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The Person Case Constraint, Person Ordering Constraint and Pronominal Clusters in Polish

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This contribution deals with preverbal clusters of deficient pronouns in Polish and combines an empirical study with a theoretical description inspired by Stegovec (2020). Polish pronouns are ill disciplined in comparison with their Slavic equivalents: they do not have a fixed position, they need not cluster together or with person-number auxiliaries and their cluster-internal ordering does not seem fixed (Franks & King 2000). These properties lead many authors to propose that their deficiency is limited mainly to phonology and morphology, while their syntactic distribution is typical for Slavic DPs. We examine preverbal pronominal clusters in a controlled setting and conclude that they show strong regularities in internal orders compatible with Person Case Constraint (PCC). We conclude that Polish shows effects of this constraint in a limited set of cases; deficient pronouns form a heterogenous group, with 1st and 2nd person SG displaying typical properties of deficient pronouns, and 3rd person masculine showing mixed properties of deficient and strong pronouns. This divide contributes to the idiosyncrasy of the pronominal system in Polish and shows that the three-way classification of pronouns in Cardinaletti & Starke (1994) is too coarse.

1 Introduction

Pronominal clitics have been most extensively studied in Romance (Perlmuter 1971; Kayne 1975; 1991; Rizzi 1986; Cardinaletti & Starke 1994; Uriagereka 1995; Sportiche 1996; Roberts 1991; 2010; Adger and Harbour 2010; Preminger 2019; Sheehan 2020; Pescarini 2021; Manzini & Pescarini 2022, etc.). These authors underscore the status of clitics as syntactic heads occupying adverbal positions, predominantly in the T/Inlf area. Multiple occurrences of clitics at T/Infl lead to the formation of the cluster, whose internal order has become a topic of seminal analyses.

1.1 Deficient pronouns

Before we introduce Polish data, let us specify the notion of deficient pronouns. Since the publication of Cardinaletti & Starke (1994), the peeling hypothesis has become popular, on which pronouns can be arranged in three classes showing the following levels of structural deficiency:

(1) a. Strong pronouns $[_{CP}$ C $[_{\Sigma P}$ Σ $[_{IP}$ I $[_{LP}$ …]]]]
b. Weak pronouns $[_{\Sigma P}$ Σ $[_{IP}$ I $[_{LP}$ …]]]
c. Clitic pronouns $[_{IP}$ I $[_{LP}$ …]]

Structural impoverishment of deficient pronouns (weak pronouns and clitics) determines their morpho-syntax:

(2) a. deficient pronouns (pro_{DF}s) cannot: – occur in VP-internal positions;
b. pro_{DF}s cannot occur in peripheral positions;
c. pro_{DF}s cannot be modified/coordinated;
d. pro_{DF}s can refer to both [+/– human] referents;
e. pro_{DF}s must occur in case positions at S-structure;
f. pro_{DF}s can prosodically restructure.

Commonly, the classification in (1) constitutes only a set of guidelines and a point of reference, as concrete examples of pro_{DF}s in particular languages fail to show all the properties expected of a given class, show mixed properties or properties opposite to what is expected.[1] We also treat it as reference and we are not committed to it, and specifically, to the view that structural peeling is a process through which pro_{DF}s have come into existence. In particular, the class of weak pronouns is not as homogeneous as Cardinaletti and Starke would have liked.[2]

[1] Poletto (2006) points out that since clitic pronouns are marked for case, and case is the feature of the DP level, they should be DPs.

[2] As pointed out by a reviewer, Italian *loro* 'to-them' is predicted to be a weak pronoun, yet, although it does not participate in the formation of the cluster (while clitics do) and can follow the lexical verb and sometimes even be separated from it by a low adverb (which clitics cannot), at the same time it moves out of the PP (like clitic pronouns).

Other pronominal classifications are also available. Dechaine & Wiltschko (2002) group pronouns into three categories but along different lines:

(3) a. [D [Φ [N]]]
b. [Φ [N]]
c. [N]

Their criteria include internal syntax (whether they are complex, with elements of D, or simple), distribution (whether they occur in argument or predicate positions), semantic properties (i.e. whether they can function as bound variables) and binding-theoretic status (whether they are subject to Conditions C or B of the Binding Theory of Chomsky 1981). Upon closer scrutiny, Dechaine & Wiltschko classify the English indefinite pronoun *one* as a pro-NP, English 1st and 2nd person pronouns as pro-DPs and English 3rd person pronouns as pro-ΦPs.[3]

A four-way division is proposed for Slavic, and Polish in particular, in Cetnarowska (2003; 2004) and Jung & Migdalski (2019), where a certain class of pronouns straddles the borderline between strong and weak pronouns:

(4) strong (stressed) pronouns > unstressed pronouns > weak pron > clitic pron

Jung & Migdalski (2019) conduct a comprehensive study of pro_{DF}s in Slavic from a diachronic perspective and point to a correlation between the loss of the morphological past tense (aorist) and the loss of pronominal clitics. They submit that certain pro_{DF}s have been subjected to 'degrammaticalization', a shift from X^o, like adverbal clitics in Bulgarian and Macedonian (or Romance languages), to a maximal projection (XP). These gravitate towards the 2nd position (South and West Slavic) or turn to hybrid weak/strong pronouns. Following Jung (2017), they propose the following scale of pronominal deficiency:

(5) Pronouns:
a. [+stress]; [+morphology]; 0 deficiency; strong pronouns;
b. [–stress]; [–morphology]; [+free distribution]; deficient 1;
c. [–stress]; [–morphology]; [–free distribution]; deficient 2; weak pronoun;
d. [–stress]; [–morphology]; [–free distribution]; [–free distribution]; deficient 3; clitic.

This division corresponds to Cetnarowska's in (4) and distinguishes between stressed strong pronouns, unstressed strong pronouns, weak pronouns and clitics, arranged along a declining scale of prominence. We endorse the proposal in (5) and in the ensuing analysis groups (5b–5d)

[3] Polish deficient pronouns belong to the category of ΦPs, a default category for most pronouns; for instance they function as pronominal variables and are subject to Binding Condition B.

are subsumed under the term deficient pronoun (pro_{DF}). In the cases we consider, the deficiency of the pro_{DF} concerns its feature make-up: lack of value for its [π] feature. This deficiency requires the pro_{DF} to undergo movement for feature valuation, while a strong pronoun does not move to value its [iπ] feature.

We adopt the following definition of pro_{DF}s:

(6) Stegovec (2020: 274): I propose specifically: (i) that […] all deficient pronouns (pro_{DF}s) in the sense of Cardinaletti & Starke (1994) (i.e. clitic/weak pronouns), enter the derivation with unvalued [iπ] features and, (ii) that only some functional heads, like v, enter the derivation with valued [uπ] features, (Kratzer 2009; Zanuttini et al. 2012).[4]

In general, pro_{DF}s tend to move out of VP and to the left periphery, while strong pronouns do so to a much lesser degree. The syntactic deficiency driving movement of pro_{DF}s to the left periphery, may be construed in other ways as well. For instance Pescarini (2021: 157–158), adopting the cartographic approach (Rizzi 1997; 2013), argues that the original driving force behind displacement of clitic/weak pronouns in Old Romance was their feature triggering g-topic interpretation. The clitic pronoun used to move as XP to the Wackernagel position (initially, a criterial position for g-topics) through an intermediate landing site in the Infl-area. Subsequently, it underwent reanalysis into an adverbal clitic (X^o) in the Infl-area.

In-depth studies of pronominal clitics in modern Slavic show that, unlike their equivalents in present day Romance, pronominal cliticization in these languages follows two general paths: the adverbal one, where the clitics are heads adjacent to the verb (Bulgarian and Macedonian) and the second position one (exploring the Wackernagel position), where the so-called pronominal clitics (in fact showing properties of maximal projections) occupy the Wackernagel position (Czech, Slovak, Slovenian, Bosnian, Serbian, Croatian and Montenegro). Both types of pro_{DF}s are subject to ordering constraints (Progovac 1993; Tomić 1996; Stjepanović 1998; Franks & King 2000; Bošković 2002; 2004; Migdalski 2006; 2016; 2021; Zubizarreta & Pancheva 2013; Jung & Migdalski 2019; Nevins 2007; Franks 2017; 2020; Pancheva & Zubizarreta 2018; Stegovec 2020, etc.).[5] As we show below, Polish pro_{DF}s behave more like maximal projections than heads.

1.2 Pronominal clusters and the Person Case Constraint

Deficient pronouns tend to cluster in particular positions and show a particular cluster-internal order. The limitation concerns expression of local person on the direct object pronoun; it is determined by presence of local person on the indirect object (the Person Case Constraint):

[4] Kratzer (2009) develops a theory of minimal pronouns, where variable and reflexive pronouns introduced in VP are bereft of ϕ-features at the outset of the derivation and receive them from v that hosts their binder DP in its specifier.

[5] In the context of the hypothesis of Bare Phrase Structure (BPS), Chomsky (1995) uses the example of pronominal clitics as elements which are both minimal and maximal projections (X^o/XP).

(9) Vera mi/ti go predstavi. Blg (Franks 2017)
Vera me/you.SG.OBL him.OBL introduced
'Vera introduced him to me/you.'

(10) *Vera mu me/te predstavi.
Vera him.OBL me/you.SG.OBL introduced
'Vera introduced me/you to him.'

This constraint has been defined in different ways, with a few prominent formulations provided below:

(11) Perlmutter (1970: 230) "Spanish provides evidence for the existence of such nonglobal constraints on clitics. […] If the direct object is third person, the clitic form of the indirect object may be used freely. […] But if the direct object is first or second person and the indirect object is third person, the clitic form of the indirect object cannot be used."

(12) Bonet (1991: 36) on the "me-lui constraint": If DAT then ACC 3rd "This constraint disallows the presence of first or second person agreement with a direct object when there is also dative agreement. This agreement can be carried by agreement morphemes on the verb but also by pronominal clitics of the kind found, for instance, in the Romance languages or the type of weakened pronouns found in languages like English."[6]

(13) Haspelmath (2001: 2) The Ditransitive Person-Role Constraint (DPRC): In combinations of weak pronouns with the roles Recipient and Theme, the Theme pronouns may not be the first or second person.

(14) Person Ordering Constraint (POC), (Stegovec 2020; Franks 2017: 264–265): In a combination of clitic pronouns
a. the last (the lowest one) has to be 3rd person (strong version)
b. if there is 3rd person, it has to be last/lowest (weak version).[7]

In minimalist analyses (Bejar & Rezac 2003; 2009; Anagnostopoulou 2005; Nevins 2007; Franks 2017; 2018; Stegovec 2020; Pancheva & Zubizaretta 2018; Foley & Toosavarandani 2022, etc.), the PCC applies to ditransitive predicates with clitic/weak pronouns.[8] They are defective (in

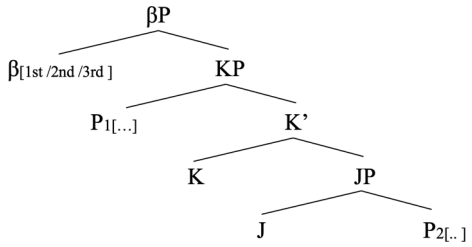
[6] The term Person Case Constraint replaces "me-lui constraint" in Bonet (1994).

[7] Stegovec (2020) repeatedly groups both clitic and weak pronouns as PCC-sensitive elements: Stegovec 2020: 262: "The PCC is traditionally seen as a constraint on co-occurring weak pronominal markers (clitic/weak pronouns and agreement markers); specifically co-occurring direct objects (DO) and indirect objects (IO)". A similar view holding that both clitics and weak pronouns may be sensitive to the PCC is also adopted in Franks (2017; 2018).

[8] Some authors extend the application of PCC to other syntactic contexts. Foley & Toosavarandani (2022) apply it in the context of subject and object clitic clusters in Sierra Zapotec, Bejar & Rezac (2003) and Anagnostopoulou (2005) apply it to the quirky subject construction in Icelandic. Preminger (2019) narrows down the application of the (strong) PCC only to the contexts, where the dative intervenor shows overt agreement with the verb.

lacking independent 1st/2nd person marking) but their deficiency can be repaired by moving them, or linking them via Agree, to a dedicated functional head (Agr/v/Asp), where the 1st /2nd person marking is obtained. The diagram below illustrates an application of PCC, with β as the head where the 1st/2nd person are licensed:

(15)



Pronouns P_1 and P_2 require person marking; they can obtain it via movement to [spec, βP], a position from which they c-command β. Yet, P_1 and P_2 do not stand equal chances, as P_1 c-commands P_2 and is closer to β. Syntactic operations such as Move or Agree are subject to locality constraints, favoring minimal operations (Relativized Minimality of Rizzi 1990, Minimal Link Condition of Chomsky 1995, Agree of Chomsky 2001). P_1 wins the competition against P_2 and obtains the 1st /2nd person marking by moving to [spec, βP]. When P_2 relates to β, β's person features are already used up by P_1, so P_2 cannot obtain 1st/2nd person marking and its person marking is reduced to the 3rd person, a default value. P_2 is clearly underprivileged in this context. If P_1 is dative and P_2 accusative, this derivation leads to effects visible in (9–10).

