FILOMENA SANDALO
University of Campinas, Brazil

DIMITRIS MICHELIOUDAKIS
University of York, UK

CLASSIFIERS AND PLURALITY: EVIDENCE FROM A DEICTIC CLASSIFIER LANGUAGE

ABSTRACT: This paper investigates the semantic contribution of plural morphology and its interaction with classifiers in Kadiwéu. We show that Kadiwéu, a Waikurúan language spoken in South America, is a classifier language similar to Chinese but classifiers are an obligatory ingredient of all determiner-like elements, such as quantifiers, numerals, and wh-words for arguments. What all elements with classifiers have in common is that they contribute an atomized/individualized interpretation of the NP. Furthermore, this paper revisits the relationship between classifiers and number marking and challenges the common assumption that classifiers and plurals are mutually exclusive.

1. INTRODUCTION

This paper investigates the grammar and interpretation of classifiers and number in a so-called deictic classifier language. According to Aikhenvald (2000: 30), deictic classifiers are "associated with deictics and articles" but a more precise definition of deictic classifiers and deictic classifier languages is needed. We show that Kadiwéu, a Waikurúan

language spoken in the South of Brazil, is a generalised classifier language on a par with Chinese, with classifiers (CL) being an obligatory ingredient of all determiner-like elements, such as quantifiers, numerals, demonstratives, and wh-words for arguments. What all elements with classifiers have in common is that they contribute an atomized/individualized interpretation of the NP. So, in our view, deictic classifiers are instances of the same category as numeral classifiers, though in the case of Kadiwéu they occur as apparently bound morphemes, inside D elements.

Furthermore, this paper revisits the relationship between classifiers and number marking in the light of cases that challenge the common assumption that classifiers and plurals are mutually exclusive. Indeed, classifiers are commonly found in languages with no obligatory number marking. This has led linguists to believe that 'number and classifiers are in complementary distribution cross-linguistically' (Chierchia 1998), or even that classifiers and number may be two different realisations of/competing for the same semantic/syntactic position (Borer 2005; Krifka 1995). A partial challenge for such assumptions comes from Western Armenian, in which classifiers and plural marking coexist in the language, though they cannot co-occur (Bale & Khanjian 2008, 2014). This also seems to be the case in Halkomelem (Wiltschko 2008). Nevertheless, if Western Armenian and Halkomelem only pose a partial challenge, even more challenging is the situation in Kadiwéu, where classifiers are compatible with plural morphology. In what follows, the actual semantic contribution of plural morphology and its interaction with classifiers are investigated experimentally and a new generalization regarding the near-complementarity of plurals and classifiers (and its exceptions) is proposed, in terms of syntactic, rather than semantic, parameters.

2. METHODOLOGY OF DATA COLLECTION

The data presented in this paper come from two different sources. Most of the data in section 2 were collected via elicitation in collaboration with a fully bilingual speaker (Kadiwéu-Portuguese). The elicitation was conducted through Portuguese sentences in 2015 in the *Casa do Professor Visitante Hotel* at the University of Campinas. In 2016 one of

the authors contacted more speakers on a fieldwork trip to the Kadi-
wéu main village in Mato Grosso do Sul, Brazil. On this occasion, all
the sentences collected in 2015 were presented to two native speakers
of Kadiwéu who were asked to translate them into Portuguese. In this
way the authors could check if the judgments matched the ones from
the previous elicitation session. Some errors of interpretation were in-
deed reported and corrected. In the fieldwork trip, the consultants were
interviewed on different days and in different places and one was not
aware of the responses of the other speaker. This was done to avoid
any kind of interference in judgements.

In the elicitation done in 2015, the authors noticed that plural mor-
phemes were sometimes avoided but no complete description of the
facts could be achieved. In order to clarify the behavior of plural struc-
tures in Kadiwéu, during the fieldwork trip in 2016 experiments on
plurals guided by pictures were conducted and all the data in section
3 come from it. The pictures control distributive vs. collective read-
ings, and also homogeneity of objects, since the elicitation task in 2015
pointed to this direction as a way to understand plurality in Kadiwéu.
To this end, color, species and disposition of the objects were controlled
for. In total, 58 pictures were tested and the experiment was inspired
by Lima's (2014) and Sandalo et al.'s (in press) methodology. Pictures
showing contrasts were provided at the same time and the task was to
give the best plural form for each picture.

In addition, a questionnaire by Lima & Rothstein (2016) was em-
ployed during the 2016 field trip in the interviews with one of the con-
sultants, in order to tease apart measure and counting readings.

3.   THE KADIWÉU FACTS: NUMBER NEUTRALITY AND NUMERAL CLASSIFIERS

Kadiwéu is a Guaikurúan language spoken by about 1,500 Indians dis-
tributed over an area of 538,000 hectares in the South-west of Brazil.
The Waikurúan language family has two branches: (a) the Gaikurúan
Branch, which includes Mbayá and its descendant Kadiwéu; and (b)
the Southern Branch, which comprises three other languages: Toba,
Pilagá, Mocoví, spoken in Argentina, Paraguay, and Bolivia.

In this section we establish that Kadiwéu is a classifier language,

even though its classifiers are deictic rather than sortal. At the same
time, we show that plurals are in fact compatible with classifiers in
Kadiwéu.

In Kadiwéu, like in classifier languages such as Chinese and Western
Armenian, bare singulars are number neutral:

(1)   João yaa   apolikaGana-Ga.
         John 3-buy horse-*n*
         'John buys horse(s) (one or more).'

In the case of count nouns as in (1), a bare singular NP is interpreted
as a group of 1 or more representatives of the kind. Unexceptionally, a
bare singular mass noun is interpreted as an unspecified amount of a
substance (2).

(2)   João yaa   nynyoGo-di.
         Joh 3-buy water-*n*
         'John buys water.'

All nouns in Kadiwéu (except loan words) end in a morpheme that
we label n, following standard Distributed Morphology notation. This
morpheme is lexically chosen, roughly serving as a class marker, while it
functions as a paucal plural suffix in some of the other Guaikurúan lan-
guages, Mocovi for instance (Grondona 1998).[1] Inalienably possessed
noun roots must be directly preceded by a possessive agreement pre-
fix. Alienably possessed nouns are preceded by *n(i)-* and a possessive
agreement marker is still required.

All bare nouns can be pluralized in Kadiwéu. Bare lexical plurals can
denote pluralities of indefinite cardinality, certainly higher than 1. Such
plurals are arguably characterized by a [-] value for a semantic feature
such as [±SQA (Specified Quantity of A)] or complete lack of such a
feature. [±SQA] is defined by Verkuyl (1972, 1994) as follows: "to
denote a Specified Quantity of A is to denote a set whose members can
be counted given an omniscient entity doing the counting, or to denote
a bounded mass of A, where bounded is to mean 'having a value *m* as
the output of a measure function". More importantly, such pluralities
are normally understood as non-homogeneous sets, i.e. as comprising
entities that belong to the kind denoted by the root but, crucially, also
to several subtypes of it. As a result of this, speakers spontaneously

translate/paraphrase such plurals as "groups of *x*" (with such groups consisting of one or more representatives). Thus, taxonomic readings are also available when bare nouns are pluralized; example (3) can also be read as types of horses, while (4) can be read as types of a substance.[2] Otherwise, in order to denote completely homogeneous sets, the language may employ the competing pluralisation strategy to be elaborated below, namely a plural-like suffix on the classifier alone, on a par with mass nouns on the non-taxonomic reading (see (9b) and (10c) below).[3]

(3)   Count nouns:
       apolikaGanaGa-idi
       horse-*n*-pl
       'groups of horses/horses of different types'

(4)   Mass nouns:
       ninyoqotiidi
       ni-nyoGo-di-idi
       alienable-water-*n*-pl
       'water tanks/water of different types'

As shown in (2-3), the plural morpheme is not needed for kind readings of count nouns. A bare non-plural noun can refer to the kind on its own (5), while the bare lexical plural can have a taxonomic kind reading (see Pelletier 2009), see (6) whereby the speaker was asked to assert that not just one type of potato was imported to Europe.[4]

(5)   api-Go-je ane nadegitikogi Europa   (kind)
       potato-*n* REL 3pl-take-to   Europe
       Potato was taken/imported to Europe.

