The Phenomenon, the Issues, and a Case Study

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1 Introduction

This chapter focuses on the phenomenon of pluractionality. Pluractionality, as strictly defined, is the morphological marking of event plurality on the verb. The term "pluractional" was coined by Newman (1980) to set apart morphemes that mark event plurality from inflectional plural agreement, that is, the marking of person on the verb. Newman used the term to describe the morphology and the meaning of some verbal morphemes of some African languages. In the descriptive linguistics literature, one finds other ways of describing the same phenomenon:

The Wiley Blackwell Companion to Semantics. Edited by Daniel Gutzmann, Lisa Matthewson, Cécile Meier, Hotze Rullmann, and Thomas E. Zimmermann.

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(i) *distributive markers* – in the tradition of the description of native American languages or (ii) *verbal plurality* – in Cusic's (1981) classical work "Verbal Plurality and Aspect." In more recent analyses, the notion of pluractionality has departed from morphology to become more generally the notion of event plurality. In this chapter, we will only deal with pluractionality as strictly defined.

The morphological marking of event plurality on verbs occurs in a variety of languages, which come from different regions and from different language families. Some examples described in the literature include Squamish (Salish, North America); Emerillon (Tupi-Guarani, South America); Chechen (Northeast Caucasian, Asia); #‡Hoan (Khoisan, Africa); Hausa (Chadic, Africa); Dyirbal (Pama–Nyungan, Australia); Kui (Dravidian, Asia). Pluractional morphemes vary across languages – they can be affixes or vowel alternation, but they are usually reduplicative (see Cusic 1981; Lasersohn 1995; Xrakovskij 1997). They have been analyzed as derivational morphemes because they don't always combine with every type of verb and because their semantic contribution is not always transparent. Nevertheless, pluractional morphology usually contributes the notion that the sentence in some way describes a multiplicity of events.

The aim of this chapter is to describe pluractionality crosslinguistically, to discuss the theoretical issues raised by the phenomenon, and to present a case study of Karitiana, a Tupian language spoken by approximately 320 people whose territory is located in Northwestern Brazilian Amazonia (Storto and Vander Velden 2005).

In section 2, we present the main crosslinguistic properties of pluractionality. Next in section 3, we discuss the analytical issues raised by pluractionality. Section 4 focuses on Karitiana as a case study. First, we present some characteristics of the language in 4.1 and then give a general description of the form and meaning of pluractionality in the language in 4.2. Section 4.3 discusses whether pluractional morphemes are derivational or inflectional in Karitiana and section 4.4 presents our analysis of the semantics of pluractionality in Karitiana and its predictions. In section 4.5 we summarize our findings and briefly comment on their impact on the analytical issues. Finally, we present the conclusion in section 5.

2 Pluractionality crosslinguistically

The aim of this section is to describe both the morphology and the semantics of what has traditionally been called pluractionality across languages. Crosslinguistically pluractional morphemes occur in a variety of forms. They can be expressed by affixes, gemination, vowel alternation, partial or full reduplication, and suppletive forms; but most of these morphemes are reduplicative (see Cusic 1981; Lasersohn 1995; Xrakovskij 1997). Pluractional morphemes may be associated with a variety of interpretations, most prominently: event repetition in time, participant distribution, and distributivity in space (see Cusic 1981; Cabredo-Hofherr and Laca 2012). Sentence (1), from Upriver Halkomelen (Salish, North America), illustrates the most frequent pluractional readings – participants, locations, or times distribution.

(1) Upriver Halkomelem

Yaleq'-et-es	te	theqat.
fall.PLURAC-TRANS-3SUBJ	DET	tree ¹

Verifying scenarios:

- a. He felled the trees. (all in one blow, or one after the other)
- b. He felled the same (magic) tree over and over.
- c. They felled the tree.
- d. They felled the trees.

Not a verifying scenario:

e. He felled the tree (once).

(Thompson 2009, 1)

Notwithstanding the vast array of readings, the literature agrees in that the most recurrent interpretation of pluractional morphemes is that of event repetition in time, as illustrated by sentences (2) and (3) from Yudja (Tupi, South America) and Kaqchikel (Mayan, Guatemala) respectively.

(2) Yudja

Yapariwa anï ba'ï **apïpï**. Yapariwa that paca shoot.RED² 'Yapariwa shot at that paca many times.' False if Yapariwa shot at the paca once.

(Lima 2011, 184)

- (3) Kaqchikel
 - a. X-in-kan-oj jun wuj. CP-E1S-search-SS a book³ 'I looked for a book.'
 - b. X-in-kan-ala' jun wuj.
 CP-E15-search-PLRC a book
 'I looked for a book (various times).'
 False if there is only one looking-for event

(Henderson 2011, 219)

An idea that seems to be implicit in many works about pluractionality is that pluractional verbs, when denoting iteration in time, usually refer to a multiplicity of or many events rather than only two or just a few. This recurrent reading is illustrated by sentences (2) and (3) above. The multiple event view is stated in the following quotation from Lasersohn (1995): "In fact, however, we find that pluractional markers often carry an implication of not just two events, but 'many', where exactly how many are needed to count as many is left somewhat vague and open to pragmatic considerations" (Lasersohn 1995, p. 241). The classical work by Cusic (1981) lists as many as 16 readings related to event plurality for these markers. They are listed below. Cusic then points out the existence of some readings that are not obviously

related to plurality: (i) perfectivity, (ii) causativity, and (iii) plurality of subjects and objects.

9

10

11

12

- 1 repetitiveness;
- 2 repeated occasions or events;
- 3 distribution;
- 4 plurality of sites of action;
- 5 habitual agency;
- 6 distributed quality;
- 13 inchoativity;
 - 14 celerativity/retarditivity;

cumulative result;

- 7 persistent consequences;
- 8 augmentation;
- 15 intensity;16 diminution.

duration;

conation;

continuity;

We won't get into the details of Cusic's listed types since they are not always easy to tease apart and his examples are not always transparent. We will, nevertheless, illustrate the three basic oppositions derived from the four parameters he proposes:

- (i) The Event Ratio Parameter
- (ii) The Relative Measure Parameter
- (iii) The Connectedness Parameter
- (iv) The Distributive Parameter

The **Event Ratio Parameter** classifies pluractionals as either event-internal or event-external (phase repetition vs event repetition). The expressions in (4) from English illustrate this distinction: (4a) shows that an event of biting, for example, may be internally composed of phases (nibblings). Note that the biting event may also be repeated (4b).

- (4) Phase repetition vs event repetition
 - a. The mouse nibbled the cheese once/many times. phase repetition
 - b. The mouse bit the cheese many times. event repetition

The **Relative Measure Parameter** distinguishes between diminutive vs intensive readings. The pluractional morpheme in Quileute (Chimakuan, North America) in (5b) – the infix {-*iy*-} – has a diminutive effect in the action described by its verb (5a). The contrast between (6a) and (6b) in Nahuatl (Uto-Aztecan, North America), on the other hand, illustrates the intensive reading that may be produced by a pluractional morpheme. Pluractionality in Nahuatl is expressed by the repetition of the first syllable.

(5) Quileute

b.

- Diminutive reading
- a. ce:gol 'he pulled'
 - ciye:gol 'he pulled a little'

(Andrade 1933, 38 cited by Cusic 1981, 92)

(6) Nahuatl

T	1.
Intensive	reading
IIIICIISIVE	reaunig

a. tlania 'to ask'

b. **tla**tlania 'to ask insistently'

(Garibay 1961 cited by Cusic 1981, 84)

The examples in (5) and (6) also show that some of the readings claimed to be pluractional are not so easily derived from the basic notion of event plurality. Intensive readings like the one in (6) are not so hard to relate to the multiplicity of events readings. Note that many events of asking can lead to a situation that could be described as an insistent asking. On the other hand, it is harder to derive a diminutive reading like the one in (5) from event plurality. What one usually observes in data like this, however, is that the diminutive reading could be associated with a "trying" reading. That is, in (5) the pluralized form might express that the "pulling a little" event is the result of many attempts to pull.

The **Connectedness Parameter** is about the "distinctness of the iterated units of action" (Cusic 1981, 99). This parameter is similar to the mass/count distinction within the nominal domain. In this sense distributive readings are less connected than durative readings. This is so because distributive sentences denote discrete events; whereas durative sentences denote one singular (possibly) long-lasting event. Sentence (7a) in West Greenlandic (Eskimo, Greenland) is a case of a pluractional morpheme with a distributive (in time) reading (the infix {-*qattaar*-}); whereas sentence (7b) is a case of a pluractional morpheme that yields a durative reading (the infix {-*tuar*-}).

