Feature Geometry and the Person Case Constraint: An Algebraic Link

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CLS 50
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There is a huge number of morphosyntactic scales:
- comparative suppletion (ABC, ABB, *ABA, *AAB)
- case hierarchy for pronoun suppletion
- omnivorous number (sg/pl + sg/pl = pl, *sg + sg = sg)
- resolved gender agreement

Different syntactic mechanisms seem to be involved
⇒ very different syntactic accounts for these phenomena

Research Program
If we abstract away from the syntactic machinery, do we find commonalities among all these scales?
What is the PCC?

**Person Case Constraint (PCC)**

Whether the direct object (DO) and the indirect object (IO) of a clause can both be cliticized is contingent on the person specification of DO and IO.

(1) Roger *me/le leur a présenté.
    Roger 1SG/3SG.ACC 3PL.DAT has shown
    ‘Roger has shown me/him to them.’

**Questions & Goals**

- What are the descriptive properties of PCCs?
  ⇒ algebraic unification in terms of presemilattices

- Can those properties be tied to independently motivated linguistic assumptions?
  ⇒ connection to feature geometry
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- Can those properties be tied to independently motivated linguistic assumptions? ⇒ connection to feature geometry
Outline

1. Person Case Constraints: An Overview

2. Characterizing the Class of PCCs
   - The Generalized PCC
   - Algebraic Characterization via Person Locality

3. Connection to Feature Complexity
   - Reducing Person Locality to Feature Complexity
   - Reducing Feature Complexity to Feature Geometries
The PCC: A Closer Look

- attested in a variety of languages, including French, Spanish, Catalan, and Classical Arabic (Kayne 1975; Bonet 1991, 1994)
- specifics of PCC differ between languages, dialects, idiolects

### Four Attested PCC Variants

- **Strong PCC** (S-PCC; Bonet 1994)
  DO must be 3.

- **Ultrastrong PCC** (U-PCC; Nevins 2007)
  DO is less local than IO (where $3 < 2 < 1$).

- **Weak PCC** (W-PCC; Bonet 1994)
  3IO combines only with 3DO.

- **Me-first PCC** (M-PCC; Nevins 2007)
  If IO is 2 or 3, then DO is not 1.
## The Four PCC Variants (Walkow 2012)

### (a) S-PCC

<table>
<thead>
<tr>
<th>IO↓/DO→</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NA</td>
<td>*</td>
<td>✓</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>NA</td>
<td>✓</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>NA</td>
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</table>

### (b) U-PCC

<table>
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<th>3</th>
</tr>
</thead>
<tbody>
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<td>1</td>
<td>NA</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>*</td>
<td>NA</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### (c) W-PCC

<table>
<thead>
<tr>
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<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NA</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2</td>
<td>✓</td>
<td>NA</td>
<td>✓</td>
</tr>
<tr>
<td>3</td>
<td>*</td>
<td></td>
<td>NA</td>
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### (d) M-PCC

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The Generalized PCC

The U-PCC is defined in terms of person locality. This system can be extended to all four PCC-types.

### Generalized PCC (G-PCC)

IO is not less local than DO (IO $\not<$ DO), where

- **S-PCC:** $1 > 2$, $1 > 3$, $2 > 1$, $2 > 3$
- **U-PCC:** $1 > 2$, $1 > 3$, $2 > 3$
- **W-PCC:** $1 > 3$, $2 > 3$
- **M-PCC:** $1 > 2$, $1 > 3$
Person Locality Hierarchies

(a) S-PCC  
(b) U-PCC  
(c) W-PCC  
(d) M-PCC
Example 1: S-PCC

\[
\begin{array}{ccc}
1 & 2 & 3 \\
\downarrow \quad {\text{IO/DO}} \quad \rightarrow & 1 & \bigg| \quad 2 & \bigg| \quad 3 \\
1 & \bigg| \quad \text{NA} & \bigg| \quad * & \bigg| \quad \checkmark \\
2 & \bigg| \quad * & \bigg| \quad \text{NA} & \bigg| \quad \checkmark \\
3 & \bigg| \quad * & \bigg| \quad * & \bigg| \quad \text{NA}
\end{array}
\]

1 > 2 
1 > 3 
2 > 1 
2 > 3
Example 2: W-PCC

1 > 3
2 > 3

IO↓/DO→ 1 2 3
1 NA ✓ ✓
2 ✓ NA ✓
3 * * NA
The G-PCC gives a unified description of the four PCCs, but we could have drawn any kind of graph. What makes the previous four structures so special?