Although not all languages that have pronominal clitics force clitic clustering, specifically in constructions involving climbing, the formation of the cluster is a strong tendency.[9] Particular languages respect PCC slightly differently; below two most frequent varieties are illustrated, the strong PCC and the weak PCC (Pancheva & Zubizarreta 2018: 1306–1309):

(16) a. El director, me l' ha recomanat la Mireia. Catalan (strong PCC)
the director, 1SG 3SG.ACC has recommended the Mireia
'As for the director, Mireia has recommended him to me.'

b. *Al director, me li ha recomanat la Mireia.
to the director, 1SG 3SG.DAT has recommended the Mireia
'As for the director, Mireia has recommended me to him.'

c. *Te' m van recomanar.
2SG 1SG have recommended
'They recommended you to me.'

[9] Sheehan (2020) uses the example of the ECM constructions in French to show that causative constructions allow for embedded subject clitics to form clusters with main verb object clitics only when both domains form a single phase (Chomsky 2001).

(17) a. El te me recomendó (a mí). Spanish (weak PCC variety)
he 2SG 1SG recommend (to me)
'He recommended you to me.'
'He recommended me to you.'

b. *Me le recomendaron.
1SG 3SG.DAT recommend
'They recommended me to him.'

In languages/varieties with strong PCC the direct object must be 3rd person, while in the languages/varieties allowing for weak PCC, the direct object can be 1st or 2nd person if the indirect object is 1st or 2nd person.[10]

If a given language has pro_{DF}s but its pronominal clusters do not obey any variant of the PCC, such pronouns tend to be described as deficient phonologically and morphologically but not syntactically. Polish was said to provide an example of such a circumstance.

2 Idiosyncrasies of Polish pronouns

Polish has two series of pronouns: strong and weak/clitic (e.g. Nagórko 1996; Grzegorczykowa et al. 1998; Saloni & Świdziński 1985; Siewierska 2013), presented in **Figure 1**.

number	person.gender	ACC		GEN		DAT	
		strong	**weak**	**strong**	**weak**	**strong**	**weak**
SG	1P	mnie	*mię	mnie		mnie	**mi**
	2P	ciebie	**cię**	ciebie	**cię**	tobie	**ci**
	3P.M	jego	**go**	jego	**go**	jemu	**mu**
	3P.F	ją		jej		jej	
	3P.N	je		jego		jemu	**mu**
PL	1P	nas		nas		nam	
	2P	was		was		nam	
	3P.VIR	ich		ich		im	
	3P.NON-VIR	je		ich		im	

Figure 1: Polish strong/weak pronouns.

In general, Polish pro_{DF}s do not follow either recognized Slavic pattern: syntax-wise, they appear in multiple preverbal positions or immediately follow the verb.[11] Many authors endorse

[10] Apart from the strong and the weak PCC, there are other variants, reviewed in Nevins (2007) and Franks (2020).

[11] A reviewer observes that in contrastive focus contexts pro_{DF}s can be separated from the verb on the right with an adverb:

their idiosyncratic distribution (Dyła 1983; Rappaport 1988; Kraska-Szlenk 1993; 1995; Witkoś 1998; Franks and King 2000; Migdalski 2006; 2016; 2021; Cetnarowska 2003; 2004; Franks 2017; 2020).

2.1 Pronominal clusters

Franks & King (2000) assume that Polish pro_{DF}s are phonological enclitics that show syntactic distribution common to other DPs, although they also optionally appear in post- and preverbal clusters similar to South and West Slavic (Franks & King 2000: 156):[12]

(18) PARTICLES > BY > AUX > DAT > REFL > ACC > GEN > INST
1st and 2nd person pronouns tend to precede other enclitic pronouns, while 3rd person pronouns tend to follow them.

This remark reflects the gist of Person Ordering Constraint (POC).

The fact, that both pro_{DF} orders are acceptable in (19), was taken by Franks & King to indicate that Polish does not observe PCC:

(19) a. ??Pokazali *mu* *cię* wczoraj.
showed.3P.VIR him.DAT you.SG.ACC yesterday
'They showed him you yesterday.'

b. Pokazali *cię mu* wczoraj.

In (19a) the ACC pronoun is 2nd person and it follows a 3rd person DAT, violating both PCC/POC in (10–13). The order in (19b) observes POC, as the local 2nd person precedes the non-local 3rd person but it violates PCC. If PCC/POC is regarded as condition on the representation at spell-out, then its inapplicability to Polish is a logical conclusion.

(i) Widzieliśmy wczoraj **go** w kinie a nie w teatrze.
saw-1PL yesterday him-ACC in Cinema but not in theater
'We saw him yesterday in the cinema but not in the theater.'

We judge (i) as border-line and hasten to report that neither (i) nor any such example (V-Adv-pro_{DF}-XP) can be found in the corpus (NKJP, National Corpus of the Polish Language).

[12] Franks & King (2000: 162) enumerate properties of Polish pro_{DF}s:

(i) pro_{DF}s appear immediately after the verb plus verbal clitics, or in any position a scrambled noun phrase can otherwise appear (other than initial);
(ii) verbal clitics precede pro_{DF}s, but the two groups need not cluster together;
(iii) pro_{DF}s ordering is not rigid;
(iv) pro_{DF}s appear freely as arguments of deverbal nouns.
(v) the system of Polish clitics is in a state of flux.

Cetnarowska (2003; 2004) credits the composition of clusters to various factors and explicitly claims that Polish disregards PCC:

(20) Dałbym mu cię za żonę bez wahania.
give.COND.1P.M.SG him.DAT you.SG.ACC for wife without hesitation
'I would give you to him for a wife without hesitation.'

For her, (20) is grammatical because the cluster is not placed in the pre-pausal position and it is right-adjacent to the inflected verb. The order within the cluster violates PCC, as in (19a). Cetnarowska's conclusion, also adopted and highlighted in Haspelmath (2004), is that PCC does not hold of Polish. Her argument is valid with respect to the canonical PCC, seen as a condition on the representation at spell-out but it becomes weaker if PCC is a condition applying intra-derivationally and subsequently obscured by reordering.

Following Aissen (1999) and Haspelmath (2001), Cetnarowska captures data concerning orders of pro_{DF}s through harmonic alignment of different scales:

(21) a. Person scale: Local person (1st, 2nd) > Non-local person (3rd)
b. Thematic Hierarchy:
Agent > Beneficiary > Experiencer/Goal > Instrument > Patient/Theme > Locative
c. Discourse/conceptual prominence scale: X > x [X-more prominent]
Topic > Non-topic
d. Prosodic (PF-relevant) constraints.

Harmonic alignment of deficient pronouns strongly prefers the order where local dative pronouns (more prominent) precede non-local accusative pronouns.

Cetnarowska observes that auxiliary and weak pronominals fall into two sub-groups with respect to the amount of phrase stress they can bear.[13] The weakest elements (reflexive *się* and auxiliary clitics *-ście*, *-śmy*) do not carry stress at all, while the stronger ones (pronominal *mu*, *jej*, *go* and conditional *by*) can carry secondary or tertiary stress. Cetnarowska proposes that *cię* be added to the set of weaker elements. She claims that a diagnostic for the strength of the clitic comes from its ability to support AUX clitics. Cetnarowska shows that while *cię* cannot support AUX clitic *-śmy* in (13), the stronger pro_{DF} *mu* supports *-ś* in (12):

(22) Naprawdę mu-ś dokuczył. vs. Naprawdę mu dokuczyłeś.
really him.DAT-2P.SG annoyed.M vs. really him.DAT annoyed.2P.M.SG
'You really annoyed him.'

[13] In this respect Cetnarowska relies on Kraska-Szlenk (1993; 1995).

(23) *Wczoraj cię-śmy widzieli w kinie. vs. Wczoraj cię
yesterday you.SG.ACC-1P.PL saw.M in cinema vs. yesterday you.SG.ACC
widzieliśmy w kinie.
saw.1P.VIR in cinema
'We saw you in the cinema yesterday.'

On the basis of an informal poll, we add the 1st person DAT *mi* and the 2nd person DAT *ci* to the same group as *cię*:

(24) *Wczoraj mi-ś dał prezent. vs. Wczoraj mi dałeś
yesterday me.SG.DAT-2SG gave.M present vs. yesterday me.SG.DAT gave.2SG.M
present.
present
'You-SG.masc gave me a present yesterday.'

(25) *Wczoraj ci-śmy dali prezent. vs. Wczoraj ci daliśmy
yesterday you.SG.DAT-1PL gave.M present vs. yesterday you.SG.DAT gave.1PL.M
prezent.
present
'We-masc gave you a present yesterday.'

In sum, four categories of pronominal elements emerge in the prosody sensitive classification: the weakest ones cannot accept any degree of prosodic highlighting (*mi* '1P.DAT', *ci* '2P.DAT', *cię* '2.P.ACC' plus person/number agreement AUX *-ś* '2P.SG, *-śmy* '1P.PL', *-ście* '2P.PL') and *się* REFL, the 'stronger' pro_{DF}s can accept secondary stress (*mu* '3.SG.M.DAT', *go* '3.SG.M.ACC' plus the conditional auxiliary *-by* 'would') and the strong pronouns, which can either bear full word and phrase stress or secondary stress (*was* 'you.2nd PL.ACC', *jego* 'him.ACC', *ją* 'her.ACC, etc.).

(26) Cetnarowska (2004: 50)
strong (stressed) pronouns > unstressed pronouns > weak pron > clitic pron
WAS [+stress] was [-stress] go się

This four-way distinction is also confirmed in Jung & Migdalski (2019). On the assumptions above, the prosodic pattern of Polish impacts the order in the cluster:

(27) (2 0)(1 0) 0 (2)
a. Przedstawiłem cię jej. (2nd ACC > 3rd DAT)
introduced.1SG.M you.SG.ACC her.DAT
'I introduced you to her.'

(2 0)(1 0) 2 (0)

b. ?Przedstawiłem jej cię. (3rd DAT > 2nd ACC)
introduced.1SG.M her.DAT you.SG.ACC
'I introduced you to her.'

Example (27a) sounds better with *jej* '3.F.DAT' bearing secondary stress in the final position than (27b) due to Selkirk's (1995) observation that unstressed function words at the end of the prosodic domain should be penalised. At the same time the universal thematic (case) hierarchy in (21b) favours the DAT > ACC order in (27b). It apparently loses out to the prosodic condition. Yet, it seems, not every pronominal cluster is relevant for PCC, (Cetnarowska 2003: 12):

(28) a. Przecież cię jej przedstawiłem.
but you.ACC her.DAT introduced.M

b. Przecież jej cię przedstawiłem.
but her.DAT you.ACC introduced.M
'But I did introduce you to her.'

The strong pronoun (*jej* 'her.DAT') is placed in highlighted and destressed positions, used in isolation and individually modified. It also topicalizes/scrambles across the boundary of the subjunctive clause. It is thus different from pro_{DF}s and it is the ordering of pro_{DF}s only, that contributes to the discussion of PCC, destressing is not enough. We focus on pro_{DF}s which have morphologically-marked strong counterparts, see (17): 1DAT.SG (*mi*), 2DAT.SG (*ci*), 2ACC.SG (*cię*), 3DAT.SG.ms (*mu*) and 3ACC.SG.ms (*go*).

This section outlines idiosyncrasies of Polish pro_{DF}s. Four conclusions come to the fore. First, Polish pro_{DF}s show ill-disciplined distribution, distinct from the clitic-second position and the adverbal position.[14] Second, pro_{DF}s still show some residue of special syntax, i.e. they tend to be right-adjacent to the verb. Third, there is a partition within the class of deficient pronouns between 1st and 2nd pronouns and 3rd person masculine pronouns, with the latter able to accommodate secondary stress and the former unable to show any individual highlighting. This distinction is relevant not only for the phonological and morphological properties but also for syntax. Fourth, an arrangement of deficient pronouns in which 3rd ms. DAT precedes 2nd ACC in (19–20) flouts PCC on the assumption that this constraint is representational and applies at the surface.

[14] Their distribution causes problems for any analysis holding that clitic/weak pronouns uniformly target a unique position in the clause (e.g. Sportiche 1996).

2.2 Research questions

In view of the discussion above, we formulated research questions helping determine the status of pro_{DF} clusters in Polish. First, we check if the cluster is sensitive to the local person – 3rd person distinction. If it is, then the cluster-internal order is driven by the PCC to some extent. Second, we check if the cluster allows for both members to be local persons and if so, in what order they preferably appear (1st – 2nd and 2nd – 1st). This is a diagnostics for weak PCC. Third, we check for the case order preference; to what extent the DAT- ACC order is fixed and whether it is alternated with local and non-local persons to the same extent. More specific questions pertaining to the experiments are detailed below.

3 Experiment

3.1 The logic of the design

Our experiment was designed to test acceptability of pro_{DF} clusters in Polish to determine if they show acceptability patterns predicted by the PCC/POC. As discussed in previous section, we selected five deficient pronouns to be tested in our experiments which make up 5 clusters presented in **Figure 2**. Since we tested all five clusters in two orders, DAT-ACC and ACC-DAT, the figure presents compatibility of all cluster options with the PCC/POC. The predictions of the PCC presented in the left column are the same for both pronoun orders. As for the POC, for DAT-ACC order (left column), the predictions of this constraint align with those of the PCC. For ACC-DAT order (right column), POC provides a different set of predictions than PCC, as shown. Note that here, we take PCC and POC as they are defined in (11) and (13) respectively, so as purely observational constraints, not as syntactic rules, which would make us commit to specific theory-internal assumptions, depending on the syntactic incarnation of these rules.

