A unique operator for verbal pluractionality and numeral distributivity

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Seri

- Seri is spoken in northwest Mexico, in two villages on the coast: *Haxöl Iihom*/El Desemboque and *Socaaix*/Punta Chueca

Figure: The Seri region in Mexico

- Isolate, approx. 900 speakers (Ethnologue 2007 estimate)
- Method: collective sessions, groups of 4 consultants

Puzzle

- In Seri, if Gadiel kicked three dogs I could say (1a) or (1b).

(1) a. Gadiel quih **haxaca quih c-apxa** iyoonifz.
Gadiel DEF dog.PL DEF SBJ.NMLZ.SBJ-be_three 3;3.RLYO.kick
Gadiel kicked three dogs. [EDSEI17OCT2018DRPM, CON]

b. Gadiel quih **haxaca quih c-apxoj** iyoonifz.
Gadiel DEF dog.PL DEF SBJ.NMLZ.SBJ-be_three.? 3;3.RLYO.kick
Gadiel kicked three dogs. [EDSEI17OCT2018DRPM, CON]

- What is the difference between *capxa* and *capxoj*?
ANSWER:
  - *capxoj* is the pluractional counterpart of *capxa*
  - *capxoj* has the intepretation of a distributive numeral

(2) *Distributive numerals* are indefinites that impose a restriction that their reference co-vary with another plurality (Farkas, 1997)

Outline

- Claim 1: Pluractionality combines with numerals
  - Seri numerals are verbs
  - Verbs have pluractional forms
- Claim 2: Pluractional numerals are distributive
  - Pluractional numerals are distributive numerals
  - Analysis and predictions

Seri numerals are verbs

- Seri has nouns, verbs, determiners, adverbs, and a few adjectives (about 10)
- All numerals and quantifiers are intr. verbs, except *tazo* 'one'
  - They inflect (*cf.* 3a and 3b) and have the same distribution as verbs

(3) a. Ham-oocj.
1PL.RLMI-be_two
There are two of us.

b. Ham-iizcam.
1PL.RLMI-arrive.PL
We have arrived.

- They modify a noun with relativization (4) like other verbs

(4) [Hoyacalcam quih c-oocj] yihiimtoj. [EDSEI8MAY2019DRPM, CON]
1POSS.brother.PL DEF SBJ.NMLZ-be_two RLYO.marry.PL
My two brothers got married.

- Nominalized clauses in Seri are internally-headed relative clauses (Marlett, 2012); i.e.
- internally, the [NP] in (4) has the syntax of a clause: the noun is the subject of the (numeral) predicate,
- externally, it has nominal syntax

Seri has pluractionality

- PLURactional forms contrast with an underspecified neutral form (Cabredo Hofherr, Pasquereau & O'Meara 2018, Pasquereau 2019, SULA 2020 talk)

(5) Juan quih hehe z iyahoiilc.
Juan DET tree INDEF.SG 3;3.RLYO.CAUS.be_tubular.PLUR
Juan made a tree tubular. [Questionnaire2FT5]
Context A: Juan carved several tubes out of a tree. TRUE
Context B: Juan carved one tube out of a tree. FALSE

(6) Pluractionality (Newman, 1980; Cabredo Hofherr, ress): The expression of multiple eventualities by markers on the verb.

- Morphology of pluractionality
Extreme many-to-many mapping: meaning X ↮ exponent Y (Baerman, 2016)

Numerals have pluractional forms

- Numerals in Seri have two forms, e.g. *-apxa*/*-apxoj* 'three' (except the word for 'eight' which is already derived from 'four')

(7) Numerals

1	tazo (adj)	tazlc (adj)
2	coocj	coocalcam
3	capxa	capxoj
4	czooxöc	czooxojoj
5	cooitom	coiitmoj
6	isnaap cazoj	isnaap cazlc
7	tomcoj cöquiih	tomcoj cöquiihtoj
8	czooxolcam	
9	csooi chanl	csooi chanaloj
10	chanl	chanaloj
11	ihanl tazo cöquiih	ihanl tazlc cöquiih

What does it mean for a numeral to be pluractional?

- Hypothesis: Pluractionality on numerals produces *distributive numerals* (Farkas, 1997)

(8) Distributive numeral (Cable, 2014)
A morphosyntatic construction containing a numeral, whereby

1. the sentence as a whole receives a distributive reading, and
2. under the allowable readings, the numeral contained within the construction must be interpreted *as if* it is within the scope of a distributive operator.