(6)   api-Go-je-li ane onadegitikogi Europa   (taxonomic)
       potato-*n*-pl REL 3pl-take-to   Europe
       Several kinds of potato were taken/imported to Europe.

Nouns in Kadiwéu can be atomized by means of deictic morphemes that Aikhenvald (2000) labels deictic classifiers (CL). Strings that contain CL are quite complex, containing slots for gender and number. These roots encode absence/presence and position (static/moving) or, equivalently, the speaker's visual/spatial perception of the denoted en-

tity (horizontally/vertically extended etc.). Such a system is rare in the world's languages, only to be found in other languages of the same family and, reportedly, also in the American Sign Language (ASL), see fn. 4. Absence is always marked by the root *ka*; when the object or person is present, however, the form varies according to position and/or type of movement. The deictic roots involved to form such strings are also used to form copulas and have cognates in all the Guaikurúan languages; (7) below lists the ones used in Kadiwéu:[5]

(7)   Kadiwéu deictic roots:

       -d:a- 'standing/vertically extended',
       -n:i- 'sitting/non-extended',
       -n:a- 'coming/approaching',
       -d:i- 'lying/horizontally extended',
       -jo- 'going away',
       -ka- 'absent/out of sight'

As for gender, the masculine prefix *i-* or the feminine prefix *a-* immediately precedes the deictic root and a plural morpheme, –*wa*, follows the root if plurality is involved. The typological literature reporting the existence of such classifiers (e.g. Aikhenvald 2000) is somewhat unclear as to what constitutes a classifier (is a string of the type described above a whole or part of it?) and what exactly their function/distribution is. In what follows, we show that Kadiwéu is a classifier language similar to conventional ones, i.e. numeral classifier languages such as Chinese. Furthermore, it is the deictic morpheme alone that functions as a classifier.

The first similarity between Chinese and Kadiwéu concerns the fact that bare nouns are normally interpreted as number neutral. As already said, in the case of count nouns, a bare singular NP is interpreted as a group (of one or more representatives of the kind), while a bare singular mass noun is interpreted as an unspecified amount of a substance. Furthermore, in Kadiwéu even bare plurals of count nouns are interpreted as denoting several groups rather than individuals. But once a classifier is present, not accompanied by a numeral, count nouns are seen as atoms in the singular (8); the availability and the interpretation of bare classifiers (i.e. classifiers not accompanied by numerals) is

a further similarity between Kadiwéu and Mandarin (see Cheng et al. 2012).

(8)   João yaa   i-**jo**   apolikaGana-Ga.
        John 3-buy masc-CL horse-*n*
        'John buys a/the horse.' (perceived as moving away from the speaker)

Unlike conventional classifier languages, Kadiwéu also features pluralised classifiers. Such classifiers, complemented by plural nouns, give rise to bounded plural readings (9), i.e. to denotations of pluralities with known/specified/measurable cardinality/[+SQA][6] and kind-level reference is no longer possible. Another possibility, whereby the plurality denoted would not consist of diverse types, is the [CL-wa N] construction (9b). In section 4 we elaborate further on all the possible sequences with plural/non-plural nouns and plural/non-plural classifiers.

(9)   a.   João yaa   i-**jo**-wa   apolikaGana-Ga-di.
            John 3-buy masc-CL-pl horse-*n*-pl
            'John buys horses/groups of different types of horses.' (perceived as moving away from the speaker)
     b.   i-**jo**-wa apolikaGana-Ga
            masc-CL-pl horse-*n*
            'a uniform set of horses'

Masses with a classifier are necessarily interpreted as packaged/coming in containers. When the classifier is singular (10a), the nominal denotes a unit or, equivalently, the content of one container. Pluralised classifiers followed by plural mass nouns denote more than one container/unit (10b). A pluralised classifier followed by a non-plural mass noun seems to directly denote the (typically, sizeable) volume of the substance contained in a container (10c). A 'CL (mass) N' sequence and a 'CL-wa (mass) N-pl' may even be used to denote the same physical entity, yet there is an important difference of perspective. A 'CL N' string is strictly understood as one unit, roughly like the singular of a count noun, with no interest in the internal structure/consistency of that unit (see (35) below for a diagnostic distinguishing between the two perpectives). In all three cases, the quantity denoted is bounded

and understood as measurable, i.e. [+SQA].

(10)   a.   i-**d:i**   ninyoGo-di
            masc-CL water-**n**
            'A/the (unit of) water' (in a horizontally extended container/layer/vessel)
     b.   i-**d:i**-wa   nynioqo-ti-idi
            masc-CL-pl water-**n**-pl
            'water tanks/units of types of water' (packaged/in several horizontally extended containers/layers/vessels)
     c.   nG-i-di-wa   ninyoGo-di
            Dem-masc-CL-pl water-**n**
            'a (big) amount of water (in a horizontally extended container/layer/vessel)'

Following standard assumptions in both the typological literature as well as theoretical works such as Chierchia (1998), the core defining property of a generalised/grammaticalised classifier, i.e. the minimum that all generalised classifier languages share, is the obligatory presence of classifiers with numerals. In Kadiwéu, cardinal numerals come in two varieties, (i) those formed with native roots (typically the ones meaning '1', '2', '3' and their derivatives), and (ii) numerals borrowed from Portuguese. Native numerals in Kadiwéu always have the so-called deictic classifiers as part of their morphological structure (11, 12).

(11)   *i-**n:i**-wa-tale*   *Gonele:gi-wa-di*
        masc-CL-pl-two man-*n*-pl
        'two men'

(12)   *i-**n:i**-wa-tadiGini Gonele:gi-wa-di*
        masc-CL-pl-three man-*n*-pl
        'three men'

With loan numerals, however, e.g. goatolo 'four', CL can sometimes be omitted, but this is crucially restricted by the precise interpretation of the "numeral+NP" construction. Applying a questionnaire by Lima & Rothstein (2016), a clear contrast was noticed between measure and counting readings. In a measuring situation, the presence of the classifier is always obligatory and, in fact, with native numerals a second

classifier is obligatorily present, in addition to the one in the morphological structure of the numeral:

(13)   Ejime idiwa itoataale galaapa waka lotiidi katinedi bacia.
         eji-me i-di-wa   i-di-wa-taale galaapa waka l-otii-di
         I-say   masc-**CL**-pl masc-**Cl**-pl-2 botle   cow   3-milk-n
         ka-tinedi bacia
         CL-inside bowl
         'I estimate/there are two bottles of cow milk inside a bowl.'

In counting readings, instead, there can be only one classifier (the one that co-occurs with the numeral), i.e. the presence of a second classifier is ungrammatical:

(14)   Maria yipeqe itoataale galaapa niyoGodi madi nameeja.
         Maria y-ipeqen i-**di**-wa-taale galaapa nyyoGo-di me-a-di
         Maria 3-put   masc-**CL**-2   bottle   water-n   C-CL
         nameeja
         table
         'Mary put two bottles of water on the table.'

This restriction is categorical in Kadiwéu for its native numerals ('1', '2' and '3', and their derivatives) which are still in use in the language. All other numerals are loanwords from Portuguese, which do not have a classifier as an indispensable part of their morphology. Nevertheless, even with such numerals the presence of a classifier is obligatory for measure readings (15). Interestingly, the measure word itself is optional, i.e. the (obligatory) classifier already means 'unit(s) of' and optional words such as 'bag' further specify the nature of the unit. In other words, with loan numerals, classifiers are obligatory when giving an estimate of the units of the substance denoted by the noun, and optional otherwise, i.e. when counting (see also below for the measuring/counting distinction). For instance, in (15), the intended reading is not to count containers, namely bags; what matters is to provide an estimate of the amount of oranges. Once the intended reading is a counting one, however, classifiers can be omitted (16), although they are more often present than not.

(15)   – What is the amount of oranges?
         – Eji-me *(i-**di**-wa)   goatolo (jako) lalaanja katined bacia
          1-say   masc-**CL**-pl four   bag   orange inside   bowl
          'I estimate four bags of oranges inside a bowl.'

