COUNT/MASS DISTINCTION IN KUIKURO:
ON INDIVIDUATION AND COUNTING

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ABSTRACT

This paper analyses the processes of individuation and counting in Kuikuro (Southern Carib, Brazil). Kuikuro is a number-neutral language characterized by the absence of numeral classifiers. The central aspect we discuss in this paper is the fact that individuation is a context-dependent operation (cf. Rothstein (2010), Lima (2012)).

KEY WORDS: Kuikuro, count/mass distinction, individuation, numerals, counting.

INTRODUCTION

Linguists and philosophers have extensively discussed how languages encode the distinction between so-called 'count nouns' (e.g. dog) and so-called 'mass nouns' (e.g. blood) (see Quine 1960, Burge 1972, 1975, Pelletier 1975, 2009, 2012, Bunt 1979, 1985, Link 1983, Gillon 1992, Krifka 1995, Chierchia 1998a, 1998b, 2010, Nicolas 2002, Borer 2005, Schwarzschild 2006, Rothstein 2010, Bale and Barner 2009, among many others).

Across many languages, these classes of nouns have distinct morphological and syntactic properties. The exact properties that distinguish 'mass' from 'count' nouns can vary from language to language. Chierchia (1998a, 1998b, 2010) has established three different categories of languages: number-marking languages, classifier languages and number-neutral languages. In the so-called number-marking languages, only count nouns can be pluralized:

1a.   This dog/girl is happy
1b.   These dogs/girls are happy

2a.   That blood is RH Positive
2b.   ?? Those bloods are RH Positive   (Chierchia 2010; 109 – examples (19a) and (19b))

3a.   That gold weighs two ounces
3b.   ?? Those golds weigh two ounces   (Chierchia 2010; 109 - examples (19c) and (19d))

In the examples above, *dog* and *girl*, *but* not *blood* and gold can be pluralized because the former but not the latter have clearly individuated entities in their extensions. In addition, the determiner system is sensitive to the mass/count distinction in English:

4. the/some boy	4'. the/some boys	4''. the/some water
5. a/every boy	5'. * a/every boys	5''. * a/every water
6. *most/all boy	6'. most/ all boys	6''. most/ all water

(Chierchia 2010 - examples (21a), (21b) and (21c))

The determiners *the* and *some* can combine with any noun, either count (4 and 4') or mass (4''). Determiners such as *a* and *every* are restricted to singular count nouns (5). Finally, determiners such as *most* and *all* are restricted to plural and mass nouns (6' and 6'', respectively).

Not only English but other number-marking languages, such as the Romance languages[2], use these two morphosyntactic criteria - pluralization of count nouns and distribution of quantifiers – to distinguish these two classes of nouns. Finally, a container or a measure phrase is required for a mass noun to be combined with a numeral ('three quarts of blood' (measure); 'three tubes of blood' (container); * 'three blood(s)'). Without such a container or measure phrase, the sentence is either ungrammatical, or else reinterpreted so that the mass noun shifts its interpretation ('we drank three beers', meaning 'three bottles of beer'; cf. Gleason 1965, Pelletier 1975, Frisson and Frazier 2005, Wiese and Maling 2005, Lima 2012).

The second type of language described in Chierchia's count/mass typology is the classifier languages. Classifier languages are characterized by (i) bare arguments, that is, nouns that are not associated with any functional material, occurring without articles, number inflection, case, etc.; (ii) the absence of pluralization and (iii) the requirement of a classifier. A classifier is understood here as "a word that denotes something like a measure, a container, or shape based words that express something like 'unit'" (Chierchia 2010; 107):

Mandarin Chinese

7a.	San	*(ge)	nanhai	7b.	Yi	*(ben)	shu
	three	CL	boy		one	CL	book
	'Three boys'				'One book'		

(Chierchia 2010; 107 – examples 15a and 15b)

Examples 7a and 7b show that nouns in Chinese require a classifier, including nouns that have well-individuated atoms in their extensions, such as *nanhai* 'boy' and *shu* 'book'. Note, however, that the distribution of classifiers is not unrestricted in this language. Cheng and Sybesma (1999) argue in favor of count-classifiers and mass-classifiers (henceforth massifiers) in Chinese. For instance, the classifier *ge* does not combine with mass nouns or, if it does, it forces a count interpretation[3]:

Mandarin Chinese

8.	?? San	ge	xue
	three	CL	blood
	'Three portions of blood'		

(Chierchia 2010; 107 – example 14)

Cheng and Sybesma (1999) show that some modifiers and adjectives can occur with one class of classifiers but not with the other. For instance, a modifier marker *de* can intervene between [massifier+N], but not between [count-classifier+N]:

Mandarin Chinese
9a.   San   bang   (de)   rou
       three   CL.pound   DE   meat
       'Three pounds of meat'
(Cheng and Sybesma 1999; 515 – example 12a)

9b.   Ba   tou   (*de)   niu
       eight   CL.head   DE   cow
       'Eight cows'
(Cheng and Sybesma 1999; 516 – example 13a)

Another aspect of the distribution of classifiers in Chinese is the fact that some adjectives modify massifiers but not count-classifiers:

Mandarin Chinese
10a.   yi   da   zhang   zhi   10b.   *yi   da   zhi   gou
       one   big   CL.sheet   paper   one   big   CL   dog
       'One large sheet of paper'
(Cheng and Sybesma 1999; 516 – examples 14a and 15a)

This set of examples show that even though pluralization and distribution of determiners are not criteria for the distinction between count and mass nouns in Chinese, other criteria can be used to establish this distinction.

