Feature Geometry and the Person Case Constraint: An Algebraic Link

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CLS 50
Apr 12, 2014

Piece of a Larger Puzzle

- 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?
  $\Rightarrow$ algebraic unification in terms of presemilattices
- Can those properties be tied to independently motivated linguistic assumptions? $\Rightarrow$ connection to feature geometry

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Outline

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)

IO↓/DO→	1	2	3
1	NA	*	✓
2	*	NA	✓
3	*	*	NA

(a) S-PCC

IO↓/DO→	1	2	3
1	NA	✓	✓
2	*	NA	✓
3	*	*	NA

(b) U-PCC

IO↓/DO→	1	2	3
1	NA	✓	✓
2	✓	NA	✓
3	*	*	NA

(c) W-PCC

IO↓/DO→	1	2	3
1	NA	✓	✓
2	*	NA	✓
3	*	✓	NA

(d) M-PCC

Outline

The Generalized PCC

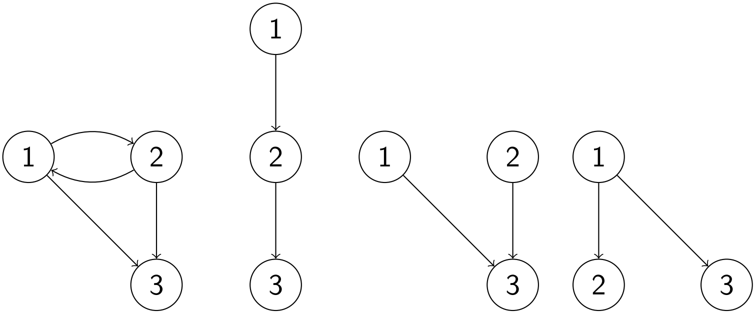
The U-PCC is defined in terms of person locality.
This system can be extended to all four PCC-types.

Generalized PCC (G-PCC)

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

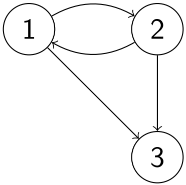
S-PCC:	$1 > 2$	$1 > 3$	$2 > 1$	$2 > 3$
U-PCC:	$1 > 2$	$1 > 3$		$2 > 3$
W-PCC:	$1 > 3$			$2 > 3$
M-PCC:	$1 > 2$	$1 > 3$		

Person Locality Hierarchies



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

Example 1: S-PCC



$1 > 2$
$1 > 3$
$2 > 1$
$2 > 3$

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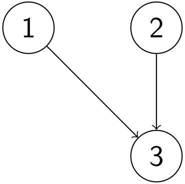
1	NA	*	✓
2	*	NA	✓
3	*	*	NA

Example 2: W-PCC



$1 > 3$

$2 > 3$

IO↓/DO→	1	2	3
1	NA	✓	✓
2	✓	NA	✓
3	*	*	NA

Presemilattices

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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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 IO $\not<$ DO such that
- $<$ defines a presemilattice $\mathcal{P}$ over $\{1, 2, 3\}$, and
- $\mathcal{P}$ respects both Top and Bottom.

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Outline

Top and Bottom Match Feature Complexity

Top and Bottom are stipulations, but express a common intuition: 1 is "maximally complex", 3 "minimally complex".

Example 1: Person Specifications in Nevins (2007)

Person	Specification
1	[+author,+participant]
2	[-author,+participant]
3	[-author,-participant]

Example 2: Alternative Specification a la Nevins (2007)

Person	Specification
1	{participant,author}
2	{participant}
3	{}

Doing Away with Top and Bottom

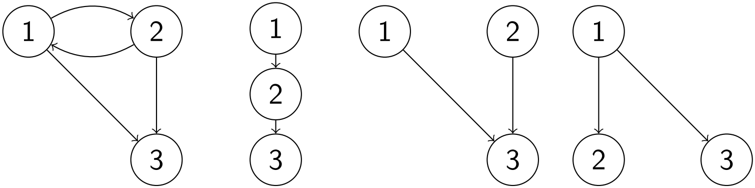
Syntactic proposals use feature geometry to derive PCC typology. Can we do the same?

Algebraic Feature Complexity [Idea Sketch]

PCC locality is partially determined by feature complexity:

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

Schema of Reduction to Feature Complexity



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

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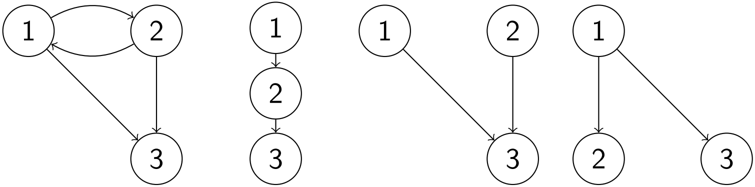

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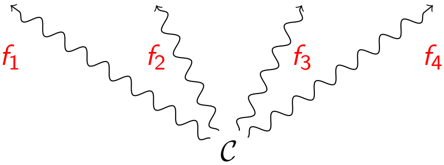
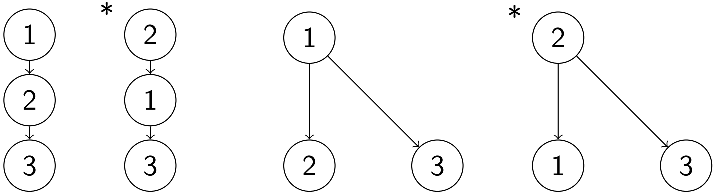
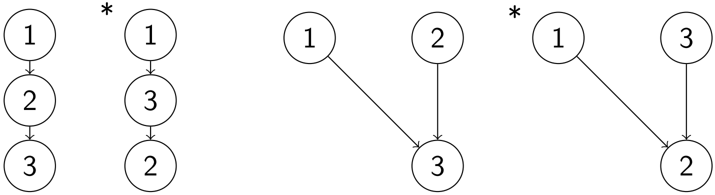


What does $\mathcal{C}$ Look Like?

