Two Types of Classifier Languages: A Typological Study of Classification Markers in Paiwan Noun Phrases[*]

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Recently many claims have been made concerning the contrasts in the occurrence of classifiers in the presence of numerals with nouns as well as the nonoccurrence of plural morphology in the presence of classifiers with nouns between languages like Chinese and those like English. This paper examines some relevant analyses such as Cheng & Sybesma (1999), Li (1999), and Chierchia (1998) in view of the morphological, syntactic, and semantic behavior of numerals in languages like Paiwan. Our findings in Paiwan, together with those in other Formosan and Tibeto-Burman languages, indicate that these accounts are all problematic in that they cannot capture the cross-linguistic distribution of numerals with classifiers, plural morphology, and nouns. For a more plausible approach, it is suggested that, in addition to the cross-linguistic variations in the morphological, syntactic, and semantic structures of numerals, classifiers, and plural morphology, so-called classifier languages should be further distinguished as poor- or rich-classifier languages.

Key words: numerals, classifiers, plural morphology, count nouns, mass nouns, typology, Paiwan, Formosan languages, Chinese languages, Tibeto-Burman languages, English

1. Introduction

So-called classifiers have been found with various kinds of syntactic categories (e.g., Senft 2000 and Aikhenvald 2000, among others). For example, with respect to predicates, as shown in (1a-d), Tang (2002a) indicates that in Paiwan causative constructions *ø-*, *ka-*, and *pe-* may be used to classify predicates by means of features like [+/−dynamic], [+/−private], etc.

Paiwan (Tang 2002a)

(1) a.   t-em-aLem/pa-ø-taLem
           plant-AF   CAUS-plant[1]
     b.   ø-tengelay/pa-ka-tengelay
           AF-like   CAUS-KA-like
     c.   ø-'apedang/pa-pe-'apedang
           AF-salty   CAUS-PE-salty
     d.   ø-'aca/ pa-pe-'aca
           AF-tall CAUS-PE-tall

In addition, Tang (2002a) claims that Paiwan focus markers like *-em-*, on the one hand, and *ø-*, *ma-*, *me-*, on the other, may be distinguished by features like [+/−dynamic], [+/−transitive], [+/−volitional], etc. (Cf. Huang's (2000) [α dynamic] analysis of focus markers such as *m-*, *-um-*, *ma-*, *ø-* in Mayrinax Atayal.)

With respect to nominalization, as given in (2a-b), Tang (2002a) posits that in Paiwan affixes like *k-in-a-…-an* and *-an* are found with two distinct types of nominalizations in terms of the feature [+/−vision], in which *ka-* and *ø-* may be treated as some kind of classifiers.

Paiwan (Tang 2002a)

(2) a.   (*k-in-a-)'apedang-an
           K-IN-A-salty-AN
           'saltness'
     b.   *(k-in-a-)kuDemeL-an
           K-IN-A-thick-AN
           'thickness'

Note here that a feature analysis of various kinds of classifiers in Paiwan enables us to capture the observation that in Paiwan while predicates like *'apedang* 'salty' in (1c, 2a)

[1] The following abbreviations are used in this paper: ACC: Accusative; AF: Agent Focus; AV: Agent Voice; CAUS: Causative; CL: Classifier; GEN: Genitive; NOM: Nominative; OBL: Oblique; PERF: Perfective; PF: Patient Focus; PL/pl: Plural; REAL: Realis; RED: Reduplication.

as well as those like *'ac*a 'tall' in (1d) and *kuDemeL* 'thick' in (2b) may undergo the same kind of causative operation, they differ in the formation of nominalization.

Based on Paiwan and other Formosan languages, as well as in comparison with Chinese, English, Tibeto-Burman languages, etc., this paper examines the morphological, syntactic, and semantic behavior of noun-class markers in Paiwan and cross-linguistically. The issues under investigation include the typology and structure of classifiers, the selectional restriction between classifiers and nouns, the cooccurrence restriction between classifiers and plural morphology, the distinction between classifiers and so-called measure words, etc.

As pointed out in Tang (2001a, 2001c, 2002b, 2002c, 2003), taking into consideration the above-mentioned and other facts, certain relevant claims in Cheng & Sybesma (1998, 1999), Li (1999), Chierchia (1998), and Kurafuji (2002) all seem to be problematic. That is, their analyses fail syntactically and semantically to capture the cross-linguistic behavior of classifiers as well as the relationship between classifiers and plural morphology.

2. Classifier languages vs. non-classifier languages

It has been suggested that languages like English are so-called non-classifier languages, whereas those like Chinese are so-called classifier languages. According to Chierchia (1998), for instance, one of the differences between these two types of languages is that, while English has count and mass nouns, all Chinese nouns are mass nouns. (Cf. Cheng & Sybesma 1998, Li 1999, Tang 2001a, 2002b, 2003 and the discussion in section 3, among others.) Other relevant claims: the postulation in Li (1999) that in classifier languages classifiers must be used when numbers combine with nouns; and the proposal in Chierchia (1998) and Cheng & Sybesma (1999) that mass-noun languages do not have number/plural morphology. (Cf. Li 1999.)[2]

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[2] By contrast, Li (1999) claims that classifier languages have plural morphemes like Chinese *-men*, whereas non-classifier languages have plural morphemes like English *-s*. And the difference in distribution between these two types of plural morphemes has been argued to result from the fact that classifier languages project a Classifier Phrase, while non-classifier languages do not. See also the discussion in §3.

It should be pointed out here that while there remains the question of whether Mandarin Chinese *-men* should be treated as plural morphology, such a marker does not appear in every Chinese dialect. In Southern Min, for instance, the plural marker *-n*, which cooccurs with plural human pronouns, does not appear with human nouns to denote plurality. The same may be said about Hakka *-tio* cooccurring with plural human pronouns.

With respect to the relationship between classifiers and plural morphology, Doetjes (1996) and Cheng & Sybesma (1999) propose, "In order for count nouns to be able to be counted, the semantic partitioning of what they denote must be made syntactically visible. In languages like English, number morphology is the grammatical marker, whereas in languages like Chinese, which lack number morphology, the grammatical marker is the classifier."

For languages like Chinese, though Cheng & Sybesma (1998) and Tang (2001a, 2002b, 2003) argue that the syntactic difference between mass nouns and count nouns may still be observed in Chinese, they differ in many important aspects. One point is whether cross-linguistically count nouns need to cooccur with either overt classifiers or overt plural morphology in order to be countable. Section 3 below will show how the analyses of Cheng & Sybesma (1999) and of Li (1999) are problematic with respect to languages like Paiwan.

3. Count nouns vs. classifiers/plural morphology

As illustrated in (3a-d) below, Tang et al. (1998), and Tang (2001a, 2001c, 2002c) observe that in Paiwan, when cooccurring with human count nouns, numerals must be prefixed by *ma-* or *mane-*, the former of which is marked with the feature [+human, < 5] and the latter of which is marked with the feature [+human, > 4].

