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

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

\[(4) \ a. \ dhaahib-un \ {\text{*('anta)}}
\]
\[
\text{going-SG} \quad \text{(you.∅)}
\]
\[
\text{‘you are going’}
\]

\][(4) \ b. \ dhaahib-aani \ {\text{*('anta) wa=Zaydun}}]
\]
\[
\text{going-DUAL} \quad \text{(you.∅)} \quad \text{and-Zayd.NOM}
\]
\[
\text{‘Zayd and you are going’}
\]
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’
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 | saw.1SG-you.OBL
    ‘I saw you’

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

c. * rrajul-u/a 'anaa ra’aytu
    the.man-NOM/ACC | saw.1SG
    ‘I saw the man’
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’
First Conjunctions 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’
First Conjuncts of Genitive Complements

Same options as for simple pronominal arguments:

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

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

c. baytu=ka \quad ’anta wa=Zaydin
    house-you.OBL [you.∅ and-Zayd.GEN]
    ‘your and Zayd’s house’
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) yahitiku=haa nnaasu [hiya wa=saa’ira
  shame=the.people [she.∅ and-rest.ACC
  ’ahli=haa]
  family.gen=the.people.OBL]
  ‘people shame her and the rest of her family’

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

<table>
<thead>
<tr>
<th>‘You came’</th>
<th>‘Zayd and you came’</th>
</tr>
</thead>
<tbody>
<tr>
<td>'atayta ['anta]</td>
<td>'atayta ['anta wa=Zaydun]</td>
</tr>
<tr>
<td>'atayta [pro]</td>
<td>'atayta [pro wa=Zaydun]</td>
</tr>
<tr>
<td>you.came you</td>
<td>you.came you and=Zayd</td>
</tr>
</tbody>
</table>
Complement Null Conjuncts

Claims:

- nonnominative null conjuncts are also *pro*
  \[\Rightarrow\] 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’
  \[
  \begin{array}{ll}
  \text{ra’aytu}(=ka_i) & ['iyyaaka_i] \\
  \text{ra’aytu}=ka_i & ['anta_i] \\
  \text{ra’aytu}=ka_i & [pro_i] \\
  \end{array}
  \]

  ‘I saw you and Zayd’
  \[
  \begin{array}{lll}
  \text{ra’aytu}=ka_i & ['iyyaaka_i] & \text{wa}=\text{Zaydan} \\
  \text{ra’aytu}=ka_i & ['anta_i] & \text{wa}=\text{Zaydan} \\
  \text{ra’aytu}=ka_i & [pro_i] & \text{wa}=\text{Zaydan} \\
  \end{array}
  \]
realization of arguments is determined by the subtyping of \textit{synsem} into \textit{canonical-ss} and \textit{non-canonical-ss} (Bouma et al. [2001])

⇒ zero anaphora is ’passively’ licensed by type \textit{non-canonical-ss}
Licensing Null Conjuncts

\[ \text{coord-phrase} \rightarrow \]
\[ \cdots \text{HD} | \text{CONJUNCTS} \ 0 \left[ \begin{array}{c} \text{L} | \text{C} | \text{CRD} \ - \\ \text{L} | \text{C} | \text{CRD} \ + \\ \vdots \end{array} \right] \]
\[ \text{DTRS} \left( \text{SYNSEM} \ 1, \ldots \text{SYNSEM} \ n \right) \]
\[ \land \ 0 \ \text{list} (\text{pro-ss}) \oplus \left( 1, \ldots n \right) \]

- \text{CRD} + enforces marking with the coordination clitic \( \text{wa=} \) (Beavers and Sag [2004]).
- \text{CONJUNCTS}: SYNSEM values of conjuncts (e.g., Yatabe [2004], Mouret [2006], Chaves and Paperno [2007])
- Only the canonical elements of \text{CONJUNCTS} are mapped to \text{DTRS}
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
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
The Concord features used by bound pronouns and (postverbal) subject agreement are always those in \texttt{INTERNAL-HEAD}\mid\texttt{CONCORD}, irrespective of the internal structure of the argument NP.
‘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’n̄a [‘Abbaas wa=’anaa]
came.1PL Abbas and-l.∅
‘Abbaas and I came’

b. ‘alay=naa [’an̄a wa=’anta] ’an...
upon-us.OBL l.∅ and-you.∅ that...
‘it is my and your duty to...’