- $\mathcal{C}$ must assign different complexity to 1 and 2:

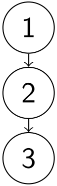


- $\mathcal{C}$ must assign different complexity to 2 and 3:



The Only Viable Shape of $\mathcal{C}$

- The previous observations entail that $\mathcal{C}$ must be

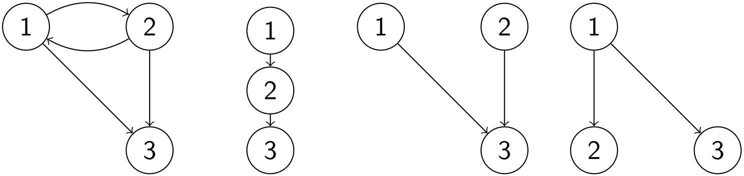


- This hierarchy has been independently argued for. (Zwicky 1977)

From $\mathcal{C}$ to Person Locality

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

Obtaining $\mathcal{C}$ from Feature Geometries



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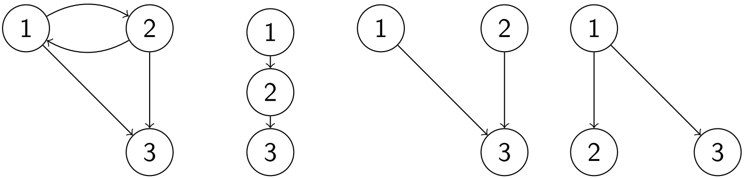

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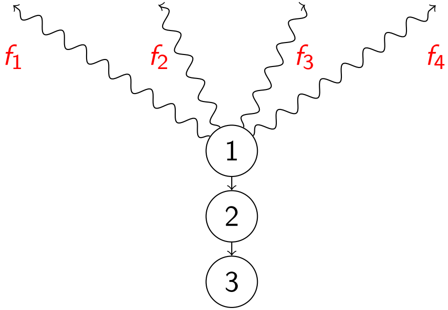

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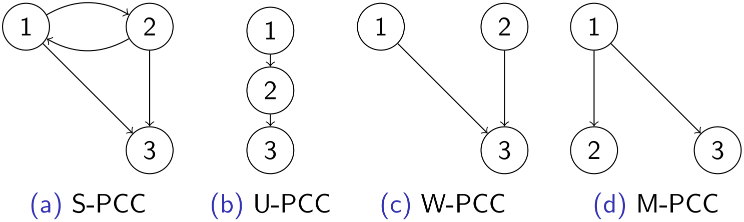

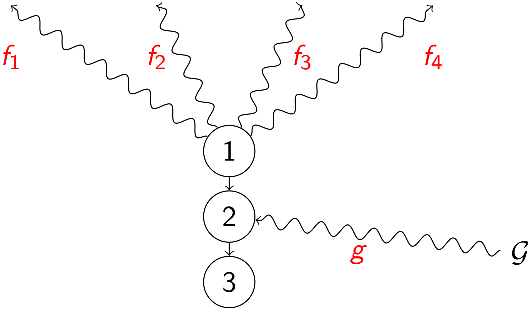

Using Nevin's Geometry

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

Reminder: Set-Theoretic Specification a la Nevins (2007)

Person	**Specification**
1	{participant,author}
2	{participant}
3	{}

This counting measure also works for unnatural specifications:

Example: Specification with Distinguished Feature for 3

Person	**Specification**
1	{participant,author,non-addressee}
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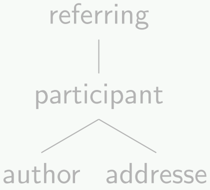
Another Feature Geometry: Harley and Ritter (2002)

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

Example: Harley and Ritter (2002) Needs a Weighted Measure

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

Person	Specification
1	{ref,part,auth}
2	{ref,part,addr}
3	{ref}



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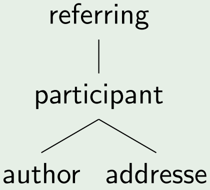

Technical Summary

- 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

What's Next

- 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

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Why IO $\not<$ DO?

Reminder: Unifying the PCCs

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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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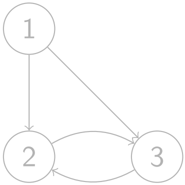
Typology with Other Constraints

	a	b	c	d
IO $\not<$ DO	S	U	W	M
DO $<$ IO	W	U	S	M2

Me-second PCC (M2-PCC): If there is a DO, IO must be 1. [unattested]

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



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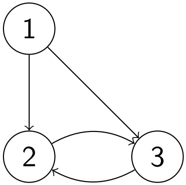

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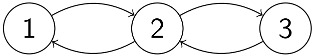

Typology with Additional Structures

	a	b	c	d	e	f
IO $\nless$ DO	S	U	W	M	M2	I
DO $<$ IO	W	U	S	M2	M	N

Indiscriminate PCC (I-PCC): No IO-DO clitic combinations. [Cairene Arabic (Shlonsky 1997:207, Walkow p.c.)]

Null PCC (N-PCC): Any clitic combination.

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The Full Extended Typology

	a	b	c	d	e	f
IO $\nless$ DO	S	U	W	M	M2	I
DO < IO	W	U	S	M2	M	N
IO < DO	W	U	S	M2	M	N
DO $\nless$ IO	S	U	W	M	M2	I

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 $\mathcal{C}$ stays the same
  $\Rightarrow$ problem of linking $\mathcal{C}$ to feature geometry unchanged.

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IO $\not<$ DO	S	U	W	M	M2	I
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