

Reciprocal Polysemy and Compositionality

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1 Components of reciprocity

Markers of reciprocity are known to display a high degree of polysemy (Frajzyngier and Curl, 1999; Lichtenberk, 1985, 1999; König and Gast, 2008; Nedjalkov, 2007). In many languages, the element that is used to indicate a reciprocal situation can have more than one function. English of course is no exception: the reciprocal marker *each other* is composed of two pieces, each of which has independent uses outside of marking a reciprocal situation (Heim et al., 1991b).

Among the patterns of reciprocal polysemy identified in Nedjalkov's (2007) extensive typological study, one of the more robust patterns cross-linguistically is a *reciprocal-iterative* polysemy. In this case, the marker used to express a reciprocal situation is also used to express event plurality. This pattern is found in diverse languages such as Mandarin, Samoan, and Madurese. It is also found in Logoori, a Luhya (Bantu, JE 41) language spoken in Western Kenya. The verbal extension *-an* can be used to indicate a reciprocal situation (1a) as well as an iterative event (1b).

- (1) a. *Sira na Imali va-lol-an-i*
 1Sira and 1Imali 2SM-see-AN-FV
 ‘Sira and Imali saw each other.’¹
- b. *Sira y-ashiamul-an-i*
 Sira 1SM-sneeze-AN-FV
 ‘Sira sneezed repeatedly.’

This dual use raises a number of interesting theoretical and empirical questions. First, given that reciprocal-iterative polysemy is observed across a range of linguistically diverse languages and language groups, we want to explain the inherent connection between reciprocity and event plurality. The natural response is to point out that the categories of reciprocity and iterativity share a common denominator: reciprocity also involves event plurality. If Sira and Imali saw each other, there are two events of seeing, one in which Sira sees Imali, and one in which Imali sees Sira (cf Siloni 2012). In Davies (2000) (for Madurese) and Faller (2004) (for Cuzco Quechua), this link has been used to show that such “polysemies” are mis-labelled. According to them, a marker like *-an* always means the same thing:

¹ All data were collected by the author in direct elicitation in the United States and Kenya unless otherwise indicated. Logoori is also called Maragoli, Lulogooli, Luragooli, Llogoori, among others. It is a Lacustrine Bantu language (JE 41), with roughly 600,000 speakers, based in Western Kenya close to Lake Victoria. I employ the standard orthography for Logoori, which omits tones and collapses some vowel distinctions. Of note is that *ng*’ represents a velar nasal (/ŋ/) and *ny* represents a palatal nasal /ɲ/ (which is phonetically realized as an inter-dental nasal). Following convention, all nouns belong to one of 17 noun classes, indicated by numbers in the glosses. All verbs in Logoori end in a final vowel which reflects mood and tense.

1-17 : Noun classes
 AC : Anticausative
 APPL : Applicative
 CAUSE : Causative
 FV : Final vowel

HAB : Habitual
 PAST : Past
 PRES : Present
 PASS : Passive
 PROG : Progressive

REC : Reciprocal
 REFL : Reflexive
 SM : Subject marker

it's a marker of event plurality. In a reciprocal frame, it simply expresses the subset of reciprocal meaning that involves event plurality. Additional properties of the language (which may or may not be grammaticalized) are invoked to generate the “rest” of reciprocity.

Importantly, such an analysis views reciprocity as *emergent*. There is no primitive that “means” reciprocal. Rather, reciprocal meaning is the sum of its parts, i.e., it is *compositional*. This idea is most famously articulated in Heim et al. (1991b), who argue that “reciprocal expressions have no semantic properties peculiarly their own and that their meaning instead arises from the compositional interactions of the meanings that their constituent parts have in isolation” (p. 67). In other words, for English, reciprocal meaning can be reduced to the interacting meanings of both *each* and *other*.

(2) The children scratched each other.

Simplifying, in (2), *each* universally quantifies over the group denoted by *the children*, and distributes the members of this group among hitting events, and at the same time *other* enforces that the pairs of children in a scratching relation are distinct (i.e., non-reflexive). The appeal of the analysis is that it combines processes that are independently observed (i.e., distributive-*each* and distinctness-*other*), and the combination directly *predicts* the considerable variation in what counts as a reciprocal situation.²

On the other hand, many studies have argued for a non-decompositional treat-

²See also Heim et al. (1991a). The general idea is elaborated in more detail in Beck (2001) to capture different flavors of reciprocity.

in how languages choose to grammaticalize pieces of this meaning. In some languages, reciprocal meanings are emergent (e.g., English), while in others, they are encoded directly (e.g., Chichewa).

In this study, I wish to defend a compositional analysis for reciprocity in at least some Bantu languages which use *-an* (and cognates) to mark a reciprocal situation. Logoori grammaticalizes some of the overall reciprocal meaning, specifically, event plurality. In particular syntactic/semantic configurations, the combination of event plurality and (implicit) processes for calculating relational plurals results in a reciprocal meaning. Thus, despite the fact that Logoori doesn't explicitly express distributivity and distinctness, a reciprocal meaning compositionally arises nonetheless. With further insight into how *-an* behaves across Bantu languages (Maslova, 2007), the picture emerges that *-an* and cognates might never be a reciprocal marker, per se. In Bantu languages, *-an* acts more like a VP-level quantifier, which interacts with other properties of the language to derive reciprocal meanings.

The view of reciprocity as compositional has larger implications for all patterns of reciprocal polysemy observed in Lichtenberk (1985); Frajzyngier and Curl (1999); Nedjalkov (2007); König and Gast (2008). In general, reciprocity can be viewed as an emergent property in all languages which display reciprocal polysemy. It turns out that the "second" function of the reciprocal marker always expresses some subset of the overall complex semantics associated with reciprocal situations. Thus, we find support for both Heim et al and Dalrymple et al: languages share a common core of reciprocity, but they vary as to how they choose to express this

meaning. Many languages resort to grammaticalizing (or otherwise recruiting) morphology that expresses sub-pieces of the overall meaning of reciprocity. The present study puts these results into a typologically more diverse picture, showing that the intuition is valid, but variation comes in which pieces are grammaticized in different languages.

This paper is organized as follows. Sections 2 and 3 are data sections, where I describe the properties of reciprocity and iterativity in Logoori, respectively. In the latter section, I discuss two key properties that *-an* expresses as a marker of event iterativity: it expresses cumulative event plurality, and it can only pluralize single-participant events. In section 4 and section 5, I provide an informal analysis for the reciprocal-iterative polysemy. In the analysis, *-an* expresses a subset of the overall reciprocal meaning while independent processes, in particular, a way to express relational plurals, accounts for the rest (Fiengo and Lasnik, 1973; Langendoen, 1978). The two processes together derive the reciprocal meaning. In section 6, I formalize *-an* as an event pluralizer which merges at the level of the verb phrase. In section 8 I provide morpho-syntactic evidence for the analysis, showing that the proposed syntax and semantics accounts for the entire distribution of *-an*. Section 9 discusses the relationship between reflexives and reciprocals in Logoori. Finally, section 10 takes a broader look at reciprocal polysemies, illustrating that the theoretical approach proposed here extends naturally to all such cases. In this last section, I focus particularly on (Narrow) Bantu, in which *-an* and cognates are robustly attested as markers of reciprocity across the family. In Section 11 I conclude.

2 -An as a reciprocator

The verbal extension *-an* may be used to indicate a reciprocal situation in Logoori. This pattern is robustly found across (Narrow) Bantu languages⁴ with cognates of *-an* (Dammann, 1954; Mchombo, 1993; Maslova, 2007; Nurse and Philippson, 2003), a.o.

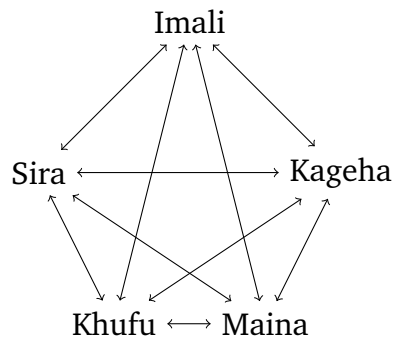
- (4) a. *avaana va-lol-an-i*
 2child 2SM-see-AN-FV
 ‘The children saw each other.’
- b. *Sira na Imali va-duy-an-i*
 1Sira and 1Imali 2SM-hit-AN-FV
 ‘Sira and Imali hit each other.’
- c. *avaana va-yag-an-i*
 2child 2SM-scratch-AN-FV
 ‘The children scratched each other.’

Perhaps the most investigated aspect of reciprocal situations is the different “flavors” of reciprocity, that is, weak vs. strong reciprocity (Langendoen, 1978; Dalrymple et al., 1998; Schwarzschild, 1996; Beck, 2001) among many others. In the strong reading, all of the subject is paired with all of the object (minus the reflexive relation) and all of the object is paired with all of the subject (again, minus the reflexive relation). A relation is strongly reciprocal if every member of the set is in a relation with every other member of the set.

- (5) *avaandu va-hol-an-a*
 2child 2SM-hit-AN-FV

⁴“Narrow Bantu” is a geographical classification. It refers to those Bantu languages spoken in Southern and Eastern African.

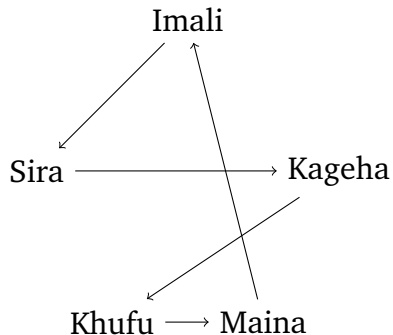
‘The children hit each other.’



