Pronominal Null Conjuncts in Arabic

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HPSG 2011

Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Introduction

The Data

The Underlying Structure

An HPSG Analysis
- Licensing Null Conjuncts
- Deriving First Conjunct Agreement
- Bound Pronouns
- Case in Coordination

Discussion

Conclusion

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Introduction

The Data

The Underlying Structure

An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination

Discussion

Conclusion

References

Introduction

- Here: Arabic = Classical Arabic + Modern Standard Arabic
- CA: spoken and written language of (roughly) 7th to 9th centuries
- MSA: written language of 20th and 21st centuries
- MSA based on CA, but differences even in some core areas of syntax
- Analysis part of grammar fragment implemented in TRALE

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Null Subjects

Case-neutral or null subject pronoun:

(1) 'atayta ('anta)
came.2SG.M (you.∅)
'you came'

Postverbal subjects: null conjunct, First Conjunct Agreement:

(2) 'atayta ('anta) wa=Zaydun
came.2SG.M (you.∅) and-Zayd.NOM
'Zayd and you came'

Preverbal subjects: no null conjuncts, resolved agreement

(3) *('anta) wa=Zaydun 'ataytum
you.∅ and-Zayd.NOM came.2PL.M
'Zayd and you came'

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Null Subjects

Nonfinite predicates do not allow pro-drop or null conjuncts (with the exception of some relative clauses):

(4) a. dhaahib-un *('anta)
going-SG (you.∅)
'you are going'

b. dhaahib-aani [*('anta) wa=Zaydun]
going-DUAL (you.∅) and-Zayd.NOM
'Zayd and you are going'

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Accusative Complements

Pronominal accusative arguments can be marked by certain combinations of bound pronouns, free accusative pronouns and case-neutral pronouns:

(5) a. ra'aytu=ka
saw.1SG-you.OBL

b. ra'aytu 'iyyaaka/*'anta
saw.1SG you.ACC/you.∅

c. ra'aytu=ka 'iyyaaka/'anta
saw.1SG-you.OBL you.ACC/you.∅

'I saw you'

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Preverbal Accusative Complements

Free pronouns as accusative complements can also occur preverbally. If they occur together with a bound pronoun, they can be analyzed as topics (7):

(6) 'iyyaaka/*'anta ra'aytu
you.ACC/you.∅ saw.1SG

(7) a. 'anta/?'iyyaaka ('anaa) ra'aytu=ka
you.∅/you.ACC I saw.1SG-you.OBL
'I saw you'

b. rrajul-u/?a ('anaa) ra'aytu=hu
the.man-NOM/ACC I saw.1SG-he.OBL

c. * rrajul-u/a 'anaa ra'aytu
the.man-NOM/ACC I saw.1SG
'I saw the man'

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Genitive Complements

Pronominal genitive arguments can be marked by bound pronouns or bound pronoun plus case-neutral pronoun:

(8) a. baytu=ka
house-you.OBL

b. *baytu 'anta
house you.∅

c. baytu=ka 'anta
house-you.OBL you.∅
'your house'

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

First Conjuncts of Accusative Complements

Same options as for simple pronominal arguments:

(9) a. ra'aytu=ka wa=Zaydan
saw.1SG-you.OBL and-Zayd.ACC

b. ra'aytu 'iyyaaka/*'anta wa=Zaydan
saw.1SG you.ACC/you.∅ and-Zayd.ACC

c. ra'aytu=ka 'iyyaaka/'anta wa=Zaydan
saw.1SG-you.OBL you.ACC/you.∅ and-Zayd.ACC
'I saw you and Zayd'

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

First Conjuncts of Genitive Complements

Same options as for simple pronominal arguments:

(10) a. baytu=ka wa=Zaydin
house-you.OBL and-Zayd.GEN

b. *baytu 'anta wa=Zaydin
house you.∅ and-Zayd.GEN

c. baytu=ka 'anta wa=Zaydin
house-you.OBL [you.∅ and-Zayd.GEN]
'your and Zayd's house'