(16)   Maria yipeqe goatolo galaapa niyoGodi madi   nameeja.
         Maria 3-put   four   bottle   water   on+CL table
         'Mary put four bottles of water on the table.'

(17) below summarises the ways numerals combine with classifiers, abstracting away from gender and plural morphemes:

(17)

	Counting	Measuring
Native numerals	(*CL) *(CL)-Numeral NP	*(CL) *(CL)-Numeral NP
Loan numerals	(CL) Numeral NP	*(CL) Numeral NP

Note that the noun is not pluralized when a measure reading is intended, in which case the denoted entities are understood as one sole group (see further discussion of plurals in section 3).

Furthermore, CLs are an obligatory ingredient of most determiner-like elements, i.e. not only numerals, but also most quantifiers (18-20), demonstratives (21), and wh-words for arguments (22). Note that, though apparently extending beyond simple co-occurrence with numerals, this distribution is in fact strikingly similar to and largely overlapping with the one of classifiers in Chinese (Cheng et al. 2012). In Chinese too, though not in Japanese and Korean, classifiers are obligatory with demonstratives and certain quantifiers, such as *every*. What all elements that are accompanied by classifiers have in common is that they contribute an atomized/individualized interpretation of the NP. It is in this sense that the deictic classifiers of Kadiwéu and the sortal classifiers of Chinese belong together, i.e. they are both instantiations of the broader category 'numeral classifiers', even though superficially, i.e. morphologically and prosodically, classifiers and determiner-like elements form one phonological word in Kadiwéu but not in Chinese.[7]

(18)   on-i-**n:i**-te-ki-beke   Gonel:egiwa
         one-masc-CL-3AGR-applicative-separately man
         'Every man (sitting)'

(19)   yi-wilegi i-**d:i**-wa-taweke   domo:jya-(tedi)
         3-wash   masc-locative-pl-collective car-*n*-(pl)

'He washed the whole car/all the cars.'

(20) aG-i-**ka**   Gonele:gi-wa
      neg-masc-CL man-*n*
      'No man'[8]

(21) Joao dawi nG-i-**jo**   negediogo
      John 3-buy DEM-masc-CL jaguar
      'John buys this (going) jaguar.' (pointing at it or already men-
      tioned in a text)

(22) ame-i-**n:i**   i-**ka**   João
      interrogative-masc-CL masc-CL João
      'Which (sitting and absent) John?'

Recall also that Kadiwéu classifiers resemble the Chinese ones, but not
the Japanese and Korean ones, in that they can occur bare and cancel
the intrinsic number neutrality of non-plural nouns, cf. (23):

(23) a. apolikaGana-Ga
          horse-*n*
          'horse' or 'horses'
      b. i-jo   apolikaGana-Ga
          masc-CL horse-*n*
          'a/the horse'

    Another piece of evidence for a necessarily atomized interpretation
of nouns when they co-occur with classifiers comes from the fact that
the verb cannot be pluralized if there is a singular/non-plural classifier.
As said above, a bare noun can co-occur with a verb with plural inflec-
tion (24a). However, a singular classifier cannot co-occur with a verb
with plural marking (24b-c).

(24) a. apolikaGana-Ga (o)-yeligo i-ni   manga
          horse-*n*   PL-eat   masc-CL mango
          'A going horse/horses eat a mango.'
      b. i-**jo**   apolikana-Ga yeligo i-ni   manga
          masc-CL horse-*n*   3-eat masc-CL mango
      c. *i-**jo**   apolikana-Ga o-yeligo i-ni   manga
          masc-CL horse-*n*   3PL-eat masc-CL mango

As shown above, classifiers and plural markers do co-occur in Kadi-
wéu but there is no such thing as obligatory concord/agreement for
number within the DP in Kadiwéu, i.e. one plural marker does not
make another plural marker obligatory. Therefore, one can observe a
free presence or absence of plural markers in the examples below. Each
example, however, involves specific interpretive effects, which are dis-
cussed in detail in the next section.

(25) a. i-**d:i**-wa   ligede:ma-Ga
          masc-**CL**-pl frog-*n*
      b. i-**d:i**-wa   ligede:ma-Ga-di
          masc-**CL**-pl frog-*n*-pl
      c. i-**d:i**   ligede:ma-Ga-di
          masc-**CL** frog-*n*-pl
          'frogs'

To sum up, Kadiwéu has two plural morphemes: (i) one invariant at-
taching to CL, -*wa*, which may co-occur with the lexical plural or not,
and (ii) a variable lexical plural that may co-occur with CL-wa or not.
So, there are four kinds of plural construction: [CL-wa N], [CL-wa N-
pl], [CL N-pl] and [N-pl] for count and mass nouns. In the following
section we will further elaborate on their interpretation and their syn-
tactic differences.

4. THE GRAMMAR AND INTERPRETATION OF PLURALS IN KADIWÉU

In order to understand plurality in Kadiwéu, we conducted sentence
elicitation experiments using pictures as stimuli. The figures were pre-
sented in pairs, aiming to capture potential interpretive contrasts. The
consultants were asked whether a singular or a plural form is compati-
ble with each picture, since translation tasks lead informants to report
a great deal of optionality of the kind seen in (26).

    Based on the speakers' intuitions regarding the importance of group-
ing, (non-) homogeneity and boundedness, we used pictures of indi-
viduals and objects potentially capturing the relevant distinctions. In
figure I below, frogs were reported to be perceived as one homogeneous
group. Regarding the notion of 'group', Chierchia's (1998:63) attempt
at a more precise definition seems suitable: "The minute we conceive

of a plurality "together", we can think of it as a group. [. . .] [G]roups are more "concrete" than sets and must formally play the role of atoms [. . .] groups are singularities". Instead, Figure II depicts a non-uniform set of frogs. In such a picture, frogs are not perceived as one group, but rather potentially subject to different groupings, therefore perceived as 'many groups'. In other words, Figure II combines non-singularity of groups/groupings and non-uniformity in their internal structure. Finally, Figure III depicts a scenario which is rare in real life, namely a set of entities which are non-uniform, yet clearly visually perceived as a group.

Figure 1

Figure 2

Figure 3

Our consultants judged the DP in (26) as the only possibility for the description of Figure I:

(26)   niGidiwa   ligedema-Ga (o)-nikoteloko libaGa-di
         DEM-masc-CL-pl frog-*n*   pl-3-sit-on   3-hand-*n*
         'These frogs sit on his hand.'

The non-plural noun is obligatory in this context as well as the plural *–wa* on CL. *LigedemaGa* 'frog' is a feminine noun in Kadiwéu, but all nouns take masculine classifiers when pluralized. Such plurals syntactically behave like collective nouns in English, as they can control either singular or plural agreement on the verb. This is also in accordance with Chierchia's view of groups/collections as *quasi* singularities.

     This plural construction denotes a group or a collection of identical units. The plural *–wa* contributes to a bounded reading of the units inside the group. Finally, as Chierchia (1998:63) notes, "for some pluralities x, there is going to be a grouping criterion P that determines a function gP, such that gP(x) is a group". CL, i.e. the piece of deictic information encoded by CL, appears to provide exactly the grouping criterion needed, in the same way that measure words or words like 'a group/team/bunch of' do.

On a strictly singular interpretation of *l-amodi* 'leaf', the scenario described in Figure II corresponds to what one would call a distributive interpretation. Nevertheless, the use of lexical plurals in both examples does not guarantee a distributive reading, since lexical plurals are also produced to describe pictures where a property is collectively predicated of diverse plural subjects. For instance, many diverse frogs or monkeys sitting on one and the same leaf or branch can be described by a [CL-wa N-pl] sequence. The interesting question would be whether or not [CL-wa N] plurals can be excluded from apparent cases of distributive interpretations, e.g. if [CL-wa N] could be used to describe frogs in a state of affairs such as the one in Figure II, the difference being that they would have to be depicted as identical, in order to form a uniform group. This possibility is indeed attested in the speakers' reactions to Figure IV, as can be noted in (29a), which can be uttered alongside (29b).[9] So, the constructions in question do not straightforwardly correspond to distributive vs collective interpretations.

