Distributivity, Plurality, and Reduplication in Tsou*

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ABSTRACT

This paper investigates the grammar of distributive quantification in Tsou and its interactions with plural markings and reduplication. As far as distribution and syntactic restriction are concerned, Tsou distributive quantifiers behave more like the English adverbial *each* rather than the determiner-like *each*—They must follow the auxiliary and precede the main verb and they must co-occur with plural pronouns and noun phrases. However, they differ from the adverbial *each* in three aspects: (1) they are normally inflected for focus and should thus be identified as verbs; (2) they only trigger the overt plural markings of human noun phrases and the noun phrases denoting entities of various kinds; (3) they are restrictive in the selection of their quantifiees—*acuhu* and *acuh* 'all' can only quantify over the subjects and their bound counterparts —*cucuhu* and *-cucuha* can only refer to patients while *ianan'ou* and *ianan'ova* 'individually/separately' are sensitive to Actors. Reduplication invariably gives rise to plurality, but does not always bring about quantification: nominal reduplication simply yields plurality and nominal reduplication plus the prefix *ma-* derive the extra meaning of various kinds or distributive quantification; numeral reduplication plus the prefix *ma-* uniformly creates distributive quantification; wh-word reduplication plus the prefix *ma-* generally involves existential quantification.

Key Words: Tsou, distributive quantification, plural markings, reduplication, subject-sensitive, Actor-sensitive, patient-sensitive, numerals, wh-words

1. INTRODUTION

While quantification, plural marking, and reduplication are among the central issues in general linguistic inquiry, there is little attention paid to the study of these grammatical processes in the Formosan literature, let alone the interactions among them. This paper aims to fill the gap. Using well-established diagnostics, we will differentiate several close but distinct notions such as **distributive** vs. **collective**, **verbal quantifier** vs. **determiner-like quantifier**, **formally plural** vs. **semantically plural**, etc. To get a feel of what our inquiry is about, let us consider the following example:

(1) a. 'e mo **macicihi** ci 'o'oko/*oko te-c'o mo-cni to tposu
Top AF each Rel children/child Irr take-one Obl book[1]
'Every child can only take one book.'

b. i-he$_i$/*si$_i$ umnu-a to mo **macicihi** ci 'o'oko$_i$ 'o tposu
NAF-3P/*3S like-NAF Obl AF each Rel children Nom book
'Every child likes the book.'

As shown in (1a), the distributive quantifier *macicihi* must co-occur with the plural noun *'o'oko* instead of with the singular noun *oko*; as shown in (1b), *macicihi* is required to co-occur with the plural pronoun *he* rather than with the singular pronoun *si*. This appears to go against the standard assumption at first sight.

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1. Abbreviations used in this paper are listed as follows:

Asp: aspect	AF: Actor focus	Conj: conjunctor
Dist: distributive	Hab: habitual	hum: human
Irr: irrealis	Loc: locative	NAF: Non-Actor focus
Nom: nominative	Obl: oblique	P: plural
Poss: possessive	PF: Patient focus	Red: reduplication
Rel: relative clause marker	S: singular	Top: topic
1: first person pronoun	2: second person pronoun	3: third person pronoun

Note that a distributive quantifier is usually said to be associated with a singular noun (e.g. *every linguist/*linguists; each student/*students*). We will attempt to account for this seemingly discrepancy in section 3.

The rest of this paper is organized as follows. Section 2 identifies *acuhu* as a distributive quantifier and discusses its syntactic behavior. The differences between *acuhu* and its morphologically bound counterparts will be revealed. Three types of syntactic constraints on quantification will be also dealt with. Section 3 distinguishes the semantic types of quantifiers such as *macicihi*, *macoconi*, and *macocono* and identifies their grammatical category and functions. It also deals with the interactions between distributive quantification and plural marking. Section 4 distinguishes three types of reduplication and examine their correlation with quantification. Section 5 concludes the paper and addresses its typological and theoretical implications.

2. ON THE DISTRIBUTIVE QUANTIFIER *acuhu*

2.1 *acuhu* as a distributive quantifier

In Tsou, *acuhu* occurs as a distributive quantifier. For example:

(2) a. 'e pasuya ho paicu mi-hin'i-cu navconga
Top Pasuya Conj Paicu AF-3P.Nom-Asp get married
'Pasuya and Paicu get married.'

b. 'e pasuya ho paicu mi-hin'i-cu acuh-u navconga
Top Pasuya Conj Paicu AF-3P.Nom-Asp all-AF get married.
'Both Pasuya and Paicu get married.'