(7) West Greenlandic

Distributive vs durative readings

a. Qaartartu-t sivisuu-mik qaar-**qattaar**-put. bomb-ABS.PL lengthy-INS explode-again&again-IND.[-TR].3PL 'Bombs exploded again and again for a long time.'

(van Geenhoven 2005, 111)

 b. Unnuaq ama-at irinarsur-tuar-puq. night.ABS all-3SG sing-continuously-IND.[-TR].3PL
 'He sang continuously all night long (without a break, nonstop).'

(van Geenhoven 2005, 110)

The **Distributive Parameter** indicates in what sense the event can be considered "pluralized" – such as individuation by running times (7a), location (8), and participants (9) and (10). Example (8) from Hausa (Chadic, Africa) with the reduplicative form {*zuz*-} illustrates a case of location distributivity.

(8) Hausa
 Ruwaa yanàa zuz-zubôwaa
 water 3SG.M.IMPF RED-pour.VN⁴
 'Water was pouring down' (from various places)

(Součková 2011, 102)

As mentioned above, beside the meanings covered by his four parameters, Cusic (1981) also points out some other meaning effects of pluractionality. One of them is that it may also pluralize verbal arguments. Examples (9)–(10) from Kaingang (Tupian, South America), an ergative language, are meant to show that pluractionality in that language results in pluralization of the subject of intransitive verbs (9) and the object of transitive verbs (10). Unfortunately, from these pieces of data from Kaingang, it is not possible to claim for sure that pluractionality is expressed by a repetition of the main verb since Henry (1948) does not provide detailed glossing.⁵

(9) Kaingang

a.

kə tə päı'ke ma	'the tree bent'
-----------------	-----------------

b. ko to paipaike' ma 'the trees bent'

(Henry 1948, 204)

(10) Kaingang

a. hadⁿ

b. hadⁿ hadⁿ

'weave a shirt' 'weave many shirts

(Henry 1948, 204)

Crosslinguistically, one does not necessarily find the whole array of readings in every pluractional language. Languages vary in the array of readings they allow for their pluractional morphemes. And, for the same language, recent works on pluractionality have uncovered that the available readings tend to depend on the *Aktionsart* of the verb or of the verbal predicate (see Abdolhosseini et al. 2002; Yu 2003; Cabredo-Hofherr and Laca 2012). Pluractional semelfactive verbs, for instance, tend to have repetitive readings, as in sentences (11a)–(11b) from Aleut (Eskimo-Aleut, North America). In Aleut, pluractionality is expressed by the infix {-*mixta*-}.

(11) Aleut

a. igluqax kata-ma-xt. hide touch-PAST-you 'You touched the hide (once).'

b. igluqax kata-**mixta**-ma-xt. hide touch-MULT-PAST-you⁶

'You touched the hide (several times, as if examining it).'

(Golovko 1997, 72)

Another case in point is Chechen, where atelic predicates yield durative readings when pluractionalized, and telic predicates yield repetition in time readings, as illustrated by the pairs of sentences in (12) and (13). According to Yu (2003), the pluractional version of sentence (12a) with the atelic predicate *xoizhira* 'hurt' in (12b) has a durative reading; whereas the pluractional version of sentence (13a) with the telic predicate *twop-qwessira* 'to shoot' (13b) has an event repetition in time

reading. Note that pluractionality is expressed by vowel alternation in Chechen: *oi~ii* and *we~i*.

(12)	Chechen
------	---------

a.	Cyna~	chow	xoizhira.
	3SG.POSS	wound	hurt.WP ⁷
	'His woun	d ached (m	omentarily).'
b.	Cyna~	chow	xiizhira.

3SG.POSS	wound	hurt.PLR.WP
'His wound	d ached (f	or a long time).'

(Yu 2003, 300)

(13) Chechen

a.	as	q'iigashna	twop-qwessira.
	1sg	crow.PL.DAT	gun-throw.WP
	'I sho	ot crows.'	
b.	as	q′iigashna	twop-qissira.
	1sg	crow.PL.DAT	gun-throw.PLR.WP
	'I sho	ot crows many ti	mes.'

(Yu 2003, 294)

In Mandarin Chinese, in turn, pluractionality has distinct effects according to the state/event distinction. Verbal reduplication with individual-level stative verbs modifies the degree of application of the property expressed by the verb, which is instantiated at a degree slightly above the standard (see example in (14)); whereas eventive verbs yield a diminutive action interpretation – note the contrast between (15a) and (15b). In Mandarin pluractionality is expressed by reduplication of the adjective or of the verbal stem.

(14) Mandarin

Zhangsan **gao-gao**-de. Zhangsan big-big-STR⁸ 'Zhangsan is quite tall.'

(Donazzan and Müller 2015, 104)

(15) Mandarin

- a. Qing ni kan zhe ge dianying. please you watch this NCL movie 'Watch this movie, please.'
- b. Qing ni **kan-(yi)-kan** zhe ge dianying. please you watch-(one)-watch this NCL movie 'Please, take a look at this movie.'

(Donazzan, p.c.)

Another crosslinguistic property of pluractionality that has been pointed out in the literature is that, in most languages, it does not co-occur with exact cardinality adverbials (see Doetjes 2008; Cabredo-Hofherr and Laca 2012). This is one of the

reasons Yu (2003) analyzes pluractional morphemes as verbal massifiers. He claims that pluractional morphemes in Chechen turn count predicates – accomplishments and achievements – into mass predicates (activities and states). According to him, verbal pluralization turns telic verbs into atelic verbs. Sentences (16a)–(16b) illustrate this property for Chechen. When the verb *khiattira* 'to ask' is pluractionalized it cannot appear in the same sentence with an adverb such as *yttaza* 'ten times'.

- (16) Chechen
 - a. xadama sialkhana cynga yttaza cxahuma khiattira. Adam.ERG yesterday 3SG.ALLA⁹ ten.times one.question ask.WP 'Adam asked him the same question ten times yesterday.'
 - b. *xadama sialkhana cynga yttaza cxahuma khittira. Adam.ERG yesterday 3SG.ALLA ten.times one.question ask.PLR.WP 'Adam asked him the same question ten times yesterday.'

(Yu 2003, 303)

This section has introduced the reader to the crosslinguistic variety of forms and interpretation of pluractional morphemes. We have seen that pluractional morphemes most frequently express event plurality. Their most prominent interpretations are therefore the ones that may be dealt with by a semantics that is able to capture instances of event plurality such as iterativity and distributivity in space or by participants. Nevertheless, intensive/diminutive and durative readings also occur with pluractional verbs in some languages. We have also seen that, according to the literature, the readings of pluractional predicates tend to depend on the *Aktionsarten* of their verbs. In the next section, we discuss some of the analytical issues raised by pluractionality.

3 Analytical issues

This section discusses the crosslinguistic properties of pluractionality introduced in the previous section and situates them against the background of event individuation.

First, the array of pluractional readings listed in the literature is quite large, and some of them are not easy to tease apart since they come from works within distinct descriptive and theoretical paradigms. Cusic's typological work is impressive as is his effort to derive most pluractional readings from his four parameters. It is important to bear in mind that he adopts a broadly construed concept of verbal plurality, which includes, besides multiple events, also event extension or diminution.

In a significant amount of the data Cusic and other authors present, it is hard to tell whether the readings they list are actually distinct readings. They might be just pragmatic inferences of the more basic event repetition in time or distribution in space readings plus contextual effects. For example, the sentences in Nahuatl in (6) above is supposed to illustrate that the pluractional form *tlatlania* of *tlania* 'to ask' means 'to ask insistently'. Nevertheless, it is not clear if this intensive reading could not be described as a pragmatic effect of the simple repetition of events of asking. In that sense, because of the way the data are presented, it is not possible

to be sure whether the interpretations attributed to the pluractional expressions or sentences are due to pluractionality, or whether they only express one of their verifying scenarios.

In section 2, we saw that, despite the variety of readings available for pluractional markers crosslinguistically, and even within a given language, its most recurrent meaning is that of a plurality of events. Pluractionality, described as the expression of event plurality, thus implies that the singular/plural opposition between atomic and nonatomic individuals applies to events as well. This is illustrated by the sentences from Aleut repeated below: sentence (17a) is true of a single/atomic event, whereas sentence (17b) is only true of plural events. Pluractionality thus supports the notion of events as part of natural language ontology.

(17) Aleut

a.	igluqax	kata-ma-xt.	= (11)
	hide	touch-PAST-you	
	'You tou	ched the hide (or	nce).′

b. igluqax kata-mixta-ma-xt.
hide touch-MULT-PAST-you
'You touched the hide (several times, as if examining it).'