Paiwan (Tang 2001c)
(3) a. *(ma-)/*mane-cidil a kakeDian   (Tang et al. 1998)
         MA- MANE-one   A child
         'one child'
     b. *(ma-)/*mane-sepat a kakeDian
         MA- MANE-four A child
         'four children'
     c. *(mane-)/*ma-Lima a kakeDian
         MANE- MA-five   A child
         'five children'
     d. *(mane-)/*ma-tapuLu a kakeDian
         MANE MA-ten   A child
         'ten children'

The same contrast, however, does not hold for Paiwan cases like (4a-c), with non-human count nouns, animate or inanimate.[3]

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[3] Tang (1993, 1996) points out that in Chinese the numeral-classifier sequence and the noun may bear a head-complement relation, as in (ia), a modifier-modifiee relation, as in (ib) and an argument-predicate relation, as in (ic), only the last of which is subject to a subject-object asymmetry.

    Mandarin Chinese (Tang 1993, 1996)

(i) a. ta mai-le [shi-zhi bi].
          he buy-LE ten-CL pen
          'He bought ten pens.'

      b. ta mai-le [shi-bang-de   rou].
          he buy-LE ten-pound-DE meat
          'He bought ten pounds of meat.'

      c. ta xuyao [bi] [shi-zhi].
          he need   pen   ten-CL
          'He needs ten pens.'

In Paiwan, as discussed in Tang et al. (1998) and Tang (2001b), numeral expressions may also bear various kinds of relation with nouns.

    Paiwan

(ii) a. na-v-en-eLi   ti   kai   tu   [telu a   kun]. (Tang et al. 1998)
           PERF-buy-AF NOM Kai ACC   three A   skirt
           'Kai bought three skirts.'

      b. *na-v-en-eLi   [tu   telu] ti   kai [a   kun].
           PERF-buy-AF ACC three NOM Kai A   skirt

(iii) a. na-v-en-eLi   ti   kai   tua [kun] tu [telu]. (Tang et al. 1998)
           PERF-buy-AF NOM Kai ACC skirt ACC three
           'Kai bought three skirts.'

      b. na-v-en-eLi   [tua kun] ti   kai [tu   telu].
           PERF-buy-AF ACC skirt NOM Kai ACC three
           'Kai bought three skirts.'

(iv) a. v-in-eLi ni   kai a   [telu a kun].   (Tang 2001b)
           buy-PF GEN Kai NOM   three A skirt
           'Kai bought three skirts.'

      b. *v-in-eLi ni   kai a   [kun] tu   [telu].
           buy-PF GEN Kai NOM skirt ACC   three

Note also that in Chinese overt classifiers must occur in the presence of numerals with nouns regardless of which relation they bear with one another.

    Mandarin Chinese

(v) a. ta mai-le [shi*(-zhi) bi].
          he buy-LE ten-CL   pen
          'He bought ten pens.'

Paiwan (Tang et al. 1998, Tang 2001b)

(4) a.   (*ma-)ita   a   vatu/kun
           MA-one A dog skirt
           'one dog/skirt'

     b.   (*ma-)sepat   A   vatu/kun
           MA-four   A   dog skirt
           'four dogs/skirts'

     c.   (*mane-)Lima   a   vatu/kun
           MANE-five   A   dog skirt
           'five dogs/skirts'

Moreover, as given in (3b-d) and (4b-c), in Paiwan there appears no overt plural morphology for such count nouns, and overt classifiers are not required for non-human plural nouns, as summarized in (5).[4]

Paiwan (Tang 2001c)

(5) a.   It has [+human] classifiers like *ma-* and *mane-*.
     b.   It does not have overt plural markers like English *-s* or Chinese *-men*.

Examples of this kind, hence, are problematic for Cheng & Sybesma (1999), who claim that count nouns can be counted only with the presence of syntactically visible markers like plural morphology or classifiers. There appear at least two empirical problems in view of languages like Paiwan. For one thing, while Paiwan may be considered as a kind of (numeral) classifier language, the relevant feature is [+/−human] only, as opposed to other classifier languages like Chinese. In addition, overt classifiers are not found with

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     b. ta mai-le [shi*(-bang)-de rou].
         he buy-LE ten-pound-DE   meat
         'He bought ten pounds of meat.'
     c. ta xuyao [bi] [shi*(-zhi)].
         he need   pen ten-CL
         'He needs ten pens.'
  By contrast, as shown in Paiwan examples like (3)-(4) and (ii)-(iv), only human nouns appear with classifiers.

[4] The affix *ma-* cannot be analyzed as plural morphology in Paiwan, for it also occurs with *-cidil* 'one'. By comparison, one might claim that in Paiwan *mane-* is a plural marker rather than a classifier, since it does not appear with singular nouns. Taking into consideration all the relevant facts in Paiwan and other Formosan languages, we shall still treat it as classifier. Note that *mane-* may also be pronounced as *man-* and Paiwan has the [+human] *ma-pida* 'how many' and the [−human] *pida* 'how many', but not the [+human] *man(e)-pida*.

non-human count nouns in Paiwan.[5] For another, while Paiwan behaves like Chinese with respect to the obligatory presence of [+human] classifiers, it does not have plural morphemes like Chinese -*men* or English -*s*. Therefore, (syntactic) plural morphology is not observed in Paiwan.[6]

As pointed out in footnote 2, Li (1999) attributes cooccurrence restrictions between classifiers and plural morphemes, as in Chinese (6) and English (7) below, to proposals as in (8).

Mandarin Chinese

(6) a. (*yi-ge)   xuesheng-men
        one-CL   student-MEN
        'students'

    b. (*san-ge) xuesheng-men
        three-CL student-MEN
        'students'

English

(7) a. one student(*-s)
    b. three student*(-s)

Mandarin -*men* vs. English -*s* (Li 1999)

(8) a. The singular/plural distinction is marked in Number.
    b. Mandarin -*men* is a plural morpheme realized on an element in Determiner.
    c. English -*s* is a plural morpheme realized in N.

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[5] In other words, in Paiwan human count nouns behave like nouns in Chinese, whereas non-human count nouns act like count nouns in English.

[6] Recall that Chinese has been argued to have no tense morphology. This, however, does not mean that there is no time interpretation in Chinese. In (i) below, as pointed out in Tang (2001c), aspectual markers like *le*, temporal expressions like *mingtian* and negators like *bu* may all contribute to the interpretation of time in Chinese.

Mandarin Chinese (Tang 2001c)

(i) a. ta da-le   Lisi.
       he hit-LE Lisi
       'He hit Lisi.'

    b. ta mingtian   bu   qu.
       he tomorrow   not go
       'He will not go tomorrow.'