No collective reading

(9) Collective scenario
Context: I have three dogs. Two girls came to wash them at 2pm. María and Alina together bathed Zombi, Lalo, and Mía at the same time. [EDSEI24OCT2018DRPM.GH.ATHF.LKPH]

Xicaquiziil cmajiic quih **haxaca** **quih**
child.PL woman.PL DEF dog.PL DEF

c-apxa/**#c-apxoj** hax
SBJ.NMLZ.be_three/SBJ.NMLZ.be_three.PLUR water

an iyahaalam.
[3POSS].in 3;3.RLYO.wash.PL

The children washed three dogs.
Speaker Comment on *capxoj*: if they are in the same basin, *capxoj* cannot be used, *capxoj* is for a pair of three

No cumulative reading

(10) Cumulative scenario
Context: I have three dogs. Two girls came to wash them at 2pm. Alina washed one and María washed the other two.

[EDSEI24OCT2018DRPM.GH.ATHF.LKPH]
Xicaquiziil cmajiic quih **haxaca** **quih**
child.PL woman.PL DEF dog.PL DEF

c-apxa/**#c-apxoj** hax
SBJ.NMLZ.be_three/SBJ.NMLZ.be_three.PLUR water

an iyahaalam.
[3POSS].in 3;3.RLYO.wash.PL

The girls washed three dogs.
Speaker Comment on *capxoj*: because one girl washes one dog and the other washes two, but the sentence says that each one washes three dogs

Distributive reading

(11) Distributive scenario
Context: I have six dogs. Two girls came to wash them at 2pm. While Alina washed 3, María washed the other 3.

[EDSEI24OCT2018DRPM.GH.ATHF.LKPH]
Xicaquiziil cmajiic quih **haxaca** **quih**
child.PL woman.PL DEF dog.PL DEF

#c-apxa/**c-apxoj** hax
SBJ.NMLZ.be_three/SBJ.NMLZ.be_three.PLUR water

an iyahaalam.
[3POSS].in 3;3.RLYO.wash.PL

The children washed three dogs.
Speaker Comment on *capxa*: because the sentence says that there are three dogs not more, but there are actually six dogs

(12) Distributive numeral (Cable, 2014)
A morphosyntatic construction containing a numeral, whereby

1. the sentence as a whole receives a distributive reading, ✓
2. under the allowable readings, the numeral contained within the construction must be interpreted *as if* it is within the scope of a distributive operator.

Num-PLUR marks the distributed share

(13) Context: We have three dogs. Six girls came over to bathe them. Each dog was bathed by a team of two girls.

[EDSEI24OCT2018DRPM.GH.ATHF.LKPH]

Xicacaziil cmajiic quih
girl.PL woman.PL DEF

c-oocalcam
SBJ.NMLZ-be_two.PLUR

haxaca quih c-apxa
dog.PL DEF SBJ.NMLZ-be_three

hax an iyahaalam.
water [3POSS]in 3;3.RLYO.wash.PL

***Two.*PLUR** *girls washed three dogs.*

Representation of the context:
∃z. three.dogs(z) & ∀x. x≠z & atom(x) → ∃e.∃y. **two.girls**(y) & y bathed x in e

- [two.PLUR girls] is interpreted as if within the scope of ∀, the sentence is true

Num-PLUR marks the distributed share

(14) Context: We have three dogs. Six girls came over to bathe them. Each dog was bathed by a team of two girls.

[EDSEI24OCT2018DRPM.GH.ATHF.LKPH]

#Xicacaziil cmajiic quih c-oocj
girl.PL woman.PL DEF SBJ.NMLZ-be_two

haxaca quih **c-apxoj**
dog.PL DEF **SBJ.NMLZ-be_three.PLUR**

hax an iyahaalam.
water [3POSS]in 3;3.RLYO.wash.PL

Two girls washed ***three.*PLUR** *dogs.*

Representation of the context:
∃z. **three.dogs**(z) & ∀x. x≠z & atom(x) → ∃e.∃y. two.girls(y) & y bathed x in e

- [three.PLUR dogs] is not interpreted as if within the scope of ∀, the sentence is false

Seri pluractional numerals are distributive numerals

(15) Distributive numeral (Cable, 2014)
A morphosyntatic construction containing a numeral, whereby

1. the sentence as a whole receives a distributive reading, ✓
2. under the allowable readings, the numeral contained within the construction must be interpreted *as if* it is within the scope of a distributive operator,

   i.e. num-PLUR denotes the distributed share ✓

- Pluractional numerals in Seri are distributive numerals, but what kind? ▸ Click here for details

Background on distributive dependencies

- Choe (1987) analyzes distribution as a (quantificational) relationship between the atoms of the SORTAL KEY and the DISTRIBUTED SHARE
- the DP containing the distributive numeral is the distributive share which is distributed over a sortal key.