Sentence (2a) and sentence (2b) have different interpretations. Sentence (2a) means that Pasuya and Paicu become husband and wife. In contrast, with *acuhu*, sentence (2b) means that Pasuya and Paicu get married respectively: Pasuya gets married with his wife and Paicu marries to her husband. It is evident that *acuhu* contributes distributivity to sentence (2b). More examples of this sort can be found in the following examples:

(3) a. mi-hin'i eemo
AF-3P build.house
'They built a house.'

b. mi-hin'i acuh-u eemo
AF-3P all-AF build.house
'They each built a house.'

Sentences (3a) and (3b) constitute a minimal pair: sentence (3b) contains *acuhu* and involves distributive quantification whereas sentence (3b) does not. This further support our assumption that *acuhu* occurs as a distributive quantifier. It behaves like English *all* and Chinese *dou* by and large.

2.2 The sensitivity effects

The distributive quantifier *acuhu* can be inflected for focus on a par with a verb: it can be inflected for AF as shown in (4a) and for NAF as shown in (4b):

(4) a. te-hin'i acuh-u cmuho
Irr-3P all-AF come(AF)
'They will all come.'
b. os-'o-cu acuh-u an-a 'e kamae
NAF-1S-Asp all-NAF eat-PF Nom guava
'All the guavas have been eaten up.'

Occasionally, *acuhu* can even take an aspect marker:

(4) c. 'e mi-cu c'o kakutia ci f'ue acuh-u-cu ton'on'o
Top AF-Asp only very few Rel sweet potato all-AF-Asp rotten
'The very few sweet potatoes (left for us) are rotten.'

It should be noted that while an ordinary verb can have four-way focus inflection, as shown in (5),

(5) Zeitoun (2000:93-4)
a. mo mo-si ta pangka to emi 'o amo
AF AF-put Obl table Obl wine NOM father
'Father puts wine on a table.'
b. i-si si-**a** ta papang to amo 'o emi
NAF-3S put-PF Obl table Obl father Nom wine
'The wine is put on a table by Father.'
c. i-si si-**i** ta amo ta emi' 'o pangka
NAF-3S put-LF Obl father Obl wine Nom table
lit. 'The table is put wine by Father.'
'Father puts wine on the table.'
d. i-si si-**eni** ta emi ta amo
NAF-3S put-BF Obl wine Obl father
lit. 'He is put wine for by Father.'
'Father puts wine for him.'

acuhu can only bear two-way focus inflection, that is, *acuhu* (AF) and *acuha* (NAF). In this regard, *acuhu* behaves on a par with an auxiliary verb. In Tsou, an auxiliary verb precedes the main verb and is inflected for AF (e.g. *mo*) or NAF (e.g. *o*-). The defective focus inflection can also be found with other adverbial expressions. For example:

(6) Chen (1999:10)
a. mi-'o na'n-o ngoseo
AF-1S very-AF tired
'I am very tired.'
b. i-'o na'n-a umnu-a na suu
NAF-1S very-NAF like-PF Nom 1S
'I like you very much.'

(6) a. la-ta asnguc-u uh ne pnguu
Hab-3S Srepeatedly-AF go(AF) Loc Pnguu
'He goes to Pnguu repeatedly.'
b. i-ta asnguc-a eobak-a na a'o
NAF-3S repeatedly-NAF beat-PF Nom 1S
'He beats me repeatedly.'

As shown in (6a-b), the degree adverbial can only be inflected for AF (i.e. *na'no*) or NAF (i.e. *na'na*). Likewise, the frequency adverbial has only two-way focus inflection, i.e. *asngucu/asnguca*.

It should also be noted that the distritutive quantifier in question can only be associated with the subject, regardless of which form it bears. For instance:

(7) a. mo acuh-u eobak-o ta 'o'oko 'e mamameoi
AF all-AF beat-AF Obl children Nom old men
'These old men all beat the children.'
b. i-he acuh-a haf-a mane'e 'o tacumu
NAF-3P all-NAF carry-PF come.home Nom banana
'The bananas are all brought home by them.'