Similarly, the absence of overt plural morphology in languages like Paiwan does not prevent them from getting the interpretation of plurality.

d. *san ge xuesheng* 'three students':

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                    DP
                  /    \
                 D      NumP
                      /     \
                    san     Num'
                          /      \
                        Num      CIP
                         |      /    \
                         PL    CL     NP
                               |      |
                               ge    xuesheng
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e. *three students*:

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              NumP
            /      \
         three     Num'
                 /      \
               Num      NP
                |        |
                PL     student
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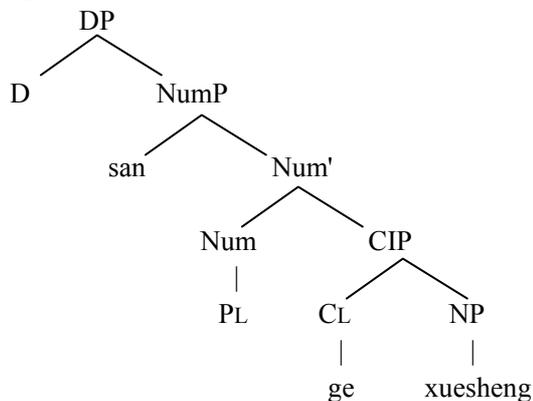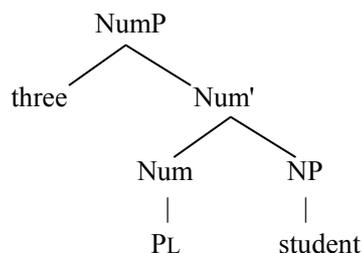
According to Li's analyses in (8), classifier languages like Chinese and non-classifier languages like English differ in two important aspects. One distinction is that only classifier languages have the projection of Classifier (CL), and the other one is that they differ in the realization of plural morphemes. These two conditions, coupled with conditions on N(oun)-movement, enable Li to capture the grammaticality contrast between Chinese (6) and English (7). In examining her postulations against languages like Paiwan, it is found that her typological claim about the relationship between classifiers and plural morphemes seems to be too strong. That is, Paiwan does not belong to either type, since in classifier languages like Paiwan classifiers are not visible when numbers combine with non-human nouns. (See also footnote 5.)

It should be pointed out here that Paiwan, nevertheless, does have plural human nouns. Consider, for instance, (9) to be compared with (10).

Paiwan (Tang 2001c)
(9) a. ma-cidil a   vavayan /*vavayavayan
        MA-one A   girl   girl:RED
        'one girl'

b. ma-dusa a vavayan/*vavayavayan
    MA-two A girl   girl:RED
    'two girls'

c. ma-telu   a *vavayan/vavayavayan
    MA-three A girl   girl:RED
    'three girls'

(10) a. aicu a vavayan/*vavayavayan
        this A girl   girl:RED
        'this girl'

b. aicu a mareka a *vavayan/vavayavayan
    this A some   A girl   girl:RED
    'these girls'

Cases like (9a-c) and (10a-b) indicate that in Paiwan non-reduplicated human nouns like *vavayan* 'girl(s)' are unmarked with the feature [+/−plural], whereas the reduplicated ones like *vavayavayan* 'girls' are marked with the feature [+plural]. In addition, while both *vavayan* and *vavayavayan* may be used as plural nouns, it seems that the latter denotes a larger amount in number.

As further shown in (11)-(13) below, as opposed to (9)-(10) above, in Paiwan marking of plurality by means of reduplication seems to be limited to human nouns only, though not all human nouns may have this option.[7]

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[7] See also Tang et al. (1998) for a discussion of the denotation of plurality by *a*-affixation in Paiwan, as given in (i) below.

Paiwan (Tang et al. 1998)

(i) a. timadu
        '(s)he'

b. tiamadu
    'they'

Zeitoun (2001) points out that, in addition to *a*-affixation, *la*- in Paiwan may also act as plural marker.

Paiwan (Zeitoun 2001)

(ii) a. kina
        'mother/aunt'

b. la-kina
    'mothers and aunts'

Such plural nouns, however, cannot appear with numerals.

Paiwan (Tang 2001c)

(iii) a. (*ma-telu   a) la-'unu
         MA-three A LA-boy

Paiwan (Tang 2001c)
(11) a.   u'alay
          boy
          'boy (s)'
     b.   u'ala'alay
          boy:RED
          'boys'
(12) a. *kakeDikeDian
          child:RED
     b. *vatuvatu
          dog:RED
(13) a.   aicu a kakeDian/vatu
          this A child   dog
          'this child/dog'
     b.   aicu a mareka a kakeDian/vatu
          this A some   A child   dog
          'these children/dogs'

Thus, based on the above-mentioned facts that Paiwan does not have syntactically productive plural morphemes like English -*s* or Chinese -*men*, that marking of plurality by reduplication is very restrictive in Paiwan and that, as illustrated in (14a), *cidil* in *ma-cidil* 'one' cannot be used alone, Tang (2001c, 2002c) posits (15)-(16) and suggests that in Paiwan both affixation of classifiers to numerals and plural morphology by reduplication seem to apply at lexicon.[8]

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       b. (ma-telu   a) 'a'unu-an
           MA-three   A   boy:RED-AN
           'three boys'

A third instance that may denote some sort of plurality in Paiwan is *mareka* as in (10b) and (13b). See Tang (2002c) for a discussion of the morphological, syntactic, and semantic behavior of *mareka*.

[8] Another piece of evidence for an analysis along this line of thought is that, as discussed in Tang et al. (1998), plurality by *a*-affixation in Paiwan does not seem to apply at syntax, either. Note that while our analysis of classifiers in Paiwan does not thus far require us to take a lexical approach to the merge of *ma-*/*mane-* and the number, the same option does not seem to hold for Li (1999), given the fact that, unlike Chinese, in Paiwan cases like (9b, c) classifiers may and must appear with plural nouns.

Paiwan (Tang 2001c)

(14) a. ma-cidil/*ma-ita/   *cidil
         MA-one MA-one   one
         'one'

     b. ita/*cidil   a   vatu/kun
         one one   A   dog skirt
         'one dog/skirt'

     c. ma-sepat/sepat
         MA-four four
         'four'

(15) a. [+human]: kakeDian
     b. [−human]: vatu, kun
     c. [α plural]: kakeDian, vatu, kun[9]
     d. [+plural, > 2]: vavayavayan, u'ala'alay
     e. [α plural, < 3]: vavayan, u'alay

(16) a. [+human, < 5]: ma-
     b. [+human, > 4]: mane-
     c. [−human]: ø-

Before turning to the discussion of measure words in Paiwan, more needs to be said about the typology of classifiers cross-linguistically. So far it has been shown in the paper that languages like Paiwan raise problems for analyses such as Cheng &

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[9] In view of (15) and (16), it should be clear by now that the countability or plural interpretation of nouns in Paiwan is not determined solely by overt classifiers or plural morphemes. Similarly, Formosan languages like Bunun also distinguish [+human] and [−human] numerals, the former of which undergo *Ca*-reduplication and the latter of which do not. And, as shown in (i) and (ii) below, no plural morphology is observed.