And further, if continuous and increase/diminution readings are included within pluractional readings, we seem to have yet another parallel between the domain of individuals and the domain of events. The telic vs atelic predicate split seems to parallel the mass vs count distinction in some pluractional languages (such as Chechen). Telic predicates can be taken to denote individuated events; whereas atelic predicates would denote homogeneous non-individuated events. The same may be thought of the stative/eventive predicates divide. As such, when one pluralizes an atelic or a stative predicate in some languages, one "augments" it, that is, its quantity becomes larger. And when one "augments" a telic or eventive predicate, one gets a larger number of events. In Chechen, according to Yu (2003), some atelic predicates always yield a durative reading when marked for pluractionality, as illustrated by (18).

(18)	Cł	nechen			
	a.	cyna~	chow.	xoizhira	= (12)
		3SG.POSS	wound	hurt.WP	
		'His woun	d ached (r	nomentarily).′
	b.	cyna~	chow	xiizhira.	
		3SG.POSS	wound	hurt.PLR.WI	p
		'His woun	d ached (f	or a long tim	ie).'
		(not: the w	ound hur	t repeatedly	or habitually)
				- ·	5.

(Yu 2003, 300)

Besides that, in Chechen a pluractional verb cannot be used when the exact number of repetitions is specified, as illustrated by the ungrammaticality of (19b) (Yu 2003). This suggests that, in many languages, pluractionality yields atelic predicates, and acts like a "universal grinder" on verbs or predicates, that is, an operation that turns

telic or eventive predicates (i.e., count predicates) into atelic or stative predicates (mass predicates) (see Yu 2003; van Geenhoven 2004; 2005).

- (19) Chechen
 - a. xadama sialkhana cynga yttaza cxahuma khiattira. = (16) Adam.ERG yesterday 3SG.ALLA ten.times one.question ask.WP 'Adam asked him the same question ten times yesterday.'
 - b. *xadama sialkhana cynga yttaza cxahuma **khittira**. Adam.ERG yesterday 3SG.ALLA ten.times one.question ask.PLR.WP 'Adam asked him the same question ten times yesterday.'

(Yu 2003, 303)

Languages thus delimit, pluralize, and extend/diminish eventualities. Many grammatical categories deal with eventualities: aspect, aspectual classes, the notions of telicity/atelicity, among others. Pluractionality is one of such tools. In their introduction to a volume dedicated to the delimitation of events, Tovena and Donazzan (2017) conclude that event delimitation is achieved in a variety of ways.

From the work presented in this volume, it appears that languages often use a combination of devices in order to delimit and individuate events. Often, delimitation is the product of applying different strategies whereby the grammatical tools of a language are used to express and define aspectual and temporal structure or relations among participants. (Tovena and Donazzan 2017, 4)

Notwithstanding the variation among the grammatical tools and the ontological entities used by language for delimiting events, the notion of events seems to be a good candidate for a semantic universal. And among the delimiting criteria, time, location, and participants are the favored delimiting criteria.

Within formal semantics the analysis of pluractionality as event plurality was established in Lasersohn's 1995 seminal work. Most of the following work on the subject deals with pluractionality in terms of event plurality and adopts some version of Lasersohn's proposal. Within his proposal all readings of pluractional sentences are generated by a single formal schema, which contains optional clauses that may be added in order to account for the variations encompassed by Cusic's parameters.

Lasersohn's proposal is stated within an event semantics framework (as in Parsons 1990) in which verbs are taken to be predicates of events. The relations between these events and the verbal arguments are expressed by their thematic (theta) roles. The event semantics framework is illustrated in (20b) by the logical form of sentence (20a), which disregards tense.

(20) a. John met George at school.

b. $\exists e \text{ [meeting (e) & Agent(e)=John & Theme(e)= George & Location (e)= at school]}$

The essentials of Lasersohn's proposal are presented in (21). According to his analysis, when a pluractional operator is applied to a predicate, the result is a

plurality of sub-events. The cardinality of the plural event is set to be equal to or higher than some contextually determined quantity, which is usually understood as "many." Thus, pluractional predicates in Lasersohn's proposal denote events that are made out of a plurality of sub-events of the same kind.

(21) V-PA (E) $\leftrightarrow \forall e \in E [V(e)] \& card(E) \ge n^{10}$

This formula is very general, and as it is does not contemplate the existing variety of pluractional readings and their dependence on language, and/or other factors. Lasersohn thus implements his formula with the possibility that the sub-events are distinct from the event denoted by the verb (V). This is achieved by substituting the variable for the verb (V) for another variable (P), which ranges over predicates in general. This is supposed to account for the distinction between event-internal vs event-external repetition (e.g. *nibble* vs *bite*):

(22) V-PA (E) $\leftrightarrow \forall e \in E[P(e)] \& card(E) \ge n (P = V in cases of event-external plurality)$

Next he adds a clause that states that the locations, times, or theta roles should not overlap. This clause accounts for distribution in space, time, or by participants. His formula then becomes as in (23), where f is a variable for locations, times, or theta roles. In order to guarantee that the f variable does not range over neighboring time intervals or locations, Lasersohn adds a clause stating that between any two sub-event running times or locations there should be a time interval in which the predicate does not hold. This is expressed by the clause in bold in (24). The continuous reading is then captured by negating this clause.

- (23) V-PA (E) $\leftrightarrow \forall e, e' \in E[V(e)] \& card(E) \ge n \& \neg f(e) \circ f(e')^{11}$
- $\begin{array}{ll} \text{(24)} & \text{V-PA} \ (\text{E}) \leftrightarrow \forall \ e, e' \in \text{E} \ [\text{V}(e)] \ \& \ card(\text{E}) \geq n \neg \tau \ (e) \ ^{\circ} \ \tau(e') \\ & \& \ \exists t \ [between \ (t, \tau(e), \tau(e')) \ \& \ \neg \exists e'' \ [\text{V}(e'') \ \& \ t = \tau \ (e'')]^{12} \end{array}$

As for the augmentation/diminution readings, Lasersohn suggests (but does not implement) that it be captured by measure functions on events, based on size, degree of effort, effectiveness, and so on. For example, the measure function may state that the agent of sentence (25) be taller than average.

(25) Mandarin
 Zhangsan gao-gao-de. = (14)
 Zhangsan big-big-STR
 'Zhangsan is quite tall.'

(Donazzan and Müller 2015, 104)

Lasersohn's account can deal with most pluractional readings. Nevertheless, one would like to know whether there are some parameters for this variation, what they are, and how to derive them for each language and type of predicate. The solution for this question seems to depend on the result of more detailed and comparable work on pluractional languages.

We now proceed to the description and analysis of pluractionality in Karitiana, a native Brazilian language that belongs to the Tupi stock. The next section presents the properties of pluractional sentences in the language and compares them to the crosslinguistic properties of pluractionals as described in this section.

4 A case study: pluractionality in Karitiana

This section focuses on describing and analyzing the semantics of pluractionality in Karitiana. Our account claims that pluractional affixes in Karitiana act as plural operators on the number-neutral denotations of Karitiana verbs – they exclude singularities from verbal denotations. While exploring the consequences of our analysis, we show that there is a difference between the plurality of lexical heads and the plurality of verbal phrases, as claimed by Kratzer (2003; 2007).

The data discussed in the paper were collected by either one of the authors within the period between 2005 and 2013, unless otherwise stated. The methodology used is the one advocated by Matthewson (2004). Speakers were asked to translate Portuguese sentences paired with particular contexts, as well as to judge the felicity of Karitiana sentences relative to specific contexts (see Matthewson 2004).

In section 4.1, we present the basics of Karitiana grammar in order to enable the reader to grasp the syntax, the morphology, and the semantics of the given examples. In section 4.2, we describe the morphology and the semantics of pluractionality in the language. Next in section 4.3, we provide support for the claim that pluractionality is an inflexional process in Karitiana. Section 4.4 presents our analysis of the semantics of pluractional morphemes in the language. Finally, in section 4.5, we summarize our findings and discuss the impact of our description and analysis on the general issues raised in section 3.

4.1 The language

In this section, we lay down the basic facts about Karitiana grammar. These will be relevant for understanding the data and their analysis. These are facts about: (i) the agreement pattern of the language; (ii) the use of copular constructions with intransitive verbs; (iii) the basic word order of the language; (iii) the verbal morphology of the language; and (iv) the absence of inflectional morphology in NPs and its consequences for NP denotations in the language.

Karitiana is a partially described Amazonian language. The first researchers to work on Karitiana were David and Rachel Landin, who worked out the basics of the syntax and the phonology of the language.¹³ Subsequently, Daniel Everett worked on it.¹⁴ Luciana Storto has been working on the description and analysis of the language since 1992. She has published various papers on its phonetics, phonology, and morphosyntax since her 1999 PhD dissertation.¹⁵ Other works on Karitiana worth mentioning are the PhD dissertations of Caleb Everett (2006), Coutinho-Silva (2008), and Rocha (2011), and Vivanco's (2014) MA thesis on aspects of the syntax and semantics of the language. Work within the framework of formal semantics has been pursued by Müller, Sanchez-Mendes, Carvalho, Alexandre, and Ferreira.¹⁶

Karitiana is an ergative language, in which intransitive verbs agree with their only argument (see (26a)); whereas transitive verbs agree with their theme arguments (see (26b)). In other words, verbs agree with their absolutive arguments in Karitiana. This pattern is very common within Tupian languages (Storto 2005).