As shown in (7a), *acuhu* quantifies over the subject *mamameoi* rather than the object *'o'oko*. Likewise, as shown in (7b), *acuha* quantifies over the subject *tacu mu* rather than the genitive pronoun *he*. In other words, *acuhu/acuha* are sensitive to the subject in quantification.

It is tempting to attribute the restriction to the well-known fact that the subject usually carries old information in Tsou, as in other Western Austrone-

sian languages. Since elements with old information are pragmatically prominent, they seem to be more ready to be singled out for distributive quantification. However, a closer inspection shows that this pragmatic account is untenable. Compare:

(8) subject vs. topic
a. 'o mamameoi i-he acuh-a eobak-a 'o 'o'oko
Top old.men NAF-3P all-NAF beat-PF Nom children
'The children are all beaten by the old men.'
b. *'o mamameoi i-he acuh-a eobak-a 'o cihi ci oko
Top old.men NAF-3P all-NAF beat-PF Nom one Rel child

In (8a-b), *mamameoi* serves as the topic of the sentences. A topic is definitely pragmatically more prominent than the subject. In the pragmatic account, a topic will be supposed to be more eligible for the distributive quantification. However, it turns out that the subject remains the only quantified element, that is, in (8a), *ac u ha* must quantify over the subject *'o'oko* rather than the topic *mamameoi*. This indicates that the sensitivity effect might not be pragmatically motivated.

Note, however, that the bound counterparts of *acuhu/acuha* are not subject-sensitive. Compare:

(9) a. o-cucuhu ta tacumu co conci kuhku
eat-all(AF) Obl banana Nom one fox
'One fox ate up all the bananas.'
b. os-'o-cu o-cucuh-**a** 'e tacumu
NAF-1S-Asp eat-all-NAF Nom banana
'I ate up all the bananas.'

As shown in (9a-b), the morphologically bound quantifiers *-cucuhu/-cucuha* refer to the patient rather than the subject. In both cases, the quantified element is *tacumu*, which occurs as the object in (9a) and as the subject in (9b). The quantification in question should be patient-sensitive instead.

It seems that different distributive quantifiers are subject to different grammatical restrictions in Tsou. Distributive quantifiers such as *ianan'ou* are neither subjects-sensitive nor patient-sensitive. Rather, they are Actor-sensitive:

(10) a. mo ianan'ou mihino ta tposu 'e pasuya ho avayi
AF separately(AF) buy(AF) Nom book Nom Pasuya and Avayi
'Pasuya and Avayi each bought a book.'

b. te ianan'ou 'e mo macicihi
Irr separately(AF) Nom AF each
'Everyone should start a separate line of work.'
c. te-mu ianan'o-**a** haf-a 'o tposu-mu
Irr-2P separately-NAF bring-PF Nom book-2P.Poss
'You each bring along your own book.'

As shown in (10), *ianan'ou/ianan'ova* can only quantify over the Actor, regardless of whether it surfaces as the subject (10a-b) or the genitive (10c).

Despite the diversity, there is still a tendency as to the constraints on quantification in Tsou. According to our previous study (Chang 1999), most of the quantifiers are subject-sensitive in Tsou. Only those who bear additional meanings such as 'do things separately/jointly' are Actor-sensitive. Following the spirit of Evan (1995), we attribute the diversion to the selection restriction triggered by the extra meanings. Borne with the extra meanings of agency, quantifiers such as *ianan'ou/ianan'ova* might require their quantifees to be agentive. As to another diversion, that is, the patient-sensitivity effects, our tentative explanation is that the bound quantifiers are attached to and deeply embedded into an action verb. They are contiguous to the patient rather than the Actor in the argument structure. As a result, they are closely tied to the patient in conceptual structure, which leads to the patient-sensitivity effects. Similar pattern can also be found in Mandarin Chinese. For example:

(11) a.? tamen chi-guang-guang bingqilin
they eat-light-Red ice cream
'They ate up all the ice cream.'
b. tamen ba bingqilin chi-guang-guang
they BA ice cream eat-light-Red
'They ate up all the ice cream.'
c. pingqilin bei tamen chi-guang-guang
ice cream BEI they eat-light-Red
'All the ice cream were eaten up.'

As in (11a-c), the suffix denoting universal quantification is associated with the patient, no matter what grammatical function the patient has. In other words, it is also patient-sensitive.