Bunun (Zeitoun 2000)
(i) a. ta-tasa'   tu   'uvaz
         RED-one   TU   child
         'one child'

     b. pa-pitu'   tu   'uvaz
         RED-seven TU   child
         'seven children'

(ii) a. tasa' tu   patasan
         one TU book
         'one book'

     b. pitu' tu   patasan
         seven TU book
         'seven books'

Sybesma (1999) and Li (1999), in that, while they may be treated as a kind of classifier language in the sense of Aikhenvald (2000) as in (17b) and Senft (2000) as in (18a), their non-human count nouns do not appear with overt classifiers.

Aikhenvald (2000)
(17) Numeral classifiers are
     a. classifiers that are independent lexemes, or
     b. classifiers that are attached to numerals, or
     c. classifiers that are attached to the head noun.

Senft (2000)
(18) a. Sortal classifiers individuate whatever they refer to in terms of the kinds of entity that they are.
     b. Mensural classifiers individuate in terms of quantity.

Are there other types of Formosan languages that may also raise problems for the two approaches under discussion? The answer seems to be positive. As pointed out in Tang (2001c), unlike Paiwan, in which classifiers are required with human count nouns, in Squliq Atayal (Taoshan), for example, classifiers are absent with count nouns, human or non-human.

Squliq Atayal (Taoshan) (Yayut Isaw, personal communication, 2001)
(19) a. qutux laqi'/ cyugal laqi'
        one   child three   child
        'one child/three children'
     b. qutux xuzil/cyugal xuzil
        one   dog three   dog
        'one dog/three dogs'

Similar observations are also found in Seediq.

Seediq (Chang 2000)
(19) c. kingan seediq /teru   seediq
        one   person three person
        'one person/three persons'
     d. kingan huling/teru   huling
        one   dog   three dog
        'one dog/three dogs'

By contrast, as opposed to Paiwan, Squliq Atayal, and Seediq, Kavalan allows optional occurrence of classifiers with non-human nouns, but not with human nouns, though they both may be overtly marked with classifiers.

Kavalan (Chang et al. 1998)
(20) a. kin-turu   a   sunis
         KIN-three A   child
         'three children'
     b. (u-)turu a   wasu
         U-three   A   dog
         'three dogs'

To give a further comparison, in Amis only numerals larger than *one* are marked with classifiers.[10]

Amis (Liu 2001)
(21) a. cecaj 'one': [α human]
     b. ta-tulu 'three, [+human]' / tulu 'three, [−human]'

Note further that in Squliq Atayal, Seediq, Kavalan, and Amis discussed above, there appears no plural morphology with count nouns, human or non-human, as well as with or without classifiers.

It should be pointed out here that similar problematic cases are also observed in non-Formosan languages. As stated in Tang (2001a, 2002b, 2003), for example, in Pre-Qin Chinese, count nouns may appear without classifiers.

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[10] Note that given the observation that the distinction in the marking of [+/−human] does not show up in the number *cecaj* 'one', one might postulate that in Amis prefixes like *ta-* in (21b) should be treated as plural morphology rather than classifier. While we shall leave this issue for future study, the answer seems to be negative. For one reason, Amis may use the operation of the reduplication of nouns, human or non-human, to denote plurality and other meanings. For another, it seems rather peculiar that plural markers such as *ta-* should be attached to numerals but not head nouns. Note further that, as opposed to *ma/mane-* in Paiwan (3b-c) and *kin-/u-* in Kavalan (20a-b), in which the [+/−human] classifiers are marked with fixed affixes, in Amis the [+human] classifier is expressed by the so-called *Ca*-reduplication. (See also Zeitoun (2000) for a discussion of such formation of [+human] classifiers in Bunun.) Also, according to Liu (2000), for the younger generation, markers like *ta-* may be used with [−human, +animate] nouns.

Pre-Qin Chinese (Peyraube 1991)

(22) zhi   hu   yi   lu   sanshi . . .
      capture   tiger   one   stag   thirty
      'We captured one tiger, thirty stags . . .'

Also, as Dai (1991) illustrates, in Tibeto-Burman languages like Taraon (Mirish), classifiers are not required for count nouns. Compare, for instance, (23a) and (23b).

Taraon (Mirish) (Dai 1991)

(23) a. ta^{31} $peng^{55}$ $wuun^{55}$ gie^{53}
        rice   bowl   one
        'one bowl of rice'

      b. ma^{31} $tsau^{53}$ ka^{31} n^{55}
        cow   two
        'two cows'

Similar distribution may also be observed in Jingpo.

Jingpo (Dai 1991)

(24) a. $phun^{55}$ ma^{31} li^{33}
        tree   four
        'four trees'

      b. la^{55} si^{51} ($khum^{31}$) ma^{31} li^{31}
        bean   CL   four
        'four beans'

And, like numerals in Amis (21), in (Bokar) Tani the optionality or obligatoriness of the occurrence of classifiers is subject to distinct types of numerals, as shown in (25).[11]

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[11] Similar observations have also been found with Formosan languages other than Amis, as shown in Tang (2002c) below.
     Tsou (Ya-yin Chang, personal communication 2002)
     (i)   1, 2, 10, . . .
        a.   [+human]: cihi 'one', yoso 'two', etc.
        b.   [−human]: coni 'one', yuso 'two', etc.
     (ii)   3, 4, 5, 6, 7, 8, 9
        [+/−human]: tuyu 'three', etc.

(Bokar) Tani (Dai 1991)

(25) a. numeral = 1: The classifier can be optionally used.

b. numeral = 2: The classifier tends to be deleted.

c. numeral > 3: The classifier cannot be used.

Note that, as has been observed in Paiwan, Squliq Atayal, Seediq, Kavalan, and Amis, plural morphemes are not required in the relevant Pre-Qin and Tibeto-Burman data.

And, as opposed to Tibeto-Burman languages like Taraon (Mirish), Jingpo and (Bokar) Tani, there appears another type of Tibeto-Burman language in which classifiers must be used when numbers combine with count nouns. Hani, as an example, is of this sort.

Hani (Dai 1991)

(26) tsho^{55} ni^{13} ga^{31}

    man   two   CL

    'two men'

Taking into consideration all this variety of numeral classifiers cross-linguistically, Tang (2001a, 2001c, 2002b, 2002c) suggests a typology of classifiers as in (27) below.