Verifying situation: *Imali, Sira, Kageha, Khufu and Maina are fighting. Imali hit Sira, Maina, Kageha, and Khufu; Sira hit Imali Kageha, Khufu, and Maina; Kageha hit Imali, Sira, Khufu, and Maina; Khufu hit Imali, Sira, Kageha, and Maina; and Maina hit Imali, Sira, Kageha, and Khufu. Thus, each child hit the four other children, and was hit by the other four other children.*

Reciprocity can also be weak, in which case it suffices that every member of the set be in a relationship with just one another member of the set, but it need not hold that every member is related to *every other* member. Unlike strong reciprocity, there are various ways that a situation can count as weakly reciprocal. For instance, a simple case could be that the subject and object for each sub-event are paired at random. In (6), all the kids are hitters for some other kid, and all the kids get hit by some other kid.

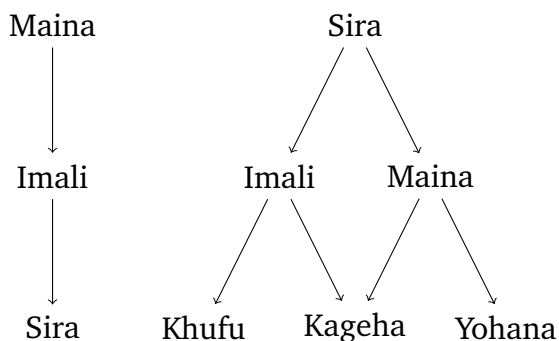
- (6) *avaandu va-hol-an-a*
 2child 2-hit-AN-FV
 ‘The children hit each other.’



Verifying situation: *Imali, Sira, Kageha, Khufu and Maina are fighting. Imali hit Sira, Sira hit Kageha, Kageha hit Khufu, Khufu hit Maina, and Maina hit Imali. Thus, each child hit some other child, and was hit by some other child.*

Weak reciprocity can also involve an inherent ordering. For instance, it's possible to use a reciprocal marker in “balancing” scenarios, like in (7).

- (7) *va-dungeleliz-an-a*
 2SM-balance-AN-FV
 ‘They are balancing on each other.’



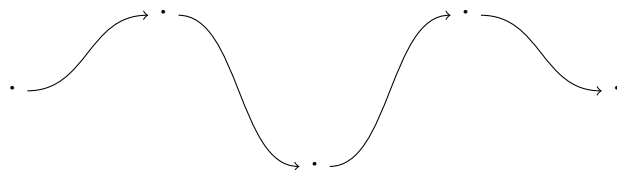
Verifying situation 1: *Sira, Imali, and Maina are acrobats. They have learned to balance on top of each other, and they’re doing it right now.*

Verifying situation 2: *The cheerleading team consisting of Sira, Imali, Maina,*

Khufu, Kageha, and Yohana has formed a pyramid. They are balancing on each other.

Similarly, weak reciprocity can be found in “following” scenarios as well.

- (8) *zindugunyi zi-rondek-an-i*
 8ant 8SC-follow-AN-FV
 ‘The ants followed each other.’



Verifying situation: *Imali saw ants making their way back to the nest carrying food in their mouths. They were all on the same curving path, one behind the other.*

Beyond weak/strong readings, reciprocal situations in Logoori can also give rise to scopal ambiguities when embedded (cf Heim et al. 1991a).

- (9) *Sira na Imali va-ganagan-a ndee va-ror-an-i*
 Sira and Imali 2SM-think-FV that 2SM-see-AN-FV
 ‘Sira and Imali think that they saw each other.’

- a. Sira thinks: “Imali and I saw each other.”
 Imali thinks: “Sira and I saw each other.” (think > rec)
- b. Sira thinks: “I saw Imali.”
 Imali thinks: “I saw Sira.” (rec > think)

In the (a) reading, *-an* is understood to scope under *think* (a *de dicto* reading). Sira and Imali each think, “We saw each other.” In the (b) case, *-an* scopes outside

of *think* (a *de re* reading). Sira and Imali each think that s/he saw the other person.

Beyond these various readings, reciprocal *-an* has other properties we typically associate with reciprocal markers. For instance, its distribution is defined by (some version of) Condition A. The antecedent must be local (10a) and c-command the object position (10b).⁵

- (10) a. * *avaana va-vor-i* [*ndii Maina a-lol-an-i*]
 2child 2SM-say-FV [that 1Maina 1SM-see-AN-FV]
 ‘*The children said that Maina saw each other.’ (LOCALITY)
- b. * [*muremi y-a avaana*] *a-lol-an-i*
 [1friend 1-of 2child] 1SM-see-AN-FV
 ‘*The children’s friend saw each other.’ (C-COMMAND)

Similarly, the antecedent for *-an* must be plural.⁶

- (11) a. * *Maina a-lol-an-i*
 1Maina 1SM-see-AN-FV
 ‘*Maina saw each other.’

⁵Note that this is a different way of characterizing the distribution of *-an* than what Dalrymple et al conclude. See Safir (1996:fn 23) for a way to reconcile the two ideas.

⁶Logoori does not have an *associative construction* (also called the *sociative*, *comitative* or *discontinuous reciprocal*), commonly found in Bantu languages (Dammann, 1954; Vitale, 1981; Nurse and Philippson, 2003; Maslova, 2007).

- (i) *Sira a-na-pend-an-a na Imali* (Swahili)
 * *Sira y-a-yaanz-an-a na Imali* (Logoori)
 1Sira 1SM-PRES-love-AN-FV and Imali
 ‘Sira and Imali love each other’

Note that associative constructions are possible with inherently reciprocal predicates in Logoori like *kwaagana*, ‘to meet,’ *kufana* ‘to resemble,’ etc. Note further that all inherently reciprocal verbs appear to bear a lexicalized *-an* marker at the end. I will not comment on such inherently reciprocal verbs. See Dimitriadis (2008b); Siloni (2012) for discussion of semantic and syntactic differences between inherent and derived reciprocals.

Moreover, *-an* has something like “subject-orientation.” For instance, it cannot be anteceded by the Goal in a Double Object Construction.

- (12) * *Sira a-many-an-i avaana*
 1Sira 1SM-show-AN-FV 2child
 [intended: ‘Sira showed the children each other (in the mirror).’]

In general, Logoori’s *-an* mirrors what Dalrymple et al. (1994) observe for Chichewa: *-an* appears to display all the functions of a marker of reciprocal; it is the Bantu counterpart to *each other*. But crucially, it is not obviously compositional like Heim et al. propose for *each* and *other*. *-An* is monomorphemic. Moreover it doesn’t express either distributivity or distinctness, like *each other*.⁷

3 Event plurality in Logoori

In addition to its use as a marker of reciprocity, in Logoori, *-an* can also be productively used to express event plurality.⁸

- (13) a. *Sira y-a-shiamul-an-i*
 1Sira 1SM-sneeze-AN-FV
 ‘Sira sneezed repeatedly.’
- b. *Sira a-hanzuk-an-i*
 1Sira 1SM-shout-AN-FV

⁷Note that Dalrymple et al take the position that *-an* is of an entirely different status than *each other*: it’s not an anaphor. I also believe that this is correct, but for different reasons (though see Safir 1996 for an alternative view).

⁸See Maslova (2007); Nurse and Philippson (2003) for similar uses of cognates in other Bantu languages. Note that there are a few exceptional verbs in Logoori which mark this kind of event iterativity idiosyncratically with reduplication or *-agel* (which is arguably composed of the progressive marker *ag* and the applicative (or possibly perfective) *-el*). It is not predictable which verbs use this strategy, and they must be listed as idiosyncratic exceptions. I put them aside here.

‘Sira shouted over and over.’

-An is in complementary distribution with *-any*, which is also used to express event plurality. (The reader is reminded that <ny> is the orthographic representation of phonemic /ɲ/.)⁹

- (14) a. *Sira a-hol-any-i iroli*
 1Sira 1SM-punch-AN 9truck
 ‘Sira punched the truck over and over.’
- b. *Sira a-vunany-any-i kivaga*
 1Sira 1SM-break-AN-FV 7branch
 ‘Sira broke the branch into many pieces.’

The choice between *-an* and *-any* is dependent on the valency of the predicate, as can be observed in Table 1.

I assume that *-an* and *-any* are valency conditioned allomorphs and I will refer to the underlying morpheme as *-aN*. I explore the connection between valency and *-aN* in subsection 3.1 and then turn to a closer look at event plurality in subsection 3.2.

Before that, it’s important to note two things about the distribution of *-aN*. First, not all instances of event plurality must be expressed using *-aN*. For instance, plural

⁹It seems likely to me that historically, *-any* is derived from *-an* plus the Bantu “low” causative affix *-i* (Nurse and Philippson, 2003). This is unlikely to be a viable synchronic analysis, as the suffix *-i* in Logoori is extremely limited, only appearing idiosyncratically on a few different roots. Moreover, the sequence /niV/ is phonetically realized as a nasal followed by a glide, e.g., /njV/, while /ny/ is phonetically realized as an interdental nasal. However, accepting a synchronic decompositional analysis does not undermine the central claims here, since in either case we still posit the affix *-aN*. We would simply have to further require that in all cases of transitive verbs, the affix *-i* also appears above *-aN*. Assuming that *-i* does reflect an argument introducing head, since I show below that the subject is generated below *-aN*, it is difficult to syntactically motivate an argument introducing head above *-aN*.