Now we are left with the question of why the majority of quantifiers are subject-sensitive. This is not an easy question, and we have no ready answer to it. However, we would like to point out that the subject-sensitivity effects are

also attested in relativization across the Western Austronesian languages (Schachter 1976, Guilfoyle et al. 1992, Chang 1997) and that relativization also involves modification. In Chang (1997), the restriction is attributed to the focus morphology on the verbs. It is well-known that focus morphology must agree with the subject in thematic relation in Western Austronesian languages. Given that modifiers such as quantifiers are realized as verbs and inflected for focus, they are tied up with the subject through the mediation of the focus morphology. The subject-sensitivity effects might arise accordingly.

3. DISTRIBUTIVITY VS. COLLECTIVITY

3.1 On the quantifiers *macicihi/macoconi/macocono*

It is generally assumed that the reduplication of numerals plus the prefix *ma-* can give rise to quantification in Tsou. For example:

(12) a. ma-ci-cihi
MA-Red-one [human]
b. ma-co-coni
MA-Red-one [non-human]
c. ma-co-cono
MA-Red-one [family]

However, it is not clear that how these quantifiers should be interpreted. Are they distributive or collective in interpretation? They appears to be collective at first sight, since they co-occur with plural nouns/pronouns. Compare:

(13) a. 'e mo macicihi ci 'o'oko/*oko te-c'o mo-cni to tpos~~u~~
Top AF each Rel children/child Irr take-one Obl book
'Every child can only take one book.'
b. i-he$_i$/*si$_i$ ~~u~~mn~~u~~-a to mo macicihi ci 'o'okoi 'o tpos~~u~~
NAF-3P/*3S like-PF Obl AF each Rel children Nom book
'Every child likes the book.'

As shown in (13a-b), the reduplicated quantifier *macicihi* co-occurs with the plural noun *'o'oko* and the plural pronoun *he* instead of the singular noun *oko* or the singular pronoun *si*. It seems that the quantifier in question is collective rather than distributive, given that a distributive quantifier is supposed be associated with a discrete entity and co-occur with a singular noun. Recall that we say *every/each student* instead of **every/each students* in English and we say *mei-ge*

xuesheng rather than **me-ge xuesheng-**meng*** in Mandarin Chinese. However, this analysis will run into problem, as will be shown below.

As a first approximation, we use contexts to distinguish between distributive quantifiers and collective quantifiers. Consider the first scenario:

(14) Context: In a singing contest, the judge says:
te-mu macicihi mateonsohu
Irr-2P.Nom each sing.once
'Everyone sings once.'

In a singing contest, it should be every candidate, rather than all the candidates together, that is asked to sing once, so as to be individually evaluated by the judge. Accordingly, the quantifier *macicihi* should be distributive in interpretation.

Consider the second scenario:

(15) Context: People in the village are going to a wedding banquet in a nearby city Chiayi.
One participant asks: How can we accommodate so many people?
The coordinator answers:
mo tuyu 'e kuyai,
AF three Nom car
'We have three cars, '
'o mo macoconci kuyai te yimo 'o te noyo
Top AF each car Irr five Nom Irr inside
'and every car can take five persons. (We can accommodate 15 persons in total. So no problem.)'

In this case, the quantifier *macoconci* (which is a contracted form of *macoconi* plus the relative marker *ci*) should be distributive in interpretation as well. Otherwise, the total amount of people which the cars can accommodate would not be 15 and the transportation to the wedding banquet would be a problem.

The third scenario:

(16) People in the village check with the chieftain how to distribute their trophies. One hunter asks: How to distribute?
The chieftain answers:
'e macocono emoo te mo-cni to fuzu
Top each house Irr take-one Obl wild.boar
'Every family will be given a wild boar.'

This is a context of distribution. Each family, not all the families together, will get a wild boar. The quantifier *macocono* should thus denote distributivity instead of collectivity.

So far, the context tests indicate that the quantifiers *macicihi/macoconi/macocono* are all distributive quantifiers rather than collective quantifiers. Further semantic tests show the same result. It is well known that distributive quantifiers can not directly combine with mass nouns since mass nouns can not be partitioned into discrete entities. The quantifiers *macicihi/macoconi/macocono* are expected not to be directly associated with mass nouns if they occur as distributive quantifiers. The expectation is indeed borne out. Compare:

(17) a.* 'e macoconci emi te-to im-a
Top each wine Irr-1S.Gen drink-PF
b. 'e macoconi pania ci emi te-to im-a
Top each bottle Rel wine Irr-1S.Gen drink-PF
'Every bottle of wine will be drunken by us.'