For Figure II, more than one option is available:

(27)   ligedeema-qa-tedi onikoteloko niale l-amo-di
        frog-*n*-pl   pl-3-sit-on   tree 3-hair-*n*
        'Frogs sit on a leaf' (=hair of tree)

(28)   nG-i-di-wa   lidegema-qa-tedi onikoteloko niale l-amodi
        DEM-masc-CL-pl frog-*n*-PL   3PL-sit-on   tree 3-hair-*n*
        'These frogs sit on a leaf (=hair of tree)'

Of the two types of answer, (27) is preferred and seems to mean that the number of frogs is unbounded, potentially higher than the number of frogs we can see in the picture. In (28), the number is understood as bounded.

Figure 4

(29)   a.   nGidiwa   eGia-di   nibi-we
              DEM-masc-CL-pl monkey-*n* branch-*n*
        b.   nGidiwa   eGia-te-di   nibi-we
              DEM-masc-*PL* monkey-*n*-*PL* branch-*n*
              'The monkeys have/are on a branch.'

Note, incidentally, that Figure IV is the equivalent of Figure I in terms of homogeneity of the entities depicted (colour-wise and shape-wise), while their spatial distribution is roughly identical to the one of entities in Figure II. The [CL-wa N] construction is deemed appropriate for Figure IV too, showing that what matters is homogeneity rather than distribution in space.

Figure III, finally, is described by the following sentence, which is characterised by the absence of *-wa*:

(30)   nG-i-di   ligedemaqatedi onikoteloko ninyoGodi
        DEM-masc-CL frog-*n*-*PL*   pl-3-sit-on   water-*n*
        'These frogs sit on water.'

The presence of the lexical plural signals the non-homogeneity of the depicted set, which is in fact perceived as comprising more sets. The classifier here again serves as the rough equivalent of a measure word, i.e. provides a grouping criterion (the deictic information).

To avoid potential confounds related to the role of different variables beyond homogeneity and boundedness, we have further employed pictures that involve different species, colors, and spatial dispositions. Homogeneity of species was always proven to be crucial for the choice of [CL-pl N-sg] structures. Spatial properties are important for the

choice of classifier (e.g. going, coming, etc.) but not for plurality. So, if a group of animals/plants of the same species is presented to our speakers, they produce the plural construction [CL-pl N-sg] (31). If this is not the case, the plural construction produced is [Cl-sg N-pl] (32):
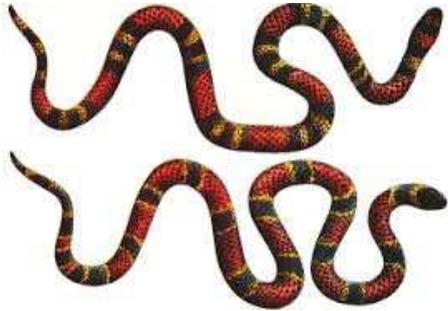

Figure 5

(31)   idiwa   laqeedi
         masc-CL snake-n
         'the snakes'

Figure 6

(32)   idi   laqeetedi
         masc-CL snake-n-pl
         'the snakes'

The pictures below show bigger animals. Notice, as mentioned above, that the position of the object is important for the choice of the classifier. Homogeneity, on the other hand, is important for the choice of plural morphology.

Figure 7

(33)   inowa waka
         i-na-wa   waka
         masc-CL-pl cow
         'the cows coming'

Figure 8

(34)   ijowa waka
         i-jo-wa   waka
         masc-CL-pl cow
         'the cows going'

Figure 9

(35) ina   waka-li
   masc-CL cow-pl
   'the cows coming'

Nominal phrases with a [CL N-pl] sequence, such as the ones in (30), (32) and (35), containing words for animals, are often used in every-day speech as swearwords, since groups/collections of different species of animals are perceived as unnatural. Nevertheless, humans (and perhaps also other primates) are perceived as diverse by default, so the use of a 'CL N-pl' sequence to denote a unique group of humans is considered natural, cf. Figure X, XI, and XII.[10]

Figure 10

(36) niG-i-di   nigaa-nigi-pawaa-nigi
   DEM-masc-CL child-DIM-PL-DIM
   'These little children (lying down)'

Figure 11

(37) nGidi   iwaa-l(o)-epodi
   DEM-masc-CL woman-*n*-PL
   'this group of women'

In plural forms, the default classifier -di- is used if the elements are not in the same position. Also, in plural forms, the gender prefix is always masculine.

Figure 12

(38)   nG-i-di   Goneleegiwa-di
        DEM-masc-CL man-n-*PL*
        'these men'

In the case of [-human] nouns, instead, including but not limited to animals, groups/collections typically consist of similar members, hence the preference for 'CL-*wa* N' sequences, cf. (39) and (40) for Figures XIII and XIV respectively.

Figure 13

(39)   nG-i-di-wa   diwelekoGo-ni
        DEM-masc-CL-pl wolf-n
        'these wolves'

Figure 14

(40)   nG-i-di-wa   emokaya
        DEM-mas-pl bocaiuva
        'these bocaiuvas'

4.1. Measuring and counting perspective

Sentences with container phrases are reported to be ambiguous between counting and measuring interpretations (cf. Rothstein 2011). So, if a nominal like *two bags of apples* can even refer to apples outside bags, the use of a container word constitutes a measurement (in terms of bags). Instead, if one refers to three bags containing apples on a table, this constitutes a counting (individuation) interpretation. As mentioned above, sentences that involve both measure and counting readings in Kadiwéu were collected by means of the questionnaire in Lima & Rothstein (2016) during the field trip of 2016 to the Kadiwéu village. The questionnaire was applied to one informant who is completely bilingual and who has been working with one of the authors for more than 20 years. One of the authors of this paper asked the consultant to translate sentences and the consultant himself used relevant materials to explain differences that are very salient in the language regarding measure and counting. In Kadiwéu, disambiguation is quite simple as already shown: Kadiwéu does not have native measure words like bags, bottles, etc. Such words are all recent loanwords from Portuguese, if used at all. Thus measure words such as *galaapa* (bottle) or *lapo* (group) are optional. Instead, as we have seen, for both mass and count nouns, classifiers are obligatory in measure readings, even with loan numerals.

Figure XV is an example of the materials used to illustrate measuring readings, whereby the content can be judged to correspond to two units (amounts corresponding to a bottle, cf. (41)), even though there is only one container (one bowl).

Figure 15

(41) nG-i-**di**-wa   i-di-wa-taale (galaapa) ninyoGodi katiwedi
      DEM-masc-**CL**-pl masc-**CL**-pl-2 (bottle) water   inside
      bacia
      bowl
      'There is two (standing/vertically extended) units of water in-
      side the bowl.'

As mentioned before, a classifier is obligatory in cases of measuring, even if there is already another classifier that comes with the numeral as in (42). Note also that the head noun (actually all nouns in the NP) is singular, like in familiar measuring constructions, e.g. 'two bottles of wine(*s)', with the additional classifier probably playing the role of the measure word.

   To have a counting reading one sole classifier appears, the one that occurs as part of the numeral, and the noun can be pluralized (though not obligatorily; the lexical plural is obligatory if denoting different types of water).

Figure 16

(42) Maria yipeke itoataale (galaapa) ninyoGoti(idi) madi nameeja
      Maria put two units of water/types of water (standing/vertically
      extended) on the table.'

Furthermore, our consultant has shown to the investigator the differ-
ence regarding the usage of quantifiers if one has a measure or a count-

ing reading. The language has two different quantifiers *owiidi* 'many' and *eliodi* 'much', and they are used in comparative sentences if the morpheme bVG- is added (see example 44 below). If one is counting the containers, *owiidi* must be used. So, if one is shown the pictures below and gets asked *'which picture has the most amount of cereal?'*, there are always two possible answers: (43a), if the speaker focuses on volume, and (43b), if the speaker focuses on the number of containers/units.

(a)   (b)

Figure 17

(43) a. (a) *beGeliodi leyeema*
          (a) more   cereal/wheat
          '(a) has more cereal'
      b. (b) *boGowiidi leyeema*
          (b) more   cereal/wheat
          '(b) has more cereal') if quantity of containers is consid-
          ered.

