Distributive pluractionality

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Jan 2023

What is distributivity?

Some distributive vocabulary

- **Key:** The thing we break up into parts.
- **Share:** The thing the parts individually participate in.
- **Map:** The relation between key and share

(1) The students each left.

a. **Key:** the students

b. **Share:** left

c. **Map:** agent theta-role

(2) two pounds of tomatos.

a. **Key:** two pounds

b. **Share:** tomatos

c. **Map:** weight

Some distributive vocabulary

I will use "distributive operator" very generally for expressions whose interpretation requires a key-share-map relation.

(3) a. The students left **one by one**.

b. The students **each** left.

c. **Every **student left.**

d. The students left individually**.

An aside on the D operator

Some verbs, so called “mixed predicates”, allow both distributive and collective readings.

(4) The children lifted the table

   a. **True** in the teamwork scenario

   b. **True** in the test-of-strength scenario

For account for the latter, many have assumed there is a covert distributivity operator.

(5) The children **D** lifted the table

I okay with this as a kind of descriptive way to mark that there the predication at hand is a distributive sort, but I am not ready to claim there is actually an operator here.

Kinds of distributive operators

I group distributive operators into four rough categories:

- distributive quantifiers: each, every, most, etc.
- distributive modifiers: one by one, individually, “floated each” etc.
- distributive predication: e.g., the distributive interpretation of mixed predicates with plural nominals.
- distributive pluractionals: **to be discussed**

Kinds of distributive operators

Within these kinds there can also be important distinctions. First, I want to distinguish distributive operators that are key-marking and those that are share-marking.

(6) a. **Each** boy ate an apple. <– key-marking

b. The boys **each** ate an apple. <– share-marking

c. The boys ate an apple **each** <– share-marking

Note!! This distinction does not change what are the key and shares.

Kinds of distributive operators

It is also important to distinguish those operators that merely distribute the share over the (atomic) parts of the key and those that also impose other constraints.

(7) The students **each** danced.
Each student gets their own leaving event.

(8) The students danced **one by one**.
Not only does each student get their own leaving event, but those events must be ordered in time.

Thinking about pluractionals

When we turn to pluractionals, classification into these subtypes will become interesting.

- Because pluractionals, by definition, are verbal morphology, they must either be share-marking or must be operating over the verb—i.e., the opposite of quantifier *each*.
- It would also be interesting to see whether pluractionals induce additional entailments about the share or key. I believe this to be commonly the case.

Distributive Strength

Distributive Strength

We can rank distributivity (operators) by strength. The stronger the distributivity, the more strictly it controls its share—consider the following pairs of examples:

(9) a. All the students gathered in the park.
 b. #All the students are numerous.
 c. #John gathered in the park.

(10) a. #Each of the students gathered in the park.
 b. #Each of the students are numerous.
 c. # John is numerous.

The predicates *gather* and *be numerous* cannot have atomic individual participants. The distributive operator *each of* forces the share to to be predicated of atoms in the key in a stricter way than *all* does.

Distributive Strength

Taking this lesson to heart we can sort distributive operators by strength.

- We have: **each** $>$ **all**

Is there any reason to think that these quantificational distributive operators are different than predicative distributivity?

(11) Suppose every single student ordered their own pizza to eat.

a. Each student ate a pizza.

b. All the students ate a pizza.

c. #The students ate a pizza.

We see here that predicative distributivity cannot "scope over" an indefinite. Another way to say this is that it isn't strong enough to trap an indefinite in the share. We thus have:

- **each** $>$ **all** $>$ **pred.dist**

Distributive Strength

What can we say about distributive modifiers? They pattern with predicative distributivity on many tests.

(12)

a. The students gathered **one by one**.

b. The students ate a pizza **one by one**.

But they seem (maybe) stronger than this.

(13)

a. The students elected the president.

b. #The students elected the president one by one.

c. #All the students elected the president.

d. #Each of the students elected the president.

Distributive Strength

We thus have a strength ranking, where (roughly) quantificational distributivity is strong than adverbial distributivity is stronger than predicational distributivity.

- **each > all > n-by-n > pred.dist**

I expect that, just as we see quantificational distributors varying in strenth, I bet we see something similar for adverbials, but I believe in this general ranking.

- **quantificational > modificational > predicational**

Some questions for pluractionals

We can now ask a bunch of questions:

- How strong are pluractional distributivity operators? Are they like quantifiers, adverbial modifiers, or vanilla predicative distributivity?
- Do pluractional distributivity operators share-markers or key-markers?
- Do pluractionals only encode distributivity, or do they also impose additional constraints on the share (or key)?