Importantly, depending on the nature of PCC and POC and the approach one takes on grammaticality, we would expect different levels of unacceptability caused by violation of these rules. In a traditional sense, violation of core syntactic rules should result in categorical unacceptability (ungrammaticality, e.g., Adger 2003).[15] However, syntactic constraints such as PCC/POC could possibly have a gradable effect, whereby incompatibility should result in milder unacceptability.[16] Such gradient acceptability can be potentially modeled via gradient grammar (e.g., Keller 2000; Sorace & Keller 2005; Featherston 2007). Yet, as one of the reviewers points out, gradience in acceptability of our clusters could also be attributed to discourse/processing

[15] In fact, in the context of linguistic judgements, the term acceptability rather than grammaticality should be used, with the former being behavioral and the latter, a mental concept (Myers 2009).

[16] This is more probable in view of an ongoing psycholinguistic research which tends to show that a number of syntactic rules, e.g., island constraints (Hofmeister & Sag 2010; Liu et al. 2022), do not incur categorical unacceptability.

effects. We test this hypothesis in Exp3 and, as we explain in the discussion section, discourse effects partially account for lower acceptability of only some of our clusters, while the rest of the effects we obtained is due to person constraints.

cluster (DAT-ACC order)	**PCC/POC**		**ACC-DAT order**	**POC**	
	weak	strong		weak	strong
1P.DAT – 2P.ACC *mi cię*	✓	*	2P.ACC – 1P.DAT *cię mi*	✓	*
1P.DAT – 3P.ACC *mi go*	✓	✓	3P.ACC – 1P.DAT *go mi*	*	*
2P.DAT – 3P.ACC *ci go*	✓	✓	3P.ACC – 2P.DAT *go ci*	*	*
3P.DAT – 2P.ACC *mu cię*	*	*	2P.ACC – 3P.DAT *cię mu*	✓	✓
3P.DAT – 3P.ACC *mu go*	n/a	n/a	3P.ACC – 3P.DAT *go mu*	n/a	n/a

Figure 2: The list of pro_{DF} clusters in Polish and their compatibility with weak/strong PCC and POC.

Since a comparison of all 5 clusters within one paradigm could compromise the naturalness and plausibility of the sentence materials, we divided the clusters into 3 sub-experiments, called Exp1, Exp2, and Exp3. **Figure 3** presents the summary of variables used in all experiments. Exp1 and Exp2 were based on two binary variables (2 × 2, pronoun cluster and pronoun order) while Exp3 was built on one variable (pronoun order).

	Pronoun cluster	*Pronoun order*
Exp1	1P.DAT – 2P.ACC *mi cię* vs. 1P.DAT – 3P.ACC *mi go*	DAT-ACC vs. ACC-DAT
Exp2	2P.DAT – 3P.ACC *ci go* vs. 3P.DAT – 2P.ACC *mu cię*	DAT-ACC vs. ACC-DAT
Exp3	3P.DAT – 2P.ACC *mu go*	DAT-ACC vs. ACC-DAT

Figure 3: A summary of variables used in Exp1–3.

In the next section, we present the materials used in all three sub-experiments.

3.2 Materials and survey construction

Each participant completed a survey of 84 sentences: 30 experimental items and 54 fillers which were pseudorandomized to avoid the same condition appear in succession. Each participant rated 3 tokens of each condition to avoid the risk of noise and increase the statistical power of the analysis. The survey included experimental items of all 3 experiments described above. For Exp1 and Exp2, we created 12 lexically matched sets (of 4 conditions) each, and for Exp3 we created 6 such sets (of 2 conditions). The items were distributed across 4 experimental lists

using a Latin square procedure so that participants saw a unique lexical item in each condition. Each list included 12 items of Exp1, 12 items of Exp2 and 6 items of Exp3 (3 items per condition in each case), which sums up to 30 experimental items in total. Since Exp3 included only 2 conditions, its items were distributed into 2 experimental lists and were copied to the other 2 lists, which means that there were two times more observations per condition for Exp3 than Exp1–2.

Exp1 included experimental sentences with clusters 1P.DAT – 2P.ACC *mi cię* and 1P.DAT – 3P.ACC *mi go* in two orders DAT-ACC and ACC-DAT. To facilitate the processing and understanding of the target sentences, a context sentence (typically a question) with referents for the pronouns was provided for each item in the survey. Importantly, the context questions were neutral in terms of information structure, and they did not impose any specific pronoun order. Experimental items in Exp1 included verbs which take DAT and ACC object, namely *polecić* (recommend), *opisać* (describe), *pokazać* (show), *zarekomendować* (recommend), *przypomnieć* (remind), *obrzydzić* (make disgusting), *zasłonić* (conceal), *przynieść* (bring), *sprowadzić* (bring), *przywiać* (bring over), *przedstawić* (introduce), *powierzyć* (entrust). Since we had to keep the animacy of the pronoun referents the same (DAT-animate, ACC-animate), the selected verbs had to be compatible with two animate objects, which limited our choices, see (29)–(30).

(29) 1P.DAT – 2P.ACC *mi cię*

context sentence

A: Skąd dowiedziałeś się o moich usługach naprawczych?
where you-learned self about my services repair
'Where did you learn from about my repair services?'

target sentence

B: Agnieszka mi cię /cię mi poleciła.
Agnieszka to-me you /you to-me recommended
'Agnieszka recommended you to me.'

(30) 1P.DAT – 3P.ACC *mi go*

context sentence

A: Skąd dowiedziałeś się o usługach naprawczych Marka?
where you-learned self about services repair of-Marek
'Where did you learn from about Marek's repair services?'

target sentence

B: Agnieszka mi go /go mi poleciła.
Agnieszka to-me him /him to-me recommended
'Agnieszka recommended him to me.'

Exp2 included sentences with clusters 2P.DAT – 3P.ACC *ci go* and 3P.DAT – 2P.ACC *mu cię* in two orders DAT-ACC and ACC-DAT with a context sentence. Similarly to Exp1, materials in Exp2 included double object verbs, namely *przedstawić* (introduce), *przyprowadzić* (bring over), *pokazać* (show), *zachwalać* (praise), *narysować* (draw), *zaprezentować* (present), *wytatuować* (tattoo), *dodać* (add), *wykraść* (steal), *przeznaczyć* (predestine), *przytrzymać* (hold), *przydzielić* (allocate). Also in this experiment, verbs had to be compatible with two animate objects, see (31)–(32).

(31) cluster 2P.DAT – 3P.ACC *ci go*

context sentence

A: Jak to się stało, że Bartek jest teraz w moim zespole?
how this self happened that Bartek is now in my team
'How come that Bartek is in my team now?'

target sentence

B: Szefowa ci go /go ci przekazała.
boss to-you him /him to-you handed
'The boss handed him over to you.'

(32) cluster 3P.DAT – 2P.ACC *mu cię*

context sentence

A: Jak to się stało, że jestem teraz w zespole Bartka?
how this self happened that I-am now in team of-Bartek
'How come that I'm in Bartek's team now?'

target sentence

B: Szefowa mu cię /cię mu przekazała.
boss to-him you /you to-him handed
'The boss handed you over to him.'

Exp3 included sentences with one cluster 3P.DAT – 2P.ACC mu go in two orders DAT-ACC and ACC-DAT, with a context sentence. Since in this experiment, there was no animacy restriction on pronoun referent (no 1/2P pronouns), we used double object verbs which are compatible with animate DAT object and inanimate ACC object, to introduce more variation to our experimental items. Importantly, we did not include animacy as a variable in any of the experiments and in Exp1–2, we used only same animacy referents for pronouns (animate) to avoid any potential effect it might have on the order of pronouns. However, since animacy effects are typically found for nouns that are inherently marked as animate/inanimate, we did not predict pronouns (that only refer to animate/inanimate nouns) to show the same effect. Thus, although in Exp3 different animacy referents were used, we believe it did not affect the ratings (see discussion in 3.6.2). We used the following verbs: *pożyczyć* (lend), *sprzedać* (sell), *dostarczyć* (deliver), *ukraść* (steal), *przynieść* (bring), *kupić* (buy), see (33).

(33) cluster 3P.DAT – 2P.ACC *mu go*

context sentence

A: Słyszałaś o zagubionym telefonie Piotra?
you-heard about lost mobile of-Piotr
'Have you heard that Peter lost his mobile phone?'

target sentence

B: Tak, ale podobno ktoś mu go /go mu ukradł.
yes but probably someone him it /it him stole
'Yes, but I've heard that somebody stole it from him.'

Filler sentences consisted of 15 acceptable, 15 unacceptable, and 24 unrelated sentences. The acceptable/unacceptable fillers included various pronouns (strong pronouns, plural pronouns etc.), and in some cases, also pronoun clusters, but unacceptability was not related to the use of pronouns/clusters, as we aimed to mask the purpose of the experiment. Also, acceptable/unacceptable fillers served as accuracy control, i.e., it was used to potentially exclude participants whose accuracy was too low. The unrelated fillers consisted of simple sentences without pronouns. All filler sentences were provided with a context sentence, see (34)–(36).

(34) ungrammatical filler

context sentence

A: Czy tata kupił ci na urodziny ten samochód hybrydowy?
if dad bought you for birthday this car hybrid
'Did dad buy you this hybrid car for birthday?'

target sentence

B: *Nie, tego hybrydowego nie mi go kupił samochodu.
no this hybrid not me it bought car

(35) grammatical filler

context sentence

A: Czy ktoś z was zna może Ewę z działu księgowości?
if someone from you knows maybe Ewa from office accountant
'Does any of you know Ewa from the accountant's office?'

target sentence

B: Tak, ja miałam z nią spotkanie w zeszłym tygodniu.
yes I had with her meeting in last week
'Yes, I had a meeting with her last week.'

(36) unrelated filler

context sentence

A: Kto przywitał wujka Antka podczas wczorajszego obiadu?
who greeted uncle Antek during yesterday's dinner
'Who greeted uncle Antek during yesterday's dinner?'

target sentence

B: Agnieszka przywitała wujka Antka.
Agnieszka greeted uncle Antek
'Agnieszka greeted uncle Antek.'

3.3 Predictions

3.3.1 Predictions: experiment 1

In Exp1 we compared clusters 1P.DAT – 2P.ACC *mi cię* and 1P.DAT – 3P.ACC *mi go.* Although both these clusters conform to PCC, each obeys its different version. Namely cluster 1P.DAT – 2P.ACC *mi cię* obeys weak PCC and violates strong PCC while cluster 1P.DAT – 3P.ACC *mi go* obeys both strong and weak PCC. Comparing acceptability of these two clusters in DAT-ACC order could therefore indicate which of the versions of PCC/POC make better predictions for Polish clusters.

Prediction 1: There should be a difference between 1P.DAT – 2P.ACC *mi cię* and 1P.DAT – 3P.ACC *mi go* clusters (in DAT-ACC order) with *mi cię* being less acceptable if strong PCC/POC holds. If Polish clusters are subject to weak PCC/POC, there should be no difference in acceptability between the two clusters.

Furthermore, we tested acceptability of the two clusters in reverse ACC-DAT to verify the predictions of the two versions of POC constraint. While the reverse 2P.ACC – 1P.DAT *cię mi* obeys weak POC but violates strong POC, the cluster 3P.ACC – 1P.DAT *go mi* violates both weak and strong POC.

Prediction 2: There should be a difference between 2P.ACC – 1P.DAT *cię mi* and 3P.ACC – 1P.DAT *go mi* clusters (in ACC-DAT order) with *go mi* being less acceptable if weak POC holds while there should be no difference between the two if strong POC holds (both should be unacceptable).

Prediction2 may be confounded by the difference between the pro_{DF} *cię* 2P.ACC and the pro_{DF} *go* 3P.ACC discussed in the previous section. Since the former, but not the latter, is claimed to be structurally deficient and incapable of bearing secondary stress, the cluster 2P.ACC – 1P.DAT

cię mi could be rated as less acceptable than 3P.ACC – 1P.DAT *go mi,* assuming that the ACC-DAT order is derived by a discourse/phonotactic-sensitive scrambling of the ACC pronoun over the DAT pronoun.

Additionally, in Exp1 we wanted to test the validity of predictions made by POC for ACC-DAT order clusters. For cluster 2P.ACC – 1P.DAT *cię mi*, POC (weak/strong) predicts that it should be as acceptable as the DAT-ACC *mi cię*. For 3P.ACC – 1P.DAT *go mi* cluster, POC (weak/strong) predicts it to be less acceptable than DAT-ACC *mi go*.

Prediction 3: There should be an interaction between pronoun cluster and pronoun order, such that the effect of order is significant only for the 1P.DAT – 3P.ACC *mi go* cluster (ACC-DAT being less acceptable than DAT-ACC) but not for the 1P.DAT – 2P.ACC *mi cię* cluster (both orders equally acceptable), if POC makes the right predictions for the reordered clusters.