Crucially, if a speaker is asked to provide a nominal expression appropri-
ate for Figure XVII(a), referring to the volume contained, (44a) appears to be an appropriate utterance. Instead, if they focus on counting rather than volume, the nominal expression is *idiwa leyemadi* [CL-pl N-pl]. The nominal expression (44b) is not an option, despite (44b) otherwise being perfectly grammatical, e.g. when referring to a group formed by different types of wheat. This difference in perspective (measuring vs. counting) is exactly what differentiates [CL-wa N] from [CL-wa N-pl].

(44) a. i-di-wa   leyema
          masc-CL-pl cereal/wheat

b. i-di   leyema
    masc-CL cereal/wheat

All in all, the lexical 'plural' suffix is a low, NP-level, projection which encodes a multitude of sets, necessarily diverse (otherwise there would be just one set). Importantly, the notion 'set' employed here also includes singletons. Furthermore, this marker is not specified for [±SQA], hence it is compatible with potentially unbounded pluralities. On the other hand, *-wa* is meant to encode a unique, bounded [i.e. necessarily [+SQA]) non-singleton set/group, with CL providing a grouping criterion, when used with count nouns. With mass nouns, *-wa* indicates a non-trivial amount/volume of the denoted substance. A uniform treatment of the semantics of *-wa* seems reasonable but goes beyond the purposes of this paper. Even diverse pluralities created by the lexical plural can be turned into one bounded superset, if they share the deictic information encoded by CL. This is how [CL-*wa* [N-pl]] sequences are generated. CL-*wa* is also compatible with uniform but not intrinsically bounded sets, which is exactly the denotation of bare nouns as we have seen. This gives rise to [CL-wa [N]] sequences, with a bounded interpretation. When CL selects a bare N, it gives rise to a bounded non-group reading, i.e. a singularity (3, 19). In every case, CL cancels the intrinsic non-atomicity of bare nouns in Kadiwéu and superimposes the notion of 'a set of' on whatever it selects (from a necessarily singleton set/unit interpretation in the case of 'CL N' to a 'set of sets' interpretation in the case of 'CL-wa N-pl').

These two types of plural are both such that classifiers are either compatible (in the case of lexical plurals) or even necessary (in the case of –*wa*). Lexical plurals on the one hand are not bounded and are compatible with kind level reference, i.e. they are arguably of type <e> and can thus be selected by CL. Classifier-level –*wa* plurals, on the other hand, are not additive plurals of the sort familiar from e.g. European languages, which are globally incompatible with grammaticalised classifiers (Chierchia 1998). Instead, they are necessarily [+SQA] and thus they arguably select atomised NPs only, i.e. they require the presence of a classifier. The picture that emerges from these generalisations is that classifiers are always incompatible with D-level plurals, but possible in languages with NP-level and classifier-level plurals. In what follows, we provide a syntactic account of how these combinations (and the correct

	Count nouns	Mass nouns
Bare N	uniform set, number-neutral (1 or more), not bounded / kind	An unspecified uniform amount of a substance, not bounded / kind
Bare N-pl	diverse sets, necessarily plural, not bounded / taxonomic	Diverse amounts of a substance / taxonomic
CL N	Singular (singleton set)	A unit of a substance (packaged, 'counting' perspective)
CL-wa	N Uniform non-singleton set, bounded, [+SQA]	The volume of a unit of a substance ('measuring' perspective)
CL N-pl	Set of diverse sets, presumably not bounded	Not elicited, presumably a set/unit containing diverse types of a substance[11]
CL-wa N-pl	Set of diverse sets, bounded, [+SQA]	Set of units/packages of diverse types, [+SQA]

Table 1: Nouns, plurals and classifiers: forms and meanings

order for each) are derived and why numerals require (but follow) *pluralised* classifiers, i.e. CL-wa.

5. A PARTIAL STRUCTURAL ANALYSIS OF THE DP IN KADIWÉU

Like in all generalised/grammaticalised classifier languages, cardinal numeral adjectives cannot select bare nouns, given their semantics. Instead, numerals select nominal projections interpreted as atoms and, as we have seen, this is the interpretation of [CL N] constituents:

(45) $[_{CardP} F_{Card}^0 [_{MeasP} CL/Meas^0 [NP]]]$ (cf. also Rothstein 2011).

Classifiers are base-generated in the same position as measure words, i.e. they directly select NP. When such elements are grammaticalised, they are attracted by a higher functional dedicated projection. When functioning as such, classifiers necessarily precede all adjectives (see Cinque 2006), as is indeed the case in Kadiwéu:

(46) $[_{ClassP} CL^0\text{-}F_{Class}^0 [_{CardP} F_{Card}^0 [_{MeasP} <CL^0> [NP]]]]$

Note that this movement of CL^0 across the numeral does not violate the Head Movement Constraint: numeral adjectives are APs in the specifier of F_{Card}^0, therefore head adjunction to them is impossible.

We further postulate that numerals require bounded readings and, as such, need to match a [+SQA] feature. As we have seen, F_{Card}^0, when hosting a numeral higher than 'one', can be followed by two types of complement: either [CL^0 [bare NP]] or [CL^0 [N-pl]]. Recall, however, that the latter is not specified (positively or at all) for [±SQA]. The former is indeed bounded, but necessarily singular. This makes it an unsuitable complement for a cardinal numeral, unlike in Chinese, presumably because the existence of plural morphemes in the language gives rise to a blocking effect that renders [CL N] constituents incompatible with number-neutral/non-singular readings. As discussed in the previous section, a type of plural which is indeed specified as [+SQA] is the one formed with *–wa*. Merger of the Num^0 head which is realized as *–wa*, right above CLP, seems to resolve the problem: CL^0 undergoes head-movement to this low Num^0 and checks the necessary features in a head-head configuration. After these features are checked and made present/copied in the low copy of CL^0 as well, the selectional requirements of cardinals are satisfied:

(47) $[_{NumP}$ CL^0-*wa* $[_{ClassP}$ $<CL^0>$ $[_{CardP}$ AP_{Card} $[_{MeasP}$ $<CL^0>$ [NP]]]]].

As for the gender prefix, we can presumably hypothesize that gender is an nP-level head, which adjoins to the immediately higher head, namely CL^0, and then moves further as part of the complex head:

(48) $[_{NumP}$ Gender-CL^0-*wa* $[_{ClassP}$ $<$Gender-$CL^0>$ $[_{CardP}$ AP_{Card} $[_{MeasP}$ $<$Gender-$CL^0>$ [nP $<$Gender$>$ [NP]]]]].

The representation in (48) derives exactly the order observed in all the examples with numerals presented above, cf. (49), among many others, repeated below:

(49)   i-ko-wa   itoataale oqo
        masc-CL-pl two   people
        'two people'

In languages with plural morphology, measure words/classifiers typically follow cardinal numerals, preceding adjectives. If we are right in assuming that, in such constructions, classifiers occupy a high functional projection, then the fact that numerals precede classifiers means that numerals are attracted to the position where Number is grammaticalised (presumably D, cf. Longobardi 2008). In Kadiwéu, low placement of cardinals is exactly the result of the absence of high, D-level, Number. Recall that generalized/grammaticalised classifiers were postulated to be possible only in languages with low plurals or no plurals at all. Bale & Khanjian (2008) identify a type of low plural which is semantically incompatible with measure words, and therefore classifiers. Among other properties, plurals can be selected by a measure word if they are compatible with kind-level reference. Thus, e.g. English plurals can be complements of measure words, but Western Armenian ones cannot. Therefore, such an analysis yields an obvious typological gap, namely languages with generalized/grammaticalised classifiers and English-style, yet low, plurals. Kadiwéu seems to be such a language: lexical plurals are indeed compatible with kind-level reference (9) (though taxonomic only), while ClassP-level plurals in fact require CL as a grouping criterion.

