When number doesn't Agree: Evidence from Yucatec Maya

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1 Non-inflectional plural marking

Number is inflectional and obligatory (for countable nouns) in many languages. Nominal and verbal elements often obligatorily agree in number.

(1) a. Dos muchacha-s est-án cantando
two girl-PL be-3.PL singing
b. *Dos muchacha est-á cantando
two girl be-3.SG singing
c. *Dos muchacha est-án cantando
two girl be-3.PL singing
d. *Dos muchacha-s est-á cantando
two girl-PL be-3.SG singing

'Two girls are singing.'

In a number of other languages, like Yucatec Maya, plural marking is not obligatory for plural interpretation. In Yucatec Maya (YM), the plural morpheme -o'ob is ambiguous between: denoting a plural noun, cross-referencing a plural third person argument on the verb and marking a third person plural possessor:

(2) u p'éek-o'ob
A.3 dog-PL
'their dog' / 'his dogs' / 'their dogs'  (Lucy 1992: 47)

(3) T-u bis-ah-o'ob
PFV-A.3 take-CMP-PL
'He took them.' / 'They took it.' / 'They took them.'  (Lucy 1992: 53)

Table 1: Yucatec Maya Set A and Set B pronominal cross-reference markers

<table>
<thead>
<tr>
<th>Person</th>
<th>Set A singular</th>
<th>plural</th>
<th>Set B singular</th>
<th>plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>in(w)</td>
<td>k … -o'on</td>
<td>-en</td>
<td>-o'on</td>
</tr>
<tr>
<td>2nd</td>
<td>a(w)</td>
<td>a(w) … -e'ex</td>
<td>-ech</td>
<td>-e'ex</td>
</tr>
<tr>
<td>3rd</td>
<td>u(y)</td>
<td>u(y) … -o'ob</td>
<td>-Ø/-ij</td>
<td>-o'ob</td>
</tr>
</tbody>
</table>

This research would not have been possible without a wealth of information and judgments from Samuel Canul Yah, Gerónimo Can Tec, José Cano Sosa and other students at the University of the Orient in Valladolid, Yucatan, Mexico. I would also like to thank Heidi Harley, Simin Karimi, Andy Barss, Jeff Punske and the attendees of the University of Arizona SynSalon for their thoughtful comments and questions. I am grateful for helpful comments and questions from the UC-Santa Cruz Syntax Circle attendees as well, especially Scott AnderBois, Robert Henderson and Sandy Chung. Data not otherwise cited were collected by the author. I would like to thank T. Florian Jaeger and Juergen Bohnemeyer for discussion of optional plural marking in psycholinguistic research on sentence processing in Yucatec Maya, collaborative research funded by NSF grants # 0848353 and 0848298. I also thank Juergen for access to his corpus of Yucatec Maya texts. All mistakes are my own.
In YM, plural marking is not necessary for plural interpretation. When the plural morpheme -o'ob is present, the noun must denote a plurality:

(4) le x-ch'úupal-o'
    DEF FEM-girl-D2
    'the girl' / 'the girls'

(5) le x-ch'úupal-o'ob-o'
    DEF FEM-girl-PL-D2
    'the girls' / NOT: 'the girl'

Plural can co-occur with a numeral and classifier:

(6) ka'a-túul peek'-o'ob
two-CL.AN dog-PL
    'two dogs'

(7) le óox-p'éel siidra-o'ob-o'
    DEF three-CL.IN cider-PL-D2
    'the three ciders' (Andrade & Máas Collí 1999:216)

(8) óox-p'éel jab'-o'ob
    three-CL.IN year-PL
    'three years' (Blair & Vermont-Salas 1965-7: 454)

There is no obligatory agreement for number:

Nominal: (9) a. le ki'ichpam x-ch'úupal-o'ob
    DEF pretty FEM-girl-PL

    b. *le ki'ichpam-o'ob x-ch'úupal-o'ob
       DEF pretty-PL FEM-girl-PL
       'the pretty girls'

Clausal: (10) a. Táan u k'aay le x-ch'úupal-o'
    PROG A.3 sing DEF FEM-girl-D2

    b. Táan u k'aay le x-ch'úupal-o'ob-o'
       PROG A.3 sing DEF FEM-girl-PL-D2

    c. Táan u k'aay-o'ob le x-ch'úupal-o'ob-o'
       PROG A.3 sing-PL DEF FEM-girl-PL-D2

    d. ?Táan u k'aay-o'ob le x-ch'úupal-o'
       PROG A.3 sing-PL DEF FEM-girl-D2
       'The girls are singing.'