First, they are all presemilattices (Plummer and Pollard 2012).

**Definition (Presemilattices for Linguists)**

A structure $S$ is a presemilattice iff for all nodes $u$ and $v$ of $S$, there is some node $t$ such that

- $t$ “reflexively dominates” $u$ and $v$, or
- $u$ and $v$ “reflexively dominate” $t$. 
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Presemilattices
Two More Restrictions

The number of presemilattices with three nodes is still more than 4. We have to stipulate two more properties:

**Top and Bottom**

- **Top** For all $x$, $1 < x$ implies $x < 1$.
  ‘Every person feature is at most as local as 1.’

- **Bottom** There is no $x \neq 3$ such that $x < 3$.
  ‘No person feature is less local than 3.’

**Unifying the PCCs**

The class of attested PCCs is given by

- the G-PCC $\text{IO} \not\prec \text{DO}$ such that
- $<$ defines a presemilattice $\mathcal{P}$ over $\{1, 2, 3\}$, and
- $\mathcal{P}$ respects both Top and Bottom.
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Top and Bottom are stipulations, but express a common intuition: 1 is “maximally complex”, 3 “minimally complex”. 

Example 1: Person Specifications in Nevins (2007)

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<tbody>
<tr>
<td>1</td>
<td>[+author, +participant]</td>
</tr>
<tr>
<td>2</td>
<td>[-author, +participant]</td>
</tr>
<tr>
<td>3</td>
<td>[-author, -participant]</td>
</tr>
</tbody>
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</tr>
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<td>3</td>
<td>{}</td>
</tr>
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Syntactic proposals use feature geometry to derive PCC typology. Can we do the same?

Algebraic Feature Complexity [Idea Sketch]

PCC locality is partially determined by feature complexity:

- Person features are ordered by their internal complexity $\Rightarrow$ algebraic structure $C$
- PCC locality rankings are exactly those structures that
  - can be obtained from $C$ by a map $f$ such that
  - $f$ preserves certain properties of $C$
Schema of Reduction to Feature Complexity

(a) S-PCC

(b) U-PCC

(c) W-PCC

(d) M-PCC
Schema of Reduction to Feature Complexity

(a) S-PCC

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(c) W-PCC

(d) M-PCC

\[ f_1 \quad f_2 \quad f_3 \quad f_4 \]

C
What does \( C \) Look Like?

- \( C \) must assign different complexity to 1 and 2:

\[
\begin{array}{c}
\text{1} \\
\downarrow \\
\text{2} \\
\downarrow \\
\text{3}
\end{array}
\quad *
\quad \begin{array}{c}
\text{2} \\
\downarrow \\
\text{1} \\
\downarrow \\
\text{3}
\end{array}
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\end{array}
\]

- \( C \) must assign different complexity to 2 and 3:

\[
\begin{array}{c}
\text{1} \\
\downarrow \\
\text{2} \\
\downarrow \\
\text{3}
\end{array}
\quad *\quad \begin{array}{c}
\text{1} \\
\downarrow \\
\text{3}
\end{array}
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\downarrow \\
\text{2} \\
\downarrow \\
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\downarrow \\
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\quad \begin{array}{c}
\text{3}
\end{array}
\end{array}
\]
The previous observations entail that $C$ must be

\[ 1 \rightarrow 2 \rightarrow 3 \]

This hierarchy has been independently argued for.

(Zwicky 1977)
From $C$ to Person Locality

- The 4 PCCs are generated from $C$ by those maps that
  - preserve connectedness ($\approx$ Presemilattice)
  - preserve maximality ($\approx$ Top)
  - preserve lack of daughter nodes ($\approx$ Bottom)
- But where does $C$ come from?
  Can we obtain $C$ from feature geometries?
Obtaining $C$ from Feature Geometries

(a) S-PCC

(b) U-PCC

(c) W-PCC

(d) M-PCC
Obtaining $C$ from Feature Geometries

(a) S-PCC  (b) U-PCC  (c) W-PCC  (d) M-PCC

$\begin{align*}
f_1 &\quad f_2 \\
&\quad f_3 \\
&\quad f_4
\end{align*}$
Obtaining $C$ from Feature Geometries

- (a) S-PCC
- (b) U-PCC
- (c) W-PCC
- (d) M-PCC
Using Nevin’s Geometry

$C$ is easily obtained from the feature specification in Nevins (2007) if person complexity is determined by the number of features.