<i>kusunduka</i>	‘to spill’ (intr)	<i>kusundukana</i>	‘to spill here and there’
<i>kwuma</i>	‘to freeze’ (intr)	<i>kwumana</i>	‘to freeze over and over’
<i>kwishiamula</i>	‘to sneeze’	<i>kwishiamulana</i>	‘to sneeze over and over.’
<i>kwivora</i>	‘to give birth’	<i>kwivorana</i>	‘to breed, increase in #'s’
<i>kuhanzuka</i>	‘to shout’	<i>kuhanzukana</i>	‘to shout over and over’
<i>kurasa</i>	‘to throw’	<i>kurasanya</i>	‘to throw repeatedly’
<i>kusundura</i>	‘to spill’	<i>kusunduranya</i>	‘to spill here and there’
<i>kuhana</i>	‘to close (trans)’	<i>kuhananya</i>	‘to close repeatedly’
<i>kududa</i>	‘to bounce (trans)’	<i>kududanya</i>	‘to bounce repeatedly’
<i>kwigora</i>	‘to open (trans)’	<i>kwigoranya</i>	‘to open repeatedly’

Table 1: Iterative uses of *-aN*. *Ku-/kw-* is the class 15 infinitival prefix.

subjects of inherently distributive predicates involve event plurality, and optionally appear with *-aN*.¹⁰

- (15) a. *avikura va-shiamul(-an)-i*
 2boy 2SM-sneeze-AN-FV
 ‘The boys sneezed.’¹¹
- b. *Sira a-duy(-any)-i ziroli*
 1Sira 1SM-hit-AN-FV 10truck
 ‘Sira hit trucks.’

We also find cases where the contribution of *-aN* is not (obviously) event plurality, rather it yields what is sometimes called an *intensiv*e reading (Schadeburg,

¹⁰There are also non-affixal event quantifiers, which differ from *-aN* is that they do not assert a cumulative event plurality, discussed in subsection 3.2.

- (i) *Sira y-ashiamul-i kanyingi*
 1Sira 1SM-sneeze-FV many.times
 ‘Sira sneezed many times.’
- (ii) *Sira a-duy-i iroli kanyingi*
 1Sira 1SM-hit-FV 9truck many.times
 ‘Sira hit the truck many times.’

¹¹This also has the reading: “The boys sneezed over and over,” where each boy sneezes multiple times. Such a reading can be derived by scoping the plural subject under *-aN*.

2003). For instance, the difference between *kumera*, ‘to grow (intrans)’ and *kumerana* ‘to grow (intrans) fast, a lot,’ does not obviously correlate with an increase in the number of growing events. Both may be used to describe the growth over an identical period of time (say, the summer). Only the latter indicates that the growth somehow went more quickly, or perhaps exceeded expectations. Similarly, the difference between *kulanya* ‘to plunder’ and *kulanyanya* ‘to completely trash,’ does not necessarily involve a difference in the number of events of plundering. Both may be used to describe an act of robbery, only the latter involves the additional meaning of intense plundering.

Such intensive readings are found with *naturally atelic* predicates, i.e., event descriptions which do not entail an end-state. Assuming that an atelic predicate has non-atomic events in its extension (Bach, 1981, 1986), we again see evidence that not all event plurality needs to be marked with *-aN*. The generalization is that if lexical semantics and/or other operations implicate event plurality, then *-aN* is not necessary. This variation in morphology is significant because it reveals that there isn’t a one-to-one mapping between meaning and form for the encoding of event plurality. Event plurality *can* be indicated with *-aN*, but there are other strategies available in Logoori as well, including an unmarked strategy.

In this regard *-aN* is like many other quantifiers which have both overt and covert counterparts. For instance, the distributive quantifier in English *each* can be overtly expressed, *Each boy fell*, but a distributive reading is still available in the absence of *each*. Naturally, the choice in verbal predicate as well as context affects the prominence of distributive readings.

3.1 Valency and *-aN*

As noted above, *-aN* is subject to valency conditioned allomorphy. However, “valency” may be defined in different ways. Valency can be syntactically defined in terms of the number of arguments projected into the structure. Valency can also be semantically defined in terms of the number of thematic roles and/or the number individuals involved in the event. In general, the syntax and semantics align. But there are well known mismatches. In Logoori, these mismatches reveal that *-aN* is not sensitive to syntactic valency. Rather, it’s sensitive to a kind of “semantic” valency — a notion I will define more precisely in section 4.

Consider first detransitivization processes in Logoori. There are two ways to derive an intransitive verb: *passivization* and *anticausativization*. As is common with a passive/anticausative distinction, passives and anticausatives differ in that the former may occur with an explicit oblique Agent, but the latter may not (Schäfer, 2008).¹²

- | | | | | |
|------|----|---------------------------------|-------------------|---------------|
| (16) | a. | <i>mpira gu-ras-w-i</i> | <i>(na Sira)</i> | PASSIVE |
| | | 3ball 3SM-throw-PASS-FV | by Sira | |
| | | ‘The ball was thrown (by Sira)’ | | |
| | b. | <i>mpira gu-ras-ik-i</i> | <i>(*na Sira)</i> | ANTICAUSATIVE |
| | | 3ball 3SM-throw-AC-FV | by Sira | |

¹²See Gluckman and Bowler (2016) for discussion of the distinction between passives and anticausatives in Logoori. In general the difference is consistent with what is known about passives vs. anticausatives cross-linguistically. Note that I am making the simplifying assumption that anticausatives are derived intransitives, though this point is debated (cf Dowty 1979 vs. Alexiadou et al. 2015). Whether the intransitivity is derived or not is orthogonal to the point here. What matters is that anticausatives have fewer event participants than passives. Moreover, as a reviewer points out, the nature of the difference between the anticausative and passive is also widely debated, with interesting inter-language variation (Koontz-Garboden, 2009). Again, what is crucial for the data below is that *-Vk* suffixed verbs involve fewer event-participants than *-w* suffixed verbs.

‘The ball got thrown.’

This pattern is primarily taken to indicate that passives are *syntactically* intransitive, but *semantically* transitive. Anticausatives, however, are both syntactically and semantically intransitive, in that their valency has been reduced in both the syntactic component (i.e., the verb sub-categorizes for only one argument) and the semantic component (i.e., the total number of thematic relations and core event-participants has been reduced).

Turning back to *-aN*, the allomorph that appears for anticausative-derived intransitives is *-an*, while that for passives is *-any*, illustrating that the choice in allomorph is sensitive to semantic, rather than syntactic valency.¹³

- (17) a. *mpira gu-ras-w{* -an, -any} -i* (*na Sira*)
 3ball 3SM-throw-PASS-AN-FV by Sira
 ‘The ball was thrown repeatedly.’
- b. *mpira gu-ras-ik{-an, * -any} -i* (**na Sira*)
 3ball 3SM-throw-AC-AN-FV
 ‘The ball was thrown repeatedly.’
- (18) a. *amaaze ga-sund-w{* -an, -any} -i*
 6water 6SM-spill-PASS-AN-FV
 ‘The water was spilled here and there.’
- b. *amaaze ga-sund-uk{-an, * -any} -i*
 6water 6SM-spill-AC-AN-FV
 ‘The water spilled here and there.’

Conversely, we also find mismatches the other way, where the syntax has “more”

¹³There is no phonological reason to rule out (17a), (18a), and no other ordering of the suffixes works.

than the semantics, i.e., there are more arguments of the predicate than there are thematic roles/event-participants. This is the case for cognate object constructions. Here we find that despite the fact that there is syntactically both a subject and an object, *-an* is still the allomorph that appears.

- (19) a. *Sira y-ashiamul-an-i miashiamuli*
 1Sira 1SM-sneeze-AN-FV 4sneeze
 ‘Sira sneezed big sneezes.’¹⁴
- b. *Sira a-vezagir-an-i mivezageru*
 1Sira 1SM-belch-AN-FV 4belch
 ‘Sira belched many big belches.’

Thus, I conclude that *-aN*’s allomorphy cannot be sensitive to syntactic valency, rather the choice in allomorphy is dependent on some other notion of valency: *-an* appears on “semantically intransitive” predicates, while *-any* appears on “semantically transitive” predicates. I return in section 4 to a more precise definition of “semantic intransitivity.”

3.2 Event plurality and *-aN*

The suffix *-aN* also asserts a particular kind of event plurality: cumulative event plurality. Thus, speakers report that verbs marked with *-aN* invoke a “summation” of sub-events into a single event.

- (20) *kisaga ki-vun-ik-an-i*
 7branch 7SM-break-AC-AN-FV
 ‘The branch broke in many pieces.’

¹⁴Note that in these two examples, the noun class here indicates that the sneezes/belches are big.

1. ✓ Sira stepped on a branch, and it broke in many pieces.
2. ✗ Over the course of the day, many people stepped on a branch, breaking it in many pieces.

(21) *Sira a-ras-any-i mpira*
 1Sira 1SM-throw-AN-FV 3ball
 ‘Sira threw the ball over and over.’

1. ✓ Sira juggled the ball.
2. ✗ Over the course of the day, Sira threw the ball multiple times.

The suffix *-aN* is only felicitous if we can perceive the plurality of events as sub-events of some larger macro-event.¹⁵ Note that *-aN* does not impose any inherent ordering on the sub-events. They may be simultaneous, as in (20), or consecutive, as in (21). Indeed, depending on the context, they may be temporally spaced apart like in (22).

(22) *ligena li-vun-ik-an-a*
 5rock 5SM-break-AC-AN-FV

¹⁵The effect of cumulativity becomes strikingly apparent with event-denoting subjects. In (i) the subject is the class 11 deverbal nominal *lugeenda*, ‘going’ or ‘walking.’