Finally, further evidence for a Num^0 projection lower than D comes from the placement of *–wa* and D relative to Dem^0. Elements which unambiguously occupy D crosslinguistically are personal pronouns (following Longobardi (2008), D minimally grammaticalises $Person^0$). Personal pronouns can combine with Dem^0, realised by the morpheme *–nG(a)* to form reflexives and intensifiers. The same morpheme combines with Gender-CL-*(wa)* sequences to form demonstratives encoding [+proximity]. In the former case, Dem^0 always follows D, indicating that no head movement takes place in this case, while Dem^0 always precedes Gender-CL-*(wa)*.[12]

(50)   a.   eem:Ga
              eem-nGa (underlying representation)
              1SG-Dem
              'myself'
        b.   nG-i-di-wa
              Dem-i-CL-pl
              'these' (horizontally extended)

These ordering facts point towards the following partial representation of the DP in Kadiwéu:

(51) $[_{DP}$ Person^0 $[_{DemP}$ –$nG(a)$ $[_{Num P}$ Gender-CL-Num^0 $[_{CLP}$ <Gender-CL> …

As for the low, nP-level, attachment of the plural suffix attaching to noun stems, a piece of evidence already mentioned is that these suffixes vary to such a degree that they must be lexically, hence locally, determined. Further compelling evidence comes from the lack of any concord DP-internally. Attributive adjectives never agree for number with pluralised head nouns (43a-b). Adjectives are not intrinsically incompatible with plural morphology, as they can take a plural suffix in predicative position (52c). In languages where number features spread to attributive adjectives too, we can assume that they are in fact spread from D to all [+N] projections c-commanded by D. The absence of concord DP-internally speaks in favor of a low Number projection at the nP-level. Agreement at the clausal level is presumably the result of Agree established by clausal agreement projections probing into the DP.

(52)   a.   ele   Gonelegi-wa
               good man-*n*
         b.   ele   (*-tibigiwaji) Gonelegi-wa-di
               good pl   man-*n*-pl
         c.   Goneleegi-wa-di me   ele-tibigiwaji
               Men-*n*-pl   REL good-pl
               'men (who are) good'

6. REVISITING CHIERCHIA'S (1998) PARAMETRISATION: TOWARDS A SYNTACTIC SOLUTION

Given the above, it is obvious that Kadiwéu poses a major challenge for theories analysing plurality and classifiers as complementary, such as Chierchia's semantic parametrisation. In what follows, we explain how exactly the facts presented are problematic for Chierchia's theory. We also argue that a modification of a basic intuition of his theory is typologically correct and explain how it can be maintained through a syntactic, rather than semantic, parametrisation of denotation and number.

Chierchia's (1998) Nominal Mapping Parameter is essentially a parameter asking if a language can have count nouns or not. The actual parametric options proposed by Chierchia concern the potential interpretation(s) of nouns, i.e. whether nouns can denote kinds (as e.g. in Mandarin), properties (like in French), or both (like in English). Since plural morphology denotes an operation mapping singular count predicates onto plural predicates, it follows that it cannot apply to a kind-denoting term. Therefore, in a language in which all nouns denote kinds, and there are no predicate denoting nouns, there can be no regular plural morphology, i.e. there will be no count nouns. So, the part of Chierchia's parametric proposal that concerns the unavailability of count nouns is just the question whether nouns can ever denote properties, i.e. whether nouns can ever be of type <e,t> in a given language, as only nouns of type <e,t> can be count nouns.[13] A negative value for such a parameter seems to correlate with the following properties (Chierchia 1998:92):

(53)   no <e,t> denoting nouns (hence no count nouns):

         (i)   Absence of regular plural morphology
         (ii)   A generalised classifier system ("grammaticalised classifiers", in the sense of Longobardi ((submitted))
         (iii) The availability of bare arguments in all argument positions and, even, "the tendential absence of definite and indefinite articles" (ibid.).

So, as far as the correlation between number morphology and classifiers is concerned, only two types of language are predicted: [-PL, +CL] languages (e.g. Mandarin/Cantonese) and [+PL, -CL] languages (e.g. French/English). However, in fact, all four possible combinations are cross-linguistically attested. Yudja (Tupi) appears to lack obligatory number marking and classifiers.[14] Likewise, classifiers and plurals have been reported to co-exist in languages such as Western Armenian (Bale & Khanjian 2008, 2014), Hungarian (Schvarcz & Rothstein to appear) and, crucially, Kadiwéu.
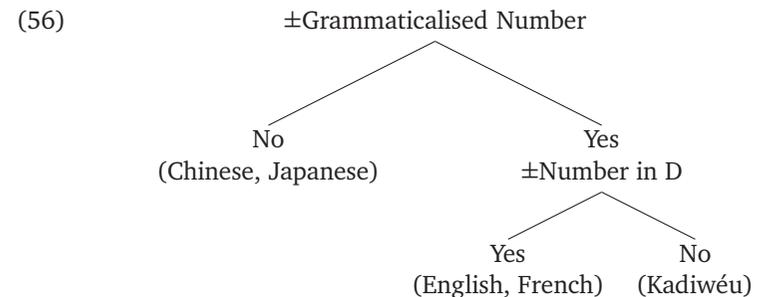
Nevertheless, the tendency of generalised/grammaticalised classifier languages to lack number morphology is too robust to be ignored.

Even though Yudja and, reportedly, some Sino-Tibetan languages seem to make a bi-conditional generalization untenable, a closer look at the structural and interpretive properties of plurals in Kadiwéu and Western Armenian lead us to a new one-way implication linking grammaticalised classifiers to the syntax of Number features. More concretely, we propose that grammaticalised classifiers are possible in a language only when Number is not realised in the D position. Equivalently, D with interpretable [Number] (in the sense of Longobardi 2008) never selects CL. Not all types of plural occur or are spread from the D position and, crucially, not the plurals of languages that happen to have generalised classifiers. Therefore, classifiers are in principle possible in a language with *low* plurals, such as the ones identified in Kadiwéu. As for Western Armenian, the plural morphology on nouns can also be shown to be an instance of non-D-level Number. The definite article in Western Armenian is suffixed, but the plural morpheme appears internally, between the stem and the definiteness morpheme. Crucially, the definiteness morpheme itself does not vary according to number (45). If agglutinative morphology is generally governed by the Mirror Principle (Baker 1985), it follows that the [Number] feature is not realised in D but is grammaticalised in a lower head. In languages with familiar number systems and suffixed articles, e.g. Romanian, plural morphology appears marked on the definite morpheme. In such cases, it is plausible to assume that the definite suffix is merged first, followed by number (possibly in/spread from D), followed by movement of everything into D (46a); in Western Armenian instead, Number^0 is between the noun and the merge position of definiteness, lower than D (46b).

(54)   a.   shenk-er
              building-pl
              'buildings'
        b.   shenk-er-e
              building-pl-def
              'the buildings'

(55)   a. $[_{DP}$ D^0 [+Number] $[_{DefP}$ Def^0 $[_{nP}$ N-n]]] → N-n-Def-(D^0)
              . . .
        b. $[_{DP}$ D^0 [DefP Def0 $[_{NumP}$Num^0 $[_{nP}$ N-n]]]] → N-n-Num-Def^0. . .

The resulting space of variation then seems to be regulated by syntactic rather than semantic parameters. A major parametric division is the one that distinguishes between "languages in which Number distinctions are obligatory at least on some part of a DP" and "those which, though exhibiting lexical expressions for 'one', 'few', 'many', numerals etc., do not mark any of these distinctions systematically on DPs" (Longobardi et al. 2013:4 (Appendix)). In the former languages number features are grammaticalised, while in the latter languages number features, if existent at all, are not grammatical/formal features entering grammatical relationships, e.g. with positions where number is not interpreted. A further parameter would then divide languages with a positive value for Longobardi et al.'s (2013) [±grammaticalised Number] parameter into (a) languages where Number is high, probably interpreted in D and spread from that position to nouns, adjectives etc., and (b) languages in which Number is low. Languages with low Number may call for further parametrisation of the exact positions available, e.g. (i) completely lexical (NP-level) Number, (ii) Number originating in a position related to the classifier system (cf. also Borer 2005; Alexiadou 2016) etc. Kadiwéu was shown to instantiate both (i) and (ii). The broader distinction between (a) and (b) language would amount to postulating a [±Number in D] parameter. As said, such a parameter is only relevant in [+Grammaticalised Number] languages, which suggests that the two parameters are part of a parameter hierarchy in the sense of Roberts (2012):