Tang (2001a)

(27) a. non-classifier languages: Pre-Qin Chinese, English, Squliq Atayal,

                                Seediq, etc.

b. classifier languages:

rich-classifier languages: Chinese, Hani, Qiang, etc.

poor-classifier languages: Paiwan, Bunun, Kavalan, Amis, Tsou,

                                    Taraon (Mirish), Jingpo, (Bokar) Tani,

                                    Tshanglo, etc.

While we have shown that syntactically neither overt classifiers nor overt plural morphology is required for the countability or the plural interpretation of count nouns,[12] the question remains as to why overt classifiers must appear when numbers combine with nouns in rich-classifier languages, but not in poor-classifier languages. Tang

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[12] Tang (2001a, 2002b, 2003) suggests a feature analysis of the head Num within the nominal projection, the interpretation of which is subject to the licensing and identification of the features posited, in a way similar to those of the head D within the nominal projection and those of the head Tense within the clausal projection.

(2001a, 2002b, 2003) proposes that various kinds of Chinese classifiers may be marked in the lexicon with features like [+/−sortal], [+/−CL], [+/−N], etc.[13] As a result, syntactically Chinese still observes the distinction between count nouns and mass nouns (cf. Cheng & Sybesma 1998).[14] And, in fact, it seems that, as already shown in this paper, while languages may vary with respect to how count nouns and mass nouns may syntactically differ from one another, such a syntactic variation indeed exists cross-linguistically, in classifier or non-classifier languages. This is because cross-linguistically numerals alone can never appear with mass nouns. Semantically, however, it seems that only nouns in rich-classifier languages may be all treated as [−count]; those in poor and non-classifier languages may be marked with [+/−count]. And only nouns marked with the semantic feature of [−count] may require the presence of overt classifiers (cf. Doetjes 1996).[15]

Another question that remains not fully answered concerns the occurrence correlation between classifiers and plural morphemes. Recall that, according to Li (1999), the grammaticality contrast between rich-classifier languages like Chinese (6b) and

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[13] According to our analysis, in Mandarin and Southern Min [+sortal] classifiers and [−sortal] classifiers do not differ from one another with respect to the possibility of the occurrence of a marker like *de* between the classifier and the noun, as well as the possibility of the occurrence of an adjective between the number and the classifier, a conclusion against an opposite claim in Cheng & Sybesma (1998, 1999). See also Tang (2001a, 2002b, 2003) for a discussion of how such an analysis may account for the similarities and differences of classifiers among Chinese languages like Mandarin, Southern Min, Hakka, and Cantonese.

[14] According to Cheng & Sybesma (1998, 1999), in Chinese the difference between mass nouns and count nouns is grammatically reflected at the level of the classifier, whereas in Indo-European languages it is reflected at the level of the noun. Under our analysis, Chinese count nouns and mass nouns may be distinguished at the levels of the classifier and noun. That is, in the case of Chinese mass nouns, they can only appear with [−sortal] classifiers, whereas in the case of Chinese count nouns, they may occur with [+/−sortal] classifiers. By comparison, in the presence of numerals English mass nouns must take measure words, whereas English count nouns may appear with or without measure words, which are categorized as [+N, −CL]. Such a feature-matching requirement may be derived in a manner of Spec-head agreement or feature checking in the spirit of the Minimalist program. (See Chomsky 1995.)

[15] In other words, in poor-classifier languages the so-called syntactic count nouns may be semantically marked as mass or count nouns, only in the case of the former overt classifiers are required. While an account along this line of thought may be evidenced by the diachronical development of classifiers cross-linguistically and capture the relevant facts in Paiwan, Squliq Atayal, Seediq, Kavalan, Taraon (Mirish), Jingpo, etc., it remains a mystery as to why in languages like Amis and (Bokar) Tani, the choice of numerals will affect the occurrence of classifiers. We shall leave this issue for further research, but it seems that such variation may also be attributed to the synchronical development of classifiers in poor-classifier languages. That is, for instance, in (Bokar) Tani classifiers are not yet fully developed and thus they are found only with certain numerals.

non-classifier languages like English (7b), repeated below as (28a-b), results from the postulation that Chinese, not English, projects to Classifier Phrase (ClP), the head of which will block N-movement of nouns like *xuesheng* 'student' in cases like (28a); hence the impossible merge of the head noun *xuesheng* and the plural morpheme *-men* at syntax.

> Li (1999)
> (28) a. (*san-ge)   xuesheng-men
>   three-CL   student-MEN
>   'students'
>   b. three student*(-s)

However, in addition to the previously discussed problems raised by poor-classifier languages like Paiwan, in which classifiers may appear with plural nouns, Li's analysis faces certain new problems in view of non-classifier languages like Squliq Atayal (29) below, as Tang (2001a, 2002b) states.

> Squliq Atayal (Taoshan) (Yayut Isaw, personal communication, 2001)
> (29) a. qutux laqi'/ cyugal laqi'
>   one   child three   child
>   'one child/three children'
>   b. qutux xuzil/cyugal xuzil
>   one   dog three   dog
>   'one dog/three dogs'
>   c. br-biru   /q-laqi'
>   RED-book RED-child
>   'books/children'
>   d. cyugal (*br-)biru   /cyugal (*q-)laqi'
>   three   RED-book three   RED-child
>   'three books/three children'

First, cases like (29c) suggest that while both English and Squliq Atayal are non-classifier languages, only in English, not Squliq Atayal, may plural nouns cooccur with numerals.

Furthermore, as given in (30), in Squliq Atayal reduplicated nouns cannot act as predicates.[16]

Squliq Atayal (Taoshan)
(30) (Pawang Nayban, personal communication, 2002)
    (*q-)laqi'   qu   Sayun   Tali.
    RED-child NOM Sayun and Tali
    'Sayun and Tali are children.'

By comparison, plural nouns in Chinese observe the considered definite effect whereas those in Paiwan do not. (See also the discussion in (8) as well as in footnotes 2 and 17.)[17]

Mandarin Chinese
(31) a. *mei you ren-men   (Li 1999)
       not have person-MEN
    b. Zhangsan han Lisi shi xuesheng(*-men).   (Tang 2001a)
       Zhangsan and Lisi be student-PL
       'Zhangsan and Lisi are students.'

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[16] By contrast, as Liu (2001) points out, in Amis plural nouns expressed by reduplication cannot appear with numerals, with or without classifiers, though they may act as predicates.
    Amis (Liu 2001)
    (i) a. ta-tulu   (a) kajing
          RED-three A lady
          'three ladies'
      b. *ta-tulu   (a) kaji-kajing
          RED-three A RED-lady
      c. tulu (a) tamina
          three A ship
          'three ships'
      d. *tulu (a) tamina-mina
          three A ship-RED
    (ii) u wawa-wawa cangra.
       U RED-child   3.pl.NOM
       'They are all children.'
[17] Kurafuji (2002) proposes that Chinese/Japanese plural markers are the same as the English -s with respect to the semantics of plurality, but they also have the interpretation of definiteness, one property that English -s does not have (cf. Li 1999). Furthermore, he suggests that Chinese and Japanese plural markers should be analyzed as plural determiners rather than plural numerals and that the cooccurrence restriction in question should be attributed to a semantic condition rather than to a syntactic condition.