The third type of language described in the literature, the number-neutral languages, share some properties with classifier languages. To start with, these languages, like classifier languages, are characterized by bare arguments:

Dëne Suliné
11a.   k'ásba   nághilnígh   11b.   li   dëneyuaze   theál
       chicken   PERF-1SG-buy O   dog   boy-DIM   PERF-bit/chew O
       'I bought a chicken'   'The dog bit the little boy'
(Wilhelm 2008; 45 - examples 4a (11a) and 4e (11b))

In these examples, the nouns in argument position (subject or object) are bare. That is, *k'ásba* 'chicken' (in 11a) li 'dog' and *dëneyuaze* 'boy' (in 11b) do not bear definiteness, case nor number inflection. The second characteristic that number-neutral languages share with classifier languages is the absence of plural morphology:

Dëne Suliné
12a.   Larry   lághe   ejĕre   nághélnígh
       Larry   one   bovine   PERF-buy O
       "Larry bought one cow'

12b. Larry   ejëre   nádághélnígh
     Larry   bovine   DIST-PERF-buy O
     'Larry bought several cows/ cattle'
(Wilhelm 2008; 45 - examples 5a and 5b)

In the examples above, *ejëre* has the same morphological form for singular ('cow' (12a)) and plural ('cows' (12b)), where, crucially, no morphology is added. What distinguishes count and mass nouns in these languages is the fact that count nouns can directly combine with numerals while mass nouns cannot. That is the first property that distinguishes classifier languages from number-neutral languages. Differently from classifier languages, number-neutral languages have no classifier systems (therefore, no numeral classifiers in constructions with mass nouns and numerals). Instead, as in number-marking languages, in number-neutral languages a numeral cannot combine with a mass noun without an intervening container or measure phrases (13c):

Dëne Suliné
13a.   Solághe   dzol
       five   ball
       'Five balls'
(Wilhelm 2008; 46 - example (8c))

13b. * Solághe   ber   13c.   Solághe   nedádhi   bër
       five   meat   five   pound   meat
                                        'Five pounds of meat'
(Wilhelm 2008; 47 - example (9b))   (Wilhelm 2008; 47 - example (10a))

Scholars challenged Chierchia's typology based on the documentation of languages that on the surface seem to lack a count/mass distinction. Some examples include Algonquian languages such as Innu-aimun. Gillon (2010) argues that in spite of the apparent absence of a count/mass distinction in Innu-aimun, the distribution of the plural morpheme in constructions with quantifiers provides evidence for grammatical differences between count and mass nouns. In Innu-aimun (Gillon 2010; 22), all nouns can occur with any class of quantifier, but only count nouns and some mass nouns can be pluralized in constructions with the quantifier *mîtshet* 'many/much':

Innu-aimum
14a.   Mîtshet   utenâu   14b.   mîtshet   utenâu-a
       lots/many   town   lots/many   town- INAN.PL
       'Many towns'   'Many towns'

15a.   pimî   15b.   pimî-a   16a.   mîtshet   pimî   16b. * mîtshet   pimî-a
       oil   oil-INAN.PL   lots/many oil   lots/many   oil-INAN.PL
       'Oil'   'Oil(s)'   'Lots of oil'   (intended: lots of bottles of oil)
(Gillon 2010; 12/21/22; examples: 1c/d; 30b, 31d, 32c, 33c)

In Ojibwe, scholars (Rhodes 1990:153 *apud* Mathieu 2012; 172) suggested that there is no grammatical distinction between count and mass nouns because any noun can be pluralized in this language, even mass nouns, as in Halkomelem Salish (Mithun 1988) and St'at'imcets (Davis and Matthewson 1999; 60-61). Contrary to this view, Mathieu (2012; 186) shows that 'pluralized mass nouns receive a measure reading' as illustrated below:

Objibwe
17a. mikwam 'ice' mikwam-iig 'pieces of ice'
17b. Semaa 'tobacco' semaa-g 'wads or pieces of tobacco'
(Mathieu 2012; 184; example 30)

In Yudja (Tupi, Brazil), a number-neutral language, any noun can be interpreted as count. Two facts from the language support this hypothesis: first, all nouns can be directly combined with numerals, even when coercion (universal packager) is not possible (cf. Lima 2010, 2012, 2013 for details):

Yudja

Ba'ï 'paca' 18a. Txabïu   ba'ï   wãnã
                      three   paca   ran
                      'Three pacas ran'

Ali 'child' 18b. Txabïu   ali   wãnã
                      three   child   ran
                      'Three children ran'

Pïkaha 'chair' 18c. Txabïu   Maria   pïkaha   ïwã
                         three   Maria   chair   buy.PL
                         'Maria bought three chairs'

Yukïdï 'salt' 18d. Maria   txabïu   yukïdï   apa
                        Maria   three   salt   drop/fall
                        'Maria dropped three (portions of) salt'

Apeta 'blood' 18e. Txabïu   uda   apeta wï
                        three   someone   blood bring
                        'Someone brought three (portions of) blood'

Y'a 'water' 18f. Maria yauda y'a   dju wï
                      Maria two   water bring
                      'Maria brought two (portions of) water'

Second, Yudja has a pair of 'count' quantifiers (*itxïbï* 'many'/ *kïnana hinaku* 'few') that are compatible with all nouns:

iidja 'woman' (human)
19a. itxïbï   iidja   19b. kïnana hinaku   iidja
      many   iidja   few   woman
      'Many women'   'Few women'

y'a 'water' (substance)
19a. itxïbï   y'a   19b. kïnana hinaku   y'a
      many   water   few   water
      '(There are) many containers of water'   '(There are) few containers of water'

A key observation of this paper is that the Kuikuro language does not obviously fit in the general picture described by Chierchia (1998a, 1998b, 2010), similarly to Blackfoot (Wiltschko 2010), Dene Suliné (Wilhelm 2008), Inuu-aimun (Gillon 2010), Karitiana (Muller, Storto and Coutinho-Silva 2006), Ojibwe (Mathieu 2012), St'at'imcets (Davis and Matthewson 1999) and Yudja (Lima 2010, 2012, 2013, ms.). Kuikuro (Southern Carib, Brazil) is characterized by its bare arguments, optional plural morphology and the absence of numeral classifiers (Franchetto, Santos and Mehinaku 2007). The central aspect we discuss in this paper is the fact that all nouns can be used as count nouns and that individuation is a context-dependent operation (cf. Rothstein (2010), Lima (2012)). This paper is structured as follows. In section 2 we present some general properties of the Kuikuro language. In section 3 we present a description of the constructions with numerals. In section 4 we present an analysis for individuation in Kuikuro based on Rothstein's (2010) contextual parameter analysis for individuation and counting and Lima's (2010, 2012) analysis for Yudja.