- INTERNAL-HEAD is identified with the HEAD value of the conjoined NP
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...’
Transparent and Opaque Coordination

transparent-coordination \rightarrow
\[
[S | L | C \begin{array}{l}
\text{HD} | \text{CONJUNCTS} & \left\langle \left[ L | C | \text{HD} \ [1], \ldots \right] \right\rangle \\
\text{IH} & \ [1]
\end{array}]
\]

opaque-coordination \rightarrow
\[
[DTRS \left\langle \ldots \left[ S | L | C \mid \text{HEAD} & \left\langle \text{pronoun} \right\rangle \left[ \text{CASE-MARKED} \ - \right] \ldots \right] \right\rangle \]
\[
[S | L | C \begin{array}{l}
\text{HD} & \ [1] \\
\text{IH} & \ [1]
\end{array} \left\langle \text{CONJUNCTS} \left\langle \text{canonical-ss}, \ldots \right\rangle \right\rangle \left\langle \text{CASE-MARKED} \ - \right\rangle]
\]
Examples I

(15)

\[
\begin{array}{c}
\text{word} \\
\text{PHON} \quad \langle \text{'anta} \rangle \\
\text{SS|LOC|CAT} \\
\text{IH} \\
\text{HEAD} \quad 1 \\
\text{pronoun} \\
\text{CONCORD} \quad 0
\end{array}
\]
Examples II

(16)

\[
\text{transparent-coordination-phrase}
\]

\[
\text{CONJS} \langle \text{L|C} \ \text{CRD} \ - \ \text{pronoun} \ \text{CONCORD} \ 0 \ \text{PRO} \ + \rangle, \ 3
\]

\[
\text{DTRS} \langle \text{PHON} \ \langle \text{wa-Zayd} \rangle \rangle
\]

\[
\text{SYNSEM} \ 3
\]

\[
\text{S|L|C|IH} \ 2
\]
Examples III

(17)

\[
\text{transparent-coordination-phrase}
\]

\[
\text{CONJS} \langle \begin{array}{c} 1 \\ \text{L|C} \\ \text{HEAD} \\ \text{CRD} \\ - \\ \text{pronoun} \\ \text{CONCORD} \\ 0 \end{array} \rangle, \ 3
\]

\[
\text{DTRS} \langle \begin{array}{c} \text{PHON} \\ \text{'anta} \\ \text{SYNSEM} \\ 1 \\ \text{PHON} \\ \text{wa-Zayd} \\ \text{SYNSEM} \\ 3 \end{array} \rangle
\]
(18)

\[ \text{opaque-coordination-phrase} \]

\[
\text{CONJS} \left\langle 1 \left[ \text{LOC} | \text{CAT} \left[ \text{CRD} \begin{array}{c} \text{HEAD} \text{pronoun} \end{array} \right] \right], 2 \right\rangle
\]

\[
\text{DTRS} \left\langle \left[ \text{PHON} \left\langle 'anta' \right\rangle, \left[ \text{PHON} \left\langle wa-Zayd \right\rangle \right] \right], \right\rangle
\]

\[
\text{S|L|C} \left[ \left[ \text{HEAD} \begin{array}{c} \text{CONCORD} \text{0} \end{array} \right], \right]\]

\[
\text{IH} \begin{array}{c} \text{3} \end{array}
\]
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])
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
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
Realization of clitics can be ensured by extending the Argument Realization Principle (Bouma et al. [2001]):

