Non-Number plurals*

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1. Introduction

In some languages, like Hebrew and Romance, the plural heads a functional Number Phrase (NumP or #P) (Bernstein 1991, Ritter 1991, Valois 1991). Recently, Wiltschko (2008) proposed that languages vary in where and how the plural merges, as head or adjuncts and at various projections along the spine of the DP. I present distributional, interpretational and experimental evidence that the plural in Yucatec Maya adjoins to the DP. I also review evidence for plural markers that merge other levels of the DP.

2. The typology of plural marking

Wiltschko (2008) proposes a typology of plural marking according to which languages can vary by two parameters: 1) how the plural merges and 2) where the plural merges.

2.1 How the plural merges

The first parameter according to which a language can vary is how the plural marker merges: as a head or an adjunct (Wiltschko 2008). A plural that merges as the head of a phrase has the ability to change the label of the constituent with which it merges. In the tree in (1) (adapted from Wiltschko (2008)), the plural of category x merges with a constituent of category y, and the resulting constituent has the label of x.

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*I owe many thanks to Heidi Harley, Simin Karimi, Janet Nicol and Andrew Barss whose helpful comments and questions shaped and greatly improved this paper. I would also like to thank Martina Wiltschko, Donna Gerds, Carrie Gillon, Jessica Coon, Scott AnderBois and Robert Henderson for very helpful comments and discussions. I also thank audiences at the 85th meeting of the LSA in Pittsburgh, the 29th meeting of WCCFL in Tucson and the 42nd meeting of NELS in Toronto where parts of this paper were presented. I also thank members of the S(yntax) Circle at UC Santa Cruz and the Syn(tax) Salon at the University of Arizona for helpful comments. This research was partially funded by grants from the National Science Foundation to T. Florian Jaeger (NSF-BCS 0848385) and Jürgen Bohnemeyer (NSF-BCS 0848298) and a Dissertation Improvement Grant to the author from the Social and Behavioral Sciences Research Institute at the University of Arizona. All mistakes are my own.
A plural that merges as an adjunct, however, lacks this category-changing potential. In the tree in (2) (adapted from Wiltschko (2008)), a plural adjunct merges with a constituent of category y. The resulting constituent carries the label of y, not plural.\(^1\)

\(\text{(2)}\)

\(\text{PLURAL} \rightarrow y\)

\[x: \text{PLURAL} \rightarrow y\]

\[x: \text{PLURAL}\]

\[\text{y}\]

2.2 Where the plural merges

The second parameter is where the plural merges (Wiltschko 2008). Since the DP hypothesis (Brame 1982, Szabolczi 1983, 1987, Abney 1987), a number of functional projections have been proposed between the DP and the noun, or root of the nominal phrase. Wiltschko considers the DP, the NumP (or #P), the categorizing nP projection and the root as potential sites for a plural to merge along the spine (see (3) below).

\(\text{(3)}\)

\[
\text{DP} \rightarrow \text{D} \rightarrow \# \rightarrow \sqrt{\text{root}} \rightarrow n \rightarrow \text{nP} \rightarrow \# \rightarrow \text{#P} \rightarrow \text{D}
\]

3. The DP-joined plural in Yucatec Maya

In this section, I present distributional and interpretational evidence for the plural morpheme –o’ob in Yucatec Maya as adjoined to the DP\(^2\).

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\(^1\) I assume, following Wiltschko (2008) as well as Hornstein and Nunes (2008) and Sato (2010) that adjuncts are syntactic objects that merge without the ability to change the label of the item with which they merge. Hornstein and Nunes (2008) suggest that specifiers and complements require both concatenation and labeling, while adjuncts require only concatenation. Wiltschko (2008, footnote 13) presents a similar suggestion.

\(^2\) This is not the first proposal for a plural merging at the DP. Li (1999) argues that the collective morpheme –men in Chinese should be analyzed as merging at D. Also, Ghomeshi (2003) analyzes the plural morpheme in Persian as merging at DP, but see Gebhardt (2008) for arguments against the DP analysis of
3.1 Optionality

The first piece of support for the proposal that the plural morpheme –o’ob in Yucatec Maya merges as an adjunct is that its use is optional. In Yucatec Maya, the presence of the plural morpheme is not necessary for plural interpretation, as shown in (4) and (5).

(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’

3.2 Lack of agreement

The second piece of evidence that the plural morpheme –o’ob in Yucatec Maya merges as an adjunct and not as a functional head is that it does not trigger obligatory number agreement or concord. In (6), the adjective need not be marked with the plural morpheme when the noun is plural-marked (though it may be, when postnominal).