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This counting measure also works for unnatural specifications:

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<td>1</td>
<td>{participant, author, non-addressee}</td>
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<tr>
<td>2</td>
<td>{participant, addressee}</td>
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Example: Specification with Distinguished Feature for 3

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- Without restrictions on what counts as a complexity measure, any feature geometry can be the basis for $C$.
- But some feature geometries are compatible with more complexity measures than others.


1 and 2 are structurally equivalent: same number of features, same structural representation $\Rightarrow$ features must be weighted

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<tr>
<td>1</td>
<td>${\text{ref, part, auth}}$</td>
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<td>${\text{ref, part, addr}}$</td>
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- referring
- participant
- author
- addresse

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<td>{ref}</td>
</tr>
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referring
participant
author
addresse
Technical Summary

- Natural algebraic characterization of the attested PCCs:
  - a ban against specific person locality configurations (G-PCC),
  - locality structures must be presemilattices,
  - locality structures respect both Top and Bottom.

- Going one level deeper:
  - person complexity must be $1 > 2 > 3$,
  - person complexity restricts shape of locality structures

- Going down another level:
  - person complexity determined by feature geometry
  - no tight link at this point
  - still, some natural geometries derive person complexity
At this point there’s too many algebraic solutions.

We need to look at morphosyntax beyond person, i.e. number, gender, animacy, case, comparatives...

All phenomena should follow from a given feature geometry once all parameters have been fixed

- mapping from feature geometry to complexity structures
- mappings from complexity structures to locality structures


Why IO $\not<$ DO?

Reminder: Unifying the PCCs

The class of attested PCCs is given by

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Maybe our problem with reducing the PCCs to feature geometries is due to our peculiar choice of G-PCC?

Spoiler

It is not.
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Typology with Other Constraints

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<th>c</th>
<th>d</th>
</tr>
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<tbody>
<tr>
<td>IO $\not&lt;$ DO</td>
<td>S</td>
<td>U</td>
<td>W</td>
<td>M</td>
</tr>
<tr>
<td>DO $&lt;$ IO</td>
<td>W</td>
<td>U</td>
<td>S</td>
<td>M2</td>
</tr>
</tbody>
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Me-second PCC (M2-PCC): If there is a DO, IO must be 1. [unattested]

- Under IO $\not<$ DO, M2-PCC is given by

Weakening Bottom to allow for this structure also brings in
Typology with Other Constraints

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  ![](image)

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  ![](image)
Typology with Additional Structures

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<tr>
<td>IO ≠ DO</td>
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**Indiscriminate PCC (I-PCC):** No IO-DO clitic combinations. [Cairene Arabic (Shlonsky 1997:207, Walkow p.c.)]

**Null PCC (N-PCC):** Any clitic combination.
Typology with Additional Structures

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**Implications**

- Choice of G-PCC has minor effect on predicted PCC typology.
- Allowing structures e and f requires a change to Bottom/Preservation of lack of daughters.
- However, the complexity ranking $C$ stays the same $\Rightarrow$ problem of linking $C$ to feature geometry unchanged.
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<td>IO &lt; DO</td>
<td>W</td>
<td>U</td>
<td>S</td>
<td>M2</td>
<td>M</td>
<td>N</td>
</tr>
<tr>
<td>DO ≠ IO</td>
<td>S</td>
<td>U</td>
<td>W</td>
<td>M</td>
<td>M2</td>
<td>I</td>
</tr>
</tbody>
</table>

#### Implications
- Choice of G-PCC has minor effect on predicted PCC typology.
- Allowing structures e and f requires a change to Bottom/Preservation of lack of daughters.
- However, the complexity ranking $C$ stays the same $\Rightarrow$ problem of linking $C$ to feature geometry unchanged.