A case-study of pluractional distributivity

A case-study of pluractional distributivity

Consider the following minimal pair in Kaqchikel.

(14) a. X-e'-in-q'etej ri ak'wal-a'. CP-A3p-E1s-hug the child-PL I hugged the children.

b. X-e'-in-q'ete-la' ri ak'wal-a'. CP-A3p-E1s-hug-PDIST the child-PL I hugged the children individually.

The first is true in both situations where:

- I hug the children as a group
- I hug each children individually

The second is is only true in the later situation. It is false if I, in fact, gave the children a group hug.

A case-study of pluractional distributivity

At an appropriately coarse level of semantic granularity, **??** is comparable to the following English sentences, where distributivity is enforced through various means.

(15)
  a. I hugged each child.
  b. I hugged the child one by one.
  c. I hugged the child individually.
  d. etc.

A case-study of pluractional distributivity

While English has a variety of ways to force distributive predication, the Kaqchikel example presents a route to distributivity that is absent in English, namely **pluractionality**.

(16) X-e'-in-q'ete-la' ri ak'wal-a'.
CP-A3p-E1s-hug-PDIST the child-PL
I hugged the children individually.

We know the -la' marker is, in fact, pluractional, because it derives verbs that cannot be satsified in single-event scenarios.

(17) X-e'-in-q'ete-la' ri ak'wal-a'.
CP-A3p-E1s-hug-PDIST the child-PL
I hugged the children individually.

A first-pass look at this sentence again makes it seem like:

- ri ak'wala' *the children* is the distributive key
- q'ete *hug* is the distributive share
- the theme theta-role is the map

Thus, the pluractional looks like a kind of distributivity operator that marks the share.

A case-study of pluractional distributivity

I will argue that this is not the case!

- Pluractionality will require that the event-predicate be the key, while the nominal is the share
- it is in fact the opposite of how we usual think of distributive constructions

A case-study of pluractional distributivity

Generalization 1: A plural object can interact with the distributive pluractional, but a plural subject can't.

A case-study of pluractional distributivity

Here we see that a plural object can interact with the distributive pluractional.

(18) X-e'-in-tun-ula' ri q'ul.
CP-A3p-E1s-fold-PDIST the blanket
I folded the blankets individually.
False if I folded any subset of the blankets simultaneously

(19) X-e'-in-kan-ala' ri wuj.
CP-A3p-E1s-search-PDIST the book
I searched for the books individually.
False if I looked for any subset of the books simultaneously

(20) X-e'-in-kam-ala' ri sanik.
CP-A3p-E1s-kill-PDIST the ant
I killed the ants individually.
False if I killed any subset of the ants simultaneously

A case-study of pluractional distributivity

Here we see that a plural subject can't interact with the distributive pluractional.

(21) X-∅-qa-kan-ala' ri wuj.
CP-A3s-E1p-search-PDIST the book
#We searched for the book individually.

(22) X-∅-qa-tun-ula' ri q'ul.
CP-A3s-E1p-fold-PDIST the blanket
#We each folded the blanket.

A case-study of pluractional distributivity

Generalization 2: Distributive pluractionals cannot create derived plurals (i.e., their distributivity is weak)

A case-study of pluractional distributivity

There are multiple ways of being plural. A nominal can be plural in virtue of its morphology or semantic class (i.e., plural morphology, group nouns, etc.). Alternatively, plurals can be derived by taking narrow scope, like the indefinite below.

(23) Every five minutes I ate a tortilla. My sister made them/*it for me.

A case-study of pluractional distributivity

Crucially, pluractional distributivity cannot create derived plurals. It cannot scope over the indefinite object.

(24) X-in-kan-ala' jun wuj.
CP-E1s-search-PDIST a book
I searched for a book in various places.
For example, if I spent all afternoon looking all over the house for a particular book.

(25) X-in-tik-ila' jun che'.
CP-E1s-plant-PDIST a tree
I planted a tree various places.
For example, if the boss kept telling me to move the tree somewhere else after every time I planted it.

A case-study of pluractional distributivity

The effect is even clearer with predicates of destruction, which are infelicitous with pluractional distributive derivational morphology and singular objects.

(26) #X-in-kam-ala' jun sanik.
CP-E1s-kill-PDIST a ant
I killed an ant various times.

(27) #X-in-qum-ula' jun mama "ak'.
CP-E1s-drink-PDIST a beer
I drank a beer various times.