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Underlying Structure

Conjoined NPs form a constituent, from which a bound pronoun realizing the first conjunct is excluded:

- Bound and a corresponding free pronoun or conjoined NP need not be adjacent:

(11) yahtiku=haa nnaasu [hiya wa=saa'ira
shame=she.OBL the.people [she.∅ and-rest.ACC
'ahli=haa]
family.GEN=she.OBL]

'people shame her and the rest of her family'

- A free pronoun as a first conjunct is always adjacent to the second conjunct.

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Subject Null Conjuncts

Parallelism between null conjuncts in subject NPs and pro-drop:

- null element is the subject pronominal which is used for verbal agreement
- null realization is possible only with finite verbs

⇒ subject null conjuncts are pro-elements:

'You came'		'Zayd and you came'		
'atayta	['anta]	'atayta	['anta	wa=Zaydun]
'atayta	[*pro*]	'atayta	[*pro*	wa=Zaydun]
you.came	you	you.came	you	and=Zayd

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Complement Null Conjuncts

Claims:

- nonnominative null conjuncts are also *pro*
  ⇒ oblique pronominals can be *pro* if they are accompanied by a bound pronoun
- pronominal arguments which are realized by a bound pronoun without being a conjunct are also *pro*

'I saw you'	
ra'aytu(=ka$_i$)	['iyyaaka$_i$]
ra'aytu=ka$_i$	['anta$_i$]
ra'aytu=ka$_i$	[*pro*$_i$]

'I saw you and Zayd'		
ra'aytu=ka$_i$	['iyyaaka$_i$	wa=Zaydan]
ra'aytu=ka$_i$	['anta$_i$	wa=Zaydan]
ra'aytu=ka$_i$	[*pro*$_i$	wa=Zaydan]

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Licensing Null Conjuncts

- realization of arguments is determined by the subtyping of *synsem* into *canonical-ss* and *non-canonical-ss* (Bouma et al. [2001])
- $\Rightarrow$ zero anaphora is 'passively' licensed by type *non-canonical-ss*

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Licensing Null Conjuncts

coord-phrase $\rightarrow$

$$\left[\begin{array}{ll} \ldots\text{HD}|\text{CONJUNCTS} & \boxed{0}\left\langle \left[\text{L}|\text{C}|\text{CRD} \quad -\right], \right. \\ & \left. \left[\text{L}|\text{C}|\text{CRD} \quad +\right] \ldots \left[\text{L}|\text{C}|\text{CRD} \quad +\right] \right\rangle \\ \text{DTRS} & \left\langle \text{SYNSEM} \quad \boxed{1}, \ \ldots \ \text{SYNSEM} \quad \boxed{n} \right\rangle \end{array}\right]$$

$\wedge$ $\boxed{0}$ list(pro-ss) $\oplus \left\langle \boxed{1}, \ \ldots \ \boxed{n} \right\rangle$

- CRD + enforces marking with the coordination clitic *wa*= (Beavers and Sag [2004]).
- CONJUNCS: SYNSEM values of conjuncts (e.g., Yatabe [2004], Mouret [2006], Chaves and Paperno [2007])
- Only the canonical elements of CONJUNCS are mapped to DTRS

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Licensing Null Conjuncts

- Applies to all types of coordination phrases
- *Pro* conjuncts are possible
- wa= cannot attach to *pro* $\Rightarrow$ Only first conjuncts can be null

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Deriving First Conjunct Agreement

- Some head features of the first conjunct must be visible for the head
  - Subject Agreement and features of bound pronouns depend on features of first conjunct
  - Head must know whether first conjunct is pro / case-neutral
- information should be separated from relevant features of conjoined NP
  - resolved features needed for preverbal subjects
- feature INTERNAL-HEAD (IH) appropriate for *cat* mediates this information
- cf. Villavicencio et al. [2005]: head features LAGR, RAGR for concord values of conjunct