(i) *lu-geend-a lu-a Kisumu na Eldoret lu-nyal-a*
 11-walk-FV 11-of 1Kusumu and 1Eldoret 11SM-be.possible-AN-FV

‘Going to Kisumu and going to Eldoret is possible.’
 [Speaker’s comment: “Could be on the same trip or not.”]

(ii) *lu-geend-a lu-a Kisumu na Eldoret lu-nyal-an-a*
 11-walk-FV 11-of 1Kusumu and 1Eldoret 11SM-be.possible-AN-FV

‘Going to Kisumu and Eldoret (on the same trip) is possible.’
 [Speaker’s comment: “This means that you’re doing it in one trip.”]

When *-an* is used on the main predicate, the events of going to Kisumu and Eldoret can only be interpreted as occurring on the same trip. That is, going to Kisumu is possible, going to Eldoret is possible, and the “sum” of these events is also possible.

‘The rock broke in many pieces.’

1. ✓ *Sira hit the rock with a hammer. It shattered.*
2. ✓ *Over millenia, the rock slowly broke apart into many smaller rocks.*

Consequently, the macro-event itself may be instantaneous or an extended situation. All that matters is that all the sub-events are perceived as grouped together.

In sum, *-aN* has two defining properties: it is sensitive to a notion of semantic, rather than syntactic, valency, and it derives a cumulative plural event. I demonstrate in the next section that this is consistent with reciprocal situations as well.

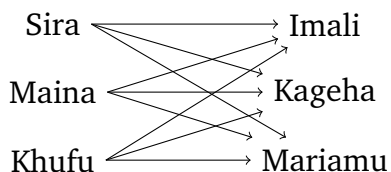
4 Relational plurals and reciprocity

Fiengo and Lasnik (1973); Langendoen (1978); Cable (2012) observe that reciprocal situations can be viewed as a subtype of a more general configuration: relational plurality, i.e., situations in which a relation between two sets of individuals is asserted. The well known observation is that, just like reciprocal situations, relational plurals have both strong and (many) weak readings.

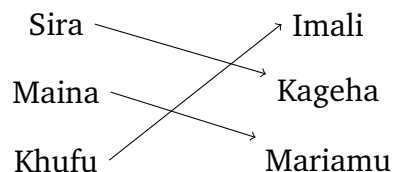
(23) *avikura va-vagaa va-lol-i avakana va-vagaa*
 2boy 2-three 2SM-see-FV 2girl 2-three

‘Three boys saw three girls.’

Strong reading:



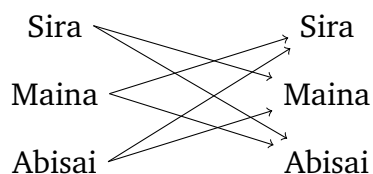
Weak reading (one of many):



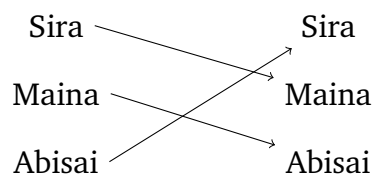
Reciprocal situations are the case of relational plurality when both arguments are, in Kemmer’s (1993) terms, *indistinguishable*. Instead of creating a relation between two referentially distinct plural individuals, “reciprocal relational plurals” create a mapping *in* a set of individuals. (I return to the reflexive relation in section 9.)

- (24) *avikura va-vagaa va-lol-an-i*
 2child 2-three 2SM-see-AN-FV
 ‘Three boys saw each other.’

Strong reading:



Weak reading (one of many):

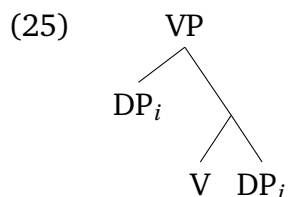


Because reciprocal situations draw on one plural individual to fill both the subject and object positions, reciprocals (as well as reflexives) are often grouped together with valency reduction strategies and are consequently categorized as intransitive (Aissen, 1982; Lichtenberk, 1985; Klaiman, 1991; Kemmer, 1993; Maslova, 2008).¹⁶ This is a particular kind of intransitivity, one which counts *event-participants*. Kemmer (1993:213) proposes the term “low participant distinguishability” to capture this idea. This view of intransitivity counts the number of core event-participants associated with the event described by the VP.¹⁷ Schematically, the structure in

¹⁶I’ll be mainly concerned here with bivalent predicates, and will not address trivalent predicates, though see brief discussion in section 9.

¹⁷See also Langacker (1976); Langacker and Munro (1975); Aissen (1982) for related discussion as well as Baker et al. (1989); Kratzer (1996); Alexiadou et al. (2015) and the importance of

(25) describes an event with a single (possibly plural) individual. It is syntactically transitive because two argument positions are projected, but it is semantically intransitive in the sense that there is only a single referential expression that fills both positions.



Reciprocal intransitivity sometimes manifests morphologically, where reciprocals are associated with valency reducing morphology (as in Greek Dimitriadis 2008b). Reciprocal intransitivity can also manifest as syntactic intransitivity, i.e., a syntactic reduction in argument structure (Siloni, 2012). While all (bivalent) reciprocal situations can be claimed to be intransitive in the sense of event-participants, there is cross-linguistic variation as to whether the reciprocal construction in a language also qualifies as syntactically intransitive.¹⁸ This is illustrated nicely by comparing Chichewa as reported in Mchombo (2004) with Logoori (and English). Mchombo provides a number of diagnostics that show that in Chichewa, reciprocal constructions involve an overall reduction in transitivity: they are syntactically and semantically intransitive. The most persuasive diagnostic involves object comparatives. Mchombo observes that sentences with a reciprocal marker do not permit object comparatives, though non-reciprocals (including reflexives) permit such a

Disjoint Reference in transitivity alternations.

¹⁸See Maslova (2008:230)'s discussion of *unary* vs. *binary* reciprocals. Note that reciprocals are never intransitive in the sense that they involve a reduction in *thematic roles*. The event description of reciprocals still requires those thematic relations associated with the subject and object positions, i.e., there still needs to be a "see-er" and a "see-ee."

reading.

- (26) *Alenje á-ma-nyóz-an-á kupósá asodzi* (CHICHEWA)
 2hunter 2SM-HAB-despise-REC-FV 15exceed 2fisherman
 ✓ ‘The hunters despise each other more than the fisherman (despise each other).’
 ✗ ‘The hunters despise each other more than (they despise) the fishermen.’
 (Mchombo, 2004:106)

In Logoori, such examples are ambiguous (as they are in English).¹⁹

- (27) *avahizi va-sor-an-a kuveta avaruvi* (LOGOORI)
 2hunter 2SM-hate-AN-FV 15exceed 2fisherman
 ✓ ‘The hunters hate each other more than the fishermen (hate each other).’
 ✓ ‘The hunters hate each other more than (they hate) the fishermen.’

If object-comparatives are taken to be a test for syntactic transitivity, then reciprocals in Chichewa involve a general reduction in valency which applies to both syntactic valency and participant distinguishability, but reciprocals in Logoori and English only involve a change in participant distinguishability. That is, we are justified in supposing that the syntax of Logoori reciprocals involves projecting two arguments into the structure, as in (25), but we may also claim that they are intransitive in Kemmer’s sense of the number of event-participants.

Though reciprocal situations differ from “true” relational plurals in the number of event-participants, both constructions share the property of cumulative event plurality. Both examples in (23) and (24) involve multiple events of seeing, one

¹⁹See also Safir and Sikuku (2018) for identical observations in Lubukusu, a related Luhia language.

for each pair of individuals, which are perceived as sub-events of a macro-event. Thus we may talk about in (24) each individual event of seeing, Sira seeing Imali, Kageha seeing Maina, etc. And we may also talk about the sum of these events, as in ... *it happened yesterday* or ... *it lasted a long time* (Kratzer, 2000). This is likewise true for reciprocity: we can talk about the individual events or we may talk about the reciprocal event as a whole.²⁰

Notice as well that relational plurality/reciprocity does not inherently order the sub-events with respect to each other. This is dependent on both lexical semantics and context. For instance, out of the blue, speakers prefer to understand (24) as involving simultaneous events of seeing, but it's also possible to say (24) in a context where the sub-events are ordered one after the other, say, in a game of hide-and-seek. Again, this is also true of relation plurals in (23) as well.²¹ Because of this, the macro-event for relational plurality/reciprocity may be perceived as instantaneous, or stretched over some span of time.

In sum, reciprocal situations are simply a kind of relation plural. They are the type of relational plural that involves a single event-participant.

5 Compositional reciprocity in Logoori

The core observation of analyses that seek to derive reciprocity compositionally is that the markers used to indicate reciprocal situations in a language independently

²⁰See extensive discussions in Fiengo and Lasnik (1973); Wierzbicka (1980); Kemmer (1993); Carlson (1998); Davies (2000); Nedjalkov (2007); Dimitriadis (2008b); Sioni (2012).

²¹The examples in section 2 further attest to this variation. See Schein (1993) for helpful discussion on these matters.

express part of the reciprocal meaning as a whole. For instance, in Heim et al. (1991b)'s analysis, *each* expresses distribution and *other* expresses distinctness among between individuals, both of which are part of the meaning of reciprocity in English.