2. KUIKURO: GENERAL PROPERTIES

Kuikuro is a dialect of the Upper Xingu Carib Language (LKAX), the Xinguan Southern Branch of the Carib family (Meira and Franchetto 2005) and it is spoken by 600 Amerindians in Southern Amazonia, living in five villages in the Southeastern part of the Xingu Indigenous Land, north of the State of Mato Grosso.

LKAX is an agglutinative, head final and ergative language. Internal arguments (Pacient/Experiencer of a transitive verb, Actor/Experiencer of an intransitive verb, argument of a postposition or of a noun), always form a phonological unit with their head. All intransitive verbs are inaccusative. The External Argument (external Cause/Source/Agent of a transitive verb) is marked by *heke*, a locative postposition.

20a.   kangamuke agu-ki-jü   is-ügünu   heke
       child   thin-VBLZ-PNCT   3-sick. PNCT   ERG
       'His sickness made (the) child thin'

20b.   kangamuke   agu-ti-lü
       child   thin- VBLZ-PNCT
       '(The/a) child/children got thin'

20c.   kangamuke   atsaku-lü
       child   run-PNCT
       '(The/a) child/children run(s)/ran'

In the nominal domain, Kuikuro is characterized by bare arguments. That is, nouns are unmarked for number and for definiteness:

21.   kanga enge-tagü   kangamuke   heke
       fish eat-CONT   child   ERG
       '(The/a/some) child/children is/are eating (the/a/some) fish/es'

As in other number neutral languages, the plural morpheme –*ko* is optional as any noun can be interpreted as singular or plural. Four properties characterize the distribution of this morpheme.

First, the morpheme *–ko* can only occur suffixed to [+animate] nouns; inanimate count nouns cannot be pluralized with *-ko* (22d-22e). Therefore, the plural morpheme is not a grammatical feature that distinguishes count from mass nouns in Kuikuro:

22a.   kanga-ko
       fish-PL   'fishes'

22b.   kuge-ko
       person- PL   'people'

22c.   kangamuke-ko
       child- PL   'children'

22d.. * tehu-ko
       stone- PL

22e.   * ehu-ko
       canoe- PL

Second, as in classifier languages (cf. Nakanishi and Tomioka 2004, cf. example 23 for Japanese), in Kuikuro, the plural morpheme *–ko* may be suffixed to individual-denoting expressions:

Japanese
23.   Taro-tati-wa   moo   kaetta
       Taro-tati-TOP   already   went home
       'The group of people represented by Taro went home already'
       (Nakanishi e Tomioka 2004; 124)

Kuikuro
24a.   Jumu-ko
       Jumu-PL
       'Extended family of Jumu/the people of Jumu'

24b.   Brazil-ko
       Brazil-PL
       'The Brazilian football team'

24c.   Tute-ko
       Tute-PL
       'Tute (Aldebaran) and its group of stars (the constellation of Taurus)'

Third, in Kuikuro pluralized nouns cannot co-occur with numerals:

25   * tilako kanga-ko
        three   fish-PL

This property is also observed in classifier languages, such as Chinese. In Chinese the morpheme *-men* cannot co-occur with numerals (cf. Cheng and Sybesma 1999):

Chinese
26.   * san-ge   haizi-men
       three-CL   child-men
       Cheng and Sybesma (1999; 537)

Fourth, the suffixation of the morpheme –*ko* to unpossessed nouns seems to be a recent process in the Kuikuro language. In interviews, elderly speakers, commenting the "new" language spoken by younger people, argue that -*ko* used to occur only suffixed to: 1) proper nouns (being interpreted as an associative plural (24)); 2) possessed nouns (in order to indicate plurality of possessors (27a-27b)) and 3) verbs (in order to indicate that the internal arguments is a plurality when the internal arguments are coded by the second, third and first person dual inclusive person prefixes (28a-28b, 29a-29b))[4]:

Possessives
27a.   i-tahaku-gu
        2-bow-REL
        'His bow(s)'

27b.   i-tahaku-gu-ko
        2-bow-REL-PL
        'Their bow(s)'
Verbs
28a.   nhatüi is-ünkgü-lü   hagu-te
        five   3-sleep-PNCT fishing.camp-LOC
        'He slept five (nights) at the fishing camp'

28b.   nhatüi is-ünkgü-lü-ko   hagu-te
        five   3-sleep- PNCT-PL   fishing.camp-LOC
        'They slept five (nights) at the fishing camp'

29a.   e-ingi-lü   iheke   titá
        2-see-PNCT   3- ERG there
        'He saw you (sing) over there'

29b.   e-ingi-lü-ko   i-heke   titá
        2-see- PNCT-PL 3- erg   there
        'He saw you (plural) over there'

Another morpheme that refers to quantities is *tuhugu*, which can be combined with [- animate] and mass nouns. As –*ko*, *tuhugu* cannot be combined with nouns in constructions with numerals:

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4. -*ko* is not agreement, as shown by the following examples:
i   kangamuke(-ko)   atsaku-lü leha   itsuni-na
        child   run- PNCT-PL   CMPL   forest-AL
        'child/children ran to the forest'

ii   * kangamuke(-ko)   atsaku-lü-ko   leha   itsuni-na
        child   run-PNCT-PL   CMPL   forest- AL
        'child/children ran to the forest'

30a.   tilako   nhukau
        three   pequi oil
        'Three (portions of) pequi oil'

30b.   *tilako   nhukau   tuhugu
        three   pequi.oil   quantity
        'Three quantities of pequi oil'

Note that *tuhugu* can co-occur with *–ko*, which may suggest that they do not have the same meaning in Kuikuro:

31.   kanga-ko   tuhugu
        fish-PL   quantity
        'Quantities of (alive) fishes'

Elderly speakers suggest that *tuhugu* could be combined with all nouns (count or mass) while *–ko*, as mentioned before, historically, was only suffixed to verbs, as well as to possessed and proper nouns . Since *tuhugu* can co-occur with *–ko* and since it modifies any noun, we may hypothesize that its meaning is similar to that of the expression quantity of in English (cf. Chierchia 2010), which can combine with count and mass nouns. This hypothesis, however, will be explored in future developments of this work (Franchetto, Santos and Lima, ms.).