A case-study of pluractional distributivity

These examples we have just seen (and partially repeated below) show Generalization 3.

Generalization 3 (to be amended): Distributive pluractionals with atomic objects are not ungrammatical, but have repetition readings.

(28) X-in-tik-ila' jun che'.
CP-E1s-plant-PDIST a tree
I planted a tree various places.

A case-study of pluractional distributivity

Given that the pluractional cannot take scope over an indefinite, we can show quite easily that a plurality of events is indeed required.

Generalization 4: Distributive pluractionality requires a plurality of events.

(29) Suppose I plant a tree just once and then walk away.
#X-in-tik-ila' jun che'.
CP-E1s-plant-PDIST a tree

I planted a tree various places.

A case-study of pluractional distributivity

Summary of the generalizations

1. Obligatory distribution over plural objects
2. Repetition with singular objects
3. Cannot create derived plurals (narrowest scope)
4. Plural events

Case Study: Analysis

Case Study: Analysis

I work with classical many-sorted type logic with events and theta-role functions.

- the domain of individuals of type e is the powerset of a designated set of entities IN minus the empty set: $D_e = \wp^+(\text{IN}) = \wp(\text{IN}) \setminus \varnothing$
- the domain of events of type ϵ is the powerset of a designated set of events EV minus the empty set: $D_\epsilon = \wp^+(\text{EV}) = \wp(\text{EV}) \setminus \varnothing$
- atomic individuals and atomic events are the singleton sets in $\wp^+(\text{IN})$ and $\wp^+(\text{EV})$ respectively; they are identified by a predicate **atom** (which applies to both individuals and events)

Case Study: Analysis

- the "part of" relation $\leq$ over individuals / events is set inclusion over $\wp^{+}(\mathrm{IN})$ / $\wp^{+}(\mathrm{EV})$: $a \leq b$ iff $a \subseteq b$
- the sum operation $\oplus$ is set union over $\wp^{+}(\mathrm{IN})$ / $\wp^{+}(\mathrm{EV})$: $a \oplus b := a \cup b$
- θ-roles are functions of type ϵe from events (type ϵ) to individuals (type e)

Case Study: Analysis

I assume that arguments and adjuncts are event modifiers:

- they have denotations of type $(\epsilon t)(\epsilon t)$
- they have translations of the form $\lambda \mathcal{P}_{\epsilon t}.\lambda \mathbf{e}_{\epsilon}$.

P(e) $\wedge \ldots$

Case Study: Analysis

Further, verbs denote cumulated predicates of events:

- they have denotations of type (ϵt)
- they have translations of the form $\lambda \mathbf{e}_{\epsilon}.\mathcal{P}(\mathbf{e})$

Case Study: Analysis

As derivational morphology, pluractional distributivity applies to predicates of events and encapsulates a θ-role function through which it encodes distributive dependencies.

(30) PDIST $\rightsquigarrow \lambda \mathcal{P}_{\epsilon t}.\lambda \mathbf{e}_{\epsilon}.$
P(e)$\wedge$
$|\{e' \leq e : \mathbf{atom}(e')\}| > n \wedge$
$\forall e' \leq e(\mathbf{atom}(e') \rightarrow \mathbf{atom}(\mathbf{th}(e')))$

The contribution of PDIST is given by the final two conjuncts of 36

- $|\{e' \leq e : \mathbf{atom}(e')\}| > n$ is the pluractionality requirement — the predicate will only be true of events whose atomic subparts are more numerous than some contextually specified standard.
- $\forall e' \leq e(\mathbf{atom}(e') \rightarrow \mathbf{atom}(\mathbf{th}(e')))$ establishes a θ-based correspondence between atomic subparts of the event and atomic subparts of the range of the **th**-role.

An example

The following example has a indefinite plural object and a derived PDIST predicate.

(31) X-e'-in-q'ete-la' oxi' ak'wal-a'.
CP-A3p-E1s-hug-PDIST three child-PL
I hugged three children individually (many times).

(32) *q'ete* $\rightsquigarrow \lambda \mathbf{e}_{\epsilon}.\textsc{hug}(\mathbf{e})$

(33) *oxi'*$^{\mathbf{th}}$ $\rightsquigarrow \lambda X_{et} \lambda \mathcal{P}_{\epsilon t} \lambda \mathbf{e}_{\epsilon}.\mathcal{P}(\mathbf{e}) \wedge$
$\exists x_e(|\{x' \leq x : \mathbf{atom}(x')\}| = 3 \wedge X(x) \wedge \mathbf{th}(\mathbf{e}) = x)$

(34) *ak'wala'* $\rightsquigarrow \lambda x_e.\textsc{child}(x)$

An example

The following example has a indefinite plural object and a derived PDIST predicate.