(26) Karitiana

- a. Y-ta-pykyn-<a>-t yn. 1S-DECL-run-NFUT I¹⁷ 'I run.'¹⁸
- b. Yn a-ta-oky-j an. I 2SG-DECL-kill-FUT you 'I will kill you.'

(Storto 1999, 157)

Another property of Karitiana, related to its verbs, is that intransitive verbs tend to occur in copular constructions in most contexts, as illustrated by sentences (27a) and (27b). These sentences are analyzed by Storto (2010) as biclausal sentences in which the subject of a small clause raises to the beginning of the sentence. According to Storto (2010), the absolutive morpheme on the verb marks this movement.

- (27) Karitiana
 - a. Taso Ø-na-aka-t i-kat-Ø. man 3-DEC-COP-NFUT PTCP-sleep-ABS 'A/some man/men slept.'
 - b. Taso Ø-na-aka-t i-otam-Ø. man 3-DEC-COP-NFUT PTCP-arrive-ABS 'A/some man/men arrived.'

Karitiana displays a general complement-head order. In postpositional phrases (PPs), complements precede postpositions, as illustrated by the PPs *Sete de Setembro tyym* ('along Sete de Setembro (avenue)') and *hotel pip* ('to the hotel') in (28). Within Noun Phrases (NPs), possessors precede possessed nouns (see (29)). In neutral contexts, subordinate clauses precede main clauses, as illustrated in (30). And, within subordinate clauses, arguments precede the verb (31).

(28) Karitiana

[Sete de Setembrotyym]a-taka-tat-i[hotelpip].Sete de SetembroPOS2SG-DECL-go-FUThotelPOS'You will get to the hotel along Sete de Setembro (avenue).'

(Storto 1999, 12)

(29) Karitiana Inacio carro Inacio car 'Inácio's car'

(30) Karitiana [Yn opiso] a-taka-kãrã-t an. I listen 2SG-DECL-think-NFUT you 'You thought that I listened.'

(31) Karitiana [Boroja taso oky tykiri] Ø-naka-hyryp-Ø õwã. snake man kill COMP 3-DECL-cry-NFUT kid 'When the man killed the snake the kid cried.'

(Storto 1999, 125)

(Storto 1999, 16)

Karitiana is verb final in subordinate clauses. In matrix clauses the word order is mostly verb second (see Storto 1999; 2003). The complementary distribution of the verb position between subordinate and matrix clauses may be observed in sentences (30) and (31) above and (32) below. Matrix clauses are inflected for person agreement, tense, and mood, whereas subordinate clauses lack these inflections. This may be perceived in sentences (31) and (32). In sentence (31) the verb *oky* 'to kill' is bare and occupies the final position of the clause; whereas in sentence (32), the same verb shows up in second position with the presence of inflectional morphemes.¹⁹

(32) Karitiana

Y a-ta-oky-j an. I 2-DECL-kill-FUT you 'I will kill you.'

(Storto 1999, 125)

Karitiana nouns and NPs have number-neutral denotations, that is, they denote both singular and plural entities, and they are not marked for number or for definiteness vs indefiniteness. Singular vs plural and definite vs indefinite interpretations for both mass and count NPs – if these differences do indeed make sense in the language – are thus not generated by the morphology. Sentence (33) illustrates the nonexistence of a singularity vs plurality contrast. This contrast is also absent from third person pronouns and from agreement (34). Depending on the context, the NPs in sentence (35) can be interpreted as definite or indefinite, singular or plural. Because of the absence of (in)definiteness marking and of the absence of number marking in the language, a sentence may be truly uttered in a vast array of situations, like the ones listed below sentence (35).

(33) Karitiana

Taso Ø-naka-'y-t myhin-t/sypom-t boroja. man 3-DECL-eat-NFUT one-ADV /two-ADV snake 'A/the man/men ate one/two snake(s).'

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Pluractionality

(34) Karitiana

I Ø-na-okoot-Ø õwã. he/they 3-DECL-bite-NFUT kid 'He/They bit the/a/some kid(s).'

(35) Karitiana

Taso Ø-naka-ot-Ø ese. man 3-DECL-bring-NFUT water 'Men brought water.'

True in the following situations:

- One (definite or indefinite) man brought some (definite or indefinite) quantity of water.
- Some (definite or indefinite) men brought some (definite or indefinite) quantity of water.
- ✓ It is usually the men who carry water.

In this section, we have presented some of the essential grammatical properties of Karitiana. The next section will specifically deal with the expression of number in the verbal domain by presenting the behavior of pluractionality in the language.

4.2 Pluractionality in Karitiana

In Karitiana pluractional markers are expressed by reduplication of the verbal root, as illustrated by the contrast between sentences (36a) and (36b). Table 1 presents a sample of verbs and their corresponding pluractional forms.

- (36) Karitiana
 - a. Ówã Ø-naka-kot-Ø sypom-t opokakosypi.
 kid 3-DECL-break-NFUT two-ADV egg
 'Kids broke two eggs.'
 - b. Õwã Ø-na-kot-kot-a-t sypom-t opokakosypi.
 kid 3-DECL-break-RDPL-TV-NFUT²⁰ two-ADV egg 'Kids broke two eggs repeatedly.'²¹

Root	Pluractional form	Translation	
pon	pon.pon	'shoot'	
pykyn	pykyn.pykyn	'run'	
eje	eje.eje	'paint'	
typ	typ.typ	'discover'	
sikiy	sikiy.sikiy	'want'	
pimbik	pimbik.pimbik	'push'	
'oom	'oom.'oom	'draw'	
paradywy	paradywy.paradywy	'lose'	
'ot	'ot.'ot	'fall'	
otam	otam.otam	'arrive'	

able I Examples of regular profactionality in Ratina	ar pluractionality in Kariti	regular	ples of	Exam	ble 1	al
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Only the verbal root reduplicates in Karitiana. Other verbal morphemes such as the causative marker $\{-m-\}$ or the stem formative $\{-na-\}$ morpheme do not enter the reduplication process (see Storto 2014). Sentences (37a)-(37b) show that the causative morpheme is not reduplicated, whereas sentences (38a)-(38b) show that when the verb is reduplicated the insertion of the formative occurs only once.

- (37) Karitiana
 - a. Taso Ø-naka-m-hõron-Ø pykyp. man 3-DECL-CAUS-wash-NFUT clothes 'A/the man/men washed clothes.'
 - b. Taso Ø-naka-m-hõron-hõron-Ø pykyp. man 3-DECL-CAUS-wash-RDPL-NFUT clothes 'A/the man/men washed clothes repeatedly.'

(Storto 2014, 407)

- (38) Karitiana
 - a. Bola Ø-na-aka-t i-hop-Ø. ball 3-DECL-COP-NFUT PTCP-blow.up-ABS 'A/the ball(s) blew up.'
 - b. Bola Ø-na-aka-t i-hop-hop-na-t.
 ball 3-DECL-COP-NFUT PTCP-blow.up-RDPL-STMF-ABS 'A/the ball(s) blew up repeatedly.'

(Storto 2014, 408)

In a few special cases, pluractionality is expressed by suppletion. Table 2 presents some of these cases. The suppletive cases are associated with irregular verbs, that is, the ones that are used more frequently and have idiosyncratic patterns.

Let us now take a closer look at the semantics of pluractionality in Karitiana. In Karitiana, differently from what occurs in many other pluractional languages mentioned in section 2, pluractionality has the following properties: (i) its only possible reading is event repetition in time; (ii) it occurs with all kinds of verbs independently of their *Aktionsarten* (as long as the event iteration in time interpretation is possible); (iii) it occurs with exact cardinality expressions; and (iv) it denotes event plurality in time (two or more events).

Sentences (39a)–(39b) illustrate the occurrence of pluractionality with semelfactive verbs. Sentence (39a) is neutral as to the number of shooting events – there may have been one or more – whereas sentence (39b) describes a situation in which there were repeated shooting events. The most salient pragmatic inference from the fact that there were many shootings is that there

Table 2	Exampl	les of roo	t supp	letion
---------	--------	------------	--------	--------

Pluractional form	Translatio	
popi	'kill'	
hot	'go'	
piit	'catch'	
ymbykyjt	'arrive'	
	Pluractional form popi hot piit ymbykyjt	

were many monkeys shot at overall. Nevertheless, this should not be taken as a necessary entailment of pluractionality. That this is so can be inferred from the fact that sentence (39b) can be truly uttered in a context in which João fired many times at the same monkey. The situations in which the sentence can or cannot be truthfully uttered are listed below the sentence.