Properties of plural marking in YM:
- Not necessary for plural interpretation
- Co-occurrence with numeral classifier
- No obligatory agreement

2 Why are non-inflectional plurals interesting?

2.1 Nominal denotation
What is the denotation of nouns in non-obligatory (non-inflectional) plural languages?
- In inflectional plural languages, like English, plural marking is obligatory for countable nouns,
indicating an inherent (semantic) difference between count and mass nouns

- Do nouns in non-inflectional plural languages lack this count-mass distinction?
- Or, can the difference be reduced to syntactic variation?

2.2 Number agreement
Do all plurals instantiate a Number category, and if not, what are the consequences?

- If non-inflectional plural marking does not instantiate the functional head Number (#), it there is no unvalued feature [u#] and hence no Agree (Chomsky 2000, 2001) operation for number (Wiltschko 2008)

2.3 Co-occurrence of plurals and classifiers
What is the function of the non-inflectional plural? Does it serve to individuate nominal referents, like inflectional plurals and classifiers, or does it have a different function?

- Plurals and classifiers predicted not to co-occur (Sanches & Slobin 1973)
  - Greenberg (1963): Numeral classifiers imply the absence of compulsory plurals
  - Chierchia (1998): “Plural marking, of the kind familiar from many western languages, will be absent, since with every noun being mass, the function PL will have no argument for which it is defined.” (Chierchia 1998: 353)
  - Borer (2005): Classifiers and plurals share the function of individuation and instantiate the same syntactic category and thus should be in complementary distribution

2.3.1 Chierchia’s (1998) Nominal Mapping Parameter
The semantic features [±arg(ument)], [±pred(icate)] constrain the way in which syntactic category N is mapped onto its interpretation, as a kind, a property or both.

A [+arg], [-pred] language (like Chinese and Japanese) bare nouns are mapped onto kinds (functions from worlds to pluralities).

- Allow bare nouns to be arguments
- Lack plural morphology since kinds are neutralizations of the singular/plural distinction
- Generalized classifier system to individuate kind nouns

A [-arg] [+pred] language (like French and Italian) maps bare nouns onto properties

- Does not allow bare nominal arguments (must combine with a determiner)

A [+arg] [+pred] language (like English and Russian) maps bare nouns onto kinds in some cases and properties in other cases

2.3.2 Is Yucatec a [+arg, -pred] language?
1. Allows bare nouns to be arguments: No. Definite arguments require the definite determiner. Bare arguments are interpreted as general or kind-referring.

(11) K-u-kin-s-ik winik j-chakmo’ol
    IMPF-A.3-kill-CAUS-CMP man MSC-jaguar

"Jaguars kill men." (Durbin & Ojeda 1978)
'That man kills jaguars.' (Durbin & Ojeda 1978)

2. Lacks plural morphology: No

3. Generalized classifier system: Yes

(13) a. ka'a-túul x-ch'úupal (14) a. óox-p'éel báaxal
     two-CL.AN FEM-girl three-CL.IN toy

b. *ka'a x-ch'úupal
   two   FEM-girl
   'two girls'

b. *óox báaxal
   three   toy
   'three toys'

Yucatec looks more like a [+arg] [+pred] language that also has a generalized classifier system (see also Cheng & Sybesma 1999, Chung 2000, Sato 2008 for arguments against Chierchia's semantic parameter approach)

Here, I'm going to pursue a Minimalist syntactic explanation for cross-linguistic variation in nominal denotation, plural morphology and number agreement.

3 A syntactic typology of plurals

Wiltschko (2008) provides evidence that the non-inflectional plural in Halkomelem as a modificational adjunct to an acategorial root and proposes these parameters for a syntactic typology of plural marking: HOW plurals are merged and WHERE plurals are merged.

3.1 How plural is merged


- Number merges with nouns and results in a new syntactic object which has the same label
- Num is obligatory because it is selected by D (by association with [u#] (Adger 2003))
- Number must be associated with a SINGULAR or PLURAL value

In Halkomelem (see (16) below)

- Plural merges with nominals but cannot change the syntactic label
- D is not able to select for plural, thus it is optional
- There is no value other than plural

<table>
<thead>
<tr>
<th>Head: (15) x: PLURAL</th>
<th>Adjunct: (16) y</th>
</tr>
</thead>
<tbody>
<tr>
<td>x: PLURAL</td>
<td>PLURAL</td>
</tr>
<tr>
<td>y</td>
<td>y</td>
</tr>
</tbody>
</table>

In English, the plural is merged as a head and changes the category of the item with which it merges:

(17) dog-s

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In Yucatec, the plural is merged as a adjunct:

(18) peek'-o'ob 'dog-PL'

3.2 Where plural is merged
Wiltschko (2008) proposes that plurals can be merged at different places within the DP. Halkomelem plurals are merged at the √ root, but the plural in Japanese may be a candidate for merge at DP.