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Deriving First Conjunct Agreement

$$\left[\begin{array}{l}\text{word} \\ \textsc{synsem}|\textsc{loc}|\textsc{cat} \quad \left[\begin{array}{ll}\textsc{head} & \boxed{1} \\ \textsc{internal-head} & \boxed{1}\end{array}\right]\end{array}\right]$$

$$\left[\begin{array}{l}\text{coordination-phrase} \\ \textsc{s}|\textsc{l}|\textsc{c} \quad \left[\begin{array}{ll}\textsc{head} & \left[\begin{array}{ll}\textsc{concord} & \text{resolve}(\boxed{2}, \boxed{3}, \ldots) \\ \textsc{conjuncts} & \left\langle \textsc{ss}|\textsc{l}|\textsc{c}|\textsc{h} \quad \boxed{1}_{\boxed{2}}, \text{NP}_{\boxed{3}}, \ldots \right\rangle\end{array}\right] \\ \textsc{internal-head} & \boxed{1}\end{array}\right]\end{array}\right]$$

The Concord features used by bound pronouns and (postverbal) subject agreement are always those in $\textsc{internal-head}|\textsc{concord}$, irrespective of the internal structure of the argument NP.

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

'Opaque' Coordination

A conjoined NP can trigger resolved index features on verbs and bound pronouns, if it contains a case-neutral pronoun:

(12) a. ji'naa ['Abbaas wa=']anaa]
came.1PL Abbas and-I.∅

'Abbaas and I came'

b. 'alay=naa ['anaa wa='anta] 'an...
upon-us.OBL I.∅ and-you.∅ that...

'it is my and your duty to...'

- INTERNAL-HEAD is identified with the HEAD value of the conjoined NP

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Restrictions on Opaque Coordination

NP does not contain a null-conjunct:

(13) ra'aa=naa wa='Amran
saw.3SG-we.OBL and-Amr.ACC
'He saw us and Amr
not: He saw me and Amr'

Nonnominative NPs require bound pronouns:

(14) * 'alaa ['anaa wa='anta] 'an...
upon-us.OBL I.∅ and-you.∅ that...
'it is my and your duty to...'

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Transparent and Opaque Coordination

transparent-coordination →

$$\begin{bmatrix} \text{S}|\text{L}|\text{C} & \begin{bmatrix} \text{HD}|\text{CONJUNCTS} & \left\langle \begin{bmatrix} \text{L}|\text{C}|\text{HD} & \boxed{1} \end{bmatrix}, \ldots \right\rangle \\ \text{IH} & \boxed{1} \end{bmatrix} \end{bmatrix}$$

opaque-coordination →

$$\begin{bmatrix} \text{DTRS} & \left\langle \ldots \begin{bmatrix} \text{S}|\text{L}|\text{C}|\text{HEAD} & \begin{bmatrix} \textit{pronoun} \\ \text{CASE-MARKED} & - \end{bmatrix} \end{bmatrix} \ldots \right\rangle \\ \text{S}|\text{L}|\text{C} & \begin{bmatrix} \text{HD} & \boxed{1} & \begin{bmatrix} \text{CONJUNCTS} & \left\langle \textit{canonical-ss}, \ldots \right\rangle \\ \text{CASE-MARKED} & - \end{bmatrix} \\ \text{IH} & \boxed{1} \end{bmatrix} \end{bmatrix}$$

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Examples I

(15)

$$\begin{bmatrix} \textit{word} \\ \textsc{phon} & \langle\, \textit{'anta} \,\rangle \\ \textsc{ss|loc|cat} & \begin{bmatrix} \textsc{head} & \boxed{1} \begin{bmatrix} \textit{pronoun} \\ \textsc{concord} & \boxed{0} \end{bmatrix} \\ \textsc{ih} & \boxed{1} \end{bmatrix} \end{bmatrix}$$