(6) le x-ch’úupal-o’ob ki’ichpam(-o’ob)
    DEF FEM-girl-PL pretty(-PL)
    ‘the pretty girls’

In the clausal domain, the nominal plural morpheme –o’ob (homophonous with the third person plural Set A cross-reference marker –o’ob) can optionally be used. Covariation of plural form with the third person plural Set A marker –o’ob is also optional, as in (7).

(7) Táan u k’aay(-o’ob) le x-ch’úupal(-o’ob)-o’
    PROG A3 sing(-PL) DEF FEM-girl(-PL)-D2
    ‘The girls are singing’

3.3 Distribution

There are distributional facts about the plural morpheme –o’ob in Yucatec Maya that support its position as merging at the DP and not in a lower position along the spine of the DP. The plural –o’ob can combine with verbs and adjectives, but when it does, it does not result in the pluractional reading (see (8)) or an intensification of the property (see (9)). It is arguably the homophonous third person plural cross-reference marker –o’ob that attaches to verbs and adjectives co-referencing a third person plural argument.

(8) Táan u yaalkab-o’ob
They are running' / NOT: ‘Running repeatedly.’

‘They are delicious.’ / NOT: ‘very delicious’

In addition, the nominal plural marker –o’ob cannot occur inside of compounds (see (10)), nor can it occur inside of derivational morphology (see (11) with the instrumental suffix and in (12) with the inalienable possession suffix).

(10) le pol-ch’oom-o’ob-o’
DEF head-village-PL-D2
‘governors’

(11) x-muk-ub-o’ob
AG-bury-INSTR-PL
‘shovels’ (Bricker et al. 1998: 365)

(12) in b’aak-el-o’ob
A1 bone-IP-PL
‘my bones’ (Bricker et al. 1998: 359)

Wiltschko presents data to argue that in Upriver Halkomelem the plural can occur inside of compounds and derivational morphology. The examples in (13) through (15) show that the reduplicative plural morpheme ignores the presence of the nominalizing prefix s-.

This is shown in the pluralization of the noun in (15) from the noun in (14).

(13) p’eq’
white
‘white’

(14) s-p’eq’
NOM-white
‘white spot on skin’

(15) s-p’eq’-p’eq’ (*sp’eq’sp’eq’)
NOM-white-PL
‘white spots on the skin’ (Wiltschko 2008: 645, data from Gallowy 1993: 379)

In addition, Wiltschko shows that in Upriver Halkomelem, the plural can occur inside of a compound. Also, the interpretation of the plural in the compound refers to the first noun of the compound, stripes, not the compound as a whole, chipmunk, as shown in (16).

(16) s-xexp’-i:tsel
NOM-stripe.PL-back
Thus, we can conclude that in Yucatec, unlike upriver Halkomelem, the plural morpheme merges higher than the root and the categorizing head. In addition, there is evidence that the plural morpheme in Yucatec merges higher than the Number Phrase. In Yucatec Maya, adjectives can optionally take the plural marker –o’ob but only when the adjective is in postnominal position. Plural marking on the prenominal adjective (whether or not the noun has plural morphology, as in (17b) is ungrammatical.

(17) 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)

   c. le x-ch’úupal(-o’ob) ki’ichpam-o’ob
      DEF FEM-girl(-PL) pretty-PL

   ‘The pretty girls’

In Walloon, a language in which the plural marker heads the Number Phrase, the plural can occur on a prenominal adjective (see (18) and (19), unlike in Yucatec.

(18) dés vêtês-ouh
    some green.PL-door
    ‘some green doors’

(19) dés nêur-s-ouy
    some black.PL-eye
    ‘some black eyes’ (Bernstein 1991, data from Remacle 1952 and Morin 1986)

Kayne’s (1994) analysis of prenominal adjectives as reduced relative clauses predicates that are raised to the specifier of the Number Phrase explains the Walloon facts, and the fact that in Yucatec a prenominal adjective cannot have plural morphology supports the idea that in Yucatec the plural does not head the Number Phrase. In order to derive the morpheme order facts of Yucatec, with the DP-adjoined plural occurring linearly rightward in the phrase, we have to assume that the plural morpheme is right-adjoined to the DP.

