | |

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

(33) *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. →
c.

| [$_v$ [uPers: <loc,3>]] | *<3,loc>$_p$ | *<loc,loc>$_p$ | *<3,3>$_p$ | MAX-$\pi_p$ | *<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:**

(34) *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-$\pi_p$ | *<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

(35) *Deriving ✓<3,3>*
a. [$_v$ [uPers: <□,□>]] [$_{IO}$ [Pers: 3]] [$_{DO}$ [Pers: 3]] COPY →
b. [$_v$ [uPers: <3,3>]] [$_{IO}$ [Pers: 3]] [$_{DO}$ [Pers: 3]] no impov. →
c.

| [$_v$ [uPers: <3,3>]] | *<3,loc>$_p$ | *<loc,loc>$_p$ | MAX-$\pi_p$ | *<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:**

(36) *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-$\pi_p$ | *<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

(37) *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. →

c.

| [$_v$ [uPers: <loc,loc>]] | *<3,loc>$_p$ | MAX-$\pi_p$ | *<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

### 3.4 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. (38). Therefore all existing PCC language types are accounted for. A further pattern is predicted: the *other-strong* version of the PCC. An other-strong language is one disallowing *<3,3> and *<3,loc> combinations while allowing <loc,3> and <loc,loc>.[4]

(38) *Constraint typology*

a. Giga version of the PCC: (Hausa, Cairene Arabic)
*<3,loc>$_p$ ≫ *<loc,loc>$_p$ ≫ *<3,3>$_p$ ≫ *<loc,3>$_p$ ≫ **MAX-$\pi_p$**

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

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

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

e. Weak version of the PCC: (Italian, Swiss German, English)
*<3,loc>$_p$ ≫ **MAX-$\pi_p$** ≫ *<loc,loc>$_p$ ≫ *<3,3>$_p$ ≫ *<loc,3>$_p$

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

[4] Spanish, however, may arguably instantiate this pattern if the compulsory use of the reflexive for the dative 3rd person in clusters is analysed as a repair mechanism to realise a *<3,3> combination as a <loc,3> as reflexives pattern with local person in many languages.





## 4 Extension to Soft Person-Case Constraints

### 4.1 Modelling Soft-Hard Variations

- Modelling gradient well-formedness with standard minimalist assumptions is not possible (for discussion see e.g. Vogel 2006; Sorace and Keller 2005)
- An alternative is offered by Stochastic Optimality Theory, a version of classic OT based on the Gradual Learning Algorithm (Anttila, 1997; Boersma and Hayes, 2001; Hayes, 2000)
- most prominently employed in syntax by Bresnan et al. (2001) to explain the soft-hard variation in passivisation in English and Lummi

### 4.2 Stochastic OT

**Classic OT:**

- constraints are ranked relative to each other
- constraint rankings are permanent, never reversed

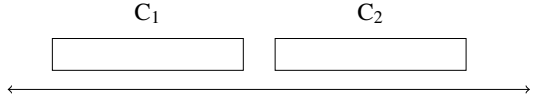
**Stochastic OT:**

- constraints are ranked according to a numerical value of strictness
- access to constraints during evaluation time is subject to variance and therefore they are best associated with *domains* of values
- i.e. a constraint is best represented by a range of values
- Main consequence and difference: constraint domains may overlap

**No overlap:**

- The ranking is strict: the resulting outputs are 'stable' and will be grammaticalised/learned with distinction of grammaticality

(39) *No overlap = strict domination = grammaticalisation*

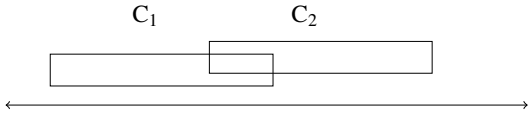



**Overlap:**

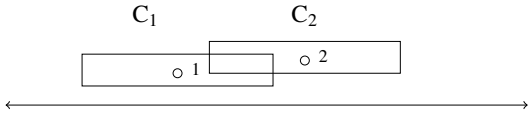
- The ranking is not strict: there will be variation/optionality between competing outputs

☞ Some evaluation scenarios may reverse the general ranking, compare (41) with (42)

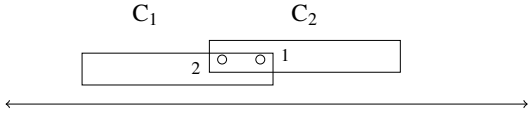
(40) *Overlap = no strict domination = optionality*




(41) *Overlapping scenario, more likely evaluation: $C_1 \gg C_2$*




(42) *Overlapping scenario, less likely evaluation: $C_2 \gg C_1$*

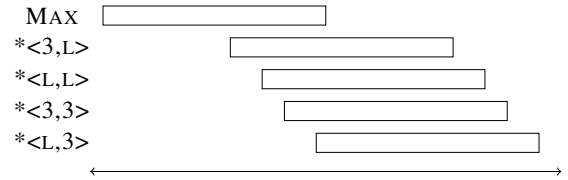



### 4.3 Analysis German

☞ The impoverishment-optimisation of Agree is stochastic

- This means that the constraints making up impoverishment overlap
- i.e. the markedness constraints overlap with the faithfulness constraint
- The relative ranking of the faithfulness constraint determines the language type as a hard (disjoint) constraint, and determines the degree of markedness as a soft (overlapping) constraint, cf. (43)