Paiwan (Tang 2002b)
(32) vavayan/vavayavayan tiamadu.
      girl   girl:RED   they
      'They are girls.'

In other words, given the several above-mentioned contrasts, one problem that may be raised for Li's approach is that as Squliq Atayal does not project to ClP: why is it that, unlike English (28b), Squliq Atayal does not permit the cooccurrence of numerals with plural morphology in terms of reduplication? Another problem: why is it that while English plural nouns as in (33) below may function as predicates, Squliq Atayal plural nouns as in (30) above cannot, although they are both non-classifier languages?

English
(33) They are student*(-s).

On the basis of the observed contrast in the definite effect of plural nouns in predicate positions, both Li (1999) and Kurafuji (2002) treat the Chinese-type of plural marker as D and the English-type of plural marker as Num. (See also footnotes 2 and 17.) Such an account, however, still cannot capture the fact that Squliq Atayal does not permit numerals to cooccur with plural nouns. Note that while the operation of reduplication of nouns in Squliq Atayal is more productive than that in Paiwan, the resulting meanings in Squliq Atayal may not be always that of plurality. (See also footnote 10.)

Note also that a similar problem has also been found with Tibeto-Burman languages like Qiang and Tshanglo. Under Dai's (1991) and our analyses, Qiang is a rich-classifier language, whereas Tshanglo is a poor-classifier language. However, as stated in Li (1988), both the plural marker Xu^{33} in Qiang and the plural marker pa^{35} in Tshanglo cannot appear with the numeral/quantifier, in addition to the observation that the plural marker pa^{35} in Tshanglo is not found in predicate position.

To summarize, the following properties seem to have been observed in languages like English, Paiwan, Chinese, and Squliq Atayal.

(A) English
     a. It is a non-classifier language.
     b. Plural nouns can act as predicates.
     c. Bare nouns cannot be interpreted as plural.
     d. -s is marked with [α human], [+plural] and [α definite]; -s is a pure plural marker.
     e. three student*(-s)/this student(*-s)/these student *(-s)/student(-s)

(B) Paiwan

    a. It is a poor-classifier language.

    b. Plural nouns can act as predicates.

    c. Bare nouns can be interpreted as plural.

    d. Plurality via reduplication is not productive; it is marked with [+human], [+plural], and [α definite]. (See the discussion in (9)-(13).)

    e. ma-telu   a   va*(vaya)vayan/aicu a   va(*vaya)vayan/

       MA-three   A   girl:RED   this   A   girl:RED

       'three girls/this girl/

       aicu a   mareka a   va*(vaya)vayan/va(vaya)vayan

       this A some   A girl:RED   girl:RED

       these girls/girl(s)'

(C) Mandarin Chinese

    a. It is a rich-classifier language.

    b. Plural nouns via *-men* affixation cannot act as predicates.

    c. Bare nouns can be interpreted as plural.

    d. *-men* is marked with [+human], [+plural], and [+definite]; *-men* is not a pure plural marker. (Cf. Iljic 1994, Cheng & Sybesma 1999 and the discussion in footnote 2, among others.)

    e. san-ge   haizi(*-men)/zhe-yi-ge   haizi(*-men)/

       three-CL   child-MEN   this-one-CL   child-MEN

       'three kids/this kid/

       zhe-yixie   haizi(-men)/haizi(-men)

       this-some   child-MEN child-MEN

       these kids/kid(s)'

(D) Squliq Atayal

    a. It is a non-classifier language.

    b. Plural nouns via reduplication cannot act as predicates.

    c. Bare nouns can be interpreted as plural.

    d. Plurality via reduplication is not that productive; it is marked with [α human] and [+plural].

    e. cyugal (*br-)biru   /(*br-)biru   qani/*(br-)biru   qani/(br-)biru

       three   RED-book   RED-book this   RED-book this RED-book

       'three books/this book/these books/book(s)'

These properties seem to suggest the following things. First, languages like English may have overt plural morphology lexically realized as Num, whereas those like

Paiwan, Chinese, and Squliq Atayal may have the feature [+plural] specified in Num. Second, overt plural morphology may be merged with nouns, whereas the feature [+plural] may be licensed and identified by demonstratives, numerals, nouns, etc. Third, affixation of genuine plural morphemes like English *-s* may be done at syntax, whereas that of non-genuine plural morphemes like Chinese *-men* and Paiwan/Squliq Atayal reduplication may be done in the lexicon. Fourth, plural nouns that can serve as predicates may be interpreted as non-referential or indefinite, whereas those that cannot serve as predicates may not. Fifth, numerals larger than 1 are marked with features like [+plural, −definite] and thus they may match with English *-s* and Paiwan reduplication, which are marked with features like [+plural, α definite], but not with Chinese *-men* and Squliq Atayal reduplication, which are marked with features like [+plural, +definite].[18] An account along this line of thought seems to be further evidenced by the fact that, as shown in the above-given examples, in Chinese and Squliq Atayal while numerals larger than 1 cannot appear with CL-N-*men* and N-reduplication, respectively, demonstratives like *zhe-yixie* 'these' and *qani* 'this, these' can, the former of which is marked with features like [+plural, +definite] and the latter of which is marked with features like [α plural, +definite]. In addition, such a feature analysis need not rely solely on the presence or absence of classifiers to account for the various kinds of cross-linguistic cooccurrence restrictions in question. We shall leave this issue for further research.[19]

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[18] Such a feature-matching requirement may be derived in a manner of Spec-head agreement or feature checking in the spirit of the Minimalist program. (See Chomsky 1995.) Alternatively, it may also be done by a condition on the c-command relation between the [+definite] and [−definite] features within a nominal projection.

[19] Watanabe (2002), for example, suggests that, in languages like Japanese, classifiers may head the projection of Num.

Note that under the feature analysis posited here, the above-mentioned facts about Qiang and Tshanglo may also be accounted for. That is, markers like Qiang *Xu*^{33} and Tshanglo *pa*^{35} may be marked with features like [+plural, +definite].

There is, however, a previously discussed language that remains unaccounted for. As given in footnote 16, repeated below as (i)-(ii), it seems that in Amis although plurality via reduplication cannot appear with numerals, it may be found in predicate position.

Amis (Liu 2001)

(i) a. ta-tulu   (a)   kajing
     RED-three A   lady
     'three ladies'

   b. *ta-tulu   (a)   kaji-kajing
     RED-three A   RED-lady

   c. tulu   (a)   tamina
     three A   ship
     'three ships'

4. Measure words

Now, let us examine the behavior of measure words with Paiwan count nouns. Examples like (34b), for instance, illustrate the fact that in Paiwan *tanu* may—and in fact must—appear with count nouns like *panguDal* 'pineapple' in the presence of measure words like *tuvung* 'bag'. In contrast, *tanu* is disallowed in (34a), in which no measure word is found.