3. NUMERALS IN KUIKURO
Numerals in Kuikuro that refer to numbers from one to five and to ten are morphologically simple[6]:

32a.   aetsi   'One'
32b.   takeko   'Two'
32c.   tilako   'Three'
32d.   tatakegeni   'Four'
32e.   nhatüi   'Five'
32f.   timüho   'Ten'

Number words above six and up to nine are formed by the combination of the numerals from one to five with a deverbal noun meaning 'the one used to cross to the other side':

33.   tilako   inkguge-toho
        three   cross-INSTNR
        'Eight'

The numerals for eleven to nineteen are formed by the combination of numerals from one to nine and the expression 'on foot' (*hügape*), as illustrated below:

34a.   tilako hügape
        three on.foot
        'Thirteen'

34b.   tilako inkguge-toho   hügape
        three   cross- INSTNR   on.foot
        'Eighteen'

The number twenty is denoted by the expression *tatute hügape* ('all on.foot') and above it there are no number words or expressions.

Numerals, like postpositions and adverbs, can be 'nominalized' by means of the suffix *–ngo* (*tilako-ngo*). Ordinal numbers occur as genitive ('possessive') constructions whose head is a nominalized numeral root[7]:

35.   anetü   etila-ngo-gu
        chief   three-NMLZ-REL
        'The third chief'

When numerals combined with nouns or NPs they can occur before the noun/noun phrase or in the end of the sentence:

36a.   konige   tilako tahitse ingi-lü   u-heke
        yesterday   three   macaw see-PNCT   1- ERG
        'Yesterday I saw three macaws'
        # 'Yesterday I saw macaws three times'

36b.   konige   tahitse ingi-lü   u-heke   tilako
        yesterday   macaw see- PNCT   1- ERG   three
        'Yesterday I saw three macaws'
        # 'Yesterday I saw macaws three times'

37a.   konige   tilako nhukau   ingi-lü   u-heke
        yesterday   three pequi.oil   see- PNCT   1- ERG
        'Yesterday I saw three (bottles) of pequi oil'
        # 'Yesterday I saw (bottles) of pequi oil three times'

37b.   konige   nhukau   ingi-lü   u-heke   tilako
        yesterday   pequi.oil   see- PNCT   1- ERG   three
        'Yesterday I saw three (bottles) of pequi oil'
        # 'Yesterday I saw (bottles) of pequi oil three times'

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7. The numeral root *etila* cannot occur as free form and it is clearly related to the number word *tilako* ('three'); the latter could be analyzed as *(e)tila-ko* (three-PL), but its internal structure is synchronically opaque (see note 5).

38. konige   tilako nhukau   ingü   ingi-lü   u-heke
     yesterday   three pequi.oil   container see- PNCT   1- ERG
     'Yesterday I saw three bottles of pequi oil'
     # 'Yesterday I saw bottles of pequi oil three times'

Note that none of the sentences above can be interpreted as expressing event quantification. That means, the sentences in 36 cannot mean "I saw (a/some) macaw(s) three times" and the sentences in (37) and (38) cannot be interpreted as "I saw bottles of pequi oil three times". In order to derive this interpretation, numerals must occur before the VP and must combine with the post-VP adverb ihisundu, which can be roughly translated as 'quantity, unit'[8]:

39. ige   ngune-mbeke tilako u-hülu   ihisundu
     DPROX   moon-TEMP   three   1-walk   unit
     'I traveled three times this month'

40. konige   tilako tahitse ingi-lü   hisundu u-heke
     yesterday three macaw see- PNCT   unit   1- ERG
     'I saw (a/the/some) macaw three times'
     # 'I saw three macaws'

In the following two examples, both the combinations of a numeral with an NP and the combination of a numeral with a VP are attested in the same sentence:

41. konige   tilako nhukau ingi-lü   u-heke   takeko   ihisundu
     yesterday three pequi.oil see- PNCT 1- ERG   two   unit
     'Yesterday I saw three (bottles) of pequi oil two times'
     # 'Yesterday I saw two (bottles) of pequi oil three times'

42. konige   tahitse tilako-ngo-ko   ingi-lü   u-heke takeko ihisundu
     yesterday macaw three-NMLZ-PL   see- PNCT   1- ERG two   unit
     'Yesterday I saw three macaws two times'
     # 'Yesterday I saw two macaws three times'

4. COUNT/MASS DISTINCTION IN KUIKURO: CONSTRUCTIONS WITH NUMERALS

As in other number neutral languages such as Dene Suliné (Wilhelm 2008) and Yudja (Lima 2010, 2012) in Kuikuro count nouns can be directly combined with numerals without intervening classifiers or measure phrases:

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8. An exception to this rule is the idiomatic expression 'nhatüi is-ünkgü-lü' presented in the example (28) reproduced below:

i   nhatüi   is-ünkgü-lü   hagu-te
      five   3-sleep- PNCT   fishing.camp-LOC
      'He slept five (nights) at the fishing camp'

In this example the numeral is combined with the VP (a man slept five times) and the post-VP adverb ihisundu is not included in the sentence. That is because 'nhatüi isünkgülü' is an idiomatic expression to express that someone stayed away from the village in a relatively long interval (that is, nhatüi 'five' here does not mean literally the number five).