\[
\begin{align*}
\text{ARGST} & \quad \text{list(gap-ss)} \\
& \quad \circ [1 \oplus 2] \left( \left( \text{list(...IH } \neg \left[ \text{PRO } + \lor \text{C-M } - \right] \right) \right) \\
& \quad \circ 3 \left( \left( \text{list(...IH pronoun)} \right) \\
& \quad \circ \text{list(...IH [C-M -])} \right) \\
\text{...COMPS} & \quad \text{args-to-clitics(3) } \oplus (2 \ominus \text{list(pro-ss)}) \right) \land \\
& \quad \left( \text{list(...gen) } \oplus \text{list(...acc) } \oplus \text{list(...\neg nominal)} \right) \\
\text{...SUBJ} & \quad 1
\end{align*}
\]
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.
Argument Realization Principle with Clitics

\[ \text{args-to-clitics}(1, 2) \iff \]

\[ \begin{align*}
2 & \text{ list(clitic-ss)} \\
\land & \text{ length}(1) = \text{ length}(2) \\
\land & \forall \ 3 \ 4 \\
\land & \forall \ 5 \ 6 \\
\rightarrow & \text{ prec}(2, [\ldots\text{PERS} \ 5], [\ldots\text{PERS} \ 6]) \rightarrow 5 \leq 6
\end{align*} \]

- 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.
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’

```
ra’aytu=ka wa=Zaydan

H
ra’aytu=ka

C
wa=Zaydan

M
ra’aytu

H
ka

w
Zaydan
```
Example: Verb Combining with Conjoined NP II

ra’aytu:
\[
\begin{array}{l}
\text{ARG-ST} & \left[ \langle 0 \ pro-ss, 1 \rangle \right] \\
\text{SS|L|C} & \left[ \text{COMPS} \left[ \langle 2, 1 \rangle \right] \right]
\end{array}
\]

=ka:
\[
\begin{array}{l}
\text{word} \\
\text{SYNSEM} & \left[ \langle 2 \ clitic-synsem \rangle \right] \\
& \left[ \langle \text{L|C|H|CONCORD} \ 3 \rangle \right]
\end{array}
\]

pro wa=Zaydan:
\[
\begin{array}{l}
\text{transparent-coordination-p} \\
\text{SYNSEM} & \left[ \langle 1 \ canonical-ss \rangle \right] \\
& \left[ \langle \text{L|C} \rangle \right] \\
& \left[ \langle \text{IH} \text{ CONCORD} \ 3 \rangle \right] \\
& \left[ \langle \text{PRO} \rangle \right] \\
& \left[ \langle \text{CASE} \ acc \rangle \right]
\end{array}
\]
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:
      tazaafuru-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.
Case Marking in Coordination: Formalization I

Generalizations (20a) and (20b):

\[
(21) \left[ \text{CONJUNCTS} \ \text{list(nominal)} \right] \rightarrow \\
\left[ \text{CONJUNCTS} \ \text{list}(L|C|H|\text{CASE } 1) \right] \\
\text{CASE} \ 1
\]

\[
\left[ \text{CONJUNCTS} \ 1 \right] \\
\left[ \text{L|C|H} \left[ \text{CASE} \ 1 \right] \right] \\
\bigvee \\
\left[ \text{CONJUNCTS} \left[ \text{CASE-MARKED } - \right] \right] \\
\oplus \left[ \text{list}(L|C|H|\text{CASE } \text{nom}) \right] \\
\text{CASE} \ 1
\]

Partitioning coordination-phrase into three types would have the same effect.
Generalization (20c):

(22)

$$\begin{align*}
\text{CONJS } \text{ne-list} & \oplus \left< \ldots \text{HD} \right> \textbf{1} \left[ \text{pronoun} \ \text{CASE} \rightarrow \text{nom} \right] \oplus \text{list} \\
\rightarrow \textbf{1} \text{ CASE-MARKED } +
\end{align*}$$
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?
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]
    ‘beating Zayd and Amr’

    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’
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
(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.

⇒ 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.
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
References I


References II


References III