Paiwan (Tang 2001c, 2002c)

(34) a. na-v-en-eLi   ti   kai   tu   (*tanu)   telu   a   panguDal.
PERF-buy-AF   NOM   Kai   ACC   TANU   three   A   pineapple
'Kai bought three pineapples.'

b. na-v-en-eLi   ti   kai   tu   *(tanu)   telu   i   tuvung
PERF-buy-AF   NOM   Kai   ACC   TANU   three   I   bag
a   panguDal.
A   pineapple
'Kai bought three bags of pineapples.'

It is, however, not true that *tanu* can freely cooccur with any measure word, as shown in the grammaticality contrast between (34b) with count nouns and (35a-b) with mass nouns.

Paiwan (Tang 2001c, 2002c)

(35) a. na-v-en-eluc   ti   kui   tu   (*tanu)   telu   a
PERF-pull-out-AF   NOM   Kui   ACC   TANU   three   A
'apulu-an   a   saviki.
tree-head-AN   A   beetlenut
'Kui pulled out three beetlenut trees.'

b. (*tanu)   dusa   a   'uyul   a   kasiv
TANU   two   A   bundle   A   lumber

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d. *tulu   (a)   tamina-mina
three   A   ship-RED
(ii) u   wawa-wawa   cangra.
U   RED-child   3.pl.NOM
'They are all children.'
Assuming that Amis reduplication is marked with [+plural, α definite], the ungrammaticality of cases like (ib, d) may be attributed to a condition on the licensing and identification of the feature [+plural] in Amis. We shall leave this aside for future research.

'two bundles of lumber'

Closer examination of cases like (34b) and (35a-b) suggests that they differ not only in the presence/absence of the markers *a* and *i*, but also in the categorization of measure words.[20] In Paiwan, as stated in (36), *tanu* may appear only with measure words that act as nouns.

Paiwan (Tang 2001c, 2002c)[21]
(36) a. [+N]: tuvung 'bag', kinDalum 'bottle', etc.
     b. [-N]: 'apuluan 'head', 'uyul 'bundle', LisaLisan 'piece', 'apipian 'string', etc.

Regardless of whether a language is poor or rich in classifiers, or has none at all, measure words may appear with count nouns.

English
(37) a. two apples
     b. two bags of apples

Squliq Atayal (Taoshan) (Yayut Isaw, personal communication, 2001)
(38) a. cyugal   sayhuy
         three   taro
         'three taros'
     b. cyugal   bakit   sayhuy
         three   basket   taro

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[20] For a discussion of *a* and *i* as well as the internal structure of noun phrases like *telu a panguDal* in Paiwan (34), see Tang et al. (1998). See also §5 for more discussion of *tanu*. We shall leave the internal structure of (34b) and (35) for further study.

[21] Prefixes like *ma-* and *mane-* are also marked with [−N] in Paiwan. Note that in other Formosan languages like Amis and Tsou, for instance, there are also measure words marked with the feature [+/−N].
    Amis (Liu 2001)
    (i) a. [+N]: pa'tan 'bucket', kajsin 'bowl', pawti 'bag', etc.
        b. [-N]: falilingan 'string', tera 'drop', falud 'bundle', etc.
    Tsou (Tang 2002c)
    (ii) [+N]
        a. tu-no   takupingi ci   chumu
            three-NO   bowl   CI   water
            'three bowls of water'
        [-N]
        b. meha-tau ci   eevi
            CL-three CI   tree
            'three trees'

'three baskets of taros'

Amis (Liu 2001)
(39) a. tulu   (a)   futing
         three   A   fish
         'three fishes'
     b. tulu   (a)   kanicaw   (a)   futing
         three   A   basket   A   fish
         'three baskets of fish'

They, of course, may also appear with mass nouns, as given in (40).

Mandarin Chinese[22]
(40) a. san-ping   jiu
         three-CL   wine
         'three bottles of wine'
     b. san-xiang jiu
         three-box wine
         'three boxes of wine'

5. Mass nouns

Mass nouns in Paiwan, like those in other languages, cannot appear alone with numerals.

Paiwan (Tang 2001c, 2002c)
(41) a. *na-t-em-ekeL   ti   kui   tu   telu   a   vava.
         PERF-drink-AF   NOM   Kui   ACC   three A   wine
     b. na-t-em-ekeL ti   kui tu   *(tanu) telu i kinDalum a   vava.
         PERF-drink-AF NOM Kui ACC TANU   three I bottle   A   wine
         'Kui drank three bottles of wine.'

In addition, like count nouns in Paiwan, *tanu* must appear with mass nouns when there appears a measure word in the category of noun, as in (41b). The grammatical presence

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[22] Tang (2001a, 2002b) argues against Cheng & Sybesma's (1998, 1999) movement analysis of measure words like *ping* 'bottle' and *xiang* 'box' in Chinese (40). Instead, both individual classifiers and measure words are treated in the lexicon as [+CL], though they differ in the specification of the feature [+/−sortal], among other things. By contrast, measure words like *bag* in English (37b) are analyzed as [+N].

of *tanu* in both (34b) and (41b) thus indicates that *tanu* is not used to mark the distinction in the feature [+/−count].

In Paiwan *tanu* is not used to mark the feature [+/−definite] either, as illustrated in (42) below, to be compared with (34b).

> Paiwan (Tang 2001c, 2002c)
> (42) na-v-en-eLi ti   kai tua azua a *(tanu) telu i tuvung
>   PERF-buy-AF NOM Kai ACC that A TANU   three I bag
>   a   panguDal.
>   A   pineapple
>   'Kai bought those three bags of pineapples.'

The occurrence of *tanu* must appear immediately before the numeral. Compare, for instance, the grammatical (42) with the ungrammatical (43).

> Paiwan (Tang 2001c, 2002c)
> (43)* na-v-en-eLi   ti   kai tua tanu   azua a   telu i tuvung
>   PERF-buy-AF NOM Kai ACC TANU that A   three I bag
>   a   panguDal.
>   A   pineapple

And, as already shown in (34a), it cannot appear without the presence of a measure word marked with [+N].

To summarize, it seems that *tanu* may have the properties as in (44).

> Paiwan (Tang 2001c, 2002c)
> (44) tanu: [α count], [α definite], [−sortal]

Unlike Paiwan, however, no counterpart of *tanu* is observed in languages like Squliq Atayal (45) and Amis (46).[23]

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[23] By contrast, if one compares Tsou (iia) and Tsou (iib) in footnote 21, it will be found that, in addition to a word-order variation, *-no* may occur only when there appears a [+N] measure word, though both (iia) and (iib) may have *ci*, a marker that indicates modification relation in Tsou. Note that, as discussed in Tang (2002c), the behavior of numerals in Tsou is rather complicated. Examine, for instance, (i) below.