43. Mutua   heke leha tahitse   ingi-pügü   tilako
    Mutua   ERG   CMPL macaw   see-PERF   three
    'Mutuá saw three macaws'

As in Yudja (Lima 2010, 2012) container or measure constructions are optional in constructions with mass nouns in Kuikuro, as long as a unit of individuation is salient in the context as presented in (44a) and (44b) and also in (44b) below:

44a. tilako nhukau   tingü   ata
     three   pequi.oil   bottle   in
     'Three bottles of pequi oil'

44b. tilako nhukau
     three   pequi.oil
     lit: 'three bottles of pequi oil'

In elicitation session with three Kuikuro *speakers*[9], the consultants included a container word in constructions with numerals and mass nouns when the sentence is out of context. All the sentences produced by the consultants included the container noun *ingü* 'casing, container', which is compatible with liquid and non-liquid substances:

45a. tilako   u-ngipi   nhukau   **ingü**
     three   1-have   pequi.oil   container
     'I have three bottles of pequi oil'

45b. aetsingo   **ingü**-pe   nhukau-pe   tu-nümingo   leha   u-heke
     one   container-EX   pequi.oil-EX   give-FUT   CMPL   1-ERG
     'I will give you one bottle of pequi oil'

45c. ama   heke nhatüi   nhukau   **ingü**N-te-pügü
     mother   ERG   five   pequi.oil   container-VBLZ-PERF
     'My mother gave (to someone) five bottles of pequi oil'

45d. aütü   heke tilako   agahü **ingü**   tu-nügü   apa-inha
     Aweti ERG   three   salt   container   give-PNCT   father-DAT
     'Aweti gave three packages of salt to my father'

In the examples above, *ingü* 'casing, container' stands for different container units, such as bottles (45a-45c) and packages (45d), in different contexts. Note that *ingü* can also be combined with count nouns such as *tapü* 'foot' meaning 'shoes' (literally, the foot's casing/container):

46. u-tapü-gü   ingü
    1-foot-REL   casing
    'My shoes (lit.: casing/clothes for foot)'

As mentioned in the introduction, cross-linguistically, either a classifier or a container/measure phrase is required in constructions with numerals and mass nouns. In Kuikuro there are no numeral classifiers and container nouns such *ingü* 'casing/container' are optional. We will exclude the possibility of *ingü* being analyzed as a numeral classifier, given that Kuikuro has no classifier system and, therefore, no numeral classifiers. Moreover, the inherently relational or depended (obligatory 'possessed') noun *ingü* can occur by itself combined with possessives, as illustrated below (if *ingü* was a classifier, that would not be possible):

47a.   u-ingü
        1s-casing/container
        'My clothes'

47b.   kagaiha   ingü
        white.people   casing/container
        'Clothes of white people'

47c.   kagaiha   gitü-gü   ingü
        White.people   head-REL   casing
        'White people's hat'

In this paper following previous work in other number-neutral languages and recent hypothesis on individuation and counting (Kratzer 2008, Rothstein 2010, Chierchia 2010, Lima 2010, 2012, 2013) we will claim that nouns in Kuikuro denote kinds by default and (cf. Krifka 1995, Chierchia 1998) and individuation/atomization is a context-dependent operation. Before motivating the context-dependent atomic function needed for individuation and counting in Kuikuro, we will motivate why the basic denotation of nouns is kinds in this analysis.

4.1. Motivating the analysis of bare nouns as kind-referring terms

Let us begin with the assumption that the basic denotation of a bare noun is kinds. A first piece of evidence in favor of this assumption is typological. It has been observed that in languages that license the use of bare nouns as arguments, bare nouns can be used to refer to kinds (Krifka 1995; 399; see also Chierchia 1998b, Müller 2002, Pires de Oliveira and Rothstein 2011, among many others) as illustrated below in 48a in contrast to 48b (reference to subkinds) and 48c (reference to specimens):

Kinds - Chinese
48a.   xiong   jue   zhong   le
        bear   vanish   kind   ASP
        'The bear is extinct'

Subspecies - Chinese

48b.   san   zhi   xiong
        three   CL   bear
        'Three bears' (objects)

Specimens - Chinese
48c.   san   zhong xiong
        three   CL   bear
        'Three bears' (species)
        (Krifka 1995; 398-399 – examples 1a, 1d, 1e)

A second piece of evidence is conceptual in nature. One may argue that reference to kind is primitive for ontological reasons. According to Krifka (1995) "kinds seems to be ontologically prior to specimens; if we want to call some real object a bear we have to relate this object to the kind *Ursus,* whereas it is not necessary to have some real specimens in mind in order to talk about the kind *Ursus*" (Krifka 1995; 399). From this point of view, reference to kind is given for free, and additional semantic operations are required to get a noun to refer to objects and subkinds (cf. Krifka 1995, Kratzer 2008). Note that there is a one to one relation between kinds and properties. To a given kind *k*, there corresponds a property *P* which is defined as the function that maps any world *w* to the set of individuals that are specimens of *k* in *w*, which is the set of individuals that belong to *k(w)* (cf. Chierchia 1998a, 1998b, 2010). In the rest of this paper, we will refer to kinds in the metalanguage using capitalized nouns. For instance, DOG is the kind of dogs, i.e. a function from a world *w* to the sum of all dog individuals in *w*. From a kind *k*, we can derive the set of individuals that are specimens of *k* in a world *w* as in (49), and we can derive the property of being a specimen of *k* as in (50):

49. $\lambda x.\ x \leq \text{DOG}(w)$

50. $\lambda x.\lambda w.\ x \leq \text{DOG}(w)$

Carlson (1977) argue that there are grammatical and lexical phenomena that are sensitive to the intuitive ontological distinction between object denoting DPs (e.g. 'The lion escaped yesterday from the Hellabrunn zoo' - Krifka *et al*. 1995; 5 – example 7a) and kind denoting DPs (The lion is a predatory cat' - Krifka *et al*. 1995; 5 – example 5a). One of these phenomena is that some predicates, such as *become extinct*, are only compatible with kind denoting DPs. For example, *become extinct* is compatible with a kind denoting subject but not with an object (specimen) denoting subject:

51.   The lion will become extinct soon.
52.   *Simba will become extinct soon.
        (Krifka *et al*. 1995; 10 – example 23a)

The same can be observed in Kuikuro (53). The bare noun *tahitse* 'macaw' is used to denote a kind (MACAW), since it occurs as the subject of the kind predicate *etünügü* 'become extinct'. That this predicate selects kind denoting subjects is confirmed by the fact that it is ungrammatical with proper names, as illustrated in (54):