(35) X-e'-in-q'ete-la' oxi' ak'wal-a'.
CP-A3p-E1s-hug-PDIST three child-PL
I hugged three children individually (many times).

(36) $\textit{in}^{\textbf{ag}} \rightsquigarrow \lambda \mathcal{P}_{\epsilon t} \lambda \mathbf{e}_{\epsilon}.\mathcal{P}(\mathbf{e}) \wedge \mathbf{ag}(\mathbf{e}) = \mathbf{speaker}$

(37) $\textit{PAST} \rightsquigarrow \lambda \mathcal{P}_{\epsilon t}.\exists \mathbf{e}_{\epsilon}(\mathcal{P}(\mathbf{e}) \wedge \mathbf{runtime}(\mathbf{e}) < \mathbf{now})$

An example

We can now get a full translation for this example

(38) X-e'-in-q'ete-la' oxi' ak'wal-a'.
CP-A3p-E1s-hug-PDIST three child-PL
I hugged three children individually (many times).

(39)
$$\exists \mathbf{e}_{\epsilon}(\textsc{hug}(\mathbf{e}) \wedge |\{e' \leq e : \mathbf{atom}(e')\}| > n \wedge$$
$$\forall e' \leq e(\mathbf{atom}(e') \rightarrow \mathbf{atom}(\mathbf{th}(e'))) \wedge$$
$$\exists x_{\mathbf{e}}(|\{x' \leq x : \mathbf{atom}(x')\}| = 3 \wedge \textsc{child}(x) \wedge \mathbf{th}(\mathbf{e}) = x) \wedge$$
$$\text{ag(e)=speaker} \wedge$$
$$\text{runtime(e)<now)}$$

This analysis captures all of the generalizations.

1. Plural events
2. Obligatory distribution over plural objects
3. Repetition with singular objects
4. Cannot create derived plurals (narrowest scope)

An example

(40) $\exists \mathbf{e}_{\epsilon}(\textsc{hug}(\mathbf{e}) \wedge |\{e' \leq e : \mathbf{atom}(e')\}| > n \wedge$
$\forall e' \leq e(\mathbf{atom}(e') \rightarrow \mathbf{atom}(\mathbf{th}(e'))) \wedge$
$\exists x_e(|\{x' \leq x : \mathbf{atom}(x')\}| = 3 \wedge \textsc{child}(x) \wedge \mathbf{th}(\mathbf{e}) = x) \wedge$
ag(e)=speaker $\wedge$
runtime(e)<now)

- There must a plurality of events due to the condition $|\{e' \leq e : \mathbf{atom}(e')\}| > n$
- As required, this is false if I hugged any subset of the children as a group. The reason is that there would be an atomic subevent $\mathbf{e}'$ of $\mathbf{e}$ whose image under **th** would be non-atomic.
- We allow for repetition with a singular object because, as a function, it is fine for theta-roles to map multiple events to the same individual.
- The translation also correctly predicts that PDIST can't create derived plurals. There is no way for ∀ over events to interact with an object quantifier—distributivity is encapsulated.

Alternatives, Lessons, and Extensions

Alternatives, Lessons, and Extensions

The analysis works, but let's consider other alternatives, lessons, and extensions.

Alternatives, Lessons, and Extensions

This analysis makes fairly detailed use of theta-roles. Is there reason to believe that theta-roles are at play and not something more syntactic like the argument position.

- For instance, perhaps the pluractional distributivity operator composes with the whole VP and not the V, and so it scope over the object, yet not the subject.

Alternatives, Lessons, and Extensions

Evidence that we are actually dealing with theta-roles comes with passives. Recall that PDIST can't force a distributive interpretation of the subject.

(41) X-∅-qa-tun-ula' ri q'ul.
CP-A3s-E1p-fold-PDIST the blanket
#We each folded the blanket.

Crucially, it can target passivized subjects:

(42) X-e-pitz'-ilä-x. \ COM-A3p-squeeze-**la'**-PAS \ 'They were squeezed individually.'

This suggests that PDIST does not care about grammatical subjecthood—i.e., the syntactic position of arguments—but thematic notions of argumenthood.

- Our analysis captures this by treating PDIST as sensitive to the verb's theme theta-role.