Clearly the same observation applies in Logoori: reciprocity involves cumulative event plurality for semantically intransitive predicates, and this is what *-aN* can express as well. The correspondence crucially relies on the fact that *-aN* is sensitive to a notion of “semantic valency.” If we understand *-aN* to be sensitive to the number of event participants, then its distribution is entirely explained: *-an* appears when the the event has a single event participant. This covers simple cases like *sneeze*, and also more complex cases like anticausatives and cognate objects. *-An* appears in reciprocal constructions because there is a cumulative plural event, and *-an* is the allomorph used for semantically intransitive predicates.

However, if this is the correct way to describe the contribution of *-aN*, it raises two additional questions. First, why is *-aN* is not required in *all* instances of event plurality. In particular, why does *-aN* not appear in relational plural sentences like (24) (as *-any*)? Second, if *-aN* only accounts for a part of the reciprocal meaning, where does the rest of the meaning come from?

Addressing the question of *-aN* with non-reciprocal relational plurals, recall from earlier that not all instances event plurality are explicitly marked. In some cases, event plurality is implicitly expressed, e.g., just in the case when the event plurality may be inferred from other properties. I suggest that this is what is happening with relational plurals. Given that any mapping between plural individuals

requires a (cumulative) plural event, the marking is redundant. As support for this view, recall that when inherently plural intransitive predicates are overtly marked, they give rise to intensive readings. This is precisely what happens when relational plurals are overtly marked with *-any*.

- (28) a. *avaana va-duy-any-i avasazi*
 2child 2SM-hit-AN-FV 2parent
 ‘The children beat up the parents severely’
- b. *avaana va-lany-any-i lidukanyi*
 2child 2SM-plunder-AN-FV 5store
 ‘The children completely trashed the store.’

Importantly, the same strategy cannot apply with reciprocal situations because null objects in Logoori are always interpreted with indefinite reference.²²

- (29) *avaana va-lol-i*
 2child 2SM-see-FV
 ‘The children saw something.’

Thus, *-an* serves the function of marking, indirectly, that there really is a syntactically projected object present, but that this object is referentially indistinguishable from the subject.²³

²²It’s worth noting that we get a Disjoint Reference Effect here as well. That is, it is not possible for (29) to mean that the children saw each other/themselves. This is likely related to the Disjoint Reference Effect found in passives, cf footnote 17. Whatever derives disjoint reference in general can apply here. See Alexiadou et al. (2015) for two plausible options which are both compatible with what is proposed here.

²³I will note that this is precisely how we must understand *each of each other* in a compositional analysis of reciprocity in English. *Each*’s function is as a distributive operator, but of course distributivity does not need to be marked with *each* when context suffices. Nonetheless, it is required in reciprocal constructions.

Addressing the second question, if we think of reciprocal meaning as involving a number of distinct components, then we can talk about which pieces are grammaticalized, and which are explicit in any given language. In Logoori, what is grammaticalized is the event plurality. What I will argue in the next section is that additional implicit processes create the relation in the sole event-participant argument by virtue of the fact that the argument is projected into two positions in the syntax. Importantly, there is no individual piece of the sentence that expresses “reciprocal” in Logoori. Because reciprocal sentences entail a cumulative plural event, and because reciprocal sentences are classified as having a single argument due to indistinguishability between the subject and the object, the presence of *-an* is required. It doesn’t mark the reciprocity directly, rather it marks the fact that there is a cumulative semantically intransitive event, which is part of the meaning of every reciprocal sentence.

6 Formalization

I define *-aN* as the morphological exponence of an event pluralizer, PL_{Ev} , which is introduced in a Num(ber) head.^{24,25} The function of PL_{Ev} is to add the $*E$ operator, defined in (31).

$$(30) \quad \llbracket PL_{Ev} \rrbracket = \lambda f_{vt} \lambda e. *E f(e)$$

²⁴See Dimitriadis 2008a for a related proposal. The reader should be aware that the analysis provided below is largely modeled on the analyses of reciprocity from Beck (2001) and Faller (2004).

²⁵I assume that the ontology of events/eventualities and individuals both are structured as complete join semi-lattices, and are partially ordered under ‘ \leq ’ (cf Link 1983; Bach 1986). Note that I assume that states are types of events.

- (31) For any set of events P , ${}^*E P$ is the set such that,
- $P \subseteq {}^*E P$, and
 - there are events e', e'' such that $e' \neq e''$ and $e', e'' \in {}^*E P$ and $e' \oplus e'' \in {}^*E P$, and
 - if $e \in {}^*E P$ and $e' \leq e$, then $e' \in {}^*E P$, and
 - if $e \in {}^*E P$ and there is no $e' \leq e$, then $e \in P$.²⁶
- (32) a. *Sira y-ashiamul-an-i*
1Sira 1SM-sneeze-AN-FV
'Sira sneezed repeatedly.'
- b.
- ```

graph TD
 NumP --- Num
 NumP --- VP
 Num --- PL_Ev
 VP --- DP
 VP --- V
 PL_Ev --- Sira
 DP --- Sira
 V --- Dashiamul_sneeze

```
- c.  $PL_{Ev}(\lambda e. \text{Sira-sneezed}(e))$
- d.  $\lambda e. {}^*E \text{Sira-sneezed}(e)$

<sup>26</sup>Part (d) is typically left out of definitions of plurality, though it is crucial. Take the following definition of  $*$  from Cable (2012) which is generally representative.

(i) Let  $S$  be any set of entities.  $*S$  is defined as the smallest set such that:

(a)  $S \subseteq *S$

(b) For all  $x, y \in *S$ ,  $x + y \in *S$

(Cable, 2012:7)

Under this definition,  $*S$  allows in its extension events which may not be events of  $S$ . Thus,  $*\text{sneeze}$  allows events of coughing, laughing, jumping, etc as long as their mereological sum is also in  $*\text{sneeze}$ . The problem is that we only want elements of  $S$  and their sums in  $*S$ , but this is not guaranteed. This appears to be a persistent problem in definitions of the Link's plural operator. Credit goes to Andrew McKenzie for pointing out this issue.

NumP describes the set of events with (at least) two members  $e', e''$  such that  $e'$  is a Sira-sneezing event,  $e''$  is a Sira-sneezing event, and  $e' \oplus e''$  is also a Sira-sneezing event. I assume that closure over events saturates the event variable.

d.  $\exists e[{}^*E\text{Sira-sneezed}(e)]$

e.  $= \exists e[\exists e', e'' \leq e[\text{Sira-sneezed}(e') \wedge \text{Sira-sneezed}(e'') \wedge \text{Sira-sneezed}(e' \oplus e'')] ] \wedge \forall e'[e' \leq e \rightarrow \text{Sira-sneezed}(e')]$

Before turning to the contribution of nominal plurality, it is important to consider what  $\text{PL}_{Ev}/{}^*E$  doesn't do. First, it is not a detransitivizing affix.  $\text{PL}_{Ev}$  may attach to any property of type  $\langle \nu, t \rangle$  (of category V). The particular allomorph that surfaces is a morphological choice. It may be realized as *-an* with semantically intransitive predicates, *-any* with semantically transitive predicates, or  $\emptyset$  when the plurality is implicit or otherwise marked.

Second,  $\text{PL}_{Ev}$  (or rather,  ${}^*E$ ) does not assert anything about the relationship among the sub-events. As discussed earlier, we do not want to encode this into the meaning of the event pluralizer given that the relation among the sub-events can be affected by both lexical as well as contextual factors.

Third, the operator  ${}^*E$  does not relate an event to a time. I take this to be the defining difference between  ${}^*E$  and, say, progressive aspect (though there may be other differences as well). The two can empirically be teased apart by their interaction with the Accomplishment class of verbs, which are known to give rise to the *imperfective paradox* with progressive aspect, where the end-state is not

entailed.<sup>27</sup>

- (33) a. *kitabu ki-nyor-ek-an-a*  
 7book 7SM-find-AC-AN-FV  
 ‘The book was found over and over (#and it hasn’t been found yet).’
- b. *kitabu ki-nyor-ek-ang-a*  
 7book 7SM-find-AC-PROG-FV  
 ‘The book was being found’ (and it hasn’t been found yet.)

Finally, *-aN* does not distribute individuals in a plural subject among the sub-events. This meaning must come from somewhere else. I define the distribution function *DISTR* which applies the operator  $*^D$ .<sup>28</sup>

$$(34) \llbracket \text{DISTR} \rrbracket = \lambda F_{\langle e, vt \rangle} \lambda x \lambda e. *^D F(x)(e)$$

- (35) For any relation between an individual and an event,  $*^D F$  is the relation such that, for some event  $e$
- a.  $F \subseteq *^D F$ , and
- b. if  $\langle x, e \rangle \in *^D F$  and  $x' \leq x$ , then  $\langle x', e \rangle \in *^D F$ , and
- c. if  $\langle x, e \rangle \in *^D F$  and there is no  $x' < x$ , then  $\langle x, e \rangle \in F$ .

<sup>27</sup>Despite the surface similarity, there is no reason to believe that *-aN* and *-ang* are morphologically related. I further note here that *-aN* and *-ang* may co-occur. (*-Anj* is an allomorph of *-ang*.)

(i) *kisara ki-vun-ik-an-anj-i*  
 7stick 7SM-break-AC-PROG-FV

‘The stick was breaking apart into many pieces.’

In truth there is some poorly understood variation concerning how progressive aspect is marked. On some verbs, the preferred suffix is *-ag*, and *ang* indicates a more habitual reading. With other verbs, only *-ang* may be used to indicate progressive meaning. That said, it suffices to note that progressive morphology and *aN* affect the meaning in different ways.

<sup>28</sup>See Link 1983 as well as Sternefeld 1998; Schwarzschild 1994; Sauerland 1998; Beck 2001; Faller 2004 among others for related definitions.