Kuikuro
53.   tahitse-pe   etü-nügü   leha
        macaw-EX   extinguish-PNCT   CMPL
        'Macaw is extinct'

54.   *Simba   etü-nügü   leha
        Simba   extinguish-PNCT   CMPL

From these examples and the data that we discussed in section 3, we conclude that noun roots refer to kinds in Kuikuro. In counting scenarios, we have seen that no additional overt morphology is needed to license a property of individuals interpretations for mass nouns. This raises the question about how the kind-referring interpretation of nouns is related to the property of individuals reading of the nouns. Should we assume that bare nouns are lexically ambiguous? Or should we rather posit a basic denotation and derive from it the other two? In the rest of this section, we will argue in favor of the second answer. We will argue in favor the hypothesis that the atomic function is manifested by a functional head in Kuikuro.

4.2. The atomic function hypothesis and the Distributed morphology framework

We propose that bare nouns in Kuikuro are morphologically complex. Following much work in Distributed Morphology (Hale and Marantz 1993, Halle and Marantz 1999, Embick and Noyer 2001, among many others) and previous work on word formation in Kuikuro (cf. Franchetto 2006, Santos 2007, 2008, Franchetto and Santos 2010) we adopt the working hypothesis that all lexical items are formed by combining category neutral roots with category-defining functional heads. In the distributed morphology framework, roots will surface in the syntax as lexical categories (nouns, verbs, adjectives, etc) only after being categorized. Therefore, lexical categories will always be syntactically complex. That is, nouns (and other lexical categories) are minimally formed by a root and an abstract morpheme as defined below:

> "Abstract Morphemes: These are composed exclusively of non-phonetic features, such as [Past] or [pl], or features that make up the determiner node D of the English definite article eventuating as the.
>
> Roots: These include items such as √CAT, √OX, or √SIT, which are sequences of complexes of phonological features, along with, in some cases, non-phonological diacritic features. As a working hypothesis, we assume that the Roots do not contain or possess grammatical (syntactic-semantic) features."
> (Embick and Noyer 2007)

In other words, the basic assumption of the distributed morphology is that roots never appear bare, without being combined with a functional head. This idea is formalized by Marantz (1995 *apud* Embick and Noyer 2007) as the 'categorization assumption':

Categorization assumption: roots cannot appear without being categorized; Roots are categorized by combining with category-defining functional heads (Marantz 1995, apud Embick and Noyer 2007)

Under this view, roots will be an open class of language-specific 'combinations of sound and meaning' (Embick and Noyer 2007). Cross-linguistically the roots that will become nouns in the syntax will vary but "the features that make up abstract morphemes are universal" (Embick and Noyer 2007). Roots always will be categorized by functional heads, which are universal and are composed of non-phonetic features. Following this framework, in order to form the bare nouns *nhukau* 'pequi oil' and *tahitse* 'macaw' one needs to combine the root √(" tahitse") and √(" nhukau ")with the nominal functional head n, as illustrated in (55):

55a.   [nP n √(" tahitse")]
55b.   [nP n √(" nhukau")]

One can make a cross-linguistic argument in favor of the morphological decomposition of bare nouns; in classifier languages, classifiers are overt manifestations of this functional head *n*. In some languages, such as English (Kratzer 2008) and Yudja (2012, 2013) these are covert operations: in English, as suggested by Kratzer (2008), covert 'classifiers' (silent functional heads) will be combined with root noun meanings in order to derive nouns and its different interpretations (kinds, subkinds, objects)[10]:

56a. [[√(" zebra")]] = 'zebra'
56b. [[CLind]] = λx λy [[kind(x) & individual (y) & y ≤ x]
56c. [[CLkind]] = λx λy [[kind(x) & kind (y) & y ≤ x]
(Kratzer 2008; 272 – examples 2a and 2b)

In this example, Kratzer is illustrating that a noun like *zebra* can denote a set of individual zebras (CL$_{ind}$) as in 'This zebra has not been fed' (56b, Kratzer 2008; 272) or a set of subspecies of the species 'zebra' (CL$_{kind}$) as in 'This zebra is almost extinct' (56c, Kratzer 2008; 272). Following Krifka (1995), for Kratzer nouns are semantically complex: they are formed by a root noun meaning and a functional head. The proposal presented in this paper make a similar claim; nouns in Kuikuro are complex: nouns are formed by combining a root noun meaning (kind-denoting) with a silent functional head that denotes a context-dependent atomic function.

Similarly to Kratzer (2008)'s proposal for English and Lima (2012)'s proposal for Yudja, we proposed that category neutral roots like *nhukau* 'pequi oil' and *tahitse* 'macaw' denote kinds. We take it that the basic denotation of the bare noun *tahitse* 'macaw' is the kind MACAW, as in (57a), or equivalently (57b). The same holds for a substance denoting noun such as *nhukau* 'pequi oil' (58):

57a.   [[√(" tahitse")]] = λw. MACAW(w)

57b.   [[√(" tahitse")]] = MACAW

58a.   [[√(" nhukau")]] = λw. PEQUI OIL(w)

58b.   [[√(" nhukau")]] = PEQUI OIL

To turn *tahitse* into a noun denoting a property of objects, we must map the kind MACAW or PEQUI OIL to the property of being an individual that is an atomic part of it. This property is represented in (57c) and (58c) for *tahitse* 'macaw' and *nhukau* 'pequi oil', respectively. We assume that we have access to a function AT that maps an individual x to the truth value 1 if and only if x is atomic:

57c.   λx. x ≤ MACAW (w) & AT(x)
58c.   λx. x ≤ PEQUI OIL (w) & AT(x)

We must then define a function that maps kinds like (57b-58b) to properties of atoms like (57c-58c). Such a function is defined in (59). Let us call it KO, for Kind to Object (cf. the realization function R in Krifka *et al*. 1995; 66). The result of applying [[√(" tahitse")]] or [[√(" nhukau")]] in (46b-47b) to KO is the property of being an atomic part of the kind MUTUM or PEQUI OIL, as illustrated in (60) and (61), respectively:

59.   KO = λk.λx.λw. k ∈ K & x ≤ k(w) & AT(x)

60.   KO([[√(" tahitse")]]) = λx.λw. MACAW in K & x ≤ MACAW (w) & AT(x)

61.   KO([[√(" nhukau")]]) = λx.λw. PEQUI OIL in K & x ≤ PEQUI OIL (w) & AT(x)

In the next section we will assume that AT is simply a relation between contexts and individuals. We will go back now to the issue of the context sensitivity of atomicity: why is it the case that units of counting are context sensitive with some NPs in Kuikuro, but not with others?