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Examples II

(16)

$$\left[\begin{array}{l}\textit{transparent-coordination-phrase} \\ \textsc{conjs} \quad \left\langle \left[\textsc{l|c} \left[\begin{array}{ll}\textsc{crd} & - \\ \textsc{head} & \boxed{2}\left[\begin{array}{ll}\textit{pronoun} & \\ \textsc{concord} & \boxed{0} \\ \textsc{pro} & + \end{array}\right]\end{array}\right]\right], \boxed{3} \right\rangle \\ \textsc{dtrs} \quad \left\langle \left[\begin{array}{ll}\textsc{phon} & \left\langle \textit{wa-Zayd} \right\rangle \\ \textsc{synsem} & \boxed{3}\end{array}\right] \right\rangle \\ \textsc{s|l|c|ih} \quad \boxed{2}\end{array}\right]$$

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Examples III

(17)

$$\left[\begin{array}{l}\textit{transparent-coordination-phrase} \\ \textsc{conjs} \quad \left\langle \boxed{1} \left[\textsc{l|c} \left[\begin{array}{ll}\textsc{crd} & - \\ \textsc{head} & \boxed{2}\left[\begin{array}{ll}\textit{pronoun} & \\ \textsc{concord} & \boxed{0}\end{array}\right]\end{array}\right]\right], \boxed{3} \right\rangle \\ \textsc{dtrs} \quad \left\langle \left[\begin{array}{ll}\textsc{phon} & \langle \textit{'anta} \rangle \\ \textsc{synsem} & \boxed{1}\end{array}\right], \left[\begin{array}{ll}\textsc{phon} & \langle \textit{wa-Zayd} \rangle \\ \textsc{synsem} & \boxed{3}\end{array}\right] \right\rangle \\ \textsc{s|l|c|ih} \quad \boxed{2}\end{array}\right]$$

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Examples IV

(18)

$$\begin{bmatrix} \textit{opaque-coordination-phrase} \\ \text{CONJS} \quad \left\langle \boxed{1} \begin{bmatrix} \text{LOC}|\text{CAT} & \begin{bmatrix} \text{CRD} & - \\ \text{HEAD} & \textit{pronoun} \end{bmatrix} \end{bmatrix}, \boxed{2} \right\rangle \\ \text{DTRS} \quad \left\langle \begin{bmatrix} \text{PHON} & \langle \textit{'anta} \rangle \\ \text{SYNSEM} & \boxed{1} \end{bmatrix}, \begin{bmatrix} \text{PHON} & \langle \textit{wa-Zayd} \rangle \\ \text{SYNSEM} & \boxed{2} \end{bmatrix} \right\rangle \\ \text{S}|\text{L}|\text{C} \quad \begin{bmatrix} \text{HEAD} & \boxed{3} \begin{bmatrix} \text{CONCORD} & \boxed{0} \end{bmatrix} \\ \text{IH} & \boxed{3} \end{bmatrix} \end{bmatrix}$$

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Bound Pronouns

Bound pronouns in Arabic are real clitics

- affix criteria of Zwicky and Pullum [1983] are not satisfied
- similarities linking bound pronouns and genitive NPs
  - require the same morphological form of the head (*Construct State*)
  - no wide scope over coordination
  - similar binding-theoretic restrictions (Mohammad [2000], Majdi [1990])

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Bound Pronouns

Free pronouns, conjoined NPs and *pro* are standard ways of realizing arguments, while bound pronouns have a special status.