3.3.2 Predictions: experiment 2

In Exp2, we compared clusters 2P.DAT – 3P.ACC *ci go* and 3P.DAT – 2P.ACC *mu cię*. In DAT-ACC order, only the first cluster obeys (weak/strong) PCC/POC, so we should expect higher ratings for it as compared to the 3P.DAT – 2P.ACC *mu cię* cluster. Here, the weak and strong PCC/POC make the same predictions, so we were not concerned with this distinction.

Prediction 4: If any version of the PCC/POC holds, we expect a difference between 2P.DAT – 3P.ACC *ci go* and 3P.DAT – 2P.ACC *mu cię* in DAT-ACC order with the former being more acceptable than the latter.

Like in Exp1, we also wanted to test the validity of POC for ACC-DAT order. While 2P.ACC – 3P.DAT *cię mu* obeys (weak/strong) POC, the 3P.ACC – 2P.DAT *go ci* does not.

Prediction 5: If (weak/strong) POC holds, we expect a difference between 2P.ACC – 3P.DAT *cię mu* and 3P.ACC – 2P.DAT *go ci* in ACC-DAT order with the former being more acceptable than the latter.

Just like in Exp1, the two clusters used here differ in the type of ACC pronoun, namely 2P.ACC *cię* and 3P.ACC *go*, with the former being structurally more deficient than the latter. Thus, if scrambling of ACC pronoun across the DAT is more problematic for 2P.ACC *cię* than 3P.ACC *go*, this could affect the ratings of the *cię mu* cluster.

Finally, just like in Exp1, we wanted to check if POC is the constraint that best captures acceptability of reordered clusters. ACC-DAT order cluster *go ci* does not obey this constraint while ACC-DAT *cię mi* does, and the opposite holds for their DAT-ACC counterparts w.r.t. the PCC/POC.

Prediction 6: If (weak/strong) POC holds for ACC-DAT orders, we expect a difference between DAT-ACC and ACC-DAT order for 2P.DAT – 3P.ACC *ci go* (with DAT-ACC being more acceptable) and also for 3P.DAT – 2P.ACC *mu cię* (but with ACC-DAT order being more acceptable).

3.3.3 Predictions: experiment 3

In Exp3, we included only one cluster, 3P.DAT – 2P.ACC *mu go* and we tested its acceptability in two orders. Since this cluster is not subject to any of the person constraints and the ACC pronoun is structurally rich enough to undergo discourse/phonotactic-sensitive scrambling, our goal was to detect the size of the basic effect of pronoun order (DAT-ACC vs. ACC-DAT). If scrambling adds to cluster's complexity and needs to be discourse-licensed, we would expect ACC-DAT order to be less acceptable than the DAT-ACC order. If this prediction is borne out, we will include pronoun order effect into our consideration of the factors that affect acceptability of ACC-DAT clusters.

Prediction 7: There should be a significant effect of pronoun order with DAT-ACC being more acceptable than ACC-DAT if scrambling contributes to acceptability.

3.4 Participants and procedure

Our survey was completed by 59 participants, all of whom are students at the Faculty of English, Adam Mickiewicz University in Poznań. In exchange for completing the survey, participants received credit points required for the 'WA experiments' course. For all participants mean accuracy was calculated based on their ratings for acceptable/unacceptable fillers. Namely, incorrect responses for ungrammatical fillers included ratings between 4–7, and for grammatical fillers, ratings between 1–4. Out of 59 participants, 3 were excluded in order to balance the number of participants per experimental list. The choice of participants to be excluded was based on their mean accuracy, i.e. one participant with 87% accuracy and 2 participants with 90% accuracy were excluded. This resulted in a total of 56 participants, whose mean accuracy was 97%, mean age 21.5, SD = 1.55 (42 women, 12 men, 1 non-binary, 1 undisclosed).

The experiment was administered online using Google Forms. Each sentence and its context were presented on their own presentation screen together with a scale from 1 to 7 (1 – *całkowicie nieakceptowalne* 'completely unacceptable', 7 – *całkowicie akceptowalne* 'completely acceptable'). The context sentence and the experimental item were presented in a form of a dialog between speakers A and B. The participants were instructed to rate acceptability of B's response alone, without making any judgements as to whether the response is a plausible answer to the question/context. The instruction made it clear that the A's utterance is only to facilitate the understanding of the B's response and in principle, the two should be plausibly connected. Since we wanted to control for the effect of context on pronoun order, we decided to provide

a fixed discourse-neutral context for each sentence. The participants were to rate the sentence by clicking on a bullet with the corresponding number (1–7). An example trial is presented in **Figure 4** together with a short instruction that accompanied each trial. The full instruction given to participants at the beginning of the survey is provided in the Appendix.

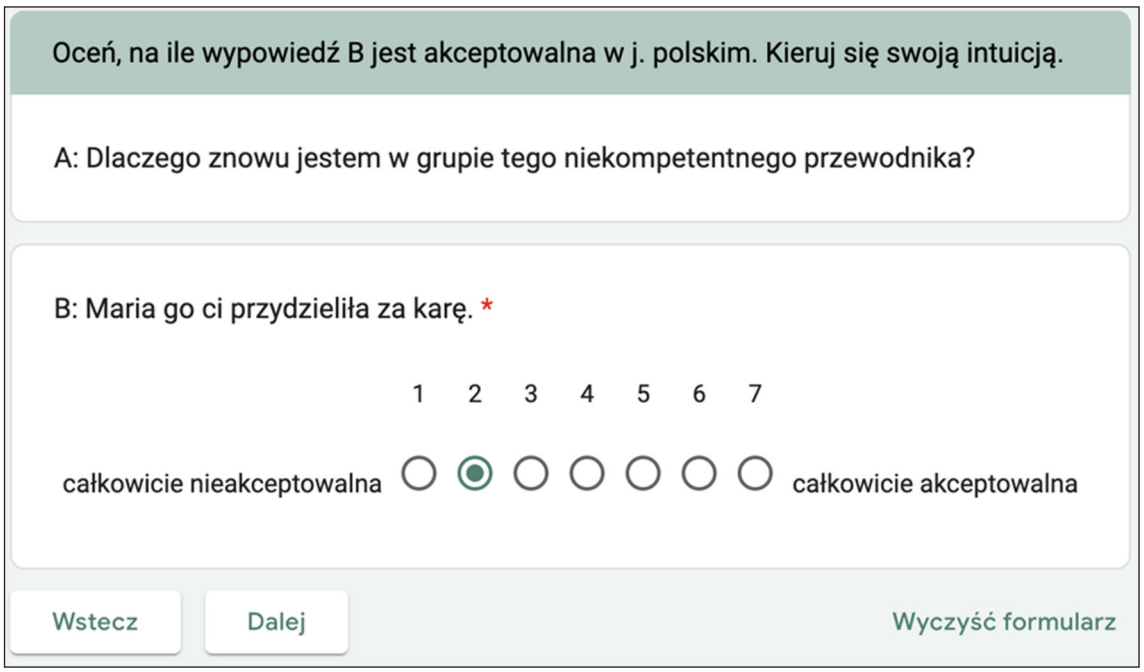


Figure 4: An example experimental trial with a short instruction which translates to "Rate how acceptable the Polish sentence in B is. Follow your intuition".

3.5 Results

3.5.1 Analysis

The results of all three experiments were analyzed in R (R Core Team 2013). Due to the ordinal nature of Likert ratings, we analyzed the raw Likert data in a cumulative link mixed effect model (CLMM, using the package ordinal, Christensen 2013). This is because CLMMs have been shown to more accurately model inter-item relations in ordinal scales, at the same time avoiding participants' response bias (e.g., Taylor et al. 2022). The model included random intercepts and slopes for pronoun cluster and pronoun order by both subject and item. We implemented sum contrast coding for the person cluster and person order predictors, where the intercept represents the grand mean. For Exp1 and Exp2, we performed planned pairwise comparisons using package emmeans with Tukey adjustment.

3.5.2 Results: experiment 1

The results obtained in Exp1 yielded a significant main effect for pronoun cluster and pronoun order. Overall, cluster 1P.DAT – 3P.ACC *mi go* was rated higher than the cluster 1P.DAT – 2P.ACC *mi cię* ($z = -4.318$, $p < 0.001$) and the pronoun order DAT-ACC was rated higher than ACC-DAT ($z = -7.088$, $p < 0.001$). Also, a significant interaction was found for pronoun cluster and pronoun order ($z = -2.077$, $p = 0.038$). Pairwise comparisons showed that ACC-DAT order was rated significantly lower than DAT-ACC in both clusters, 1P.DAT – 3P.ACC *mi go* ($z = -5.250$, $p < 0.001$) and 1P.DAT – 2P.ACC *mi cię* ($z = -7.089$, $p < 0.001$). Also, cluster 1P.DAT – 3P.ACC *mi go* was rated significantly higher than 1P.DAT – 2P.ACC *mi cię* in ACC-DAT order ($z = -6.164$, $p < 0.001$), but not in DAT-ACC order ($z = -1.215$, $p = 0.617$). **Figure 5** presents the proportion of ratings per condition. We indicate significant effects with (*) and no effect with ( ).

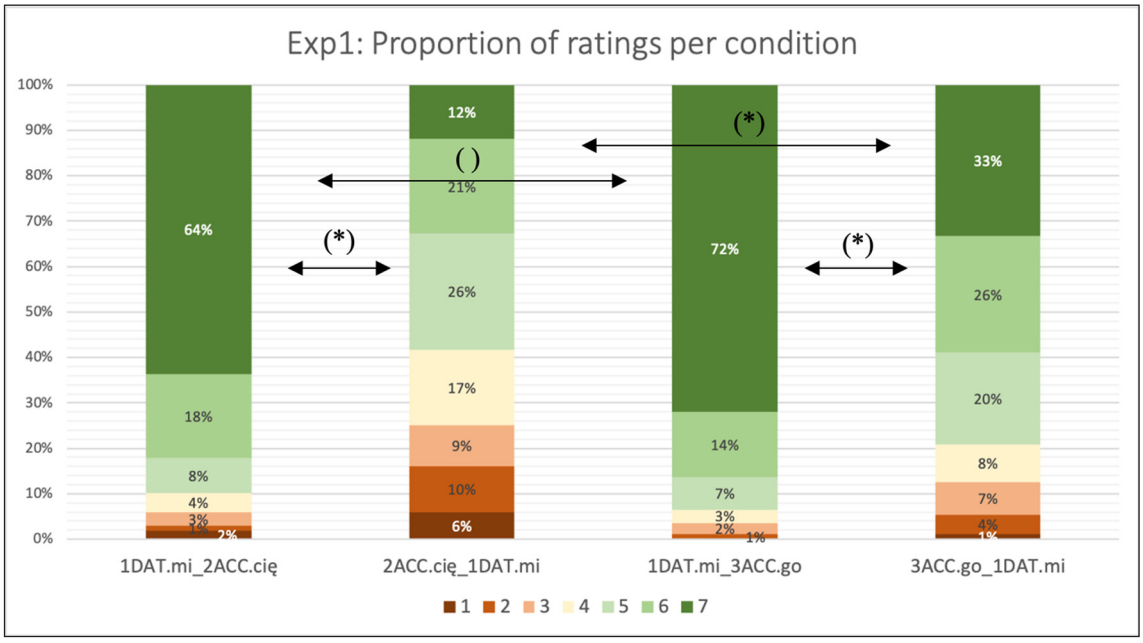


Figure 5: Proportion of ratings per condition in Exp1.

3.5.3 Results: experiment 2

In Exp2, a significant effect was found for both pronoun cluster and pronoun order. Generally, cluster 2P.DAT – 3P.ACC *ci go* was rated higher than 3P.DAT – 2P.ACC *mu cię* ($z = 2.688$, $p = 0.007$) and DAT-ACC order was rated higher than ACC-DAT ($z = -5.462$, $p < 0.001$). Also, a significant interaction was found for pronoun cluster and pronoun order ($z = -2.045$, $p = 0.041$). Pairwise comparisons showed that ACC-DAT order was rated significantly lower than DAT-ACC in

cluster 2P.DAT – 3P.ACC *ci go* ($z = -5.496$, $p < 0.001$) but not in cluster 3P.DAT – 2P.ACC *mu cię* ($z = -2.279$, $p = 0.103$). Also, cluster 2P.DAT – 3P.ACC *ci go* was rated significantly higher than 3P.DAT – 2P.ACC *mu cię* in DAT-ACC order ($z = 2.843$, $p = 0.023$), but not in ACC-DAT order ($z = 1.548$, $p = 0.409$). Additionally, the results showed no significant difference between 2P.DAT – 3P.ACC *ci go* in ACC-DAT order and 3P.DAT – 2P.ACC *mu cię* in DAT-ACC order ($z = -0.478$, $p = 0.964$). We present the proportion of ratings in **Figure 6**.