(56)   ±Grammaticalised Number

                No   Yes
        (Chinese, Japanese)   ±Number in D

                                    Yes   No
                            (English, French)   (Kadiwéu)

Equivalently, using Longobardi & Guardiano's notation, the two interacting parameters can be represented as follows:

Then, knowing the values of [±Gramm. Number] and [±Number in

	Acronym	Conditions on activation	English	Chinese	Kadiwéu	Yudja
±Gramm. Number	FGN		+	–	+	–
±Number in D	FND	+FGN	+	0	–	0

Table 2: A syntactic parametrisation of Number

D], one can ask if a language grammaticalises classifiers. The generalisation would be that the question is only relevant in languages lacking a positive value for [±Number in D], i.e. either [-Number in D] languages or [-Gramm. Number] languages. Following Longobardi & Guardiano's (2009) notation, if a parametric question does not even emerge, no value can be assigned for that parameter (such a state of affairs is represented with a 0 in their system). Thus, [-Grammaticalised Number] languages would be [0 Number in D]. Following this same notation, and given our assumption above that [+Number in D] excludes classifiers, [+Number in D] languages are automatically [0 Grammaticalised Classifier] languages, i.e. languages in which acquirers of languages such as English or Russian are never faced with a question regarding the obligatoriness of classifiers in certain contexts. Instead, [¬+Number in D] languages, i.e. [-Number in D] languages and [0 Number in D] (equivalently, [-Grammaticalised Number]) languages, can in principle have classifiers as a means of atomising nouns, which are all kind-denoting in such languages, following Krifka (1995) and Chierchia (1998).

Languages such as Chinese (which is a [-Grammaticalised Number, 0Number in D] language) choose to grammaticalise ("generalise" in Chierchia's terms) classifiers, i.e. make them obligatory in a number of contexts to be discussed below, while Yudja does not. Much of the empirical part of the paper was devoted to showing that Kadiwéu, a [+Grammaticalised Number, -Number in D] language indeed has a system of elements with a distribution largely overlapping that of Chinese numeral classifiers (possibly identical in all relevant respects), even though the Kadiwéu classifiers are of a different type, i.e. deictic elements rather than names of units, and of different (possibly non-nominal) etymology.

Table 3 below summarises the parametrisation assumed:

	Acronym	Conditions on activation	English	Chinese	Kadiwéu	Yudja
±Gramm. Number	FGN		+	–	+	–
±Number in D	FND	+FGN	+	0	–	0
±Gramm. Classifiers	FGC	¬+FND	0	+	+	-

Table 3: Number and Classifiers (adapted from Longobardi et al.'s (in prep) Table A)

Recall that Kadiwéu classifiers are to be paralleled mainly with the Chinese ones, rather than classifiers of the Japanese/Korean type. Both Kadiwéu and Chinese lack morphological case on nouns, as opposed to Japanese/Korean. In languages without case, it appears that classifiers have a wider use. Among other properties, classifiers disambiguate in contexts which are non-definite but also incompatible with (semantic) incorporation, while in languages which exhibit number-neutrality of non-plural forms but which also have case, the presence of case seems to be enough to mark atomicity/non-incorporated readings (cf. Japanese/Korean, see Longobardi et al. in prep). In other words, all classifier languages obligatorily employ classifiers with numerals, but only languages without case employ them more widely, as a generalised atomisation strategy. Languages with a [-Number in D] parameter setting are automatically predicted to have number-neutral non-plural nouns. In the absence of case ([-Morphological Case]), they are also predicted to need an overt marker every time (semantic) incorporation is not available, i.e. a bounded interpretation is forced and not otherwise obtained (e.g. through definiteness). Such a case is the obligatory use of an element meaning 'one' for indefinite non-plural count complements of a telic predicate. In [+Gramm. Classifiers] languages, this role can be taken up by classifiers (48), even without the actual numeral meaning 'one' (as in Mandarin, see Cheng et al. 2012).

(57)   Context: "In the end of the semester you won't have to sit an exam as usual; instead, by Monday of Week 10, you will have to…"
seho   *(yat pin) lunman   (Cantonese)
Write-COMPLETIVE one   CL   essay
(K. Tse, p.c.)

While derived from [-Number in D] and [-Morphological Case] in Chinese, this behaviour of nouns is parametrically available also in [+Number in D] languages.[15] The relevant parameter is Longobardi et al.'s (2009) [±Grammaticalised Boundedness]: "[i]n languages with [-Grammaticalised Boundedness] bare count singulars, wherever grammatical, are also bounded, i.e. do not have a Number-neutral reading, but denote just one entity. Instead, in languages in which boundedness is grammaticalized (+CGB), bare singular count nouns, when not understood as definite, normally have unbounded denotation; thus, in order to get a bounded denotation, an overt determiner is required systematically: the numeral for 'one' is normally used in these cases and must not be confused with a true indefinite article". So, for instance, Hindi employs *ek* 'one' in the relevant contexts, while Chinese employs classifiers, and Mandarin in particular can use even bare classifiers (Cheng et al. 2012, though see Li & Bisang 2012 for discussion of variation in the use and interpretation of bare classifiers in different Sinitic languages). Kadiwéu is also [-Number in D] and [-Morphological Case], like Chinese, so it is predicted to have the same type of number-neutrality and a similar wide distribution of classifiers.

Table 4 below summarises the discussion of number-neutrality and (un)boundedness sketched above. Note that [0 Gramm. Boundedness] means that the language has all the properties of a [+] value, as described above, especially number-neutrality of bare, non-plural, nouns, but that these properties are independently derived by the absence of Number in D.

	Acronym	Conditions on activation	English	Hindi	Kadiwéu	Chinese	Japanese/Korean
±Number in D	FND	+FGN	+	+	-	0	0
±Gramm.Boundedness, +FND	CGB	+FND	-	+	0	0	0
±Gramm.Classifiers, ¬+FND	FGC	¬+FND	0	0	+	+	+
±Morphological Case	FGM		+	+	-	-	+

Table 4: Number-neutrality and marking of boundedness (adapted from Longobardi et al.'s (in prep) Table A)

7. FINAL REMARKS

To conclude, we have shown that Kadiwéu is a language that has grammaticalised/generalised classifiers on a par with languages with sortal numeral classifiers and no morphological case, like Chinese. We have also established that it features two kinds of plural morpheme, each with its own semantics. None of them occurs in D however. Thus, we can maintain the generalisation that only languages without Number in D can feature generalised/grammaticalised classifiers. In section 6 we elaborated the implications of this typological picture for the parameterisation of number and related features.

Each one of the possible ways that classifiers cluster with the two types of plural available was analysed as involving a different semantics. [CL N] turns an unbounded set of one or more representatives of a kind (for counts) or an unbounded amount of a substance (for masses) into an atom, i.e. is unambiguously interpreted as singular. A [CL-pl N] sequence denotes a uniform and bounded group of atomised representatives of a kind, either countable entities (e.g. frogs of the same type) or units of a mass. [CL N-pl] instead means a not necessarily bounded plurality consisting of different types (e.g. a group of different types of frogs). And [Cl-pl N-pl] is a bounded collection/group of potentially diverse sets. Moreover, we have given an analysis of classifiers on a par with classifiers deriving from measure elements (Cinque (2006) and Rothstein (2011)). Finally, we have provided evidence for a Num^0 projection lower than D at the ClassP-level, while we have also shown that the plural suffix on nouns is lexically determined (different morphemes

for different nouns), i.e. nP-internal, since it fails to control agreement within the DP.

Notes

[1]The data below is from Mocovi (Grondona 1998). Compare the word sholder/back in Kadiwéu [-elaGa] 'shoulder', [-elaqatedi] 'shoulders'. The paucal morpheme of Mocovi is a cognate morpheme occurring in all forms, singular and plural, in Kadiwéu. The plural morpheme causes devoicing of the last consonant of the stem if this consonant is a stop in Kadiwéu.