- a conjoined NP represents the entire argument including arbitrary nonpronominal conjuncts, while a bound pronoun represents only a single set of index features
- bound pronouns are bound to the head while conjoined NPs and free pronouns can be separated from it

Technical Implementation:

- Clitics have SYNSEM values of type *clitic-synsem*
- Elements of ARG-ST can be of types *canonical-ss*, *gap-ss*, *pro-ss*, but not *clitic-synsem*
- Clitics are introduced by the principles linking ARG-ST and COMPS

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Bound Pronouns: What we should capture

- whether a complement is realized by a clitic depends on its INTERNAL-HEAD value:
  - pro and case-neutral pronouns require a clitic
  - other pronouns may have an optional clitic
- Case Constraint: genitive precedes accusative. As a consequence, genitive NPs are incompatible with accusative clitics.
- Person Constraint: *first* $<$ *second* $<$ *third*

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Argument Realization Principle with Clitics

Realization of clitics can be ensured by extending the Argument Realization Principle (Bouma et al. [2001]):

$$\left[\begin{array}{l}
\textsc{argst} \quad \text{list}(\text{gap-ss}) \\
\quad \circ \left(\boxed{1} \oplus \boxed{2} \left(\begin{array}{l} \text{list}\left(\left[\textsc{...ih} \quad \neg \left[\textsc{pro} \quad + \vee \textsc{c-m} \quad -\right]\right]\right) \\ \circ \boxed{3} \left(\begin{array}{l} \text{list}\left(\left[\textsc{...ih} \quad \textit{pronoun}\right]\right) \\ \circ \text{list}\left(\left[\textsc{...ih} \quad \left[\textsc{c-m} \quad -\right]\right]\right) \end{array} \right) \end{array} \right) \right) \\
\textsc{...comps} \quad \left(\text{args-to-clitics}(\boxed{3}) \oplus (\boxed{2} \ominus \text{list}(\textit{pro-ss}))\right) \quad \wedge \\
\left(\text{list}(\textit{...gen}) \oplus \textit{list}(\textit{...acc}) \oplus \textit{list}(\textit{...}\neg \textit{nominal})\right) \\
\textsc{...subj} \quad \boxed{1}
\end{array}\right]$$

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Argument Realization Principle with Clitics

- Line 1: gaps
- Line 2: subjects, complements which do not require a clitic
- Line 3: arguments which can be combined with a clitic
- Line 4: arguments which require a clitic
- Line 5: clitics and canonical arguments are copied to COMPS
- Line 6: Case constraint
- The clitics and genitive NPs from COMPS are retrieved in one instance of *head-complement-phrase* in the order they appear in COMPS.
- *head-complement-phrase* is the only phrasal type allowing a daughter with unsaturated requirements for clitics or genitive NPs ⇒ Strict positioning and impossibility of wide scope over coordination are captured.

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Argument Realization Principle with Clitics

args-to-clitics(1, 2) $\leftrightarrow$

$$\left(\begin{array}{l} \boxed{2}\ \textit{list(clitic-ss)} \\ \wedge\ \text{length}(\boxed{1}) = \text{length}(\boxed{2}) \\ \wedge\ \forall\ \boxed{3}\ \boxed{4} \left(\begin{array}{l} \text{member}(\left[\begin{array}{ll} \ldots\text{IH}|\text{CASE} & \boxed{3} \\ \ldots\text{IH}|\text{CONC} & \boxed{4} \end{array}\right], \boxed{1}) \\ \leftrightarrow\ \text{member}(\left[\begin{array}{ll} \ldots\text{HD}|\text{CASE} & \boxed{3} \\ \ldots\text{HD}|\text{CONC} & \boxed{4} \end{array}\right], \boxed{2}) \end{array}\right) \\ \wedge\ \forall\ \boxed{5}\ \boxed{6} \left(\text{prec}(\boxed{2}, \left[\ldots\text{PERS} \quad \boxed{5}\right], \left[\ldots\text{PERS} \quad \boxed{6}\right]) \rightarrow \boxed{5} \leq \boxed{6}\right) \end{array}\right)$$

- Lines 2 and 3: exactly the arguments from the list are realized
- Line 4: Person Constraint: higher persons come first
- Since the number of clitics seems to be maximally two, this analysis could be compiled out straightforwardly.