> Tsou (Ya-yin Chang, personal communication, 2002)
> (i) a. tu-no   takupingi   ci   chumu
>   three-NO   bowl   CI   water
>   'three bowls of water'

Squliq Atayal (Taoshan) (Yayut Isaw, personal communication, 2001)
(45) a. cyugal yuyut
       three   bottle
       'three bottles'
   b. cyugal yuyut qwaw
       three   bottle   wine
       'three bottles of wine'
   c. cyugal sayhuy
       three   taro
       'three taros'
   d. cyugal bakit sayhuy
       three   basket taro
       'three baskets of taros'

Amis (Liu 2001)
(46) a. tusa (a) pa'tan
       two   A   bucket
       'two buckets'
   b. tusa (a) pa'tan (a) nanum
       two   A   bucket A   water
       'two buckets of water'
   c. tulu (a) futing
       three A   fish

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   b. tuyu ci takupingi
       three CI bowl
       'three bowls'

Cases like (ib) differ from those like (ia) in three important aspects. First, in (ib) *tuyu* 'three' is a free morpheme and in (ia) *tu-* 'three' is not. Second, in (ib) *takupingi* 'bowl' does not act as measure word and in (ia) it does. Third, in (ib) *-no* is not allowed and in (ia) it is required. See Tang (2002c) for further discussion of the functional projections of nominals in Tsou.

Note also that, as shown in (ii), the numeral may be incorporated into the verb in Tsou.

   Tsou (Ya-yin Chang, personal communication, 2002)
  (ii) a. m-o   tmopsʉ   no [tuyu ci tposʉ] 'o   pasuya.
       Av-Real write   Obl three CI book   Nom Pasuya
       'Pasuya wrote on three books.'
   b. m-o   tma-teyu   no   tposʉ   'o   pasuya.
       Av-Real write-three Obl book   Nom Pasuya
       'Pasuya wrote three books.'

'three fishes'

d. tulu (a) kanicaw (a) futing
three A basket A fish
'three baskets of fish'

6. Conclusion

We have examined in this paper the morphological, syntactic, and semantic behavior of classification markers in Paiwan noun phrases as well as the interaction of such markers with count nouns, mass nouns, classifiers, measure words, plural morphology, etc. A comparative study of our observations in Paiwan with those in other languages (Formosan, Chinese, English, Tibeto-Burman) suggests that certain typological claims about the syntactic relationship between classifiers and nouns, as well as that between classifiers and plural morphology as posited in Cheng & Sybesma (1998, 1999) and Li (1999), is problematic.

Chierchia (1998) attempts to connect the absence of overt determiners, the absence of plural morphology, and the obligatory use of classifiers in the presence of numerals in languages like Chinese and Japanese. He posits the "Nominal Mapping Parameter" as in (47) and summarizes the relevant facts for each type of language as in (48)-(50).

The Nominal Mapping Parameter (Chierchia 1998)
(47) a. N: [+argument, −predicate]   (e.g., Chinese, Japanese)
         N: type *e*, *type <e, t>
     b. N: [+argument, +predicate]   (e.g., English)
         N: type *e*, type <e, t>
     c. N: [−argument, +predicate]   (e.g., French)
         N: *type *e*, type <e, t>

Chinese-type languages (Chierchia 1998)
(48) a. Every noun extension is mass.
     b. There is no plural marking.
     c. A numeral can combine with a noun only through a classifier.
     d. There is no definite or indefinite article.
     e. Nouns can occur bare in argument position.

English-type languages (Chierchia 1998)
(49) a. The mass/count distinction is attested; the characteristics of (48) are not found.

    b.   Mass nouns can occur bare as arguments.

    c.   Mass nouns are names of kinds; count nouns are predicates.

French-type languages (Chierchia 1998)

(50) a.   The mass/count distinction is still attested.

      b.   No noun (count or mass, singular or plural) will be able to occur by itself as a bare argument; every noun will be a predicate.

In capturing facts about the considered presence or absence of classifiers in languages other than Chinese or English, we have indicated that, in addition to features like [+/−sortal], [+/−CL], [+/−N], etc, classifiers may be further distinguished in accordance with the typology of poor-classifier languages vs. rich-classifier languages coupled with the possibility of syntactic vs. semantic count nouns and mass nouns. In other words, Chierchia's account is also problematic cross-linguistically.[24] We have illustrated in the previous discussion, for instance, Squliq Atayal (Taoshan) has the characteristics shown in (51) below, to be compared with Chinese (48) and English (49).

Squliq Atayal (Tang 2002b)

(51) a.   The mass/count distinction is attested.

      b.   The numeral does not take a classifier cooccurring with the noun.

      c.   Number morphology cannot appear with plural morphology.

      d.   There is no definite or indefinite article.

      e.   Nouns can appear bare in argument position.

However, if, like non-classifier English, Squliq Atayal is [+argument, +predicate] and, like classifer Chinese, plural morphology will change a type $<e, t>$ N into a type e N,[25] then why is it that in Squliq Atayal, but not in English, nouns can occur bare as argument?[26]

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[24] See also Kurafuji (2002) and Watanabe (2002) for a revision of Chierchia's hypothesis.

[25] See Kurafuji (2002) for a discussion of this kind of type shifting.

[26] It should be clear from our discussion of Formosan languages like Paiwan, Atayal, Amis, Tsou, and Kavalan that the morphological, syntactic, and semantic behavior of numerals, classifiers, and plural morphology in Formosan languages alone is already very complicated. This research is just the beginning of a long-term study of classifiers cross-linguistically; we shall leave for future research the syntax of numerals, classifiers, and plural morphology, as well as the functional projections of nominals.

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兩種量詞語言類型：
排灣語名詞類別語素的類型研究

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　　數詞與量詞的共存限制以及複數詞與量詞的共存限制一直都是語言學研究的重要課題，其中更有不少文獻致力於詮釋漢語與英語在這兩種限制的相同點與相異點。這篇文章除了研究排灣語、其他台灣南島語以及藏緬語的相關詞彙、句法和語意行爲之外，並說明 Cheng 和 Sybesma (1999)、Li (1999) 和 Chierchia (1998) 等人的主張都無法有系統的處理英語、漢語、台灣南島語以及藏緬語的相關語言類型異同。文中因而建議：除了要考慮數詞、量詞和複數詞的不同詞彙、句法和語意結構之外，還要將所謂的量詞語言細分爲貧脊型的量詞語言和豐富型的量詞語言。

關鍵詞：數詞，量詞，複數詞，可數名詞，不可數名詞，語言類型，排灣語，
　　　　台灣南島語，漢語，藏緬語，英語