(43) *Constraint ranking in German on a continuum*




### 4.4 Consequences

- Given that the markedness constraints have a fixed degree of overlap, hard PCC languages are expected to show a significant difference in well-formedness between the grammatical combinations
- For instance, weak PCC languages like Italian, English or Swiss German would show significant differences in acceptability between the grammatical combinations <loc,3> > <3,3> > <loc,loc>, while *<3,loc> is ungrammatical





- This can be tested by translating the questionnaires for the German studies into other languages

## 5 Conclusion

**Empirical claims**

☞ Scalar nature of the PCC: not only strong and weak versions, but also super-strong, giga and zero (and other-strong), following two implicational hierarchies

☞ Hard-Soft variation: German acceptability data reflecting the hard typology

**Theoretical claims**

☞ More powerful mechanism needed to derive the full typology of the PCC: the impoverishment-like optimisation of (the Copy step of) Agree

☞ An account of the PCC in terms of syntactic scale-driven impoverishment of Agree can derive both the full typology of the PCC

☞ and the hard-soft variation by making scale-driven impoverishment stochastic

- Still restrictive: constraints derived by harmonic alignment and local conjunction of feature scales (only 6 possible language types predicted)

## References

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

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

Anagnostopoulou, Elena (2005). Strong and Weak Person Restrictions: A feature checking analysis. In: *Clitic and Affix Combinations*, edited by Heggie Ordoñez and Francisco Ordoñez, Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 199–235.

Anagnostopoulou, Elena (2008). Notes on the Person Case Constraint in Germanic (with special reference to German). In: *Agreement Restrictions*, edited by Roberta D'Alessandro, Susann Fischer, and Gunnar Hrafn Hrafnbjarganson, Berlin/New York: Mouton de Gruyter, pp. 15–47.

Anttila, Arto (1997). Deriving Variation From Grammar. In: *Variation, Change and Phonological Theory*, edited by Frans Hinskens, Roeland van Hout, and Leo Wetzels, Amsterdam: John Benjamins, pp. 35–68.

Arregi, Karlos and Andrew Nevins (2012). Contextual neutralization and the Elsewhere Principle. lingbuzz/001690.

Bhatt, Rajesh and Martin Walkow (2013). Locating Agreement in Grammar: An argument from Agreement in Conjunctions. *Natural Language and Linguistic Theory*, 31, no. 4: pp. 951–1013.

Bierwisch, Manfred (1967). Syntactic features in morphology: general problems of so-called pronominal inflection in german. In: *To honour Roman Jakobson*, The Hague: Mouton, pp. 239–270.

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

Boersma, Paul and Bruce Hayes (2001). Empirical Tests of the Gradual Learning Algorithm. *Linguistic Inquiry*, 32, no. 1: pp. 45–86.

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

Bonet, Eulália (1994). The Person-Case Constraint: A Morphological Approach. *MIT working papers in linguistics*, 22: pp. 33–52.

Borer, Hagit (1984). *Parametric Syntax*. Dordrecht: Foris.

Bresnan, Joan, Shipra Dingare, and Christopher D Manning (2001). Soft constraints mirror hard constraints: Voice and person in English and Lummi. In: *Proceedings of the LFG01 Conference*, pp. 13–32.

Chomsky, Noam (2000). Minimalist Inquiries: The Framework. In: *Step by step*, edited by Roger Martin, David Michaels, and Juan Uriagereka, Cambridge/Mass: MIT Press, pp. 89–155.

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

Doliana, Aaron (2013a). On the Person-Case Constraint: From the Giga to the Zero Version with Copy Impoverishment and Check. Ba thesis, Universität Leipzig.

Doliana, Aaron (2013b). The Super-Strong Person-Case Constraint: Scarcity of Resources by Scale-Driven Impoverishment. In: *Linguistische Arbeitsberichte 90*, edited by Fabian Heck and Anke Assmann, Leipzig: Universität Leipzig, pp. 177–202.

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

Haspelmath, Martin (2004). Explaining the Ditransitive Person-Role Constraint: a usage-based account. *Constructions*, 2.

Hayes, Bruce (2000). Gradient Well-Formedness in Optimality Theory. In: *Optimality Theory: Phonology, Syntax, and Acquisition*, edited by Joost Dekkers, Frank van der Leeuw, and Jeroen van de Weijer, Oxford University Press, pp. 88–120.





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

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

Keine, Stefan and Gereon Müller (2008). Differential Argument Encoding by Impoverishment. In: *Scales*, edited by Marc Richards and Andrej Malchukov, *Linguistische Arbeitsberichte*, vol. 86, Leipzig: Universität Leipzig, pp. 83–136.

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

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

Nevins, Andrew (2007). The Representation of Third Person and its Consequences for Person-Case Effects. *Natural Language & Linguistic Theory*, 25, no. 2: pp. 273–313.

Perlmutter, David (1971). *Deep and surface structure constraints in syntax*. New York: Holt, Rinehart and Winston.

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

Richards, Marc (2008). Defective Agree, Case Alternations, and the Prominence of Person. In: *Scales*, edited by Marc Richards and Andrej Malchukov, *Linguistische Arbeitsberichte*, vol. 86, Leipzig: Universität Leipzig, pp. 137–161.

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

Sorace, Antonella and Frank Keller (2005). Gradience in linguistic data. *Lingua*, 115: pp. 1497–1524.

Vogel, Ralf (2006). Degraded Acceptability And Markedness in Syntax And The Stochastic Interpretation Of Optimality Theory. In: *Gradience In Grammar. Generative Perspectives*, edited by Gisbert Fanselow, Caroline Féry, Matthias Schlesewsky, and Ralf Vogel, Oxford University Press, pp. 246–269.