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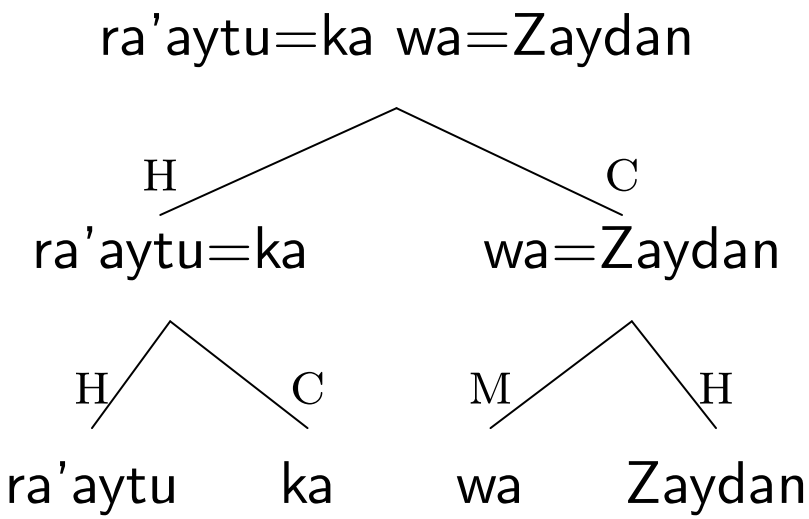
Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Example: Verb Combining with Conjoined NP I

(19) ra'aytu=ka wa=Zaydan
saw.1SG-you.OBL and-Zayd.ACC
'I saw you and Zayd'



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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Example: Verb Combining with Conjoined NP II

ra'aytu:

$$\begin{bmatrix} \text{ARG-ST} & \left\langle \boxed{0}\ \textit{pro-ss}, \boxed{1} \right\rangle \\ \text{SS}|\text{L}|\text{C} & \begin{bmatrix} \text{COMPS} & \left\langle \boxed{2}, \boxed{1} \right\rangle \end{bmatrix} \end{bmatrix}$$

=ka:

$$\begin{bmatrix} \textit{word} & \\ \text{SYNSEM} & \boxed{2} \begin{bmatrix} \textit{clitic-synsem} & \\ \text{L}|\text{C}|\text{H}|\text{CONCORD} & \boxed{3} \end{bmatrix} \end{bmatrix}$$

pro wa=Zaydan:

$$\begin{bmatrix} \textit{transparent-coordination-p} & \\ \text{SYNSEM} & \boxed{1} \begin{bmatrix} \textit{canonical-ss} & \\ \text{L}|\text{C} & \begin{bmatrix} \text{IH} & \begin{bmatrix} \text{CASE} & \textit{acc} \\ \text{CONCORD} & \boxed{3} \\ \text{PRO} & + \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Case Marking in Coordination: Generalizations

(20) a. Usually, all conjuncts are marked for the case of the conjoined NP.

b. If the first conjunct is case-neutral, the noninitial conjuncts can have nominative marking:

taẓaafuru-*hu* [*huwa* wa-'Abuu Sa'd]
help-he.OBL [he.∅ and-Abu.NOM Sa'd]

'his and Abu Sa'd's help (Reckendorf [1921])'

c. Noninitial case-neutral pronouns have nominative case:

*ra'aytu [Zayd-an wa-hum]
saw.1SG Zayd-ACC and=they.∅

'I saw Zayd and them'

Note that (12b) is not a counterexample to this generalization, because (20b) allows the second case-neutral conjunct to have nominative case.