A stronger piece of evidence in support of the DP-adjoined hypothesis for Yucatec Maya comes from the phenomenon of plural marking with conjoined nouns. The syntax of coordination arguably involves a structure that is headed by a coordinate phrase (Munn 1993, Progovac 1997) and dominated by a phrase of the same category as the conjuncts (Jackendoff 1977, Chomsky 1981, Gadzar et al. 1985, Sag et al. 1985). In other words, the coordination of two DPs is headed by a coordinate phrase and dominated by a maximal DP. Given that the plural marker –o’ob in Yucatec is adjoined to the DP, it should be possible for it to adjoin to the highest DP, which dominates the DPs of both
conjoins. This means that in Yucatec, the plural marker, since it adjoins to a DP can
adjoin to either of the DPs of the two conjoined nouns or to the highest DP, which
dominates the conjunct as a whole, as shown in (20).

(20)  

Because the plural morpheme can adjoin to the highest DP in (20), it can occur at the
linear end of a DP with two conjoined nouns and result in the meaning that both nouns of
the conjunct are singular. It can also result in the meaning that the first noun or the
second or both nouns are plural, as shown in (21).

(21)  

This is unique evidence that the plural marker in Yucatec is adjoined to the DP. It would
not show the behavior it does with conjoined nouns if it were merged at #P or lower.

3.4 Interpretation

There is interpretational evidence that the plural morpheme –o’ob in Yucatec merges at
the DP. In Yucatec, the use of the plural marker results in a specific interpretation. The
example in (22) shows that in a context in which a noun is non-specific, in other words, it
is not one specific instance out of a set, no plural marker is necessary. However, when
referring to a specific noun in a set of others, the plural marker is used, as in (23).

(22) Tumben le xanab-o’?
    new DEF shoe-D2
    ‘Are those shoes new?’ CONTEXT: A student comes to school wearing shoes that
    appear to be new. Another student asks this student “Are those shoes new?”

(23) Tumben le xanab-o’ob-o’?
    new DEF shoe-PL-D2
    ‘Are those shoes new?’ CONTEXT: A person goes into a shoe store and sees a pair
    of shoes that look old on a rack with many other shoes that look new. This person
    asks the salesperson “Are those shoes new?”
Non-Number plurals

Assuming that the DP is the locus of definiteness and specificity (Lyons 1999), this interpretational evidence would support the idea that the plural marker in Yucatec resides in the DP, giving way to the specific interpretation of the plural.

4. Other non-Number plurals

4.1 nP plurals

There have been a number of arguments for plural marking that merges at the level of the categorizing head (nP) (e.g. Acquaviva’s (2008) lexical plurals, Alexiadou 2010). Kramer (2009) presents arguments that the irregular plural in Amharic merges at the nP, while the regular plural merges at the Number Phrase. Kramer shows that irregular plurals in Amharic give rise to idiosyncratic interpretations like lexical plurals. Word formation at the level of the category-defining head is more susceptible to phonological and semantic irregularities (Marantz 1997, 2001, Arad 2003, 2005), thus if the irregular plural in Amharic is merged at the nP, these idiosyncratic meanings would be predicted.

Kramer also presents distributional evidence in support of the split analysis of plural marking in Amharic. Double pluralization, with the regular and irregular plural markers co-occurring, is a common phenomenon in Amharic, as shown in (24). And, Kramer shows that the order of the morphemes is always irregular plural followed by regular plural, not the reverse. Given the Mirror Principle (Baker 1985), this suggests that the irregular plural must merge closer to the root than the regular plural (lower than NumP).

(24) k’al-at-otsts *k’al-otsts-at
    word-IRREG.PL-REG.PL word-REG.PL-IREEG-PL
    ‘words’ (Kramer 1009: 193)

Gillon (in prep) proposes a similar split analysis of plural marking in Innu-aimun. Gillon shows that Innu-aimun has one plural with identical semantics to that of the plural in English and merges at the Number Phrase. She shows that Innu-aimun has another plural with different semantics, similar to lexical plurals. In Innu-aimun, plural mass nouns have two distinct interpretations; depending on which plural marker they take. The Number plural implies individuation (the ‘bottles of water’ interpretation of (25)) while the other, which merges at nP, does not (the ‘lots of water’ interpretation of (25)).

(25) nipiaa
    water.PL
    ‘bottles of water’ / ‘lots of water’ (Gillon in prep: 8)

As is predicted by Gillon’s analysis, count nouns can similarly get mass interpretations by combining with nP plurals (the ‘tea’ interpretation in (26)).

(26) nipish-a
    leaf-INAN.PL
‘tea’ / ‘cups of tea’ (Gillon in prep: 15)

I take this as evidence for plural marking that merges at the categorizing head, nP.