- (39) Karitiana
 - a. João Ø-na-pon-Ø pikom kyynt.
 João 3-DECL-shoot-NFUT monkey POS 'João shot at monkeys (one or more shootings).'
 - b. João Ø-na-**pon**-pon-Ø pikom kyynt. João 3-DECL-shoot-RDPL-NFUT monkey POS 'João shot at monkeys repeatedly.'

Situations that make the sentence true:

- ✓ João shot at some monkeys many times.
- ✓ João shot at one monkey many times.
- ✗ João shot at some monkeys once.
- ✗ João shot at a monkey once.

Sentences (40a)–(40b) have the achievement predicate *otam* 'arrive'. Sentence (40a) is neutral with respect to the number of events expressed by the predicate; whereas sentence (40b) means that the events of João arriving were repeated in time.

(40) Karitiana

- a. João Ø-na-aka-t i-otam-Ø João 3-DECL-COP-NFUT PTCP-arrive-ABS 'João arrived (once or more than once).'
- b. João Ø-na-aka-t i-otam-otam-Ø João 3-DECL-COP-NFUT PTCP-arrive-RDPL-ABS 'João arrived repeatedly.'

Situations that make the sentence true:

- João arrived more than once.
- ✗ João arrived once.

Accomplishment predicates can only be formed with certain types of arguments in Karitiana. As mentioned in section 4.1, unmodified NPs are number-neutral in the language. Also there are no articles, determiners, classifiers, or number morphology that could mark atomicity or individuation. Thus unmodified common nouns in Karitiana behave like English bare plurals and yield atelic predicates. One strategy for obtaining accomplishment predicates in Karitiana is by having their theme arguments filled by proper names, by NPs that denote unique entities, or by NPs that are modified by numerals, all clearly quantized NPs. In (41a)–(41b), for example, *escola* 'school' is equivalent to a definite NP in the context, since there is only one school in the village. The VP thus denotes an accomplishment. The pluractional version of the sentence is always interpreted as iteration in time, and does not have a durative interpretation.

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(41) Karitiana

a.	João	Ø-naka-eje-Ø	escola.
	João	3-DECL-paint-NFUT	school
	'João p		

 b. João Ø-naka-eje-eje-Ø escola.
 João 3-DECL-paint-RDPL-NFUT school 'João painted the school repeatedly.'

Situations that make the sentence true:

- ✓ João painted the school more than once.
- **✗** João painted the school for a long time. **✗**
- ✗ João painted the school once.

The proper name in (42) warrants that we have an accomplishment predicate. Once again the only available interpretations for the pluractional versions of this type of sentence are the ones of event repetition in time.

- (42) Karitiana
 - a. Ivan Ø-na-aka-t i-kokot-Ø Sete de Setembro dewota kyyn. Ivan 3-DECL-COP-NFUT PTCP-cross-ABS Sete de Setembro other.side POS 'Ivan crossed Sete de Setembro (Street).'
 - b. Ivan Ø-na-aka-t i-kokot-kokot-Ø Sete de Setembro dewota kyyn. Ivan 3-DECL-COP-NFUT PTCP-CROSS-RDPL-ABS Sete de Setembro other.side POS Ivan crossed Sete de Setembro (Street) repeatedly.'

Situations that make the sentence true:

- ✓ Ivan crossed Sete de Setembro Street more than once.
- ✗ Ivan crossed Sete de Setembro Street for a long time.
- X Ivan crossed Sete de Setembro Street once.

Repeated event readings of pluralized semelfactive, achievement, and accomplishment predicates are not a surprise in pluractional languages. However, as we have already pointed out, verbs of all *Aktionsarten* allow for pluractional versions in Karitiana. Even atelic predicates (states and activities) get repeated event readings when pluralized. We have seen above that in Chechen, for example, those are sentences that get durative readings. Sentence (43) presents an example with an activity predicate in Karitiana.

(43)) Ka	ritian	a	
	a.	João	Ø-na-aka-t	i-pykyn- <a>-t.
		João	3-DECL-COP-NFUT	PTCP-run-ABS
		'João	ran.'	
	b.	João	Ø-na-aka-t	i- pykyn- pykyn- <a>t.
		João	3-DECL-COP-NFUT	PTCP -run-RDPL-ABS
		'João	ran repeatedly.'	

Situations that make the sentence true:

- ✓ João ran more than once.
- ✗ João ran once for a long time.
- ✗ João ran once.
- ✗ João ran a long distance once.
- $\pmb{\times}$ João ran once with much effort.

Sentence (44) presents an example with a stage-level stative in the language in which it is easy to individuate events to distribute. Thus in this case pluractionality is available. Nevertheless with individual-level predicates the reduplication is not possible since no purely distributive reading is possible (see (45)).

(44) Karitiana

a. Inacio Ø-na-aka-t i-osedn-Ø. Inacio 3-DECL-COP-NFUT PTCP-happy-ABS 'Inacio was happy.'

 b. Inacio Ø-na-aka-t i-osedn-osedn-Ø.
 Inacio 3-DECL-COP-NFUT PTCP-happy-RDPL-ABS 'Inacio was happy repeatedly.'

Situations that make the sentence true:

João was happy on many occasions.

- ✗ João was happy once for a long time.
- ✗ João was very happy once.

(45) Karitiana

- a. João Ø-na-aka-t Karitiana-t. João 3-DECL-COP-NFUT Karitiana-ABS 'João is Karitiana.'
- b. *João Ø-na-aka-aka-t Karitiana-t. João 3-DECL-COP- RDPL-NFUT Karitiana-ABS

An interpretation which is not available in Karitiana is the one called the "argument distributive reading." These are readings in which it is the arguments that are pluralized, not the predicates. Since Karitiana has no nominal number morphology one could suggest that pluractionality also pluralizes the absolutive argument as it does in languages such as Kaingang (Henry 1948) and Chechen (Yu 2003).

But this is not the case in Karitiana. Despite the fact that Karitiana is a language without nominal number morphology, pluractionality as a grammatical operation does not affect argument pluralization. Sentence (46b), which is the pluractional version of sentence (46a), illustrates the fact that when the verb *manga* 'to lift' is pluractionalized, the absolutive argument $\delta w \tilde{a}$ 'kid' is not necessarily interpreted as plural but remains number-neutral. This is confirmed by the fact that sentence (46b) may be truly uttered in situations in which there is just one boy. Neither does the ergative argument *taso* 'man' get affected by the pluractionality of the verb since it may be taken to be singular or plural.

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Pluractionality

(46) Karitiana a. Taso

Taso	Ø-na-mangat-t	õwã
man	3-DECL-lift-NFUT	kid
'Men li	fted kids '	

Situations that make the sentence true:

- ✓ One man lifted one kid (any number of times).
- ✓ One man lifted kids (any number of times).
- ✓ Some men lifted one kid (any number of times).
- ✓ Some men lifted kids (any number of times).
- b. Taso Ø-na-**mangat**-mangat-t õwã. man 3-DECL-lift-RDPL-NFUT kid 'Men lifted kids repeatedly.'

Situations that make the sentence true:

- X One man lifted one kid once.
- **X** Each man lifted one kid once.
- ✗ Men collectively lifted one kid once. ✓
- X Men collectively lifted a group of kids once.
- ✓ One man lifted one kid more than once.
- ✓ Men lifted one kid more than once.
- ✓ Men lifted kids more than once.
- ✓ One man lifted kids more than once.

Examples with proper names confirm this fact. If pluractionality only affected argument pluralization we wouldn't expect the pluractional version of sentence (47a) in (47b) to be grammatical.

(47) Karitiana

a. Inacio Ø-na-manga-t Nadia. Inacio 3-DECL-lift-NFUT Nadia 'Inacio lifted Nadia.'

Situations that make the sentence true:

- ✓ Inacio lifted Nadia once.
- ✓ Inacio lifted Nadia more than once.
- b. Inacio Ø-na-mangat-mangat-t Nadia. Inacio 3-DECL-lift-RDPL-NFUT Nadia 'Inacio lifted Nadia repeatedly.'

Situations that make the sentence true:

- ✗ Inacio lifted Nadia once.
- Inacio lifted Nadia more than once.

It must be noted, however, that pluractionality does not block plural interpretations of sentential arguments. Since common NPs are cumulative in Karitiana, participant plurality is already available independently from reduplication. Pluractionality does not have any special grammatical effect on nominal number.