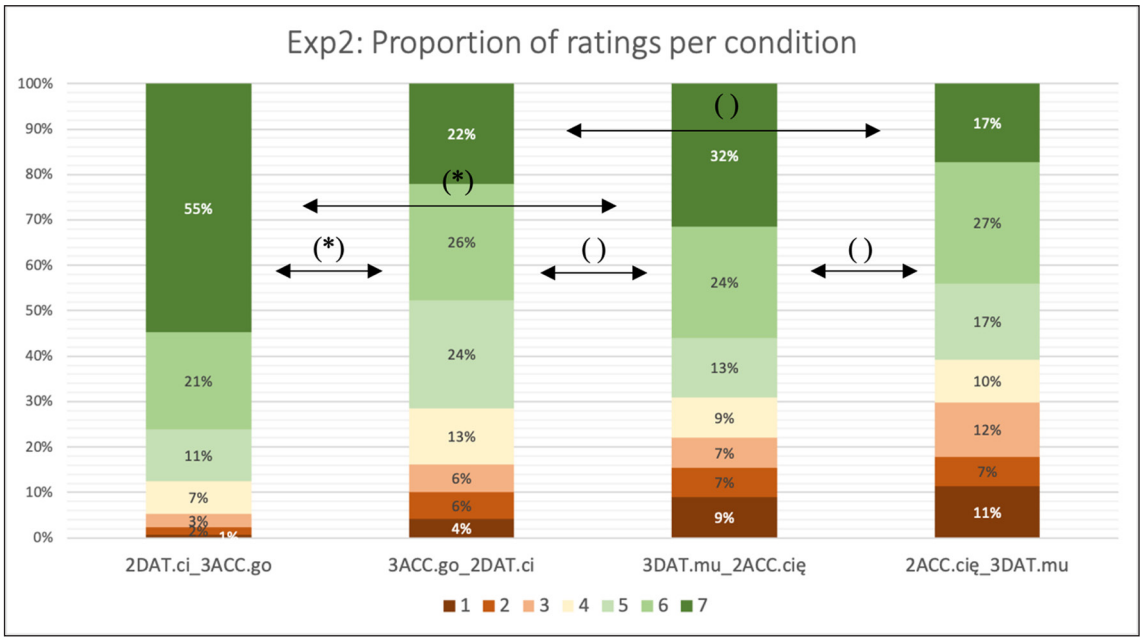


Figure 6: Proportion of ratings per condition in Exp2.

3.5.4 Results: experiment 3

A significant effect of pronoun order was obtained in Exp3, namely DAT-ACC order was rated higher than ACC-DAT ($z = -6.768$, $p < 0.001$). We present the proportion of ratings in **Figure 7**.

3.6 Discussion of the results

3.6.1 Descriptive data

Based on descriptive results of EXP1–3, we identify tree degrees of pronoun cluster acceptability, represented in **Figure 8**, where mean scores and medians are provided for each cluster in both orders. The green highlight marks fully acceptable clusters (with mean rating between 6–7 and median 7), the light green highlight marks still acceptable but degraded clusters (mean between 5–6, median 5–6) and the orange highlight marks marginally acceptable clusters (mean 4–5, median 5). Generally, clusters in DAT-ACC order belong to the first group, with the exception of cluster 3DAT-2ACC *mu cię*. The second group comprises clusters in ACC-DAT order except clusters

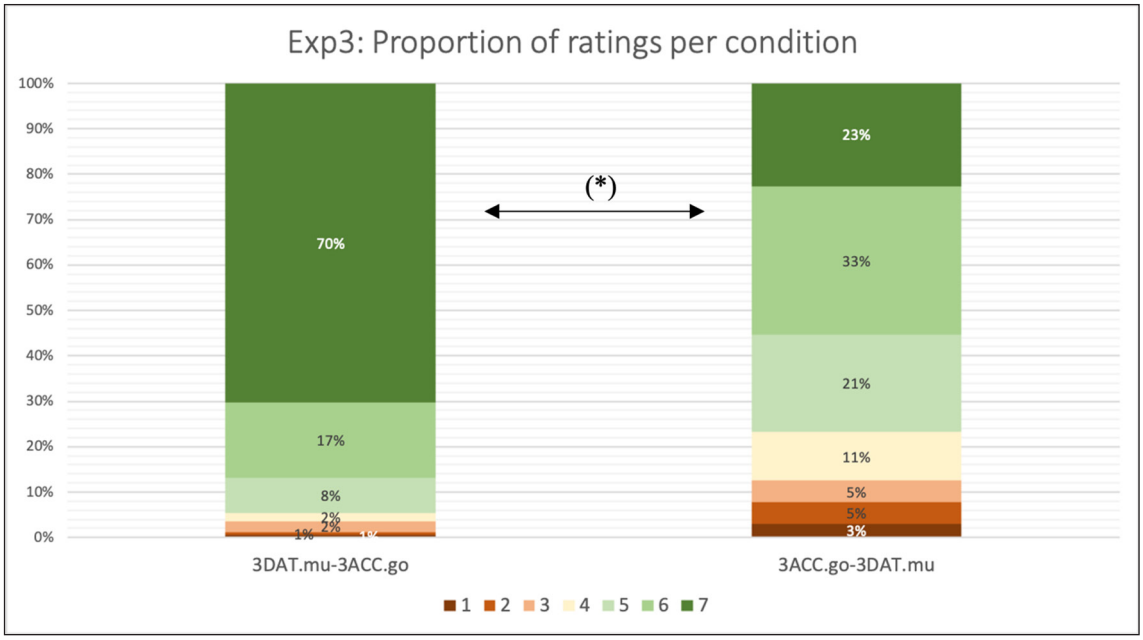


Figure 7: Proportion of ratings per condition in Exp3.

with 2ACC pronoun *cię*, and plus a 3P.DAT –2P.ACC *mu cię* cluster. The lowest rated group consists of clusters with 2ACC pronoun *cię* in ACC-DAT order. These results show that clusters following basic DAT-ACC order and abiding by weak PCC are fully acceptable, while those PCC-incompatible (3P.DAT – 2P.ACC *mu cię*), are only slightly degraded. Also, their scrambled ACC-DAT counterparts are rated as slightly degraded, but when the ACC pronoun involves 2ACC *cię*, a more deficient weak pronoun, those ratings are even lower and make the clusters only marginally acceptable.

EXP 1			**EXP 2**			**EXP 3**		
pronoun order	mean	median	pronoun order	mean	median	pronoun order	mean	median
1DAT-2ACC *mi cię*	6,25	7	2DAT-3ACC *ci go*	6,10	7	3DAT-3ACC *mu go*	6,46	7
2ACC-1DAT *cię mi*	4,56	5	3ACC-2DAT *go ci*	5,11	5	3ACC-3DAT *go mu*	5,32	6
1DAT-3ACC *mi go*	6,47	7	3DAT-2ACC *mu cię*	5,10	6			
3ACC-1DAT *go mi*	5,52	6	2ACC-3DAT *cię mu*	4,63	5			

Figure 8: Summary of means and medians for EXP1–3.

3.6.2 Discussion of statistical results

All 3 experiments yielded main effect of pronoun order, with DAT-ACC order more acceptable than ACC-DAT. This effect was also obtained in EXP 3, where the person constraint did not play a role since it included only 3DAT – 3ACC. Interestingly, only EXP 3 used animate DAT and inanimate ACC referents for pronouns, which potentially may have contributed to the preference of DAT-ACC (animate-inanimate) order. As mentioned before, this effect, if present, would not be a typical animacy effect since here the referents (in the context sentence) are marked for animacy and not the pronouns themselves. As for the result, if animacy was a strong predictor for pronoun order, we would expect a much stronger effect, alongside the preference for DAT-ACC order (i.e., ACC-DAT in Exp3 should be rated lower than it was compared to Exp1–2). Since we did not observe that, we attribute the effect of pronoun order mainly to the preference for DAT-ACC, leaving the potential effect of animacy on pronoun order for future consideration.

Prediction 7–conclusion: Scrambling to ACC-DAT order alone affects acceptability.

This result, coupled with the descriptive results shown above suggests that lower acceptability of all ACC-DAT clusters can also be due to scrambling and may not be related to person ordering.

In EXP1, we did not observe any statistical difference between the clusters 1P.DAT – 3P.ACC *mi go* and 1P.DAT – 2P.ACC *mi cię* in DAT-ACC order and they were rated as acceptable. This suggests that if Polish is subject to PCC rule, it observes its weak version.

Prediction 1–conclusion: Polish DAT-ACC clusters are not subject to strong PCC, but may be subject to weak PCC.

For ACC-DAT order, cluster 3P.ACC – 1P.DAT *go mi* was rated significantly higher than the cluster 2P.ACC – 1P.DAT *cię mi*. This result cannot be explained either by the weak or the strong POC, since the former predicts 3P-1P ordering to be less acceptable than 2P – 1P, while the latter predicts both to be equally unacceptable.

Prediction 2–conclusion: Neither weak nor strong POC holds for reordered clusters.

This result, however, can be explained if we assume the categorization of pro_{DF}s in Polish proposed in Cetnarowska (2003; 2004), according to which 2ACC *cię* pronoun is structurally more deficient and hence, cannot move excessively, which could degrade acceptability of *cię mi* cluster.

The interaction between pronoun order and pronoun cluster showed that ACC-DAT order was rated lower than DAT-ACC in both clusters, although to a different degree (the effect was stronger for 1P.DAT – 2P.ACC *mi cię* cluster, as discussed above) which is the opposite to what POC predicts for reordered clusters. This further strengthens the previous conclusion.

Prediction 3–conclusion: POC does not hold for reordered clusters.

As for Exp2, in DAT-ACC order, cluster 2P.DAT – 3P.ACC *ci go* was rated significantly higher than 3P.DAT – 2P.ACC *mu cię*. This result was expected if 3P.DAT – 2P.ACC *mu cię* cluster violates (weak/strong) PCC/POC. Combined with the results from Exp1, we can conclude that DAT-ACC clusters obey weak PCC.

Prediction 4–conclusion: Polish DAT-ACC clusters are subject to weak PCC

Still, *mu cię* cluster was rated just as acceptable as the scrambled 3P.ACC – 2P.DAT *go ci* cluster, which means that 3P.DAT – 2P.ACC *mu cię* cluster is not ruled out by PCC and suggests that this is a preference constraint. Also, it could potentially mean that derivational complexity of *mu cię* is akin to the one of scrambled ACC-DAT clusters.

The fact that in ACC-DAT order, cluster 2P.ACC –3P.DAT *cię mu* was the same as 3P.ACC – 2P.DAT *go ci* cluster contradicts the predictions made by the (weak/strong) POC, namely that *cię mu* cluster should be rated as more acceptable.

Prediction 5–conclusion: POC does not hold for reordered clusters.

Although no statistical difference was obtained here, descriptive data suggest that scrambling of 2ACC *cię* may be less acceptable than scrambling of 3ACC *go*, partially accounting for lower acceptability of *cię mu* cluster as compared to *go ci* cluster.

Although EXP2 yielded similar results with respect to pronoun order as EXP1, namely ACC-DAT order was rated as less acceptable overall, the interaction and further post hoc tests revealed that this effect was significant only in 2P.DAT – 3P.ACC *ci go* cluster but not for 3P.DAT – 2P.ACC *mu cię* cluster. This, again, contradicts the POC predicted acceptability, where ACC-DAT *go ci* cluster should be worse than its DAT-ACC order, and ACC-DAT *cię mu* cluster better than its DAT-ACC order. This result additionally confirms the previous conclusion.

Prediction 6–conclusion: POC does not hold for reordered clusters.

Interestingly, unlike all other clusters in this experiment, 3P.DAT – 2P.ACC *mu cię* cluster is the only one that was not affected by pronoun order variable, i.e., both orders were equally marginally acceptable. Since we assume, based on Exp3 result, that the ratings for ACC-DAT are lower at least partially due to reordering, and *cię mu* cluster is reordered, we would expect it to be rated lower. Also, this cluster involves 2ACC *cię* pronoun, which is potentially more difficult to move across the DAT (see Exp1), so the ratings should be even lower. Our descriptive data

do show that *cię mu* cluster is rated lower, but this was not significant in the statistical analysis. An alternative explanation could be that the pronoun order effect in this cluster is evened by some repair mechanism in syntax. Considering that this is the only cluster that violates PCC, its exceptional acceptability pattern must be related to a different syntactic licensing of this cluster.

4 Theoretical foundations for pronominal clitic placement

Our mechanics of pro_{DF} ordering in Polish stems from Stegovec (2020) and Franks (2017; 2020).

Generally, Slovenian shows PCC-compatible clitic clusters in the second position in the clause, with DAT pronouns preceding ACC pronouns. (Stegovec 2020: 264–265):

(37) a. Mama {mi / ti / mu} ga bo predstavila. IO > DO
Mom 1P.DAT/2P.DAT/3P.M.DAT 3P.M.ACC will introduce
'Mom will introduce him to me/you/him.'

b. *Mama mu {me / te } bo predstavila. IO > DO
Mom 3P.M.DAT 1P.ACC/2P.ACC will introduce
'Mom will introduce me/you to him.'

Both DAT – ACC and ACC – DAT orders are fine, depending on discourse factors.[17] The DAT – ACC order is primary, the ACC – DAT order is less frequent and called reverse. This pattern is also regulated by a reverse version of PCC: the second, DAT, pro_{DF} comes as 3rd person:

(38) a. Mama {me / te / ga} mu bo predstavila. DO > 3P.IO
Mom 1P.ACC/2P.ACC/ 3P.M.ACC 3P.M.DAT will introduce
'Mom will introduce me/you/him to him.'

b. *Mama ga {mi / ti } bo predstavila. *3P.DO > 1P/2P.IO
Mom 3P.M.ACC 1P.DAT/2P.DAT will introduce
'Mom will introduce him to me/you.'