4.2 QP plurals

The Quantificational Phrase is argued to be another layer of the DP spine (Giusti 2002) (e.g. DP > QP > NumP > nP > root). Park (2008) argues that the plural marker –tul/deul in Korean merges at the QP because in Korean, the plural marker implies distributivity. The sentences in (27) and (28) show that the plural marker –tul/deul is optional with collective predicates with a distributive sub-entailment. When the plural is used, as in (28), the reading is that all of the professors participate.

(27) Swuhakkwa kyoswu-ka kyosil-ey moyessta
    math department professor-NOM classroom-LOC gather-PST
    ‘The professors of a math department gathered in the classroom’

(28) Swuhakkwa kyoswu-tul-i kyosil-ey moyessta
    math department professor-PL-NOM classroom-LOC gather-PST
    ‘(All) the professors of a math department gathered in the classroom’ (Park 2008, data from Kwak (2003))

With truly collective predicates with no distributive sub-entailment, however, the plural marker –tul/deul is infelicitous (as in (30) compared to (29))

(29) Swuhak-kwa-nun kyoswu-ka ney myeng-ita
    math department-TOP professor-NOM four CL-CPL.DC
    ‘The professors of a math department are a group of four’

(30) ??Swuhuk-kwa-nun kyoswu-tul-i ney myeng-ita
    math department-TOP professor-PL-NOM four CL-CPL.DC
    ‘The professors of a math department are a group of four’

The plural marker –tul/deul in Korean is a potential candidate for a QP plural.

4.3 Constraining the typology

The languages in which I have examined the variation in the syntax of plural marking can be organized into a typology of where the plural merges. This typology is shown in (31).

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4 I thank JaeHoon Choi for verifying these judgments in Korean for me.
If Wiltschko’s (2008) parameters are taken to their logical end and based on the DP spine in (30) above, we would predict 10 types of languages: head or adjunct to DP, QP, NumP, nP and the root. It is possible, however, to imagine that this typology is more tightly constrained. For example, we might expect that if a plural merges as a head, having the label-changing potential, it would always label the projection as Number. If this is true, the typology would be cut to 6 types: 1) head of NumP, 2) adjoined to NumP, 3) adjoined to DP, 4) adjoined to QP, 5) adjoined to nP, 6) adjoined to the root.

There are, however, reasons to question whether a plural marker would be expected to merge at the root. In inflectional plural languages, in which the plural is assumed to head the Number Phrase, it is also possible to have plural marking inside of compounds in some cases (for example, sports complex in English or capi mafia, master-PL mafia, “mafia bosses” in Italian’). Gerdts (2012) argues that in Island Halkomelem the plural marker cannot be adjoined to the root because it shows agreement effects. For example, Gerdts shows that in Island Halkomelem, bare Class A nouns cannot combine with plural adjectives, while bare Class B nouns can. In addition, diminutives cannot combine with plural adjectives unless they are also plural marked.

The question of whether we would expect a plural marker to merge at the root is an interesting one, especially with regard to the issue of how the variation in the syntax of plural marking is constrained, but it requires more in-depth investigation in a language which appears to have a root-adjointing plural.

5. Experimental evidence for the DP-adjointed plural in Yucatec Maya

Here I present experimental evidence fro the DP-adjointed plural in Yucatec Maya. The experiment shows that in order to account for all of the experimental responses, the DP-adjointed plural hypothesis is necessary.

5.1 Method

5 I thank an anonymous reviewer for the Italian example.
This experiment is a timed translation task in which participants heard stimulus sentences with conjoined nouns and an intransitive verb in Spanish. The participants translated these sentences into Yucatec under time pressure. There were 18 items (5 conjuncts referring to humans and 13 to animals) in 4 conditions, shown in the table in (32). There were 36 fillers consisting of transitive sentences in which the number of the subject varied, transitive sentences with conjoined object nouns varying in number, and sentences with predicate adjectives. The items and fillers were pseudo-randomized and arranged in a Latin Squares design into four experimental lists. The Spanish stimuli were delivered by the synthetic voice of Alberto from AT&T Labs Natural Voices.