In many languages pluractionality has been claimed to be unacceptable with cardinal adverbs, such as 'three times'. In these languages "cardinality adverbials cannot give the cardinality of the plurality in the denotation of the pluractional."²² In Karitiana there is no such restriction of pluralized verbs and cardinal adverbs. See, for example, the non-pluractional sentence (48a) and its pluractional version in (48b) below. These sentences show both that cardinal adverbs are available with pluractionality and that pluractionality is optional in this environment. Remember that non-pluractionalized verbs in Karitiana can be used to describe one or more events. So the denotation of both non-reduplicated and reduplicated forms of *kot* have plural events of breaking.

(48)	Karitiana	

a.	Õwã	Ø-na-kot-a-t	sypom-t	opo	okakosypi.
	kid	3-DECL-break-TV-NFUT	two-ADV	egg	5
	'Kid(s	s) broke egg(s) twice.'			
b.	Õwã	Ø-na- kot -kot-a-t	sypon	n-t	opokakosypi.
	kid	3-DECL-break-RDPL-TV-N	FUT two-A	DV	egg
	'Kid(s	s) broke egg(s) twice.'			

We saw that many pluractional markers when applied to the verbal root result in a plurality of several or many events. This is not the case in Karitiana. In this language, pluractional morphemes may refer to few events, actually to any plurality of events. Sentences (49) and (50) illustrate both facts, that is, the occurrence of pluractionality with exact cardinality adverbs and its occurrence with "few" events.

(49)	Karitiana Sypom-t two-ADV	'ejepo stone	Ø-na-aka-t 3-DECL-COP-NF	UT	i-' ot- 'ot-Ø. PTCP-fall-R	DPL-NFUT
	Possible tr ✓ 'Two s ✓ 'Stone メ 'Two s	anslation stones fell s fell twic stones fell	is: l one at a time.' ce.' l at the same tin	ne.'		
(50)	Karitiana Sypom-t two-ADV Possible tr ✔ 'João s	Ø-na- por 3-DECL-sh anslation shot at tw	n-pon-Ø .oot-RDPL-NFUT .s: ro boars more tl	João João han c	o sojxaaty o boar once.'	kyynt. POS

✓ 'João shot at (a) boar(s) twice.'

In this section, we have seen that pluractionality in Karitiana is possible for all types of predicates and is always interpreted as event repetition in time. In this language, pluractionality involves neither durative nor argument distributive readings. We have also seen that pluractional morphemes in Karitiana, contrary to what has been claimed to be the case in other languages, may occur with exact cardinality adverbs, and may express the occurrence of "few" events.

4.3 Derivational or inflectional?

Pluractionality has been described as a derivational process by many researchers (see Newman 1980; Lasersohn 1995; Xrakovskij 1997; Yu 2003; among others). This section argues that, given all the properties presented above, pluractionality in Karitiana is to be analyzed as an inflectional morphological process rather than a derivational one. It is a systematic, coherent, and predictable process as compared to the idiosyncratic behavior of derivational morphemes across languages.²³

Inflectional morphology is assumed to be more productive than derivational morphology (see Stump 2001, among others). Inflectional paradigms tend to be complete. One example is nominal plurality in English – the morpheme {-s} as in *boy-s* and *car-s* applies to most nouns. Irregular paradigms are exceptional with inflectional morphemes, as are the pairs *woman-women* and *child-children*. Derivational morphemes, on the other hand, do not show this regular and coherent behavior. The suffix {-*en*} of deadjectival verbs, for instance, has an unpredictable distribution. Whereas *harden* and *deafen* are well-formed, **colden* and **braven* are not.

Besides having an (almost) regular distribution, inflectional morphemes have more predictable meanings as compared to the derivational ones. For example, the morpheme {-s} when applied to verbs as in *sing-s* systematically marks third person singular and present tense. A derivational morpheme, on the other hand, is not that predictable. The suffix {-*ize*}, for instance, can be associated to very distinct meanings. *To hospitalize* means something like 'to put (someone) into a hospital' whereas *to vaporize* is 'to (cause to) become vapor'.

It is usually assumed that derivational morphemes form new words, whereas inflectional morphemes do not change the original word. Inflectionally derived lexemes are not to be listed in the lexicon as different words – one would be missing important regularities if one claimed that *car* and *cars* have distinct lexical entries. Some of the reasons why pluractionality has been described as a derivational, rather than an inflectional process are that: (i) in many languages it applies only to some verbal classes; (ii) the resulting meanings do not seem to be predictable. Nevertheless, this is not the case in Karitiana. We have seen that, in this language, pluractional morphemes are not limited to some verbal classes and the resulting meanings are not idiosyncratic. We therefore claim that pluractionality is an inflectional process in Karitiana. Positing that it is a derivational morpheme would be missing an important generalization about the language. The fact is that once you learn that this process is available in the language, you can apply it to any verb except for the suppletive forms.

The next section presents our account of the properties of Karitiana discussed above.

4.4 The account and its predictions

This section presents our analysis of pluractionality in Karitiana and shows that its predictions are borne out. Our claim is that pluractional morphemes are plural operators over the number-neutral denotations of verbal heads. They strip these denotations of their singularities. Thus pluractionality in the case of Karitiana

yields the exclusion of atomic events from number-neutral denotations of verbal heads (see Ojeda 1998 for nouns and verbs and Müller 2000; Yu 2003 for nouns, among others). It also places the further restriction that the sub-events in the denotation of the pluractional predicate be individuated in terms of non-overlapping running times. This account implies that pluractional morphemes are similar to nominal plural morphemes within the nominal domain of many languages. They are arguably functional, as are number morphemes within the nominal domain. This is in agreement with the analysis of pluractionality as an inflectional process in Karitiana, not a derivational one.

Event counting is often understood as based on temporal structure in that atomic events can be individuated by their running times. Krifka (1998) argues that there is a temporal trace function – τ_E – from the universe of events to the universe of time structure. This function maps events into their running times. According to Krifka, there is a homomorphism that relates event structure to time structure, so that the sum of two events *e* and *e'* is equivalent to the sum of their running times as stated formally in (51). Pluractionality in Karitiana is an operation that pluralizes events on the basis of their running times. Thus the homomorphism in (51) holds for Karitiana.

(51) $e + e' = \tau(e) + \tau(e')^{24}$

Our proposal for the denotation of the pluractional operator in Karitiana is formalized in (52a)-(52b) for intransitive and transitive verbs. It is illustrated by the intransitive verb *pytim'a* ('work') in (53a) and by the transitive verb *pon* ('shoot') in (53b). The outcome of the pluractional operation is that all singular events are excluded from the denotation of verbal heads, as illustrated in (54a) for the intransitive verb *pytim'a*, and in (54b) for the transitive verb *pon*.

(52) a. Intransitive verbs

 $\llbracket PA \rrbracket = \lambda V \langle s,t \rangle \lambda Es. [V(E) \& nonatomic(E)] \& \forall e,e' \leq E [[V(e) \& V(e')] \& [atom(e) \& atom(e')] \rightarrow \sim \tau(e) \text{ o } \tau(e')]^{25}$

- b. Transitive verbs $\begin{bmatrix} PA \end{bmatrix} = \lambda V \langle e, \langle s, t \rangle \rangle \lambda Xe \lambda Es. [V(X)(E) \& nonatomic(E)] \& \forall e, e' \leq E \forall x, x' \leq X$ $[[V(x)(e) \& V(x')(e')] \& [atom(e) \& atom(e')] \rightarrow \sim \tau(e) \circ \tau(e')]$
- (53) a. $[[pytim'a]] = \{work_1, work_2, work_3, < work_1 + work_2 >, \dots, < work_1 + work_2 + work_3 >, \dots\}$
 - b. [[pon]] = {<shooting₁, monkey₁,>, <shooting₂, monkey₂>, <shooting₃, boar₁>, <shooting₄, boar₂+boar₅>, <shooting₅, monkey₃>, <shooting₆, monkey₃>, ..., <shooting₁+shooting₂, monkey₁+monkey₂>, ..., <shooting₂+shooting₃, monkey₂+boar₁>, <shooting₅+shooting₆,monkey₃>, ..., <shooting₁+shooting₂+shooting₃+shooting₄, monkey₁+monkey₂>, ...,
+boar₁+boar₂>, ...}

(54) a. [PA] ([pytim'a]) = {<work₁+work₂>, ..., <work₁+work₂+work₃>, ...}

b. [[*PA*]] ([[*pon*]]) = {<shooting₁+shooting₂, monkey₁+monkey₂>,..., <shooting₂+shooting₃, monkey₂+boar₁>, <shooting₅+shooting₆, monkey₃>

..., <shooting₁+shooting₂+shooting₃+ shooting₄, monkey₁+monkey₂+boar₁+boar₂>, ...}

As we saw in section 3, most formal work on pluractionality takes Lasersohn (1995) as its starting point. We repeat the relevant version of his formula in (55) below. Note that, according to his analysis, when a pluractional operator is applied to a predicate the result is a plurality of sub-events. Thus pluractional predicates in Lasersohn's proposal denote events that are made out of a plurality of sub-events of the same kind.