The quantifier *macoconi* cannot directly combine with the mass noun *emi*, as shown in (17a), while the insertion of a measure word can save the sentence, as shown in (17b). This proves that *macoconi* is not a collective quantifier. Recall that unlike distributive quantifiers, collective quantifiers are eligible to co-occur with mass nouns (cf. *all the water* vs. **each/*every water*).

A paradox then arises: Why do *macicihi/macoconi/macocono* co-occur with plural nouns?

3.2 Verbal quantifiers vs. determiner-like quantifiers

3.2.1 Quantifiers as verbs

It is well-known that distributive quantification presupposes two properties: plurality and discreteness. The two properties are both instantiated in English. For example:

(18) a. **Each** student$_i$ said he$_i$ was tired.
a'. ***Each** students$_i$ said they$_i$ were tired.
b. The students **each** bought a book.
b'. *The student **each** bought a book

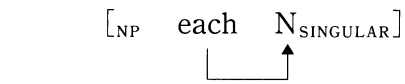
As shown in (18a-a'), the distributive quantifier *each* behaves like a singular determiner such as the article *a:* it occurs prenominaly and is directly combined

with the head noun to form a noun phrase. Through the direct combination, its discreteness is highlighted. Accordingly, it formally requires a singular noun and is prototypically associated with a singular pronoun. Alternatively, a distributive quantifier can also function as an adverb such as *respectively:* it conflates with the verb and assigns the verbal property to each member of the set denoted by the subject. In English, the members of a set denoted by the subject are conventionally encoded by a plural noun phrase, as illustrated in (18b-b'). The encoding formally represents the profiling of the plural aspect of the distributive quantifier, as opposed to its discrete aspect. It follows that the adverbial distributive quantifier is normally associated with a plural pronoun through the mediation of its quantifee, as shown below:

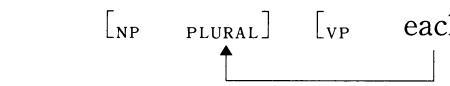
(19) a. The students$_i$ will **each** invent a musical instrument, which can be played by them$_i$.
b. The students$_i$ will **each** be directed to select one picture which they$_i$ will research and write a creative essay about.
c. The studentsi will **each** choose their$_i$ favorite legend by the group they$_i$ chose in the beginning and print it out.

Incidentally, the examples in (19) also prove that unlike its determiner-like counterparts, the adverbial instances of the distributive quantifier are embedded in the verb phrase rather than directly combine with the subject. Thus, they follow the auxiliary instead of preceding it. The two syntactic realizations of the distributive quantifier and their respective consequence can be schematized as follows:

(20) Direct combination and highlight of the discreteness



(21) Indirect combination and highlight of the plurality



In other words, the determiner-like *each* is associated with a noun but its adverbial counterpart with a noun phrase.

With this picture in mind, let us now turn to the distributive quantifiers in Tsou. First of all, consider *macicihi*:

(22) a. **mi**-hin'i macicihi eobak-o ta oko
AF-3P each beat-AF Obl child
'They each beat a child.'
b. 'e **mo** macicihi ci 'o'oko te-c'o mo-cni to tpos̶u̶
Top AF each Rel children Irr-only take-one Obl book
'Every child can only take one book.'

Does *macicihi* behave like the determiner-like *each* or the adverbial *each*? As shown in (22a), *macicihi* is preceded by the auxiliary *mi* and followed by the main verb *eobako*. Obviously, it behaves more like the adverbial *each*. It comes as no surprise that it patterns with the plural pronoun *hini'i*. In (22b), *macicihi* looks like a determiner as it occurs prenominally. However, a closer inspection shows that the *macicihi* in question also occurs as an adverbial quantifier. Note that it is preceded by the auxiliary *mo* and followed by the relative clause marker *ci*. This indicates that the phrase containing *macicihi* is a relative clause and that the *macicihi* in (22b) behaves like an adverbial quantifier in the same way as that in (22a). Actually, the data we have elicited so far show that *macicihi* never occur as a determiner and behaves uniformly like an adverbial quantifier instead. It is not surprising that *macicihi* is required to co-occur with a plural pronoun, as already shown in (22a).