- c.  $\exists e[[[\lambda x\lambda y\lambda e.^{*D*D*E}\text{see}(x)(y)(e)]([\text{avaana}])](\text{avaana})](e)$
- d.  $\exists e\forall x,y[x,y \leq \text{CHILDREN} \rightarrow ^{*D*D*E}\text{see}(x)(y)(e)]$

Every individual in the set gets paired with all other individuals in the set in both directions, and so we have a case of strong reciprocity. Note that the definition as is does not exclude the reflexive relation. Thus, if Sira is in the group of children, then Sira saw Sira is part of the meaning of (37d). I return to this issue in section 9.

Weak reciprocity can be derived through application of a morpheme CUM applying a cumulativity operator  $^*C$ .<sup>30</sup>

$$(38) \quad [\text{CUM}] = \lambda f_{\langle e,vt \rangle} \lambda x\lambda y\lambda e.^{*C}f(x)(y)(e)$$

(39) For any relation  $R$  between two individuals and an event,  $^*CR$  is the relation such that, for some event  $e$ ,

- a.  $R \subseteq ^*CR$  and
- b. if  $\langle x, y, e \rangle \in ^*CR$  and  $x' \leq x$ , then there's a  $y' \leq y$  such that  $\langle x', y', e \rangle \in ^*CR$  and,
- c. if  $\langle x, y, e \rangle \in ^*CR$  and  $y' \leq y$ , then there's a  $x' \leq x$  such that  $\langle x', y', e \rangle \in ^*CR$
- d. if  $\langle x, y, e \rangle \in ^*CR$  and there is no  $x' \leq x$  and there is no  $y' \leq y$ , then  $\langle x, y, e \rangle \in R$ .

Informally, the  $^*C$ -operator pairs up all the elements in the subject set with elements in the object set, and vice versa.

<sup>30</sup>See again Sternefeld (1998); Sauerland (1998); Beck (2001); Faller (2004); Sauerland (1998) for compatible ideas.



- (40) a. *avaana va-lol-an-i*  
 2child 2SM-see-AN-FV  
 ‘The children saw each other’.
- b.  $\exists e [ \textit{avaana} [ \textit{avaana} [ \text{CUM} [ 2 [ 1 [ \text{NumP} \text{PL}_{Ev} t_2 \text{-lol- } t_1 ] ] ] ] ] ] ] ]$
- c.  $\exists e [ [ [ \lambda x \lambda y \lambda e. {}^{*C*E} \text{see}(e)(x)(y) ] ] ( [\textit{avaana}] ) ] ( [\textit{avaana}] ) ] (e)$
- d.  $\exists e [ \forall x [ x \leq \text{CHILDREN} \rightarrow \exists y \leq \text{CHILDREN} \wedge {}^{*C*E} \text{see}(x)(y)(e) ] \wedge \forall y [ y \leq \text{CHILDREN} \rightarrow \exists x \leq \text{CHILDREN} \wedge {}^{*C*E} \text{see}(x)(y)(e) ] ]$

In this case, weak reciprocity arises because it suffices that each individual among the set of children is paired up with at least one other individual (and all the children are used as both an Agent and a Patient).<sup>31</sup>

We are thus able to derive reciprocity through the combination of cumulative event plurality and nominal distributivity and cumulativity. Importantly, DISTR and CUM are independently needed to derive relational plurality. The combination of the processes derives relational plurality, of which reciprocity is a kind.<sup>32</sup>

<sup>31</sup>I’ll note that it’s been suggested that strong reciprocity may be one sub-case of weak-reciprocity, in which case we don’t need *\*D*, and *\*C* (plus context) suffices for all readings (Bruening, 2007).

<sup>32</sup>For space reasons, I put aside a more fine-grained analysis for how to divide up the individuals in the subject to account for sentences like *The chickens and dogs weigh more than each other*. The solution that both Schwarzschild (1996) and Beck (2001) propose is that distribution is, essentially, contextually defined. When deciding how to distribute individuals among events, you divide up the set of individuals into “salient” groups. In the case of *the children*, the atomic children are the most salient (this is essentially the default case). More complex examples, like *The chickens and the cows weigh 1000lbs*, where we can think about the set of chickens and the set of cows as distinct groups, each of which weighs 1000lbs, involve picking the salient groups CHICKENS and COWS. Note that “saliency” is in part also defined by lexical semantics. Some predicates of individuals only have atomic elements in their extensions (e.g., *sneeze*). Schwarzschild (1996); Landman (1996) and Beck (2001) use *covers* to capture this meaning. Faller (2004) proposes a vague relation *R*. In all cases, the partitioning is contextually defined. As this paper is not a defense of a particular analysis of reciprocity, I will put aside this complication.

## 7 Condition A revisited

The proposal above neatly accounts for many of the “reciprocal” properties discussed above. For instance, consider locality and c-command again (Condition A).

- (41) a. \* *avaana va-vor-i* [ *ndii Maina a-lol-an-i* ]  
 2child 2SM-say-FV [ that 1Maina 1SM-see-AN-FV ]  
 ‘\*The children said that Maina saw each other.’ (LOCALITY)
- b. \* [ *muremi y-a avaana* ] *a-lol-an-i*  
 [ 1friend 1-of 2child ] 1SM-see-AN-FV  
 ‘\*The children’s friend saw each other.’ (C-COMMAND)

The verb phrase containing *-lol-*, ‘see’ doesn’t describe a single-participant event in either (41a) or (41b). Thus, these sentences are correctly predicted to be ungrammatical since *-an* is not the appropriate allomorph. However, choosing *-any* then implies that the predicate is not semantically intransitive, and so the reciprocal meaning is blocked.

Similarly, *-an* cannot be anteceded by the Goal in a Double-Object Construction:

- (42) \* *Sira a-many-an-i avaana*  
 1Sira 1SM-show-AN-FV 2child  
 [intended: ‘Sira showed the children each other (in the mirror).’]

In this case, the verb phrase still doesn’t describe an event with a single-participant in (42). Again, the ungrammaticality follows from the fact that the verb phrase involves more than one event participant.

## 8 On morphosyntactic structure

In this section, I will corroborate the proposal above by looking at the morphological and semantic interaction of  $-aN$  with two valency increasing suffixes, the causative and applicative. Assuming that there's a mapping between syntactic structure and morphological ordering as in the Mirror Principle (Baker, 1985), then we predict a correlation between the (semantic) valency of the predicate that  $-aN$  attaches to and which allomorph appears (cf Hyman 1993). The allomorph  $-an$  should appear adjacent to stems that correspond to syntactic projections which denote properties of single-participant events; while  $-any$  should appear adjacent to stems that correspond to projections which denote properties of events with more than one participant. Informally:<sup>33</sup>

- (43) a.  $-aN \rightarrow -an$  / [single-participant event descriptions] \_\_  
 b.  $-aN \rightarrow -any$  / [multi-participant event descriptions] \_\_

Moreover, we should find a correlation between  $-aN$ 's position relative to a syntactically (in)transitive phrase, and a reciprocal reading vs. a “pure” iterative reading.

For instance, consider the interaction of  $-aN$  and the valency increasing causative suffix  $-iz$ . In Logoori, the synthetic causative is only possible on intransitive verbs (both unaccusatives and unergatives).<sup>34</sup> When  $-aN$  appears inside of the causative  $-iz$ , only the allomorph  $-an$  is permitted.

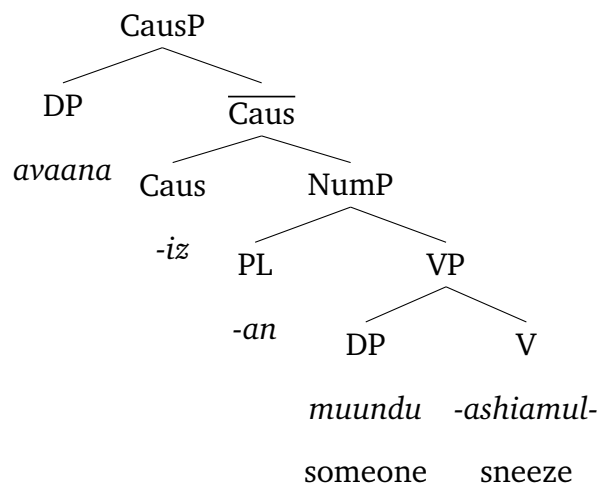
<sup>33</sup>Note that there is a third option, which is that event plurality is expressed with null morphology,  $\emptyset$ , which is always possible, provided that the event plurality can be recovered some other way.

<sup>34</sup>Causativized transitive verbs appear in an analytic form using the verb *kuomba* ‘to make, do.’ Interestingly,  $-iz$  can attach to predicates which bear a reciprocal (or reflexive) marker.

## (44) CAUSATIVE

- a. *avaana va-ashiamul-an-iz-i muundu*  
 2child 2SM-sneeze-AN-CAUS-FV person  
 ‘The children made someone sneeze repeatedly.’

b.