(55) V-PA (E) $\leftrightarrow \forall e, e' \in E [V(e)] \& card(E) \ge n$

Note also that in Lasersohn's formula, pluractionality is not a plural operation in the traditional sense (see Link 1983). According to Link's account of plurality, singular count nouns denote the atoms at the bottom of a join semi-lattice, and plural morphology generates their sums in the lattice structure. Thus Link's plural operator builds pluralities out of singularities (atoms), whereas Lasersohn's pluractional operator generates sub-events out of potentially plural events. Our proposal follows the spirit of Lasersohn's proposal since it generates plural events out of number-neutral denotations.

Once pluractionality in Karitiana is analyzed as resulting in plural sub-events as individuated by their non-overlapping running times, the repeated event readings come for free. A plurality of events in the case of pluractional predicates in Karitiana corresponds straightforwardly to a plurality of temporal traces. This goes hand in hand with the facts described in section 4.2 that show that pluractionality is possible for all *Aktionsarten* and for both telic and atelic predicates, since every eventuality that has some duration can be paired with distinct non-overlapping running times.

Ward (2012) presents a partially similar analysis of Karitiana pluractionals based on data from our previous work (Sanchez-Mendes and Müller 2007; Müller and Sanchez-Mendes 2008). She claims that pluractionals apply to cumulative predicates and yield nonatomic predicates. Nevertheless, probably because she had only limited access to the data, she also claims that pluractionality in Karitiana only applies to achievements, accomplishments, and semelfactives. This is not true, as we have shown above.

The analysis presented here also captures the fact that pluractional sentences have no durative readings in Karitiana. Since the sub-events are to be individuated on the basis of their running times, an event that lasts for a long time is still just a single event, and there are no single/atomic events – no matter how long they take (the durative readings) in the denotations of reduplicated verbs.

The fact that pluractionality does not display argument distributive readings is also explained by our proposal since running-time pluralization does not necessarily imply argument pluralization or vice versa. Thus pluractionality does not force distributivity as it does in some languages like Chechen (Yu 2003) or Kaingang (Henry 1948), but it does not block it either. Another property of pluractionality in

25

Karitiana that is adequately explained by running-time pluralization is the absence of pure intensity readings, where there is not a plurality of events

Our claim that pluractionality in Karitiana removes atoms from the numberneutral denotations of verbs and that these atoms are individuated on the basis of their running times is also in agreement with the fact that pluractionality is compatible with pluralities of any cardinality value, since it is only the atoms that are excluded from verbal head denotations. In section 4.2, we have shown that this is so. The use of reduplication in sentence (56) which is about two shooting events confirms this:

(56)	Karitiana						
	Sypom-t	Ø-na- pon -pon-Ø	João	sojxaaty	kyynt.		
	two-ADV	3-DECL-shoot-RDPL-NFUT	João	boar	POS		
	'João shot	t at two boars more than	once.'	/ 'João sh	not at (a)	boar(s) twic	e.′

The counterpart of this prediction is that sentences describing singular/atomic events should not reduplicate. Sentence (57a) describes a single event of "lift-ing" – one single lifting – and is appropriate without reduplication, whereas the same sentence in the same context when reduplicated (57b) is ungrammatical.

- (57) Karitiana
 - a. Inácio Ø-na-mangat-Ø myhin-t Nádia ka'it. Inácio 3-DECL-lift-NFUT one-ADV Nádia today 'Inácio lifted Nadia once today.'
 - b. *Inácio Ø-na-mangat-mangat-Ø myhin-t Nádia ka'it.
 Inácio 3-DECL-lift-RDPL-NFUT one-ADV Nádia today
 Intended reading: 'More than once today, Inácio lifted Nádia once.'

At this point, we will show that the facts related to pluractionality in Karitiana provide evidence that confirm Kratzer's (2003; 2007) thesis that lexical plurality or cumulativity differs from verbal predicate plurality.

Karitiana sentences that have not undergone number operations (such as the use of numerals or of overt distributive operators) have a wide range of possible interpretations regarding the number of individuals or events that they can describe. This range of interpretations is illustrated by sentence (58) below. Sentence (58) is neutral as to the number of events and entities involved in the situation it describes. The sentence $\tilde{O}w\tilde{a}$ nakam'at gooj holds true for any number of events in which any number of children built any number of events (E) and the number of children (X) or canoes (Y) is absolutely neutral.

(58) Karitiana

Õwã Ø-naka-m'a-t gooj. kid 3-DECL-CAUS-make-NFUT canoe 'Kids built canoes.'

(59) $\exists E \exists X \exists Y [build(Y)(E) \& agent(X)(E) \& child(X) \& canoe(Y)]$

Sentence (58) holds true for situations which may be referred to as (i) cumulative: children building canoes in various possible combinations; (ii) collective: a group of children building one or more canoes together; and (iii) distributive: each child building one canoe, or each child building two canoes, and so on. The important point to keep in mind is that the (pseudo-)distributive interpretations of sentence (58) are due to its vagueness as to the number of entities and events involved and not to the presence of some distributive operator.

To see why this is so, first note that sentences like the one in (60) do not have readings that imply that the whole verbal predicate has been pluralized. The meaning of the sentence is expressed by the logical form in (61). Differently from its English translation, sentence (60) has only a collective reading, in which Luciana and Leticia built one canoe together. The sentence does not have a strictly distributive reading, in which each of the girls built one canoe (i.e., a total of two canoes were built).

(60)	Karitiana	1			
	Luciana	Leticia	Ø-naka-m-'a-t	myhim-t	gooj.
	Luciana	Leticia	3-DECL-CAUS-build-NFUT	one-ADV	canoe
	'Luciana	and Leti	cia built one canoe.'		

Collective interpretation

- **✗** Distributive interpretation ∎
- (61) [[Luciana Leticia nakam'at myhint gooj]] = 1 iff $\exists e \exists x [canoe(x) \& build(x)(e) \& agent(Luciana+Leticia)(e) \& |x| = 1]^{26}$

Note that when the number-neutral denotation of the verb (see (62)) is composed with the denotation of its object and with the cardinal (see (63)), the plural events in the verbal denotation are excluded from the denotation of the predicate since any event of building more than one canoe is not an atomic event of "building one canoe." The resulting denotation of the VP '*a myhint gooj* ('build one canoe') is illustrated in (63).

- (62) [['a]] = {<building₁, house₁>, <building₂, canoe₁>, <building₃, oven₁>, <building₄, canoe₂>, <building₅, canoe₃> ,..., <building₁+building₂, house₁+canoe₁> ,..., <building₂+building₄+building₅, canoe₁+canoe₂ +canoe₃> ,..., <building₃+building₂+building ₁, oven₁+canoe₁+ house ₁>,...}
- (63) [['at myhint gooj]] = {<building₂, canoe₁>, <building₄, canoe₂>, <building₅, canoe₃>, ... , <building_n, canoe_n>, ... }

A prediction that follows from this hypothesis is that sentences with a truly distributive interpretation of a singular (atomic) predicate – that is, a predicate that denotes an atomic event – should not take pluractional affixes. This is so because,

according to our analysis, the pluractional operator only affects the verb, removing singular events from its denotation. Therefore, singular predicates should not be possible because there are no atomic events to distribute over.

When distributing an atomic predicate, we distribute single event predicates as the ones in (60) above. Since there are no singular events in the denotation of pluractional verbs, sentences with this type of predicate and reduplicated verbs should come out ungrammatical. The contrast between the grammaticality of sentence (60) with no reduplication and the ungrammaticality of sentence (64) with the reduplicated verb upholds our prediction.

(64) Karitiana

*Luciana Letícia Ø-naka-m-'a-'a-t myhin-t gooj. Luciana Letícia 3-DECL-CAUS-build-RDPL-NFUT one-ADV canoe Intended: 'Luciana and Letícia built a canoe more than once.'

The possible interpretations and the contrast between sentences (60) and (64) give further support to the analysis that Karitiana pluractional affixes act as operators on verbal heads, not on verbal phrases (VPs). The plural subject of sentence (60) can only be interpreted as the collective agent of the action of building one canoe. And, since the singular collective action of building one canoe does not pertain to the denotation of the reduplicated verb, sentence (64) does not appropriately describe the distributive situation.