4.3. On a contextual parameter for counting in Kuikuro

The literature on countability relies on the assumption that counting is counting atoms. A first and central question to ask is how we define atoms. When I say 'There are three cats on the bed' the things that are counted are cat-atoms. Nouns like *cat* have natural atoms in their denotation. There is a family of easily identifiable properties that individual cats always have, in every context: they have a head, a body, four legs, a tail, etc. Because we know these properties, what counts as a cat and what counts as a body-part of a cat is stable across contexts. Other count nouns like *wall* have a less straightforward denotation.

Take as an example a medieval castle (based on Rothstein 2010; 374). There is a big building in the middle, which is surrounded by a thick wall in form of a square. Now, we might refer to this wall as 'the wall of the castle', in which case we count it as a wall-atom. Or we might refer to parts of this wall as walls themselves, as when we talk about the northern wall of the castle. Of course, we cannot mix these different ways of counting walls. That is, the 'northern wall' and the 'wall of the castle' cannot be counted as two walls in the same context. For instance, if someone asks the (funny) question 'How many walls are there in the castle?' we cannot answer 'there are two walls, the northern wall and the wall of the castle'. This example shows that wall-atoms are not natural atoms as they vary with the context.

Rothstein (2010) discusses the idea that we do not need natural atoms for counting. In the author's proposal, the basic denotation of a noun like *wall* (henceforth the root noun meaning) is a set of wall-atoms of different kinds, possibly overlapping. For instance, the root noun meaning of *wall* in our example includes both the *wall* of the castle and the northern wall of the castle. We cannot count the members of the root noun meaning of wall because the set includes overlapping atoms of different kinds. As a consequence, before we can count *walls*, i.e. before we can combine a numeral with the noun *wall*, we need to select a type of wall-atoms to be counted.

How are atoms selected from a root meaning according to Rothstein (2010)? Rothstein introduces the notion of a context as a set of objects. A context k is a subset of the universe of discourse M. A context is a set of objects of all kinds (walls, fences...). Given any root noun meaning Nroot and a context k, the intersection Nroot ∩ k is a set of N-atoms of the same kind. This entails that for any x,y ∈ Nroot ∩k, if x≠ y then x and y do not overlap. A function COUNTk is used to select atoms of a particular kind in a root noun meaning Nroot.

For Rothstein, count nouns derived with COUNTk are not sets of individuals, but sets of pairs of an individual and the context k, i.e. the context in which the first member of the pairs count as atoms.

Note that k appears as a parameter of the function k, i.e. the value of k is chosen once and for all in a given context of utterance:

62. COUNTk (Nroot)={<d, k>: d ∈ N ∩ k}   (Rothstein 2010; 364)
      COUNTk (Wallroot)={<d, k>: d ∈ Wallroot ∩k}

Our proposal is to exploit this difference between natural atoms and non-natural atoms to analyze the distinction between count and mass nouns in Kuikuro. We have seen that count and mass nouns can be directly combined with numerals in Kuikuro; numeral constructions with mass nouns can optionally include a container noun (*ingü* 'unspecified casing/container') that may be interpreted as different instantiations of a kind depending on the context.

In this analysis, as discussed in section 4.1, all nouns in Kuikuro denote kinds and need a context-dependent atomic function in order to map properties of individuals. While the minimal unit that constitutes an atom for a count noun such as *tahitse* 'macaw' or *itoto* 'man' is stable across contexts, the minimal unit that constitutes an atom for a mass noun like *nhukau* 'pequi oil' varies with the context and therefore a context-dependent atomic counting function is crucial.

We can now redefine the function KO presented in (59) and the associated functional *n* head as in (63). Given a context of utterance *c*, KO maps a kind *k* to the property of individuals that are part of the extension of *k* in the world of evaluation, and that count as atoms in the context *c*:

63. $[[n+ KO]]^c = KO = \lambda k.\lambda x.\lambda w. k \in K$ $x \leq k(w)$ & AT(c)(x)

The result of applying the denotation of the root $\sqrt{(" \text{tahitse} ")}$ (or the root $\sqrt{(" \text{nhukau} ")}$) to the function KO is the property of being an atomic part of MUTUM (or PEQUI OIL) in the context of utterance *c*:

64a. $[[n+ KO \sqrt{(" \text{tahitse} ")}]]^c = \lambda x.\lambda w.$ MACAW $\in K$ & $x \leq$ MACAW(w) & AT(c)(x)
64b. $[[n+ KO \sqrt{(" \text{nhukau} ")}]]^c = \lambda x.\lambda w.$ PEQUI OIL $\in K$ & $x \leq$ PEQUI OIL (w) & AT(c)(x)

The functional head *n*, in addition to introducing a categorical feature in the morpho-syntactic representation, may map the kind denoted by the root to a property of objects. In this sense, this analysis is also similar to Chierchia's analysis for classifier languages (Chierchia 1998, Chierchia 2010). In classifier languages nouns are uniformly mapped onto kinds. In this perspective, no automatic type adjustments are possible to turn kinds into properties in number-noun constituents. As a consequence, overt morphemes must intervene between numbers and their nominal arguments and that fact explains the emergence of classifiers in classifier languages. In Chierchia's perspective, classifiers are instantiations of AtP (65). In Kuikuro there are no numeral classifiers that can fulfill this function. Instead, a covert (or logical, in Chierchia's terms – Chierchia 2013) is responsible for the atomic function operation (66):