Nouns with paucal -o

Singular	Paucal	Gloss
-aλak	-aλak-o	˙shoulder, back˙
mañik	mañik-o	˙rhea˙
napagɢak	napagɢak-o	˙bridge˙
pyoɢ	pyoɢ-o	˙dog˙

[2]It might be reasonable to consider the preferred reading of (4) (namely, 'weirs') as an instance of what some authors call 'abundance plurality' (cf. Wiltschko 2008 for Halkomelem, Tsoulas 2006 and Alexiadou 2011 for Greek). However, our informants typically reject such readings for other bare (i.e. non-classifier) lexical plurals.

[3]A bare pluralized mass noun was pointed out to be compatible with abundance plural in a first elicitation of 2015 with one sole speaker. In the translation task in 2016, the two informants said that this is not the case. Note that in example 4 the translation is types of waters or weirs. One can have an abundance plural with a pluralized classifier

and a singular noun. This kind of structure will be discussed in section 3.

[4]All the contrasts in meaning (like in example 6) were explained in Portuguese by the consultant who has been working with one of the authors for 23 years.

[5]ASL has deictic morphemes, though they are verbal agreement markers, not classifiers.

[6]As for plurals, the root –di- is used as default, that is, regardless of the position and of the presence/absence of the object being referred to. This is used because the position of individuals may vary within a group. The default –di- is also used for the plural form if the noun is feminine. The masculine gender i- is obligatory for all plurals.

[7]Kadiwéu has different quantifiers for 'many' (owiidi) and 'much' (eliodi) and they don't need to occur with classifiers.

[8]The classifier form here must be -ka- since the man is obviously absent (no man).

[9]A sentence with a pluralized bare noun is also available for an unbounded reading: eGiatedi nibewedi.

[10]The plural marker –wa, when used to humans in a singular form, can be used to mean 'Kadiwéu nationality' or 'pertaining to the Kadiwéus' (e.g. ad:iwa iwal:o 'that Kadiwéu woman sitting' vs. ad:i iwal:o 'that woman sitting'). It is a majestic plural, with the exception of oqo 'people', see discussion below.

[11]The interpretation mentioned is a working hypothesis based on the parallelism holding in general between similar constructions with mass and count nouns; further tests need to be conducted to elicit this reading.

[12]The adjacency of two nasal consonants in Kadiwéu leads to a geminate nasal consonant. Note also that nasal consonants are deleted in Kadiwéu in word-final position. So the first person pronoun eem is realized as ee phonetically if nG is not attached. Also, the underlying form of nG is actually nGa and a vowel is deleted before another vowel in Kadiwéu, and, therefore, it surfaces as nG before the gender morpheme that comes with the classifiers.

[13]As correctly pointed out by an anonymous reviewer, the entailment does not hold in the other direction, since nouns of type <e,t> can also be mass nouns (as e.g. in French). So, in principle, there could be a hypothetical language where all nouns denote <e,t> but are mass nouns. A parametric setting entailing the absence of property denoting nouns necessarily entails the absence of count nouns, though in this system there is no single parametric setting necessarily predicting the availability of count nouns.

[14]Fargetti (2001) and Lima (2012, 2014) report that there is a plural morpheme in Yudja but that it is restricted to human nouns (Lima 2014).

[15]The discussion in this paragraph is based on on-going work with the LanGeLin (Language and Gene Lineages) research team at the University of York (PI: Giuseppe Longobardi).

References

Aikhenvald, A. 2000. *Classifiers*. Oxford: Oxford University Press.

Alexiadou, A. 2011. 'Plural mass nouns and the morpho-syntax of number'. In M. B. Washburn, K. McKinney-Bock, E. Varis, A. Sawyer & B. Tomaszewicz (eds.) 'Proceedings of WCCFL 28', 33–41. Somervill, MA: Cascadilla Press.

——. 2016. 'Some puzzles about number'. Paper presented at Syntax and Semantics of the Nominal Domain, University of Frankfurt, 4 February 2016.

Baker, Mark. 1985. 'The mirror principle and morphosyntactic explanation'. *Linguistic Inquiry* 16: 373–415.

Bale, A. & Khanjian, H. 2008. *Classifiers and Number Marking*. Semantics and Linguistics Theory.

——. 2014. 'Syntactic complexity and competition: the singular-plural distinction in Western Armenian'. *Linguistic Inquiry* 45, no. 1: 1–26.

Borer, Hagit. 2005. *Structuring Sense, Vol I: In Name Only*. Oxford: Oxford University Press.

Cheng, L. L., Doetjes, J. S., Sybesma, R. P. E. & Zamparelli, R. 2012. 'On the interpretation of number and classifiers'. *Italian Journal of Linguistics* 24, no. 20.

Chierchia, G. 1998. 'Plurality of mass nouns and the notion of "semantic parameter"'. In 'Events and Grammar', 53–103. Springer Netherlands.

Cinque, G. 2006. 'Are all languages 'Numeral Classifier Languages'?' *Rivista di Grammatica Generativa* 31: 119–122.

Fargetti, C. 2001. *Estudo fonológico e morfossintático da língua Juruna*. Ph.D. thesis, Unicamp.

Grondona, V. 1998. *A Grammar of Mocovi*. Ph.D. thesis, University of Pittsburgh.

Krifka, M. 1995. 'Common Nouns: A Contrastive Analysis of Chinese and English'. In Gregory N. Carlson & Francis Jeffry Pelletier (eds.) 'The Generic Book', 398–411. Chicago: University of Chicago Press.

Li, X. & Bisang, W. 2012. 'Classifiers in Sinitic languages: From individuation to definiteness-marking'. *Lingua* 122, no. 4: 335–355.

Lima, S. 2014. *The grammar of individuation and counting*. Ph.D. thesis, UMass.

Lima, S. & Rothstein, S. 2016. 'The count/mass distinction questionnaire'. University of Toronto & Bar-Ilan University, Ms.

Lima, Suzi. 2012. 'Numerals and the universal packager in Yudja (tupi)'. In 'SULA 6: Proceedings of the Sixth Conference on the Semantics of Under-represented Languages in the Americas and SULA-Bar', 81–104.

Longobardi, G. 2008. 'Reference to individuals, person, and the variety of mapping parameters'. In Alex Klinge & Henrik Hoeg Muller (eds.) 'Essays on nominal determination: From morphology to discourse management', 189–211. Amsterdam: John Benjamins.

Longobardi, G. & Guardiano, C. 2009. 'Evidence for syntax as a signal of historical relatedness'. *Lingua* 119, no. 11: 1679–1706.

Longobardi, G., Guardiano, C., Silvestri, G., Boattini, A. & Ceolin, A. 2013. 'Toward a syntactic phylogeny of modern Indo-European languages'. *Journal of Historical Linguistics* 3, no. 1: 122–152.

Longobardi, G. et al. (submitted). 'Who likes to travel alone? Languages and genes in the history and geography of Eurasian migrations'.

Roberts, I. 2012. *On the nature of syntactic parameters: a programme for research*. Parameter theory and linguistic change.

Rothstein, S. 2011. 'Counting, measuring, and the semantics of classifiers'. *The Baltic International Journal of Cognition, Logic, and Communication* 6: 1–42.

Sandalo, F., Rodrigues, C., Roeper, T., Amaral, L., Maia, M. & Silva, G. in press. 'A Pilot Study on Pirahã Prepositional Phrases'. In Luiz Amaral, Marcus Maia, Andrew Nevins & Tom Roeper (eds.) 'Recursion across Domains', Cambridge University Press.

Schvarcz, B. & Rothstein, S. to appear. 'Hungarian classifier constructions and the mass/count distinction'. In 'Approaches to Hungarian: Volume 15', Amsterdam: John Benjamins.

Tsoulas, G. 2006. 'Plurality of mass nouns and the grammar of Number'. Paper presented at the 29th GLOW colloquium in Barcelona.

Verkuyl, H. 1994. 'Distributivity and collectivity: a couple at odds'. In Makoto Kanazawa & Christopher J. Piñón (eds.) 'Dynamics, Polarity and Quantification', 49–80. Center for the Study of Language (CSLI).

Verkuyl, H. J. 1972. 'On the Compositional Nature of the Aspects'. In 'Foundations of Language, Supplementary Series, Vol. 15', D. Reidel, Dordrecht.

Wiltschko, M. 2008. 'The syntax of non-inflectional plural marking'. *Natural Language & Linguistic Theory* 26, no. 3: 639–694.