Alternatives, Lessons, and Extensions

Recognizing the importance of theta-roles to the analysis raises some important compositional issues.

- In this account the pluractional is an event modifier and is lexically specified to target the verb's theme theta-role.
- Another option would be to compositionally target the verb's theme role.

(43) PDIST $\rightsquigarrow \lambda\Theta_{\epsilon e}\lambda\mathcal{P}_{\epsilon t}\lambda x\lambda \mathbf{e}_{\epsilon}.$
P(e) $\wedge\Theta(e) = x\wedge$
$|\{$e'$\leq e : \mathbf{atom}(e')\}| > n\wedge$
$\forall e' \leq e(\mathbf{atom}(e') \rightarrow \mathbf{atom}(\Theta(e')))$

This analysis is quite clean and allows us to distinguish pluractionals from adverbial event modifiers, but I'm not sure how to argue for it. I think this kind of analysis would be really important to explore.

Alternatives, Lessons, and Extensions

Whether or not pluractional distributivity is an event-modifier or a theta-role modifier, it is clearly operating in the VP.

- Is this VP the share or the key?
- According to the analysis here, it is the key!

Recall that:

- **Key:** The thing we break up into parts.
- **Share:** The thing the parts individually participate in.
- **Map:** The relation between key and share

The crucial subformula is: $\forall e' \leq e(\mathbf{atom}(e') \rightarrow \mathbf{atom}(\Theta(e')))$

- The key is the event argument, which we break into atomic parts.
- The share is the theme argument, whose atomic parts are linked up with the parts of the key.
- The map is the theme theta role.

Alternatives, Lessons, and Extensions

This is fairly cool. In most other cases, distributive operators that enforce a distributive interpretation of an arugment have that argument as key.

- This makes sense because the key is what we are breaking into parts.
- The way that PDIST gets around this is that the share involves an **atom** predicate over individuals.
- The result is a kind of simultaneous distribution over both event and individual arguments.

Alternatives, Lessons, and Extensions

I strongly believe that this kind of distributivity should be canonical for pluractionals. Why? Because if the verb is the share and the distributive operator is strong, then while a plurality of events can be produced, the verb is not a **predicate** of plural events, as we may want a pluractional verb to be.

(44) The girls each left.

(45) $\sigma x.\textsc{girl}(x) \wedge \forall x' \leq x[\textbf{atom}(x) \rightarrow \exists e[\textsc{left}(e) \wedge \textbf{ag}(e) = x]]$

If there is more than one girl, then there will a distributive interpretation of the subject and there will be a plurality of events, but I don't want to call this a distributive pluractional—the verb is not a predicate of pluralities. If it were, each girl would have to leave many times:

(46) $\sigma .x\textsc{girl}(x) \wedge \forall x' \leq x[\textbf{atom}(x) \rightarrow \exists e[\textsc{left}\text{-}\textbf{plrc}(e) \wedge \textbf{ag}(e) = x]]$

Alternatives, Lessons, and Extensions

In contrast, if the VP is the key in a distributive construction, the verb can naturally accept a plural event in support of distributivity.

(47) $\sigma e.\textsc{verb}\text{-}\mathbf{plrc}(e) \wedge \rightarrow \forall e' \leq e[\mathbf{atom}(e) \rightarrow \ldots]$

Alternatives, Lessons, and Extensions

Finally, let's consider the question of whether PDIST is merely distributive, or whether it imposes some additional constraints on its key / share.

- With plural objects, it appears that no additional constraints on imposed. It just looks like we have distributivity.

(48) X-e'-in-kam-ala' ri sanik.
CP-A3p-E1s-kill-PDIST the ant
I killed the ants individually.
False if I killed any subset of the ants simultaneously

Alternatives, Lessons, and Extensions

With singular objects, though, we get additional spatial readings.

- Various locations of the theme.

(49) X-in-tik-ila' jun che'.
CP-E1s-plant-PDIST a tree
I planted a tree various places

- Various parts of the theme.

(50) X-in-k'ut-ula' jun kem.
CP-E1s-show-PDIST a weaving
I showed various parts of the weaving.

What do we want to say here? In the case of this example it looks like the distributive pluractional is imposing extra constraints on its share.

(51) X-in-k'ut-ula' jun kem.
CP-E1s-show-PDIST a weaving
I showed various parts of the weaving.

That is, each part of the key (each event), must be mapped, not to an atomic part of the theme, but to spatially distinct part of the theme—e.g.,

- Every atomic event in the plural event of showing is mapped to a part of the weaving by the theme relation.
- No two parts of the weaving that are mapped to by the theme relation occur in the same location.