The reverse PCC leads Stegovec to consider PCC as a derivational constraint, determined by Agree and intervention effects.[18] He assumes that pro_{DF}s enter the derivation with unvalued,

[17] See the reverse order below, a reviewer observes that it is subject to dialectal variation:

(i) Mama mu ga je opisala.
Mom 3rdM.DAT 3rdM.ACC is described.F
(ii) Mama ga mu je opisala.
Mom 3rdM.ACC 3rdM.DAT is described.F

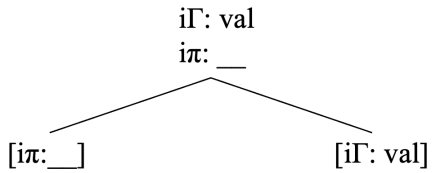
[18] Bejar & Rezac (2003: 53–54) propose that PCC results from intervention; v bears two unvalued probes, [π] and [#]. The [π] probe on v matches [π] on DAT, yet Agree cannot take place, as DAT bears inherent case (assigned by P). Thus the [π] probe on v remains unvalued and obtains a default value, equivalent to 3rd person:

but interpretable, [iπ] features. Convergence requires that they must either have these features valued, or surface with default 3rd person.[19] The value for the [_iπ] feature is obtained through Agree (Chomsky 2001; 2013) with v bearing an uninterpretable valued [π] feature and an uninterpretable unvalued number feature:[20]

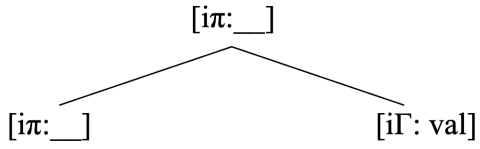
(39) v: [uπ: val; uΓ:_]

Stegovec (2020: 290) proposes the following internal feature composition for pronouns:

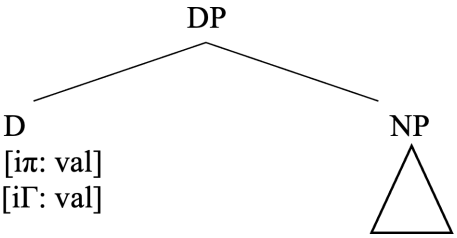
(40) a. clitic pronouns:



b. weak pronouns:



c. strong pronouns:



Strong pronouns in (40c) are self-sufficient, as D is the locus of the [π] feature value, so the strong pronoun is not subject to PCC. Both (40a) and (40b) result from a merger of two heads but they differ in significant respects. The clitic in (40a) consists of two heads, which project together, yielding a feature bundle and sharing the features, very much like the Infl node in the late GB system sharing Tense and Agreement before Pollock (1989). The weak pronoun in (40b)

(i) v° DAT ACC
π π = 3 π = 2/3
= SG # = PL

[19] Stegovec assumes the PLC, after Bejar & Rezac (2003: 53):

(i) The Person Licensing Condition (PLC): An interpretable 1st/2nd person feature must be licensed by entering into an Agree relation with a functional category.

[20] Stegovec (2020) follows Pesetsky & Torrego (2007), where features are [+/– interpretable] and [+/– valued].

also results from a merger of two heads but here, one head, the probe bearing [_π], projects and takes the head bearing Γ as its complement. Thus the weak pronoun contains a complex object with two heads bearing separate features. This implies that the weak pronoun constitutes a maximal projection and moves as one.

Furthermore, pro_{DF}s are arranged asymmetrically in the high applicative projection, where IO c-commands DO:

(41) $[_{vP}$ v $[_{ApplP}$ IO Appl $[_{VP}$ V DO]]]

PCC arises due to the following assumptions:

(42) a. A pro_{DF} has unvalued [iπ] features that must be valued before spell-out;
b. An unvalued [π] can get a value either: (i) via Agree with a valued [π], or (ii) by getting a default 3rd person if valuation via Agree is impossible.

Here is a derivation involving pro_{DF}s with the structure in (40b) in the canonical order:

(43) $[_{vP}$ v $[_{ApplP}$ IO Appl $[_{VP}$ V DO]]]
[π, Γ_] [π_], [Γ] [π_], [Γ]

While v^o is one head bearing two probes, pro_{DF}s have separate heads bearing probes for person and number features, with the former being interpretable but unvalued and the latter interpretable and valued. As the probe must c-command the goal, first the [Γ_] probe on v^o accesses the closest goal, the IO pro_{DF} in situ. The pro_{DF} also bears an unvalued [π_] probe which causes IO pro_{DF} to move to [spec,v] to c-command v^o (this step reflects the claim in Bošković 2007 that unvalued probes actively search for goals through movement to phase edges):

(44) $[_{vP}$ IO v $[_{ApplP}$ ~~IO~~ Appl $[_{VP}$ V DO]]]
[π:val], [Γ] [π, Γ:val] [π_], [Γ]

Now the unvalued π-feature of the IO pro_{DF} c-commands its valued equivalent on v^o. The feature value of the goal is copied onto the probe. At this point the relevant stage of the derivation could finish; the DO pro_{DF} remains in situ, its [π_] unvalued and defaulting to 3rd person. Yet another alternative opens up. Following Agree, the features of the goal may optionally not delete and remain active for another Agree:[21,22]

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[21] Bošković (1999) submits that multiple wh-movement in Bulgarian requires C as active goal after the formation of the first specifier.

[22] Stegovec (2020) follows Anagnostopoulou (2005), where the Weak PCC is accounted for by a parametrized Multiple Agree (Hiraiwa 2001):

(45) [$_{vP}$ IO [$_{v'}$ DO v [$_{ApplP}$ ~~IO~~ Appl [$_{VP}$ V ~~DO~~]]]]
[π:val], [Γ] [π:val], [Γ] [π, Γ:val]

The [π_] forces DO pro$_{DF}$ to move to a position from which it c-commands the goal. Because here two pro$_{DF}$s value their features against the same head, the second movement tucks in the DO. This allows it to minimally c-command v^{o} in (45), otherwise IO would intervene. This option leads to the weak PCC; the [π] of the goal is shared by both the IO and DO.

Furthermore, Stegovec (2020: 283–284) treats π-person features as composed of sub-atomic properties, in line with the privative approach to features of Harley & Ritter (2002) and Bejar and Rezac (2009), and he takes the 1st person and the 2nd person to share the sub-atomic property of Part (for Participant), with 1st person, also including AUTH (for author). Significantly, the 3rd person does not include PART but the most basic [π, person] sub-atomic element. The scenario for the Weak PCC described above and based on non-deletion of the features of the goal, applies only when [uπ] on v includes PART. Its non-deletion on the first instance of Agree produces the Weak PCC and its deletion after the first Agree produces a regular 1st/2nd person – 3rd person order. The impossibility of 3rd person – 1st /2nd person orders derives from the fact that in such a derivation [u π] on v lacks PART from the very beginning; it cannot be copied onto any probe on pro$_{DF}$, either through the first or second Agree. This scenario only licenses the 3rd person – 3rd person clusters.

In order to subsume both canonical (DAT – ACC) and reverse (ACC – DAT) clusters under the PCC, Stegovec proposes that grammars of the languages that allow for the latter order employ a parametric option of switching the positions of pro$_{DF}$s below v. In Slovenian ACC pro$_{DF}$s can move above DAT pro$_{DF}$s to form another specifier of ApplP:[23]

(46) [$_{vP}$ v [$_{ApplP}$ DO [$_{Appl'}$ IO Appl [$_{VP}$ V ~~DO~~]]]

The reverse order of pro$_{DF}$s causes ACC pro$_{DF}$ to become closer to the v head, and DAT pro$_{DF}$ to default to 3rd person, see (38).

Unexpectedly the order of pro$_{DF}$s following imperatives is random:

(47) a. Predstavi mu me!
introduce.IMP 3P.M.DAT 1P.ACC

b. Predstavi me mu!
introduce.IMP 1P.ACC 3P.M.DAT
'Introduce me to him!'

(i) A Condition on Multiple Agree: Multiple Agree can take place only under non-conflicting feature specifications of the agreeing elements ([+/–person]). (Anagnostopoulou 2005: 220–221).

[23] Movements targeting the same head observe the 'tucking-in' requirement of Richards (1998) but the switching of pronouns within ApplP is leap-frogging.

(48) a. Predstavi mi ga!
introduce.IMP 1P.DAT 3P.M.ACC
b. Predstavi ga mi!
introduce.IMP 3P.M.ACC 1P.DAT
'Introduce him to me!'

The paradigm above leads Stegovec to propose that the order of pro_{DF}s at spell-out is determined by two types of language-specific reorderings of the canonical IO > DO pro_{DF}s:

(49) a. pro_{DF}s reordering in the domain of v; this leads to reverse PCC effects.
b. pro_{DF}s reordering in the domain above vP: […] if an object clitic reordering after [π]-valuation can apply freely on top of an underlying canonical/reverse PCC alternation, we predict patterns where IO > DO and DO >IO clitic orders can alternate without any person restrictions (Stegovec 2020: 303).

Postulate (49) highlights the derivational character of PCC; pro_{DF}s meet PCC at some stage of a convergent derivation. In certain languages the configuration in which the π-features of pro_{DF}s are valued shows at spell-out but in others it is obscured by further reordering.

Next, we apply these mechanics to Polish.

5 Polish clusters of pro_{DF}s as a residue of PCC

In this section we analyse the results of our experiment. We start with the least problematic cases of the orders showing the highest degree of acceptability and proceed down the scale to the less acceptable ones.

We submit that the distribution of Polish pro_{DF}s in clusters results from two major factors: (a) the mechanics of PCC satisfaction and (b) the four-way division of pronouns in (4–5). We adopt the following arrangement of pro_{DF}s at input:

(50) $[_{vP}$ v $[_{ApplP}$ IO Appl $[_{VP}$ V DO]]]
[π, Γ_] [π_], [Γ] [π_], [Γ]

The four-way division of pronouns in (5) highlights differences between 1st/2nd SG pronouns and 3rd ms.SG pronouns. We submit that the former move in the frame of (50) only for π-feature valuation. Movement for another reason is possible but it severely impacts acceptability. As the 1st/2nd SG pro_{DF} have impoverished structure, they cannot be moved beyond the vP (they do not scramble). The 3rd ms.SG pronouns have less impoverished internal structure, bear secondary stress, so they can move beyond vP (scramble).

The derivations involving *mi – go /ci – go*, the orders of highest acceptability, correspond to (50) straightforwardly. The IO pro_{DF} (with unvalued π-features but valued number and gender features) is in [spec, ApplP], while the DO pro_{DF} is the complement of V. The IO pro_{DF} plays a dual role: its π-features require valuation by v, while its number and gender features are goals for features on v. The valuation of the latter takes place in situ. Next, in line with Bošković (2007), an unvalued π-feature of IO pro_{DF} acts as probe, which propels the movement of IO pro_{DF} to [spec,vP], a position c-commanding the $v_{\{val\ \pi\}}$ goal. At this stage, the value of v (1st /2nd person in the cases at hand) is copied onto the IO pro_{DF}, see (53). Subsequently, DO pro_{DF} tucks in below IO and has its [π] restricted to 3rd person, see (54). Alternatively, the DO pro_{DF} remains in situ and bears a default [π] setting:

(51) $[_{vP}\ v_{\{val\ \pi\}}\ [_{ApplP}\ IO_{\{\pi\}}\ [Appl\ [_{VP}\ V\ DO_{\{\pi\}}]]]]$

(52) $[_{vP}\ IO_{\{val\ \pi\}}\ [_{v'}\ v_{\{\sout{val}\ \pi\}}\ [_{ApplP}\ \sout{IO}_{\{\pi\}}\ [Appl\ [_{VP}\ V\ DO_{\{\pi\}}]]]]]$

(53) $[_{vP}\ IO_{\{val\ \pi\}}\ [_{v'}\ DO_{\{\pi\}}\ [_{v'}\ v_{\{\sout{val}\ \pi\}}\ [_{ApplP}\ \sout{IO}_{\{\pi\}}\ [Appl\ [_{VP}\ V\ \sout{DO}_{\{\pi\}}]]]]]$

The clusters involving *mi – go /ci – go* orders involve the most optimal derivations from the perspective of the cluster formation scenario.

The fully acceptable order of pro_{DF}s involving 1st and 2nd SG indicates that pronominal clusters in Polish observe the weak PCC constraint:

(54) On mi cię przedstawił już dawno.
he me.DAT you.SG.ACC introduced already long time ago
'He introduced me to you already long time ago.'