Moreover, it is not possible for this have a reciprocal meaning (with or without *muundu*, ‘person’). On the other hand, when attached outside of the causative, *-aN*

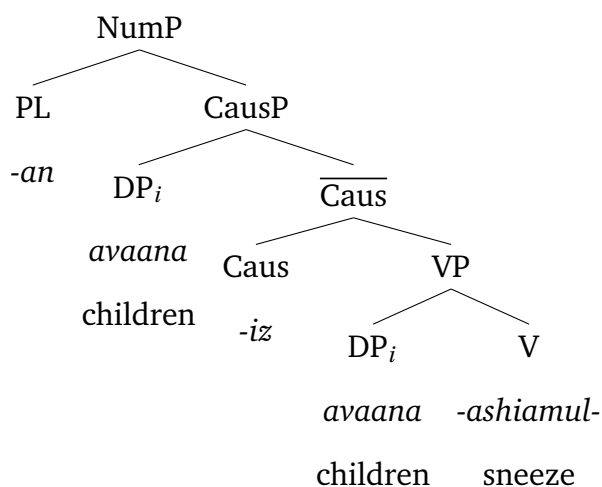
- (i) *Sira a-romb-i Imali a-sing'-i Maina*  
 1Sira 1SM-make-FV 1Imali 1SM-hit-FV 1Maina  
 ‘Sira made Imali hit Maina.’
- (ii) \* *Sira a-sing'-iz-i Imali Maina*  
 Sira 1SM-hit-CAUS-FV 1Imali 1Maina  
 [intended: ‘Sira made Imali hit Maina’]
- (iii) *Sira a-sing'-an-iz-i avaana*  
 1Sira 1SM-hit-SC-CAUS-FV  
 ‘Sira made the children hit each other.’

I take this as further indication that reciprocalization involves some kind of valency reduction, and more interestingly that the causative affix is sensitive the semantic valency. Similarly, the causative can appear after the anticausative, but not after the passive — though there are complications with this pattern which I put aside here.

has two options. If the causee is the same as the causer, then CausP describes an event with a single-participant. *-An* is expected to appear and the reading should be a reciprocal reading since the event-participants are not distinguishable.

- (45) a. *avaana va-sek-iz-an-i* CAUSATIVE  
 2child 2SM-laugh-CAUS-AN-FV  
 ‘The children made each other laugh.’

b.



If the causer and causee are not identical, then we expect *-any* to appear and the only possible reading is that of non-reciprocal event plurality (of the causing event).

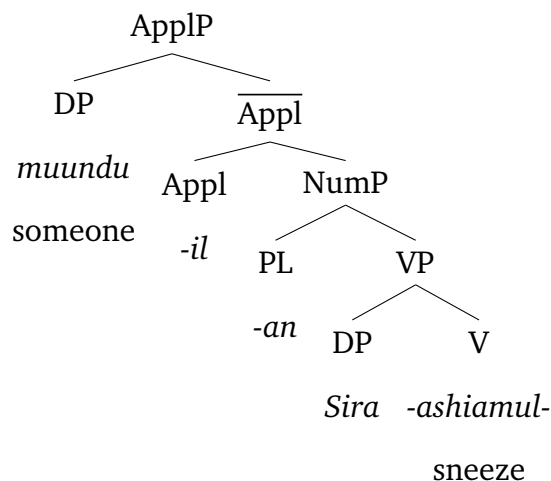
- (46) *avaana va-sek-iz-any-i*  
 2child 2SM-laugh-CAUS-AN-FV  
 ‘The children repeatedly made someone laugh.’

The same idea can be observed with the valency increasing applicative suffix *-il*. When applied to intransitive verbs, only the order *-anil-* is permitted, and the reading can only be that of repeated action, not reciprocity.

## (47) APPLICATIVE

- a. *avaana va-ashiamul-an-il-i* (*muundu*)  
 2child 2SM-sneeze-AN-APPL-FV (person)  
 ‘The children sneezed repeatedly for someone.’

b.



Notice that in contrast to subjects, applied arguments are predicted to scope *above* the plural operator. This is again confirmed: In (47a)/(47b), it cannot be the case that there are multiple people and Sira sneezed for each of them. The only possible reading is that there is a particular person for whom Sira sneezed multiple times (like his doctor).

When *-aN* appears after the applicative, then the distinctness of the two arguments matters. If the two arguments are indistinct, *-an* appears, if they are distinct, then *-any* is used.<sup>35</sup>

<sup>35</sup>Note that there is not a general ban on *-any* occurring before *-il*. In constructions with a High Applicative in the double-object construction, the order is fine.

- (i) *avakana va-kubag-any-el-i* *Kageha Sira*  
 2girl 2SM-hit-AN-APPL-FV *Kageha Sira*

- (48) a. *avaana va-hanzuk-il-an-i* APPLICATIVE  
 2child 2SM-shout-APPL-AN-FV  
 ‘The children shouted at each other’
- b. *avaana va-hanzuk-il-any-i* APPLICATIVE  
 2child 2SM-shout-APPL-AN-FV  
 ‘The children shouted at someone over and over.’

In sum, the morphological ordering and appearance of the event pluralizer *-aN* provides additional morpho-syntactic evidence for treating *-aN* as simply an event pluralizer which is sensitive to the number of event-participants..<sup>36,37</sup>

‘The girls hit Sira for Kageha over and over.’

As stated above, space limits the discussion to a simple intransitive/transitive distinction. A more detailed study of further valency increasing and decreasing operations would be informative, in particular paying attention to the well known differences between High and Low applicatives.

<sup>36</sup>Note that we also find cases where *-an* can appear twice in the same verb-stem when separated by valency increasing morphology, as in (49).

- (49) *avikura va-ashiamul-an-iz-an-i*  
 2boy 2SM-sneeze-AN-CAUS-AN-FV  
 ‘The boys made each other sneeze over and over.’

The first *-an* pluralizes the event of sneezing, and the second *-an* pluralizes the causing event, resulting in the reciprocal meaning.

<sup>37</sup>The interaction of *-aN* and the detransitivizing suffixes is also relevant, but there are a number of additional confounds that, for space reasons, makes their discussion not possible here. The core problem is that *-Vk* (anticausative) and *-w* (passive) independently occupy different positions in the structure, as can be demonstrated by their interaction with causatives, applicatives, and aspectual suffixes (Gluckman, 2019b). Thus, the ordering of *-aN* and the detransitivizing suffixes is confounded. Still, a detailed look at the data support the proposal above: *-an* is found attached directly to stems that describe single-participant events, while *-any* is attached to stems that describe multi-participant events.

## 9 The distinctness condition

The last piece of meaning that must be explained is how the “distinctness condition” arises. That is, why can’t *-an* be used to express a reflexive situation? Stated as an empirical problem, why can’t *-an* appear with a singular subject, resulting in a reflexive meaning?

- (50) \* *Sira a-lol-an-i*  
 1Sira 1SM-see-AN-FV  
 [intended: ‘Sira saw himself.’]

(50) should be acceptable given that reflexives are also thought to be (semantically) intransitive (Kemmer, 1993).

The answer requires us to examine how reflexivity is marked in Logoori. Like other (Narrow) Bantu languages, reflexives are marked with a prefix, which occurs in the slot typically associated with object markers (Nurse and Philippson, 2003).

- (51) a. *Imali a-i-lol-i*  
 1Imali 1SM-REFL-see-FV  
 ‘Imali saw herself.’
- b. *avaana va-i-yag-i*  
 2child 2SM-REFL-scratch-FV  
 ‘The children scratched themselves.’

Interestingly, reflexively marked predicates are felicitous in so-called “mixed” situations, where the event involves sub-events of reflexive action and sub-events of reciprocal action (Murray, 2008). The Logoori sentence in (52) is in fact the natural way to express the situation below.



- (52) *Sira, Maina, and Kageha went out hiking and got bug-bites. Sira scratched himself, but Maina scratched Kageha's bites and Kageha scratched Maina's bites.*

*avaana va-i-yeg-i*

2child 2SM-REFL-scratch-FV

'The children scratched themselves/each other.'

In general, the reflexive marker is felicitous whenever *at least one* individual is acting reflexively. The other pairs need not be reflexive, but are consistent with a reciprocal interpretation. Since *i-* expresses reciprocity in addition to reflexivity, then in effect, utterances with *i-* and *-an* are in competition. The speaker could use either to express a reciprocal situation. But an *i-* utterance is “stronger” in that it also expresses at least one reflexive relation. It's plausible then that the “distinctness condition” is computed as an implicature. By not using the stronger meaning, *i-*, speakers are signaling that a reflexive relation is not part of the relation in the subject/object nominal. This explains why *-an* cannot be used with a singular antecedent, since this would entail a reflexive situation (50) (Gluckman, 2019a).

There is more to say about the relationship between the reflexive and reciprocal in Logoori. For instance, it's possible to use both at once (often in addition to an applicative affix). This is the typical method for indicating reciprocity in Double Object Constructions.<sup>38</sup>

- (53) a. *avikura va-i-many-an-il-i*                      *ipicha*  
           2boy    2SM-REFL-show-AN-appl-FV 9picture

<sup>38</sup>It's also possible to use periphrastic expressions like *aveene ku veene*, literally 'themselves to themselves,' and *m̄la sia mlala*, literally 'the one like the other.' See Safir and Sikuku (2018) for similar observations in Lubukusu (Luhya).

‘The boys showed each other a picture.’

- b. *avikura va-i-many-an-i*      *Imali*  
 2boy    2SM-REFL-show-AN-FV 1Imali  
 ‘The boys showed each other to Imali.’

More puzzlingly, we might expect on the analysis above that *-an* can be used to iterate a reflexive event, since these can also be characterized as being semantically intransitive. This isn’t always possible; some reflexive marked verbs require the transitive allomorph *-any*.

- (54) a. *Sira a-i-vol-any-i*  
 1Sira 1SM-REFL-hit-AN-FV  
 ‘Sira hit himself repeatedly.’
- b. *Sira y-i-sing-an-i*  
 1Sira 1SM-REFL-wash-AN-FV  
 ‘Sira washed (himself) over and over.’