(16) a. 'The girls washed three-PLUR dogs' (15)

b.

SORTAL KEY: the girls		DIST. SHARE: 3-PLUR dogs
Alina	———	3 dogs
María	———	3 dogs

- what can the sortal key be for Seri PLUR-numerals?

Temporal sortal key

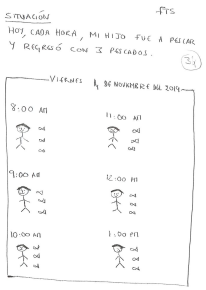
(17) Distribution over times
Context: Today, every hour, my son Juan caught 3 fish.

[EDSEI15NOV2019DRPM.ATHF.GHF.AMMO.GH]

Juan quih **zixcam quih c-apxoj**
Juan DEF fish DEF NMLZ-be_three.PLUR

iyoocö.
3;3.RLYO.kill

Juan caught three fish (repeatedly).



Spatial sortal key

(18) Distribution over locations
Today there was a race between several groups of three girls.

[EDSEI24OCT2018DRPM.GH.ATHF.LKPH]

Xicaquiziil cmajiic quih c-apxoj
child.PL woman.PL DEF SBJ.NMLZ.be_three.PLUR

yopancojc.
RLYO.run.PL

Women ran in threes. [EDSEI24OCT2018DRPM.GH.ATHF.LKPH]

Other sortal keys

- The num-PLUR DP can be distributed to times, participants, locations
  = traditional parameters/sortal keys for eventuality individuation (Lasersohn 1995)
- But there are other sortal keys that are highly contextual, e.g. fish species (19) or book topic (20)

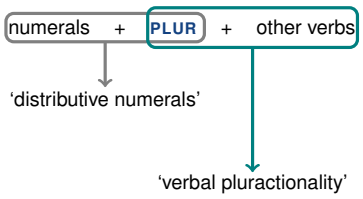
(19) Ihyaazi quih **zixcam** **quih** **c-apxoj** iyoocö.
1SG.son DEF fish DEF SBJ.NMLZ-be_three.PLUR 3;3.RLYO.kill
My son caught three fish of different species. SC: if in one outing, he catches 3 fish of many species [EDSEI24OCT2018DRPM.GH.ATHF.LKPH, ELAB]

(20) Juan quih **hapaspoj** **hanoocaj** **quih**
Juan DEF SBJ.NMLZ:PASS:write SBJ.NMLZ:PASS-carry_under_arm DEF
c-oocalcam sacaaitom caha.
SBJ.NMLZ-be_two.PLUR IRR.IND.read SBJ.NMLZ.AUX
Juan is going to read two books on a variety of themes. SC: 2 on a similar theme, 2 more on another theme, ...) [EDSEI26OCT2018DRPM.GH.ATHF.LKPH, CON, ELAB]

Descriptive generalizations

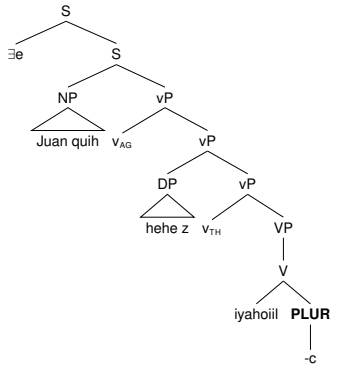
- Num-PLUR require that there be more than one group of cardinality *Num*
- Group individuation is highly context-sensitive; it is achieved by variation in one or more parameters
  - eventuality parameters: spatial or temporal location, co-participant in the event that the groups also participate in
  - lexical parameters: fish species, book topic, clothe color ...
- // diversity condition on pluractionality (Cabredo Hofherr and Laca, 2012; Donazzan and Müller, 2015), especially in Seri (Pasquereau and Cabredo Hofherr, 2020)

A homogeneous meaning/syntax for PLUR in Seri



Composing PLUR with verbs - Syntax

Juan quih hehe z
Juan DET tree INDEF.SG
iyahoiilc.
3;3.RLYO.CAUS.be_tubular.PLUR
Juan made a tree tubular.
[Questionnaire2FT5]



Composing PLUR with verbs - Semantics

- In a sentence like (21a) from (3), PLUR combines with the V *iyahoiij* 'make tubular' to create a set of plural eventualities e, such that each one of these plural eventualities is composed of at least two sub-eventualities e' of 'making tubular'

(21) a. 'Juan made_tubular.PLUR a tree', (4)

b.