As in the previous derivation, IO pro_{DF} functions as goal for the [Γ] probe on v in situ but valuation of its own [π] probe against v requires movement:

(55) $[_{vP}\ v_{\{val\ \pi;\ val\ \Gamma\}}\ [_{ApplP}\ IO_{\{\_\pi\}\{val\ \Gamma\}}\ [Appl\ [_{VP}\ V\ DO_{\{\_\pi\}\{val\ \Gamma\}}]]]]$

(56) $[_{vP}\ IO_{\{val\ \pi\}\{val\ \Gamma\}}\ [_{v'}\ v_{\{val\ \pi;\ val\ \Gamma\}}\ [_{ApplP}\ \sout{IO}_{\{\_\pi\}\{val\ \Gamma\}}\ [Appl\ [_{VP}\ V\ DO_{\{\_\pi\}\{val\ \Gamma\}}]]]]]$

Now probe [π] c-commands the goal and its value of [π] is copied. The value contains subatomic PART, common for both 1st and 2nd person. In this derivation the value of the [π] feature on v may be copied multiple times. Next, DO pro_{DF} moves to have its [π] valued, tucks in and minimally c-command the goal. It copies its value of [π] onto DO as well:

(57) $[_{vP}\ IO_{\{val\ \pi\}\{val\ \Gamma\}}\ [_{v'}\ DO_{\{val\ \pi\}\{val\ \Gamma\}}\ [_{v'}\ v_{\{\sout{val}\ \pi;\ val\ \Gamma\}}\ [_{ApplP}\ \sout{IO}_{\{\pi\}\{val\ \Gamma\}}\ [Appl\ [_{VP}\ V\ \sout{DO}_{\{\_\pi\}\{val\ \Gamma\}}]]]]]]$

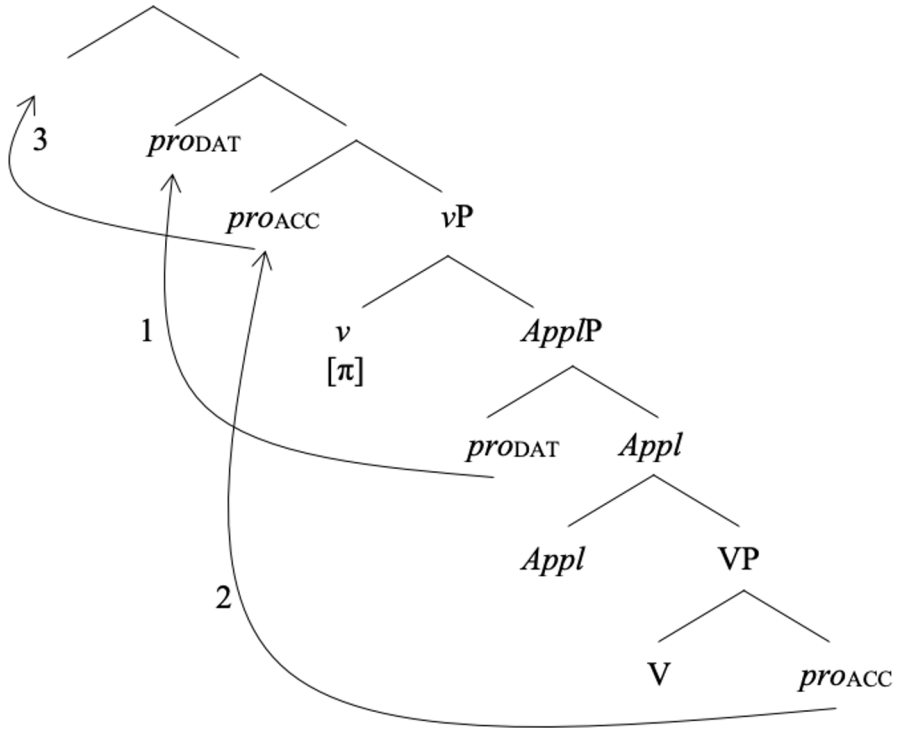
The order between pro_{DF}s 1st DAT – 2nd ACC complies with the weak PCC and is also rated high by the subjects in our empirical study.

We now turn to the clusters judged as less acceptable. The orders 3rd msc.ACC – 1st DAT (*go – mi*) and 3rd msc.ACC – 2nd DAT (*go – ci*) are rated lower in our study, (5.52) and (5,11) respectively. We attribute their lower score to derivational complexity, specifically to the scrambling of the ACC pro_{DF} above vP, after PCC is met. As we showed in connection with (22–25), 3rd person DAT and ACC pro_{DF}s seem to be less structurally deficient, so they can move outside the vP domain. Thus the derivation of (58–59) involves an extra step, where the 3rd msc. ACC moves across the DAT pro_{DF} to a specifier of some head above vP (step 3 in diagram 60). This movement is not related to π-feature licensing but driven by either information structure or phonotactic considerations.:

(58) $[_{vP}\ IO_{\{val\ \pi\}}\ [_{v'}\ DO_{\{\pi\}}\ [_{v'}\ v_{\{\sout{val}\ \pi\}}\ [_{ApplP}\ \sout{IO}_{\{\pi\}}\ [Appl\ [_{VP}\ V\ \sout{DO}_{\{\pi\}}]]]]]$

(59) $[_{XP}\ DO_{\{\pi\}}\ X\ [_{vP}\ IO_{\{val\ \pi\}}\ [_{v'}\ \sout{DO}_{\{\pi\}}\ [_{v'}\ v_{\{\sout{val}\ \pi\}}\ [_{ApplP}\ \sout{IO}_{\{\pi\}}\ [Appl\ [_{VP}\ V\ \sout{DO}_{\{\pi\}}]]]]]]$

(60)



The option of pro_{DF} scrambling (movement above vP) is not available to the 2nd SG pro_{DF}, as its movement unrelated to π-feature licensing is strongly penalised, see the score of 4,56 for (*cię – mi*) above. We attribute this fact to the maximally impoverished morpho-structure of 1st/2nd SG

pro$_{DF}$s. In terms of (1b), their ΣP layer is defective.[24] Thus 1st/2nd SG pro$_{DF}$s preferably move only for π-feature licensing in the domain of v:[25]

(61) a. Pokazali mu cię wczoraj.
showed him.DAT you.SG.ACC yesterday
'They showed 'im you [mju] yesterday.' Intended: 'They showed you to him'

b. Pokazali cię mu wczoraj.
showed you.SG.ACC him.DAT yesterday
'They showed you to him yesterday.'

Ex. (61a) is exactly the opposite to what the PCC provides for. It also violates POC, because the 3rd person pro$_{DF}$ linearly precedes the 2nd person pro$_{DF}$. (61b) respects POC but still violates PCC.

These derivations involve two steps provided in (49): either only a pronominal switch below v (in 61b) or both, a pronominal switch below v and scrambling above vP (in 61a). The derivation of (61b) involves a reverse PCC: the DO pro$_{DF}$ moves across the IO pro$_{DF}$ to form outer [spec, ApplP]:

(62) $[_{vP}\ v_{\{val\ \pi\}}\ [_{ApplP}\ DO_{\{\pi\}}\ [IO_{\{\pi\}}\ [Appl\ [_{VP}\ V\ \eth\Theta_{\{\pi\}}]]]]]$

After this switch DO pro$_{DF}$ is closer to the [π] goal in v. It moves to [spec, vP], probes and has its [_π] features valued first:

(63) $[_{vP}\ DO_{\{val\ \pi\}}\ [_{v'}\ v_{\{\sout{val}\ \pi\}}\ [_{ApplP}\ \eth\Theta_{\{\pi\}}\ [IO_{\{\pi\}}\ [Appl\ [_{VP}\ V\ \eth\Theta_{\{\pi\}}]]]]]$

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[24] There are two reasons to keep the ΣP layer in the representation of 1st and 2nd SG pro$_{DF}$s. One follows from Stegovec (2020): if they were pure X^0 clitics, Polish should show strong PCC effects and combinations of 1st – 2nd person pro$_{DF}$s should be ungrammatical, contrary to what we show above. The second reason comes from Włodarczyk (2018: 65), who provides evidence from the corpus (NKJP) that *mi* 'me', when used outside the cluster, may appear in clause-initial positions of topic and positions of focus:

(i) ja zawsze piłam mocna herbatę z cukrem no ale nie zawsze mi pomagało
I always drank strong tea with sugar well but not always me helped
'I always drank strong tea with sugar but it did not always help me.'

a **mi** przeważnie pomaga herbata z miodem.
and me typically helps tea with honey
'and tea with honey typically helps me.'

Prescriptive grammar of Polish would have predicted the strong pronominal form *mnie* 'me' in (i). We leave this issue for further research.

[25] As Franks (2020) notes in fn. 12, the order in (61a) is not preferred by Polish speakers he polled, while Migdalski accepts it without reservations, finding (61b) degraded. We concur with Migdalski's judgements.

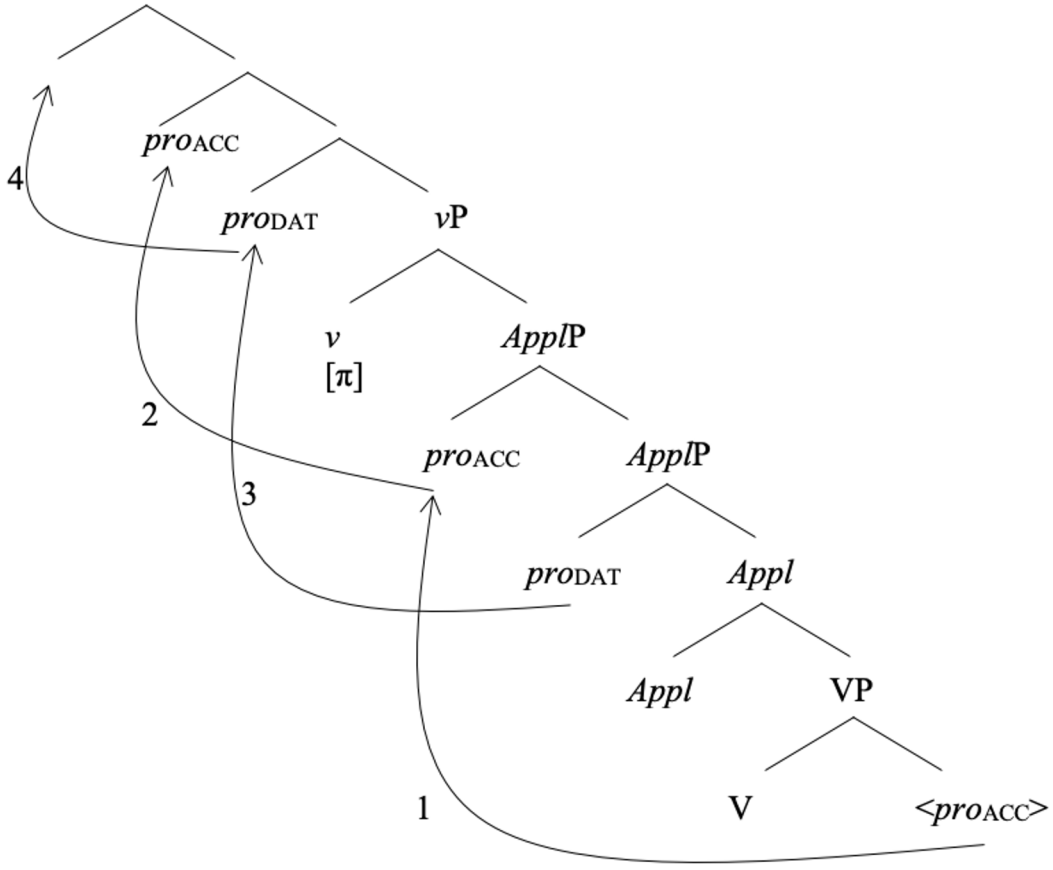
The IO pro_{DF} moves second, tucks in but the value of the goal has been copied onto DO and used up, consequently IO pro_{DF} is restricted to 3rd person:

(64) $[_{vP}\ DO_{\{val\ \pi\}}\ [_{v'}\ IO_{\{\pi\}}\ [_{v'}\ v_{\{\sout{val}\ \pi\}}\ [_{ApplP}\ \sout{ÐO}_{\{\pi\}}\ [\sout{IO}_{\{\pi\}}\ [Appl\ [_{VP}\ V\ \sout{ÐO}_{\{\pi\}}]]]]]]$

After this step (step 3 in 66), the derivation of (61b) ends. The derivation of (61a) continues, with the order of pro_{DF}s reversed again, as IO pro_{DF} moves above vP, destroying the POC-compatible order (step 4 in 66):

(65) $[_{XP}\ IO\ [_{X'}\ X\ [_{vP}\ DO_{\{val\ \pi\}}\ [_{v'}\ \sout{IO}_{\{\pi\}}\ [_{v'}\ v_{\{\sout{val}\ \pi\}}\ [_{ApplP}\ \sout{ÐO}_{\{\pi\}}\ [\sout{IO}_{\{\pi\}}\ [Appl\ [_{VP}\ V\ \sout{ÐO}_{\{\pi\}}]]]]]]]]$

(66)



How do these derivational steps correlate with the experimental scores assigned to particular orders? The order 2nd SG.ACC – 3rd msc.SG.DAT (*cię* – *mu*) reflects the derivational stage in (64–65) and obtained a low score of 4,63. We attribute it to the order switching movement in (65), although within the c-domain of v, it does not result in π-feature valuation of the 2nd SG.ACC pro_{DF}. As stated above, 2nd SG. pro_{DF}s fare best when moving for π-feature valuation.