The contrast between these sentences also illustrates one of the points made in Kratzer's (2003; 2007) analysis, which claims that there is a difference between the lexical availability of cumulative interpretations and the operation of pluralizing a VP. In Karitiana the distribution of a VP has to be generated through overt distributive operators such as *tamyry.tamyry*. As a result, the distributive interpretation, which was impossible for (60), is now available for (65).

(65) Karitiana

Ta-myry.ta-myryLuciana LeticiaØ-naka-m-'a-tmyhin-tgooj.3AN-alone.3AN-aloneLuciana Leticia3-DECL-CAUS-build-NFUTone-ADVcanoe'Luciana and Letícia each built one canoe.'

- ✗ Collective interpretation
- ✓ Distributive interpretation
- (66) Karitiana

*Ta-myry.ta-myry Luciana Leticia Ø-naka-m-'a-'a-t myhin-t gooj. 3AN-alone.3AN-alone Luciana Leticia 3-DECL-CAUS-build-RDPL-NFUT one-ADV canoe Intended: 'Luciana and Letícia built one canoe.'

In this section, we have presented arguments that support the thesis that Karitiana pluractional markers act as plural operators over the cumulative denotations of verbal heads. This conclusion, alongside data showing the nonexistence of VP distributivity in the absence of an explicit distributive operator, supports Kratzer's

(2003; 2007) thesis that the cumulativity of lexical denotations is distinct from distributivity and therefore from pluralizing verbal phrases.

4.5 Summing up and comments

This section has presented a description and an analysis of pluractionality in Karitiana based on event plurality. Our analysis claims that pluractionality in Karitiana is a plural operation on the domain of events. It excludes atomic events from verbal denotations. Pluractionality in Karitiana was claimed to have the following properties: (i) it only yields iteration in time readings; (ii) all verbs can be pluractionalized, except for individual-level verbs; (iii) pluractionality only has scope over the verb (or adjectival predicates).

The first thing to note is that pluractionality in Karitiana, as in all pluractional languages, is related to event plurality. Events are individuated by their running times in this case. This seems to be the most common strategy for delimiting events crosslinguistically. Rothstein (1999; 2004; 2008) claims that in the verbal domain the mass/count distinction is not similar to the one found within the nominal domain. According to her, all verbs can be considered count, as long as the context makes an individuating unit available. In that sense, individuation by time intervals should be easily available, except for individual-level predicates. Individual-level predicates are neither durative nor homogeneous. They cannot therefore be individuated by time intervals.

Sanchez-Mendes (2012a) has argued that all verbal predicates behave as count predicates relative to pluractionality and adverbs such as *pitat* 'a lot' and *kandat* 'many times'. The data with these adverbs show that frequency interpretation is easily available with all kinds of verbal predicates (except individual-level), supporting a counting denotation of verbal predicates in the language. This is different, for example, from *souvent* 'frequently' in French, which is argued to have a special component responsible for counting events in the verbal domain previously sorted in count and mass denotations (Doetjes 2007). Sanchez-Mendes' proposal goes hand in hand with the Karitiana data. It also makes sense of the fact that pluractionality is a regular process in the language.

The fact that pluractionality in Karitiana only scopes over the verbal head may or may not be a distinct property of the language. In order to decide on this issue one would need more detailed data from other languages.

5 Conclusion

In this chapter we have introduced the readers to the phenomenon of pluractionality – the morphological marking of event plurality on the verb. Some of its theoretical and analytical issues were discussed, and we presented an analysis of pluractionality in a specific language.

If one goes back to Cusic's list of pluractional readings (see section 2) and to the data, one can see a major divide between count and mass readings of pluractional morphemes. Count readings extend the quantity of the eventualities in the denotation of the verb or predicate. They result in a plural quantity of non-overlapping

events. These readings would most probably include the ones Cusic calls (1) repetitiveness; (2) repeated occasions or events; (3) distribution; (4) plurality of sites of action; (5) habitual agency; and (6) distributed quality. Event plurality implies event individuation. Events tend to be individuated by their running times, their locations, or their participants. We have seen that crosslinguistically pluractionality allows for all these possibilities.

Mass readings seem to be less frequent. Yu (2003) reports that pluractional durative readings are typologically rare. We will label them "intensive readings," in the sense that they augment the eventuality in some of its dimensions, be it time, or some other property. They most probably include the readings Cusic calls: (i) duration; (ii) continuity; (iii) intensity (iv) celerativity/retarditivity; (v) augmentation; (vi) diminution.

Finally, the readings Cusic calls persistent consequences, inchoativity, cumulative result, and conation do not seem to fit into either of the two cases. Since the data presented to support them is not clear enough, one would have to wait for more detailed studies in order to conclude whether or not they belong to the mass/count divide or whether they should be considered some other type of phenomena.

Acknowledgments

We thank our two anonymous referees and our editors for their comments and criticisms. Our chapter most surely improved because of them. Its mistakes remain our own.

Notes

- 1. Data from other languages will be presented exactly as given by the authors. Less obvious glosses are explicitly presented.
- 2. Glossing conventions for Yudia (Lima 2011): RED = reduplicative.
- 3. Glossing conventions for Kaqchikel in Henderson (2011): CP = completive aspect, E = ergative, PLRC = pluractional, SS = status suffix.
- 4. Glossing conventions for Hausa in Součková (2011): VN = verbal noun.
- 5. We were unable to find clear-cut sentential examples of pluractional argument distributivity.
- 6. Glossing conventions for Aleut in Golovko (1997): MULT = multiple.
- 7. Glossing conventions for Chechen in Yu (2003): PLR = pluractionality; WP = perfective marking.
- 8. Glossing conventions for Mandarin in Donazzan and Müller (2015): NCL = noun classifier; STR = structural particle.
- 9. Yu (2003) does not provide a glossing convention for the abbreviation ALLA.
- 10. PA: pluractional marker; V: verb; E: variable over singular or plural events; e: variable over atomic events; n: variable over natural numbers; card: cardinality.
- 11. °: the overlap relation.
- 12. τ : running times.
- 13. D. Landin (1983; 1984; 1988); R. Landin (1982; 1987; 1989); D. Landin and R. Landin (1973).
- 14. Everett (1985; 1993).

- 15. Storto (1994; 1996; 2001; 2002; 2003; 2005; 2008; 2010; 2011; 2012a; 2012b; 2013; 2014), Storto and Demolin (2005), Storto and Thomas (2012).
- Müller (2009; 2011; 2012), Müller and Negrão (2012), Sanchez-Mendes (2006; 2008; 2009; 2011; 2012a; 2012b; 2014; 2015; 2016), Müller and Sanchez-Mendes (2008; 2010; 2016), Sanchez-Mendes and Müller (2007), Carvalho (2009; 2010), Alexandre (2017), and Ferreira (2017).
- 17. Glosses for the Karitiana examples follow the Leipzig Glossing Rules. Other conventions used: AN = anaphoric; POS = postposition; RDPL = reduplication; STMF = stem formative; TV = thematic vowel.
- 18. The translations presented are our translations of the Portuguese ones given to or by the consultant. Other interpretations may very well be available.
- 19. For simplicity, we will only present sentences in the declarative mood (see Storto 2002 and Ferreira 2017 for mood in Karitiana).
- We are glossing the verbal reduplication in Karitiana as RDPL. Differently from the recommendations on Leipzig Glossing Rules we use a hyphen in reduplication instead of a tilde.
- 21. We will consistently translate pluractional sentences by using the adverb "repeatedly." The detailed account of the meaning of the pluractional affix will be given in section 4.4.
- 22. We thank one of our referees for this comment.
- 23. Tovena and Kihm (2008) have investigated pluractionality in Romance languages and also claim that it is not a derivational process.
- 24. e, e': variables over events; τ : temporal trace functions.
- 25. V: variable over verbs; X: variable over singular and plural entities; E: variable over plural events; e(entities), s(events) and t(truth values) are semantic types and indicate the type of the argument the lambda function takes.
- 26. |x| = n means that the cardinality of x is equal to n, that is, the number of entities contained in the set denoted by x is equal to n.

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Abstract: This chapter focuses on the phenomenon of pluractionality, strictly defined as the morphological marking of event plurality on the verb. Pluractionality occurs in a variety of languages, both from different regions and from different families. Pluractional sentences have a variety of readings, which may depend at the same time on the language and on the verbal type. The chapter describes pluractionality crosslinguistically, discusses the analytical issues raised by the phenomenon, and presents a case study of Karitiana – an Amazonian language. It concludes that one can posit a major divide on the result of the operation effected by pluractional morphemes crosslinguistically: count vs mass readings. Count readings expand the quantity of the eventualities in the denotation of the verb or predicate. They result in a plural quantity of nonoverlapping events. Mass or intensive readings augment the eventuality in some of its dimensions, whether time, or some other property.

Keywords: distributivity; events; plural; underrepresented languages