In Yucatec, plural seems to be merged at the level of the DP

4 Evidence for DP-adjunction of plural in Yucatec Maya

4.1 Yucatec Maya plural as a syntactic adjunct
• Optionality
• No obligatory agreement
• No irregular forms
• No allomorphs

4.2 Yucatec Maya plural does not merge at #
• Plural and numeral classifier co-occur (assuming following Borer (2005) that #P is the relevant domain for both)
• No obligatory number agreement (not a functional head)
• Plural cannot occur on a pre-nominal adjective, but can occur post-nominally (see Section 4.4.1)

4.3 Yucatec Maya plural does not merge at the n/v/a level
• When the plural morpheme -o'ob merges with a verbal or adjectival constituent, it does not pluralize the event or intensify the property
• Plural scopes over multiple constituents in the nominal phrase (see (2) repeated here as (19))

(20) u p'éek-o'ob
A.3 dog-PL
  'their dog'/ 'his dogs' / 'their dogs' (Lucy 1992: 47)
Unlike Halkomelem, the plural in Yucatec does not adjoin to the root. It does not occur between compounds or inside derivational morphology.

(23)  a. le pol-ch'oom-o'ob-o'  
      DEF head-parrot-PL-D2

b. * le pol-o'ob-ch'oom-o'  
      DEF head-PL-parrot-D2

4.4 Evidence for DP-adjunction

4.4.1 Plural cannot attach to prenominal adjectives

(24)  a. le ki'ichpam x-ch'úupal-o'ob-o'  
      DEF pretty FEM-girl-PL-D2
       'the pretty girls'

b. *le ki'ichpam-o'ob x-ch'úupal-o'

c. * le ki'ichpam-o'ob x-ch'úupal-o'ob-o'

4.4.2 No contraction of third person plural plurals

Table 2: Emphatic pronouns (from Bohnemeyer 2002: 90)

<table>
<thead>
<tr>
<th></th>
<th>teen</th>
<th>ti'</th>
<th>en</th>
<th>LOC</th>
<th>B.1.SG</th>
</tr>
</thead>
<tbody>
<tr>
<td>First person singular</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First person plural</td>
<td>to'on</td>
<td>ti'</td>
<td>o'on</td>
<td>LOC</td>
<td>B.1.PL</td>
</tr>
<tr>
<td>Second person plural</td>
<td>te'ex</td>
<td>ti'</td>
<td>e'ex</td>
<td>LOC</td>
<td>B.2.PL</td>
</tr>
<tr>
<td>Third person plural</td>
<td>*to'ob</td>
<td>ti'</td>
<td>o'ob</td>
<td>LOC</td>
<td>B.3.PL</td>
</tr>
<tr>
<td></td>
<td>leti'o'ob, le</td>
<td>ti'</td>
<td>o'ob</td>
<td>LOC</td>
<td>PL</td>
</tr>
</tbody>
</table>
4.4.3 **“Double” plurals**

Plural possessor and possessee both marked

(27)  Kux  túun  a  suku'un-e'ex-o'ob?  
      what.about  then  A.2  elder.brother-B.2.PL-PL  
      'What about your (pl) elder brothers?  (Blair & Vermont-Salas 1965-7: 85)

The plural morpheme -o'ob cannot also occupy # (assuming that the second person plural occupies #P because it triggers obligatory second person plural agreement)

(28)  te'ex-e'  táan  a  k'aay*(-e'ex)  
      PRN.2.PL-TOP  PROG  A.2  sing-B.2.PL  
      'As for you, you are singing.'

In borrowings from Spanish:

(29)  ba'ax  j  tal  u  bet  le  éespanyool-es-o'ob-o'  
      what  PAST  come  A.3  do  DEF  Spanish-PL(Sp)-PL-D2  
      'what the Spaniards came to accomplish' (Lehman 1989: 111)

(30)  bey  t-u  beet-aj-o'ob  túlakal  tu'ux  le  éespanyol-o'ob-o'  
      thus  PST-A.3  do-CMP-PL  all  where  DEF  Spanish-PL-D2  
      'that Spaniards did so everywhere' (Lehman 1989: 90)

4.5 **If plural is adjoined to DP, we would predict:**

4.5.1 **The presence of the plural should license argumenthood**

(assuming the presence of DP is necessary for argumenthood (Longobardi 1994))

Yes, Yucatec allows bare plurals

(31)  Ko'lel-o'ob-e'  ma'  táan  u  bin-i'  
      woman-PL-TOP  NEG  PROG  A.3  go-D4  
      'Women don't go there.'  (Verhoeven 2007:105)