The order 3rd msc.SG.DAT – 2nd SG.ACC (*mu – cię*) has obtained a better score of 5,10, placing it in a range similar to the orders of *go – mi* and *go – ci*, where the scrambling movement of pro_{DF}s has taken place. This score indicates that the order *mu – cię* is not base-derived but it results from scrambling (movement of 3rd msc.SG.DAT above vP): [26]

(67) 3rd msc.SG.DAT – 2nd SG.ACC (mu – cię) > 2nd SG.ACC – 3rd msc.SG.DAT (cię – mu)

The scrambling of 3rd msc.SG pro_{DF}s, although marked, contributes to higher acceptability of the cluster, in line with the idea that more licit operations rescue less licit ones in the same domain.[27]

Finally, the *cię – mi* cluster (2nd ACC – 1st DAT). As we see in **Figure 8**, this cluster is not acceptable (score 4.56) but our account allows for its derivation in a manner similar to (63–65):

(68) $[_{vP}\ v_{\{val\ \pi\}}\ [_{ApplP}\ DO_{\{\pi\}}\ [IO_{\{\pi\}}\ [Appl\ [_{VP}\ V\ \eth\Theta_{\{\pi\}}]]]]]$

(69) $[_{vP}\ DO_{\{val\ \pi\}}\ [_{v'}\ v_{\{\sout{val}\ \pi\}}\ [_{ApplP}\ \eth\Theta_{\{\pi\}}\ [IO_{\{\pi\}}\ [Appl\ [_{VP}\ V\ \eth\Theta_{\{\pi\}}]]]]]$

(70) $[_{vP}\ DO_{\{val\ \pi\}}\ [_{v'}\ IO_{\{\pi\}}\ [_{v'}\ v_{\{\sout{val}\ \pi\}}\ [_{ApplP}\ \eth\Theta_{\{\pi\}}\ [\text{Ю}_{\{\pi\}}\ [Appl\ [_{VP}\ V\ \eth\Theta_{\{\pi\}}]]]]]]$

2nd SG.ACC *cię* adjoins to ApplP and is now closer to v and moves first to [spec, vP]. It copies the [π] value of the goal. Subsequently *mi* (1st SG.DAT) tucks in and values its π-feature against the goal. The degraded status of this cluster-internal order stems from the movement of *cię* (2nd SG.ACC) in (69), which does not facilitate immediate valuation of its π-feature.

Having painted a detailed picture of cluster patterns embraced by our study, in which 1st/2nd person pronouns and 3rd person pronouns show different movement properties, we firmly emphasize that they must all leave VP. We recognise that pro_{DF}s must move out of the VP as a reflex of a more general strategy of object shift. Several reasons for this tendency have been proposed in the literature. Holmberg & Sandstrom (1999) credit this need to evacuate VP to signalling given information by weak pronouns and their incompatibility with VP-internal default focus interpretation. Pescarini (2021) argues that inherent topicality of clitic pronouns forces them to leave VP. Manzini & Pescarini (2022) propose that clitic pronouns in Romance are externally pair-merged with v/T/C (depending on construction type), so they avoid merger inside VP altogether.

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[26] In and of itself (61a) provides little evidence that Polish disrespects PCC. Such orders are allowed in Romance and Slavic languages that observe the 'me-first' pro_{DF} cluster, see Nevins (2007) and Franks (2017; 2020). Pancheva & Zubizarreta (2018) explicitly include Polish in 'me-first' clitic languages. Yet, treatment of (61a) as a result of the 'me-first' constraint would gain plausibility if Polish still had a productive 1st ACC pro_{DF} (*mię*), which is now entirely obsolete.

[27] Richards (1998): the Principle of Minimal Compliance (PMC) holds that constraints are observed once in a particular domain and then ignored by further operations applying to the same domain.

Cardinaletti & Starke (1994), endorsed recently by Foley & Toosarvandani (2022), propose that structurally impoverished weak pronouns must associate with case positions (placed outside VP) in overt syntax and clitics must move even higher to the Infl domain of the clause. We endorse these general strategies for pronominal mobility and show that in Polish all pro_{DF}s move out of VP but while the more deficient 1st and 2nd person pro_{DF}s target the checking domain of v, the less deficient 3rd person pro_{DF}s may subsequently move onward, to some position beyond the vP projection.

6 Pronominal rearrangements and PCC interactions

Our results concerning (61) shed new light on a proposal in Franks (2017; 2020) according to which two strategies are used to repair the PCC. One strategy is the pronoun switch in (61), which satisfies POC.[28] Franks (2020: fn. 12) surmises that in such cases the reordering could result from highlighting and information structure requirements, rather than PCC. Franks notes that the "Polish style" reordering also rescues PCC-defective pro_{DF} clusters in Slovenian and Czech:

(71) Já tě mu nedám!
I you.SG.ACC him.DAT not-give
"…I won't give you to him!'

He takes these facts to show that pro_{DF}s in these languages can move via scrambling as maximal projections, which causes pragmatic effects. As we show above, the "Polish-style" reordering involves the switch of DO and IO, a component of reverse PCC in Stegovec (2020).

The study of Czech pro_{DF}s in Sturgeon, et, al. (2011) also provides evidence for reverse application of PCC. The authors claim that Czech observes the 'strictly descending' PCC and provide evidence from a corpus search and an experiment:

(72) Představil **mi tě /*ti mě** včera v Hradec Králové
introduced me.DAT you.SG.ACC /you.SG.DAT me.ACC yesterday in Hradec Králové
'He introduced you to me yesterday in Hradec Králové.'
√<1 2>, *<2 1>

[28] The other strategy is to use strong pronouns to avoid illicit pro_{DF} clusters, as in Bulgarian:

(i) *Pokazvat mu te.
show him.OBL you.OBL
??'The are showing 'im you [mju].'

(ii) Pokazvat te na nego.
show you.OBL to HIM.OBL
'They are showing you to him.'

A corpus search reveals a limited number of examples (12 tokens are reported), violating the canonical formulation of PCC, yet conditioned by POC:

(73) …a s radosti **mě mu** předal.
and with pleasure me.ACC him.DAT passed
'…and with pleasure he passed me to him.'
http://www.stmivani.eu/36-jednodilne-povidky/vlkodlaci-svatba-novy-mesic/

The ACC pro_{DF} is 1st/2nd person, while the DAT pro_{DF}s is 3rd person; an order generated by moving ACC across DAT in the domain of vP in our analysis.[29]

Rearrangement of the surface order of pro_{DF}s defying PCC is not typical only of Polish, Slovenian and Czech. It is a frequent phenomenon that PCC compatible orders do not show at spell-out. In French DO pro_{DF} precedes IO pro_{DF}, when the latter is 3rd person. But the surface order must be IO pro_{DF} > DOpro_{DF}, when the IO is 1st or 2nd person:

(74) a. Paul la lui présentera. 3.DO > 3.IO Stegovec (2020: 300)
Paul her.ACC him.DAT introduce.FUT.3P
'Paul will introduce her to him.'

b. It { me /te} 'l envoya. 1/2.IO > 3.DO
he me.DAT/you.SG.DAT him.ACC sent.3P
'He sent him to me/you.'

It is a pressing question why individual languages allow for particular surface orders in this context.[30] Stegovec (2020: 304) enumerates the following options for pro_{DF} reordering and PCC interactions, presented in **Figure 9**.

We propose that the idiosyncratic pattern of the distribution of Polish pro_{DF}s does not place it on a margin of this classification, though it has long been regarded as an outlier in the Slavic family. It appears that Polish fits class 5, alongside Swiss German and Slovenian. Stegovec (2020: 303) generalises that 'one option crucially remains unattested: a language or construction where the reverse PCC occurs without a canonical PCC counterpart'.[31] We have clearly shown in the sections above that Polish shows canonical PCC in prevailing orders of pro_{DF}s at spell-out.

[29] Sturgeon et al. (2011) adopt an OT-based account, assuming that POC is more significant that PCC (DAT – ACC). They also confirm that there is considerable inter-and intra-speaker variation in languages with weak PCC.

[30] A reviewer raises the question of the difference in distribution between Polish and Slovenian pro_{DF}s. A detailed reply requires a separate study, although Slovenian weak pronouns lag behind their Polish equivalents in the flexibility of cluster order and general positioning, they follow a similar path. As **Figure 9** shows, pro_{DF} ordering in Slovenian imperatives is nearly identical to Polish. Only the pro_{DF} clusters in the Wackernagel position do not show results of post [π]-valuation reordering. We speculate that the cluster formed in the checking domain of v is moved to the domain of C as a unit, so any subsequent reordering within it later clashes with Minimal Tampering of Chomsky (2001).

[31] Stegovec (2020: 303) formulates the Reverse PCC Generalisation as follows:

Reordering before [π] valuation	Reordering after [π] valuation	Predicted PCC pattern	Example languages
1.no	No	Canonical	Greek
2.no	Optional	Canonical	Greek (imperatives
3.no	Obligatory	Canonical	French (with 3P.IO)
4.optional	No	canonical +reverse	Slovenian, Czech, Zurich Gm,
5.optional	Optional	mixed/no PCC	Swiss Gm, Slovenian (imperatives), **Polish**
6.optional	Obligatory	canonical+reverse	German
7.*obligatory	No	Reverse	Unattested
8.*obligatory	Optional	Reverse	Unattested
9.*obligatory	Obligatory	Reverse	Unattested

Figure 9: Possible options for clitic order/PCC interactions.

7 Conclusions and open questions

Our analysis justifies addition of Polish to **Figure 9**. It has a smaller set of pro_{DF}s than other Slavic languages (1st person ACC weak pronoun is no longer used productively) and the set includes only the pro_{DF}s which show morphological contrast with strong forms. In order to test to what extent PCC-compatible cluster orders are relevant, we conducted a series of acceptability judgement experiments showing that out of four clusters involving the pro_{DF}s, experimental subjects value best the three that show expected orders compatible with PCC (orders 1st DAT-3rd ACC *mi-go*,2nd DAT-3rd ACC *ci-go* and 1st DAT-2nd ACC *mi-cię*), see **Figure 8**. In all the highest valued clusters the 1st/2nd pro_{DF} precedes the 3rd pro_{DF}. In clusters with the reverse order, medium level-unacceptability appears when 3rd pro_{DF} is cluster-initial but when 2nd pro_{DF} (ACC) is cluster-initial, unacceptability is much more profound. We credit this fact to the maximum deficiency of 1st and 2nd person pronouns, noted in Cetnarowska (2003; 2004); Migdalski (2016; 2021) and Jung & Migdalski (2019; 2020), who observed that they do not support the person/number agreement clitics phonologically, while the 3rd person pro_{DF}s can do so for some speakers. In our analysis the PCC-incompatible initial cluster position of pro_{DF}s is derived via scrambling movement, with which 3rd pro_{DF}s are compatible but the more deficient 1st/2nd pro_{DF}s are not. The fourth cluster (order 3rd DAT-2nd ACC *mu-cię*), previously taken to indicate that PCC does not hold of Polish clusters, turns out to be accepted to a much lower degree than the three canonical ones, a fact we credit to derivational complexity and scrambling of 3rd msc.DAT across 2nd ACC. We thus conclude that Polish shows a weak residue of PCC. Our results converge on studies of a more universal and general nature. In the context of Jung & Migdalski's (2019) hypothesis of the

(i) The reverse PCC is possible in a language iff the language also has a canonical PCC counterpart.

de-cliticization and de-grammaticalization of certain pronouns, we corroborate the observation that the 'degrammaticalization' of the deficient pronouns runs at uneven pace.[32] The 1st SG.DAT, the 2nd SG.DAT and 2nd SG.ACC pro_{DF}s still retain vestiges of syntactically deficient pro_{DF}s and they appear to represent class (5c). The 3rd msc.SG pro_{DF}s (*mu* and *go*) have almost completed their 'degrammaticalization' path syntax-wise, while keeping their morpho-phonological deficiencies. They now represent class (5b), at least for some speakers.[33] Needless to say, the distinction between morphosyntactic properties of the 1st/2nd SG pronouns and 3rd SG msc. pronouns indicates that the three-way pronominal classification in Cardinaletti & Starke (1994) seems too coarse grained and requires further refinements. Many questions remain open and we hope to address them in further research.

[32] In terms of the analysis in Norde (2009), this type of degrammaticalization exemplifies 'debonding': a change at the morphosyntactic level consisting in a shift from a bound morpheme (affix, clitic) to a free morpheme.

[33] A reviewer observes that the uneven pace of the change from clitic to non-clitic is also reported in Franks and Bański (1999): the 1st and 2nd person plural forms are still widely accepted as both clitics and affixes, while the 1st person singular from is used as an affix in the standard.

Abbreviations

1P = first person, 2P = second person, 3P = third person, ACC = accusative, COND = conditional, DAT = dative, F = feminine, FUT = future, IMP = imperative, M = masculine, OBL = oblique, PL = plural, SG = singular, VIR = virile, NON-VIR = non-virile.

Data availability

The Appendix and experiment data are available at https://osf.io/74kjx/.

Ethics and consent

The research reported here was conducted in line with the requirements dictated by the Ethics Committee of Adam Mickiewicz University, Poznan.

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Competing interests

The authors have no competing interests to declare.

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