Alternatives, Lessons, and Extensions

Under this account, the distributive pluractional would be like pluractional adverbial like *one by one*, which are distributive over the individual argument, but in addition say that the distributive share has to be arranged in a certain way.

(52) The students left one by one.

- Every atomic student participates in their own leaving event.
- Not to leaving events that a student participated in take place at the same time.

Alternatives, Lessons, and Extensions

This is quite nice and makes the verbal pluractional look like the pluractional adverbial *one by one*.

- I believe, though, that this is not what we want for the pluractional.
- Why? We don't need it.

Note that for eventive verbs, if the location of theme of two events is different, then the location the event took place in are different.

- We can more simply capture data like the following by imposing constraints on the key.

(53) X-in-k'ut-ula' jun kem.
CP-E1s-show-PDIST a weaving
I showed various parts of the weaving.

(54) X-in-tik-ila' jun che'.
CP-E1s-plant-PDIST a tree
I planted a tree various places

Alternatives, Lessons, and Extensions

This new theory would say for an example like the following:

(55) X-in-k'ut-ula' jun kem.
CP-E1s-show-PDIST a weaving
I showed various parts of the weaving.

- each atomic event that in the plural event that satisfies the pluractional k'utula' is mapped to an atomic weaving—that is, in each pluractional subevent I show you the weaving
- moreover, no two atomic events that are part of the plural event occur in the same space—thus, the showings are of different parts of the weaving.

The same works for these other examples with spatial readings:

(56) X-in-tik-ila' jun che'.
CP-E1s-plant-PDIST a tree
I planted a tree various places

- each atomic event that in the plural event that satisfies the pluractional tikila' is mapped to an atomic tree—that is, in each pluractional subevent I plant the same tree.
- moreover, no two atomic events that are part of the plural event occur in the same space—thus, I must plan the tree in different locations.

Alternatives, Lessons, and Extensions

This works for these examples, but what about cases like the following where we never talked about a spatial reading and instead distributive was over individuals.

(57) X-e'-in-kam-ala' ri sanik.
CP-A3p-E1s-kill-PDIST the ant
I killed the ants individually.
False if I killed any subset of the ants simultaneously

Well, in this cases, I think the spatial aspect of the pluractional is taken care of by the fact that different individuals occupy different spaces by definition.

- I cannot kill every any in literally the same space beacause even the dead ones occupy some space that the live ones are not in.

Alternatives, Lessons, and Extensions

The Kaqchikel pluractional marker is thus a distributive operator with the following properties:

- It has an event argument key
- Its share is the atomic parts of an individual
- Its map is a theta role (here the theme)
- It has a secondary spatial commonent it imposes on the key

How common is this kind of pluractional across languages?

How common is this kind of pluractional across languages?

I believe this kind of pluractional, based on theta roles and including an additional constraint on the event-key is pretty common.
Consider some examples:

How common is this kind of pluractional across languages?

Here is the Yup'ik distributive postbase:

<u>Argument plural only: Yup'ik distributive postbase (Jacobson 1984:542)</u>

tekite- 'to arrive'	tekitequut 'they are leaving one after another'
nere- 'to eat'	ner'qui 'he is eating them one after another'

Assuming the event argument is key as in Kaqchikel,

- The share is the atomic parts of an arugment (though it looks like we cannot have purely atomic arguments).
- The map is either the theme **or agent** theta roles
- There is an additional temporal constraint on the key.

How common is this kind of pluractional across languages?

Argument and spatial plural: Evenki distributive (Nedjalkov 1997:251):

d'ava- 'take/seize'

d'ava-ty- 'take/seize several objects one by one'

lo:van- 'hang (meat or fish for drying)'

lo:vat- 'hang (pieces of meat or fish for drying) here and there'

Assuming the event argument is key as in Kaqchikel

- The share is the atomic parts of an arugment (though it looks like we cannot have purely atomic arguments).
- The map is the theme theta role.
- There is an additional spatial **or temporal** constraint on the key.

How common is this kind of pluractional across languages?

In sum, I think across languages we see the following kind of distributive pluractionality that varies along a few parameteres:

- The key is the event.
  - languages can pick whether they add additional temporal or spatial variation constraints on the key events.
- The share is the atomic parts of an argument.
  - languages can pick whether the argument itself is allowed to be atomic.
- The map is a theta role.
  - language can pick which theta roles, but there seems to be a preference typologically for themes.