65.   *Chinese (Atomic function mapping)*

```
            AtP
          /     \
     NumP         AtP
                /     \
             At        N_k
```

San	ge	ren
three	CL	people

'Three people'

San	bang	rou
three	pound	meat

'Three pounds of meat
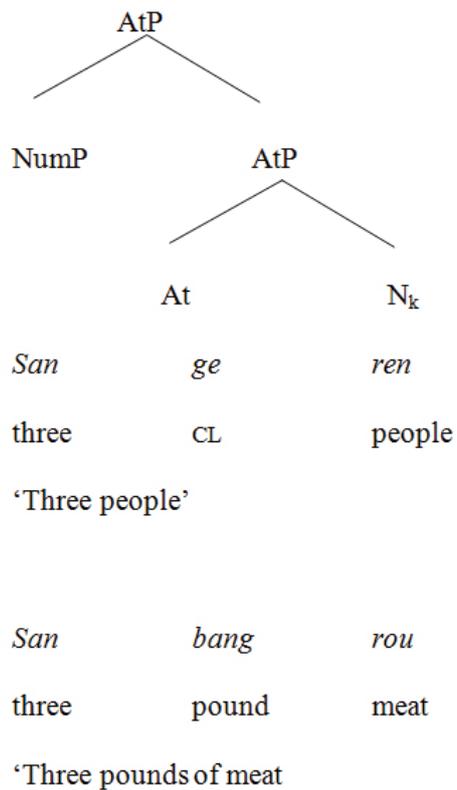
66.   *Kuikuro (Atomic function mapping)*

```
            AtP
          /     \
     NumP         AtP
                /     \
             N_k        At
```

nhatüi	nhukau	ø
five	pequi.oil	

tilako	kanga	ø
three	fish	
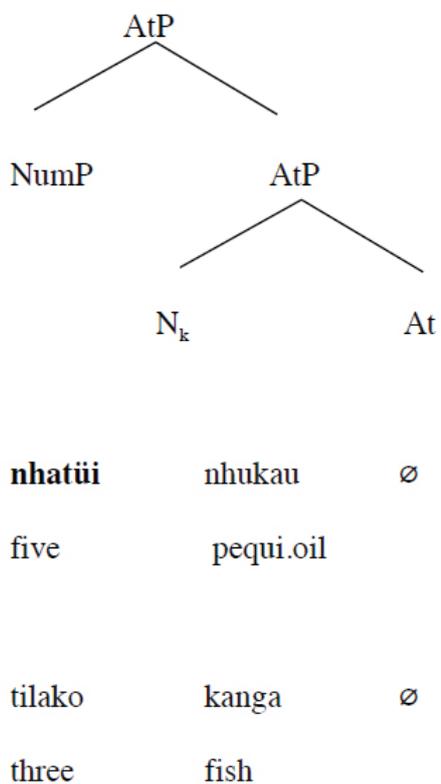
While in classifier languages there are overt classifiers for both count and mass nouns, in Kuikuro this operation is going to be denoted by a silent functional head. To say that the same atomic function is needed for count and mass nouns is not to say that there is absolutely no linguistically relevant difference between mass and count nouns. One difference that was observed relates to the influence of context on the determination of units of counting (atoms) for a given noun. For notionally count nouns like macaw, it appears that what counts as an atom is stable across contexts. However, for notionally mass nouns like pequi oil, what counts as an atom varies across contexts of utterance. Thus, this analysis predicts that the mapping from kinds to properties of individuals is an independent grammatical operation in the sense that is not part of the root noun meaning.

FINAL REMARKS

In this paper we discussed the processes of individuation and counting in Kuikuro (Southern Carib, Brazil). Kuikuro is a number-neutral language characterized by: 1) bare arguments; 2) optional plural morphology; 3) absence of numeral classifiers. Following Lima (2012, 2013)'s analysis for Yudja, we have argued that nouns in Kuikuro denote kinds and other types of denotations are derived. In order to interact with the count system (numerals, for example), a context-dependent individuation operation (cf. Rothstein (2010)) is required. Our hypothesis predicts that all nouns are morphologically complex: they are formed by combining a root noun meaning (kind-denoting) with a silent functional head that denotes the atomic function. What distinguishes count nouns from mass nouns is the fact that the atoms in the extension of count nouns are stable across contexts; while the atoms in the extension of mass nouns are unstable, i.e., vary across contexts.

Following Chierchia (2013) and Lima (2013a, 2013b, ms.) this analysis claims that despite the variation in the grammar of counting, classifier languages such as Mandarin and number-neutral languages such as Yudja and Kuikuro are similar in the sense that they are both kind-denoting and that numeral classifiers or null classifiers (or 'logical classifiers', in Chierchia (2013)'s terms) denote an atomic function that maps kinds to properties of individuals and makes it possible for nouns to interact with the count system.

A DISTINÇÃO CONTÁVEL-MASSIVO EM KUIKURO: INDIVIDUAÇÃO E CONTAGEM

RESUMO

Neste artigo analisamos o processo de atomização e contagem em Kuikuro (Carib, Brasil). Kuikuro é uma língua de número-neutro caracterizada pela ausência de classificadores numerais. Hipotetizamos neste artigo que o processo de atomização em Kuikuro é realizado através de uma operação dependente do contexto (cf. Rothstein (2010), Lima (2012)).

PALAVRAS-CHAVE: Kuikuro, distinção contável-massivo, individuação, numerais, contagem.

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INTERLINEAR GLOSSES (KUIKURO)

1	first person
2	second person
3	third person
AL	alative
CMPL	completive (aspect)
DAT	dative
DPROX	proximal deictic
DIM	diminutive
ERG	ergative
EX	nominal suffix with past meaning, detached
FUT	future
INSTNR	intrumental nominalizer
LOC	locative
NMLZ	nominalizer
PERF	perfective
PL	plural
PNCT	punctual (aspect)
QUANT	quantity
REL	relational ('possession' suffixes)
TEMP	temporal
VBLZ	verbalizer