Of Tops and Bottoms: The Algebra of Person Case Constraints

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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 presésenté.
Roger 1SG/3SG.ACC 3PL.DAT has shown
'Roger has shown me/him to them.'

The Problem & The Solution

- Existence of something like the PCC is not surprising. (Graf 2011; Kobele 2011)
- But why do we only find certain types of PCCs?
- Algebraic unification in terms of presemilattices

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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

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

The PCC in Minimalism

- The Minimalist feature calculus is exactly as powerful as so-called **rational constraints**. (Graf 2011; Kobele 2011)
- So unless one puts restrictions on the feature system any given language may employ, any kind of rational constraint could in principle be instantiated in some language.
- The **existence of PCC-like constraints is unsurprising** under this view because they are indeed rational constraints.
- But there are at least $2^6 = 64$ logically possible PCC variants. Why do we find only 4?

The Generalized PCC

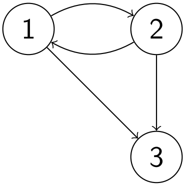
All four PCC-types can be described similar to the U-PCC.

Generalized PCC (G-PCC)

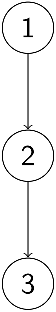
IO is not less local than DO (IO $\nless$ DO), where

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:	$1 > 2$	$1 > 3$		

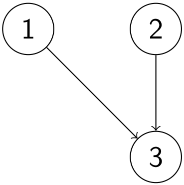
Person Locality Hierarchies



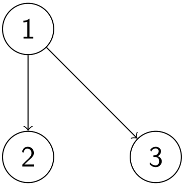
(a) S-PCC



(b) U-PCC

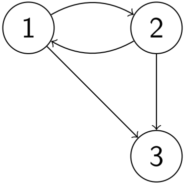


(c) W-PCC



(d) M-PCC

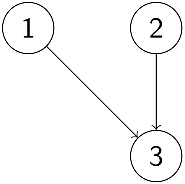
Example 1: S-PCC



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

IO↓/DO→	1	2	3
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

Preorders

The locality hierarchies are **preorders**.
(Reminder: we ignore the diagonal)

Definition (Preorder)

A binary relation $\sqsubseteq$ is a preorder iff it is

- reflexive ($x \sqsubseteq x$), and
- transitive ($x \sqsubseteq y$ & $y \sqsubseteq z \Rightarrow x \sqsubseteq z$)

In fact, they are all **presemilattices**.

Definition (Presemilattices for linguists)

A preorder $\sqsubseteq$ over set S is a presemilattice iff for all $u, v \in S$, there is some $t \in S$ 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 over $\{1, 2, 3\}$ is still more than 4.

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 such that $x < 3$.
'No person feature is less local than 3.'

Unifying the PCCs

The class of attested PCCs is given by

- IO $\not<$ DO, where
- $<$ defines a presemilattice over $\{1, 2, 3\}$ respecting both Top and Bottom.

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Generalizing Top

From a mathematical perspective, Top and Bottom aren't duals.

Redefining Top as the Dual of Bottom

Top′ There is some x such that $x < 1$.
'Some person feature is less local than 1.'

Pairing Bottom with Top′ yields one more hierarchy.

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'Some person feature is less local than 1.'

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$$
\begin{tikzcd}
2 \arrow[d] \\
1 \arrow[d] \\
3
\end{tikzcd}
$$

Top′ in Algonquian?

In some Algonquian languages 2 is apparently more local than 1. Nishnaabemwin affixes its verb with an inverse marker if DO is more local than SUBJ (Béjar and Rezac 2009:50).

(2) a. n-waabm-ig
1-see-3.INV
'He sees me.'

b. g-waabm-ig
2-see-3.INV
'He sees you.'

Top′ in Algonquian? [cont]

The marker also occurs if DO is 2 and SUBJ is 1, but not the other way round, where a default marker is used instead (Béjar and Rezac 2009:49). This indicates that 2 is indeed more local than 1.

(3) a. g-waabm-in
2-see-1.INV
'I see you.'

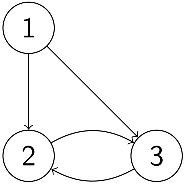
b. g-waabm-i
2-see-DFLT.1
'You see me.'

Generalizing Bottom

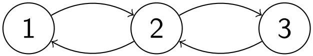
Redefining Bottom as the Dual of Top

Bottom′ For all x, $x < 3$ implies $3 < x$.

Coupling Top with Bottom′ yields two new hierarchies:



(a) IO must be 1



(b) No clitic combinations

Bottom′ in Sign Language/Cairene Arabic?

- The first new hierarchy might be present in sign languages, where 2 and 3 form a natural class.
  Are there sign languages that show PCC effects?
- The second type disallows all clitic combinations. This behavior is attested in some languages such as Cairene Arabic (Shlonsky 1997:207; Martin Walkow p.c.).

Conclusion

What has been Accomplished?

- The four attested PCC variants are unified into the Generalized PCC: IO $\not<$ DO.
- The possible interpretations of $<$ are given a succinct, natural algebraic characterization in terms of presemilattices.

Open Questions

- Do we find any of the conjectured patterns?
- Why IO $\not<$ DO, and not DO $\not<$ IO or IO $\geq$ DO?
- What motivates Top and Bottom?

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