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Case Marking in Coordination: Formalization I

Generalizations (20a) and (20b):

(21)
$$\left[\textsc{conjuncts} \quad \text{list}(\text{nominal})\right] \rightarrow$$
$$\left[\begin{array}{ll}\textsc{conjuncts} & \text{list}(\textsc{l}|\textsc{c}|\textsc{h}|\textsc{case} \quad \boxed{1}) \\ \textsc{case} & \boxed{1}\end{array}\right]$$
$$\vee \left[\begin{array}{lll}\textsc{conjuncts} & \left\langle \textsc{l}|\textsc{c}|\textsc{h} \quad \left[\begin{array}{ll}\textsc{case} & \boxed{1} \\ \textsc{case-marked} & -\end{array}\right]\right\rangle \\ & \oplus \text{list}(\textsc{l}|\textsc{c}|\textsc{h}|\textsc{case} \quad \textsc{nom}) \\ \textsc{case} & \boxed{1}\end{array}\right]$$

- Partitioning *coordination-phrase* into three types would have the same effect.

Pronominal Null Conjuncts in Arabic

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Case Marking in Coordination: Formalization II

Generalization (20c):

(22)

$$\left[\text{CONJS} \quad \textit{ne_list} \oplus \left\langle \ldots\text{HD} \quad \boxed{1}\left[\begin{array}{l}\textit{pronoun}\\ \text{CASE} \quad \neg\ \textit{nom}\end{array}\right]\right\rangle \oplus\ \textit{list}\right]$$
$$\rightarrow \boxed{1}\ \text{CASE-MARKED}\ +$$

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Alternative: Linearization-based Analysis

- Successful linearization-based analyses of clitic ordering exist (e.g., Crysmann [2000])
- Possible analysis for Arabic data:
  - pronouns may introduce several types of domain objects simultaneously
  - Null Conjuncts are pronouns which do not introduce a domain object corresponding to a free pronoun
- Conceptual problem: how to capture the analogy between subject agreement and clitics?

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Divergent case-marking on two conjuncts

Divergent case-marking on two conjuncts in Classical Arabic (Sibawayh [1988]):

(23) a. ḍarbu [Zayd-in wa=‘Amr-in]
beating [Zayd-gen and-Amr-gen]

b. ḍarbu Zayd-in wa=‘Amr-an
beating Zayd-gen and-Amr-acc
‘beating Zayd and Amr’

(24) a. maa ’ataa=nii ghayr-u [Zayd-in wa=‘Amr-in]
not came-me other-nom [Zayd-gen and-Amr-gen]

b. maa ’ataa=nii ghayr-u Zayd-in
not came-me other-NOM Zayd-GEN
wa=‘Amr-un
and-Amr-NOM
‘Nobody came to me but Zayd and Amr’

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Divergent case-marking on two conjuncts

The case of the second conjunct in the (b) examples is the expected case a second dependent would have:

- (23b): verbal nouns realize at most one complement as genitive NP, the others receive accusative
- (24b): verbs allow two nominative dependents, as shown by clauses with nominative expletives (Reckendorf [1921]).

This suggests that

- the divergent case marking results from the standard case assignment mechanism.
- the two conjuncts occupy different positions in the valence lists of the head and do not form a constituent

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Linearization-based Null Conjuncts?

- (23b) and (24b) seem to show that an analysis of null conjuncts at the level of constituent structure is required in an 'ideal' grammar of Classical Arabic
- $\Rightarrow$ little motivation for designing an additional linearization-based mechanism to capture the same phenomenon in the case of pronouns
- Nevertheless, alternative analysis with some linearization-based components might be attractive.

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

Conclusion

- Arabic null conjuncts can be analyzed as instances of *pro*-drop
- First-conjunct agreement and constraints on clitics suggest feature sharing via INTERNAL-HEAD, which allows uniform analysis of agreement and bound pronouns
- Presented formalization of clitics and constraints on case marking in coordination
- Similar phenomena are found in other languages, including modern varieties of Arabic and other Semitic languages
- Analysis verified as part of grammar fragment implemented in TRALE

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References

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Introduction
The Data
The Underlying Structure
An HPSG Analysis
Licensing Null Conjuncts
Deriving First Conjunct Agreement
Bound Pronouns
Case in Coordination
Discussion
Conclusion
References