The generalization is that *-an* appears on the class of verbs which cross-linguistically encode *inherent reflexivity*, e.g., *wash*, *shave*, *scratch*, ... — though note that in Logoori, these verbs are explicitly reflexive-marked; they do not morphologically differ from any other reflexive marked verb.

In the end, a closer investigation into the transitivity of reflexives in Logoori will be revealing. As noted above, there is cross-linguistic variation with respect to how “transitive” reflexive and reciprocal situation are (Mchombo, 1993; Siloni, 2012). Indeed, as observed in König and Gast (2008), despite Kemmer’s (1993) claim that distinctness between subject and object can correspond with general differences in

transitivity, languages sometimes make individual choices about whether to treat the reciprocal or reflexive (or neither) as a transitive/intransitive construction.

## 10 On reciprocal polysemy cross-linguistically

I have argued that reciprocity in Logoori is conveyed through a “mixture” of independent elements: *-aN* provides the (cumulative) event and single-participant meaning, with the rest of reciprocity being contributed by the independently motivated processes for relational plurals. Thus, Logoori is just like English in that it has a compositional strategy for reciprocity.

Stepping back a bit, we can consider more broadly Nedjalkov’s (2007) typological study of reciprocal polysemy. As observed by Nedjalkov (as well as a number of other authors, e.g., Lichtenberk 1985; König and Gast 2008; Frajzyngier and Curl 1999), markers of reciprocity tend to be polysemous. Crucially, he observes that all of the polysemies involve a “common denominator.” That is, the second function that the reciprocal marker has always seems to share some piece of meaning with reciprocity as a whole. For instance, consider the three most robust patterns of reciprocal polysemy.

- **Reciprocal-reflexive polysemy** (e.g., Romance SE) : the marker expresses a relation between identical individuals (cf, Murray 2008 for Cheyenne; Safir 1996)
- **Reciprocal-sociative polysemy** (e.g., Turkish, Bantu) : the marker expresses the collective/cumulative plurality of the single event participant (cf Wierzbicka

1980, Dixon 1988 for Boumaa Fijian; Maslova 2007; Dimitriadis 2008b for Bantu)

- **Reciprocal-iterative polysemy** (e.g., Logoori) : the marker expresses the plural event (cf Davies 2000 for Madurese)

In all three cases, the second meaning, whether it's reflexivity, sociativity, or iterativity, is always a sub-component of reciprocal meaning in general. Reciprocal-reflexive markers indicate that there is a relation between an identical subject and object. Reciprocal-sociative markers indicates that there is a collective action by a plural subject. Reciprocal-iterative markers indicate that there is a plural event.<sup>39</sup> In all cases, the maker expresses *some but not all* of reciprocal meaning. The patterns reported by Nedjalkov et al are important for another reason, namely, what we *don't* find. For instance, there doesn't appear to be a pattern of **reciprocal-past tense** polysemy, or a **reciprocal-definite** polysemy. On the present understanding, this is because tense/definiteness aren't sub-components of reciprocity. The patterns that are observed across languages all involve the reciprocal marker sharing a sub-component of the overall meaning of reciprocity.

This suggests that the Logoori strategy for “cobbling together” a reciprocal meaning isn't anomalous, rather, it's widespread. In all the languages with polysemous reciprocal expressions, we expect to find a similar pattern of grammaticalizing sub-meanings.

This idea of compositional reciprocity is of course supported by the numerous

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<sup>39</sup>More minor patterns observed by Nedjalkov (like **reciprocal-valency decreasing polysemy**) support the overall generalization as well.

bipartite reciprocal constructions (Evans et al., 2011; Nedjalkov, 2007). For instance, Faller (2004) demonstrates convincingly that reciprocity in Cuzco Quechua is composed of two independent pieces, a pluractional marker and a reflexive marker, instantiating two of the properties discussed above.

Returning to Bantu, the suffix *-an* is extremely polysemous across the family.

“In addition to expressing reciprocity, examples of related but not exactly reciprocal uses [of *-an*] are attested from all over Bantu. In Nen (A44; [. . .]), the reflex of *\*-an-* is used to express joint actions by several agents (and also plurality of the addressee of imperative forms). In Kela (C75), *\*-an-* expresses repetitive or intensive actions, in Songye (L22) it expresses actions directed towards several other people, and in Shona (S12) it is “used of a single subject with reference to its part and their relation to one another” (Fortune 1955:219; e.g. =*gony-an-a* ‘curl’ < =*gony-a* ‘bend’). Similar examples could be cited from many other languages.” (Schadeburg, 2003:102).

Across Bantu then, *-aN* (and cognates) reflect two of the three main polysemies: sociativity and iterativity, as well as general nominal plurality. (See additional examples in Dammann 1954.) This is consistent with saying that *-aN* is, generally, simply a marker of plurality. The variation comes in what it pluralizes. In Logoori, *-aN* ranges over events. In a language which employs *-an* as a sociative marker, it ranges over individuals, as essentially argued in Maslova (1999); Dimitriadis (2008b). (Maslova 2007 uses the term “polyadic” to describe this behavior of *-an* across Bantu.) We might hypothesize that *-aN* in these languages expresses

DISTR or CUM (in certain syntactic/semantic contexts). It's possible that in some languages *-aN* is “unselective,” cumulatively or collectively pluralizing both events and individuals. This appears to be the case in Ndebele, where *-aN* has both sociative as well as iterative functions, in addition to being a marker of reciprocity (Khumalo, 2014).

It's worth noting that in some Bantu languages, reciprocal markers are bimorphemic: In Runyambo (JE 21), *-an* may appear separately, but to express reciprocity it must be part of the (arguably) bimorphemic *-angan*. (*-Ang* is typically a progressive marker, or some other event iterator across Bantu (Nurse and Philippson, 2003; Nurse, 2008).)

- (55) a. *-reeb-a* look  
       *-reeb-an-a* keep in touch  
       *-reeb-angan-a* look at each other
- b. *-kwat-a* hold/touch/seize  
       *-kwat-an-a* be related; stick together  
       *-kwat-angan-a* hold/seize each other
- c. *-ras-a* throw, shoot  
       *-ras-an-a* fight, struggle  
       *-ras-angan-a* shoot or throw at each other (Mchombo, 2007:210)

Seen from this perspective, we might wonder whether Chichewa can be reanalyzed along these lines. While this deserves its own investigation, the fact that Chichewa's *-an* permits a discontinuous reciprocal may be taken to indicate that

it's function is closer to that of a sociative marker, and thus, by hypothesis, actually expresses something closer to individual plurality/collectivity.

- (56) *Mkángó u-ku-páts-án-a*            *mphâtsò ndí kálúlu*  
 3lion    3SM-PRES-give-REC-FV 10gift    with 1Ahare  
 'The lion and the hare are giving each other gifts.' (Mchombo, 2004:103)

While language specific investigation is needed, in general the findings are consistent with treating *-an* across Bantu languages as a marker of plurality. In a language like Logoori, the plurality is strictly event plurality. In a language like Chichewa, or other “polyadic” languages, *-an* is consistent with being restricted to pluralizing in the domain of individuals. This suggests that Bantu languages cannot be held up as an argument against Heim et al's analysis of compositional reciprocity. Indeed, they can be taken evidence *for* such a view.

Of course, the idea that reciprocity can be compositional does not preclude that a language might have “true” reciprocal marker. It's possible that some languages employ a marker whose sole function is that of expressing reciprocity. The hypothesis put forth here is that patterns of polysemy are mis-labelled. A marker that functions as both a reciprocal and something else doesn't “mean” two things. Rather, in such languages, a close inspection should reveal that reciprocity is compositional in that language. More importantly, the fact that a language might not exhibit a morphologically complex reciprocal doesn't provide evidence that the language lacks a semantically compositional reciprocal construction. In Logoori, as in possibly all languages, what is explicitly expressed must combine with implicit operations to derive the totality of reciprocal meaning.<sup>40</sup>

<sup>40</sup>In fact, Bantu languages also reflect the third major type of Nedjalkov's typological: reflexive-

## 11 Conclusion

Languages differ as to which pieces of reciprocity they grammaticalize. In Logoori, the sub-meanings of event plurality and intransitivity are expressed by the suffix *-aN*, which, when used with a transitive predicate, results in a reciprocal meaning given an independently motivated theory of relational plurals. Thus, though Dalrymple et al. (1998) are correct in showing that Bantu languages like Chichewa pose a challenge for Heim et al.'s (1991b) analysis of reciprocity, Bantu languages are still consistent with the idea that reciprocity may be expressed compositionally. This idea can be extended beyond Bantu. A typological examination of reciprocal “polysemy” suggests that all such cases are simply a language’s attempt to “cobble together” a reciprocal meaning, in light of the complex universal semantics associated with reciprocity. Of course, it still might be possible that a language has a dedicated reciprocal marker, i.e., reciprocity isn’t compositional. But it illustrates that *just* looking at how reciprocity is marked in a particular language doesn’t necessarily reveal the nature of the reciprocal marker in that language.

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reciprocal polysemy. For instance, in Luvale, the prefixal marker *li-* (cognate with Logoori’s *i-*) indicates both reflexive and reciprocal meaning (Schadeburg, 2003:102). The historical reciprocal marker *-(ak/ag)an* is solely used to indicate a collective or cumulative reading. A similar same thing appears to have happened in Angolan Bantu languages. Interestingly, this polysemy arises only for the reflexive marker *i-* (and cognates), but never for cognates of *-an*.



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