(32)  Juan-e'  k-u-meent-ik  chak  k'án-o'ob  
      Juan-TOP  IMPF-A.3-make-INC  red  hammock-PL  
      'As for Juan, he makes red hammocks.'  (Tonhauser 2009: 4)

4.5.2 **The presence of the plural marker should trigger definiteness/specificity effects**

Yes, definiteness and specificity effects are observed:

- When a person comes to school with a new pair of shoes, someone will ask him/her:

(33)  Tumben  le  xanab-o'  
      new  DEF  shoe-D2  
      'Are those shoes new?'
• If a person goes to a shoe store and sees a pair of shoes that look old on a rack with a bunch of other shoes, they ask:

(34) Tumben-o'ob le xanab-o'
new-PL DEF shoe-D2
'Are those shoes new?'

• Obligatory wide scope in specific reading of indefinite objects

(35) Juan-e' t-uy=il-ah hun-túul koh-o'ob beyxan Pedro
Juan-TOP PRV-A.3=see-CMP one-CL.AN puma-PL also Pedro

t-uy=il-ah-o'ob
PRV-A.3=see-CMP-PL
'Juan saw pumas and Pedro saw them too.
NOT: Juan saw pumas and Pedro saw some too.'

(36) Juan-e' t-uy=il-ah hun-túul koh-o'ob beyxan Pedro
Juan-TOP PRV-A.3=see-CMP one-CL.AN puma-PL also Pedro

t-uy=il-ah-
PRV-A.3=see-CMP-
'Juan saw pumas and Pedro saw them too.
Juan saw pumas and Pedro saw some too.' (Norcliffe 2009: 90)

Similar effects have been found with plural marking in Persian (Ghomeshi 2003)

4.6 Revisiting the plural typology

• Yucatec Maya is an example of a language in which the plural morpheme is merged as an adjoined modifier at the level of D (in accordance with Wiltschko’s (2008) syntactic typology)

Table 3: Syntax of plural marking

<table>
<thead>
<tr>
<th>Language</th>
<th>Merged how</th>
<th>Merged where</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>head</td>
<td>#</td>
</tr>
<tr>
<td>Halkomelem</td>
<td>adjunct</td>
<td>√root</td>
</tr>
<tr>
<td>Yucatec Maya</td>
<td>adjunct</td>
<td>D</td>
</tr>
</tbody>
</table>

• Other logical possibilities in the typology
  • If plural is a functional head, can it be merged anywhere other than Number?
  • Is there anywhere a plural adjunct cannot merge? #?
  • Korean plural as QP adjunct

(37) Swuhak-kwa kyoswu-ka kyosil-e y moyessta
math-department professor-NOM classroom-LOC gather
'Professors of a math department gathered in the plaza.'

(38) Swuhak-kwa kyoswu-tul-i kyosil-e y moyessta
math-department professor-tul-NOM classroom-LOC gather
'(All) the professors of a math department gathered in the plaza.'
(39) Swuhak-kwa-nun kyoswu-ka n ey myeng-ita
math-department-TOP professor-NOM four CL-CPL.DC
'The professors of a math department are a group of four.'

(40) ?? Swuhak-kwa-nun kyoswu-tul-i n ey myeng-ita
math-department-TOP professor-tul-NOM four CL-CPL.DC
'The professors of a math department are a group of four.' (Park 2008, data from Kwak 2003)

5 Conclusion

- Yucatec Maya is a language in which the non-inflectional plural is a syntactic modifier that does not head a functional projection. It merges as an adjunct to D.

- If inflectional and non-inflectional plurals do not instantiate the same syntactic category, then we can maintain Chierchia and Borer's generalizations about the co-occurrence of classifiers and plurals (those that head a functional Number projection).


Abbreviations used

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1st person</td>
</tr>
<tr>
<td>2</td>
<td>2nd person</td>
</tr>
<tr>
<td>3</td>
<td>3rd person</td>
</tr>
<tr>
<td>A</td>
<td>Set A cross reference marker</td>
</tr>
<tr>
<td>APPL</td>
<td>Applicative</td>
</tr>
<tr>
<td>B</td>
<td>Set B cross-reference marker</td>
</tr>
<tr>
<td>CAUS</td>
<td>Causative</td>
</tr>
<tr>
<td>CL</td>
<td>Classifier</td>
</tr>
<tr>
<td>CL.AN</td>
<td>Animate classifier</td>
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<td>Inanimate classifier</td>
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<td>Completive</td>
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<td>Deictic particle (distal)</td>
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<tr>
<td>DEF</td>
<td>Definite determiner</td>
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<td>Feminine</td>
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