(32) Experiment conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Noun 1 (N1)</th>
<th>Noun 2 (N2)</th>
<th>Verb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singular-Singular (SS)</td>
<td><em>La muchacha</em> y</td>
<td><em>la mujer</em></td>
<td><em>están cocinando</em></td>
</tr>
<tr>
<td></td>
<td>The girl-SG and</td>
<td>the woman-SG</td>
<td></td>
</tr>
<tr>
<td>Singular-Plural (SP)</td>
<td><em>La muchacha</em> y</td>
<td><em>las mujeres</em></td>
<td><em>están cocinando</em></td>
</tr>
<tr>
<td></td>
<td>The girl-SG and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plural-Singular (PS)</td>
<td><em>Las muchachas</em> y</td>
<td><em>la mujer</em></td>
<td><em>están cocinando</em></td>
</tr>
<tr>
<td></td>
<td>The girls-PL and</td>
<td>the woman-PL</td>
<td></td>
</tr>
<tr>
<td>Plural-Plural (PP)</td>
<td><em>Las muchachas</em> y</td>
<td><em>las mujeres</em></td>
<td><em>están cocinando</em></td>
</tr>
<tr>
<td></td>
<td>The girls-PL and</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.2 Procedure

Participants took the experiment on a laptop while wearing a Siemens headset with a unidirectional microphone. The experiment was delivered on a MacBook Pro using Experiment Builder software developed at the University of Rochester. The participants were given oral and written instructions and went through four initial practice trials.

In the experiment, the Spanish stimulus sentence was initially delivered then repeated two times. The participant was instructed that he or she could listen to the Spanish stimulus sentence all three times, or he or she could press the spacebar anytime after hearing the sentence the first time to advance to the recording of the Yucatec translation. On the screen, there was a picture of an ear when the participant was to be listening to the Spanish stimulus and a picture of a mouth when the participant was to be saying the Yucatec translation. Participants were given 15 seconds to say the translation in Yucatec. A time bar appeared at the bottom of the screen to indicate how much time remained. If the participant had already completed his or her responses and there was still time remaining, the participant was allowed to press the spacebar to advance to the next trial, if he or she so desired. The experiment took no longer than 30 minutes to complete.

5.3 Participants

Twenty-eight bilingual Yucatec Maya-Spanish speakers between the ages of 18 and 42 participated in the experiment and were compensated 25 Mexican pesos (just over 2 U.S. dollars) for the participation. The experiment was carried out in a recording room at La Universidad del Oriente in Valladolid, Yucatan, Mexico.
5.4 Results

The Yucatec responses were coded by the author and two native speakers of Yucatec for plural marking on the first and second nouns and the verb. Responses were excluded from the analysis if they were unintelligible, or if the coder was unsure of whether there was a plural or not, if the response was in Spanish, or if there was no response given. Responses with nouns that were borrowed from Spanish were included if they had Yucatec morphology (e.g. the Yucatec definite determiner and/or distal deictic marker or plural marker) because there was no effect of Spanish borrowings on the likelihood of the use of the Yucatec plural marker –o’ob in the experimental responses.

In the Yucatec responses, there were significantly more plurals marked on the second noun in the SP and PP conditions, compared to the SS and PS conditions ($\chi^2(3)=161, p < 0.001$). In addition, there were significantly more plurals marked on the first noun in the PS and PP conditions compared to the SS and SP conditions ($\chi^2(3)=101, p < 0.001$). These results are consistent with the expectation that morphosyntactic priming from the Spanish stimulus to the Yucatec response would be an influence on the translations.

Another potential influence on the experimental responses is underspecification. Since plural marking in Yucatec is not obligatory, the participant could have simply not used the plural morpheme in Yucatec, even if he or she heard a plural in the Spanish stimulus. Underspecification, in addition to morphosyntactic priming, can account for a majority of the experimental responses. The responses that cannot be attributed to morphosyntactic priming or underspecification, however, are those: 1) the SS condition when there was a plural used after the second noun, 2) the PS condition when a plural was used after the first and second nouns and 3) the PS condition when a plural was used only after the second linear noun. The black boxes in the figure in (33) indicate these responses that can only be unambiguously accounted for by the DP-adjoined plural hypothesis.

(33) Responses unambiguously accounted for by DP-adjoined hypothesis

[Diagram of proportion by condition with black boxes indicating specific conditions]
6. Conclusion

I have discussed the idea that there is wide variation across languages in the distributional and interpretational properties of plural marking. Still, the phenomenon can be captured by a universal syntax that allows variation in where and how plurals are merged. Wiltschko (2008) proposed that plural marking can merge as a head or an adjunct and to various projections along the spine of the DP (DP, NumP, nP, root). Wiltschko argued that plural marking in Upper Halkomelem merges as an adjunct to the root. I presented evidence that the plural morpheme in Yucatec Maya merges as an adjunct to the DP. I presented distributional, interpretational and experimental evidence for the DP-adjoined plural hypothesis for Yucatec Maya. The clear implication of these findings, as Wiltschko (2008) pointed out, is that identify of function does not imply identical syntax.

References

Non-Number plurals

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