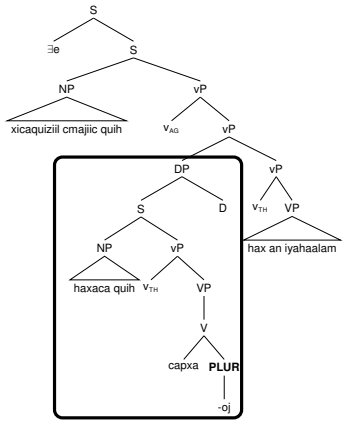
t_1	—	e'	—	making_tubular
t_2	—	e"	—	making_tubular
t_3	—	e"'	—	making_tubular
		e	—	*theme of e = a.tree, *agent of e = Juan, ...

- Crucially, because PLUR applies to V, arguments are predicated of these plural eventualities (not of their parts)

$[\![\text{PLUR}]\!]^k = \lambda V_{<s,t>}\ \lambda e_s.\ e=\cup\{e' |\ V(e')\ \&\ e'<^k e\ \&\ e'\in \text{Part}(e)\}\ \&\ \neg\text{atom}(*\text{theme}(e))$

Composing PLUR with numerals - Syntax

Xicaquiziil cmajiic quih
child.PL woman.PL DEF
haxaca **quih** **c-apxoj**
dog.PL DEF SBJ.NMLZ.be_three.PLUR
hax an iyahaalam.
water [3POSS].in 3;3.RLYO.wash.PL
The children washed three dogs.



Composing PLUR with numerals - Semantics

- Like other verbs, numerals are analyzed as predicates of eventualities —specifically *states*—whose holder is of cardinality *num*, e.g. *3 dogs* denotes an individual that
  1. satisfies the predicate *dogs*, and
  2. is in a state of being of cardinality *3*
- Num-PLUR = a set of plural states e that are each composed of sub-states e' whose respective holder is of cardinality N

(22) a. 'The girls bathed **three.PLUR dogs**', (8)

b. Simplified graph ▸ More detail here

e'	—	|*theme|=3
e"	—	|*theme|=3
e	—	*theme of e=dogs, . . .

- Context supports individuation of states of being 3 dogs via distribution over another plurality

$[\![\text{-apxa}]\!]^k = \lambda e_s.\ |{*\text{theme}}(e)|=3$
$[\![\text{PLUR}]\!]^k = \lambda V_{<s,t>}\ \lambda e_s.\ e=\cup\{e' |\ V(e') \ \&\ e'<^k e \ \&\ e'\in \text{Part}(e)\} \ \&\ \neg\text{atom}(*\text{theme}(e))$

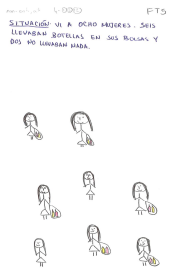
Predictions

- Predictions as regards context sensitivity, atomicity of distribution, overlapping distribution, . . . ▸ Click here
- E.g.: num-PLUR do not require exhaustive distribution unlike distribution achieved via universal quantification (Knežević and Demirdache, 2018)

(23) Context: non-exhaustive distribution [Questionnaire4FT5]

a. [Cmajiic coi] [hateeya quih
woman.PL DEF.PL bottle DEF
coocalcam] iyoonec.
SBJ.NMLZ.be_two.PLUR 3;3.RLYO.carry.PL
The women carried 2 bottles. TRUE

b. [Cmajiic coi **iij càap tazo cah**] [hateeya
woman.PL DEF.PL **each** bottle
quih coocalcam] iyoonec.
DEF SBJ.NMLZ.be_two.PLUR 3;3.RLYO.carry.PL
Each of the women carried 2 bottles. LIE, SC: because two women are not carrying anything



Summary and perspectives

- Seri clearly shows that pluractionality is the source of distributivity with numerals
- **In my analysis, pluractional numerals are only distributive inasmuch as distribution is a way to individuate eventualities** // pluractional distributivity
- This explains a number of properties that pluractional/distributive numerals have in Seri ▸ Click here for handout
- Could it be the case in other languages as well?
  - To what extent do pluractional verbs and distributive numerals have the same properties?
  - If there are asymmetries, can they be derived?
  - To what extent is pluractionality a cross-categorial category?
- Comments welcomed! (jepasquer@gmail.com)

¡Haa xah tiipe!

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List of abbreviations

ABS	absolute
ART	article
AW	away
CAUS	causative
DEF	definite
DEM	demonstrative
FLX	flexible
FOC	focus
INDEF	indefinite
INF	infinitive
INTR	intransitive
IO	indirect object
MULT	multiple
NMLZ	nominalizer
OBJ	object
OBL	oblique
PASS	passive
PL	plural
POS	possessive
RLS	realis
SG	singular
SUJ	subject
TRNS	transitive
UNSPEC	unspecified