Two points are in order at this moment. First, according to the data we have collected so far, along with the other types of quantifiers, the distributive quantifiers seem to all occur as verbs in Tsou. The strongest evidence is that as already shown above, the distributive quantifiers such as *acu̶h̶u̶* can be inflected for focus and take an aspect marker on a par with an ordinary verb. As to the other distributive quantifiers, while they do not bear focus morphology, they encode their verbal properties in their syntactic behavior. They have very fixed distribution: they are usually preceded by an auxiliary and followed by the relative clause marker *ci* when functioning as a modifier. Moreover, they can follow an auxiliary and be conjoined with the main verb. For example:

(23) a. te-to macicihi ho an-a 'o tacu̶m̶u̶[2]
Irr-1P each and eat-PF Nom banana
'We will each eat the bananas.'

2. In (23a), the distributive quantifier *macicihi* quantifies over the genitively marked agent rather than the subject. Unlike the other distributive quantifier *acu̶h̶u̶/acu̶h̶a̶*, *macicihi* does not seem to observe the subject-sensitive restriction. Neither does *macoconi*, as shown in (24).

b. i-ta macoconi ho an-a 'e tacumu
NAF-3S each and eat-PF Nom banana
'He ate the bananas one by one.'

Occasionally, the distributive quantifier *mococoni* can take an oblique case marker:

(24) te-to macoconi **ta** tacumu ho an-a
Irr-1P.Gen each Obl banana and eat-PF
'We will ate the bananas one by one.'

Thus, when we said the distributive quantifiers behave like an adverbial, we were referring to their grammatical/semantic function rather than their lexical category. Given these facts, the structure of distributive quantification in Tsou will be different from those in English. It can be roughly schematized as below.

(25) Indirect combination and highlight of the plurality
$[_{NP}\ (PLURAL)]\ \ [_{VP}\ [_{V}\ \textbf{macicihi/acuhu}]\ V]$

Unlike their English counterparts, the distributive quantifiers are always associated with noun phrases in Tsou. According to the analysis developed above, the plural aspect rather than the discrete aspect of the associated nouns is invariably highlighted in Tsou. The associated nouns should uniformly have formal plural markings in Tsou. However, as will become clear in the next section, the grammatical realizations of plurality are very limited in Tsou.

3.2.2 Quantification and plural marking

According to the informants we have consulted so far, only human nouns/pronouns and nouns which refer to various entities have overt plural markings in Tsou. Thus, though adverbial/verbal quantifiers require plural noun phrases, only human nouns/pronouns and nouns which refer to various entities can grammatically manifest the plural markings. The plural markings can be instantiated either through separate lexical entries or through reduplication. Personal pronouns adopt the former method to encode plurality, e.g. *mu/to/hin'i* for the plural personal pronouns 'you, we, and they' vs. *su/'o/ta* for the singular ones 'you, I, he'. The verbal distributive quantifiers are required to be associated with the plural personal pronouns, as illustrated above. To make the picture clearer, we present the following contrasts:

(26) a. mi-**hin'i**/*ta acuh-u eemo
AF-3P all-AF build.house
'They each built a house.'
b. te-**to**/*'o macicihi ho an-a 'o tacumu
Irr-1P each and eat-PF Nom banana
'We will each eat the bananas.'
c. 'e mo macicihi$_i$ mo mainca mi-**hin'i**/*ta$_i$[3] bon-u to mo coni ci
Top AF each AF say(AF) AF-3P/3S eat-AF Obl AF one Rel
cnumu
banana
'Everyone said that he ate an banana.' (Chin 1998:22)

On the other hand, human nouns and nouns referring to various entities encode plurality in term of partial reduplication of their roots, as will be shown in the next section. While the distributive quantifiers *macicihi*, *macoconi*, and *macocono* all mean 'each', they observe different selectional restrictions: *macicihi* can only apply to human nouns while *macoconi* and *macocono* can only apply to nonhuman nouns. It comes as no surprise that only the nouns associated with *macicihi* have formal plural marking. Compare:

(27) a. 'e mo macicihi ci **'o-'oko** te-c'o mo-cni to tposu
Top AF each Rel Red-child Irr-only take-one Obl book
'Every child can only take one book.'
b. 'o mo macoconi ci **kuyai**, te yimo 'o te noyo
Top AF each Rel car Irr five Nom Irr stay
'Every car can accommodate five persons.'
c. 'e macocono **emoo** te mo-cni to fuzu
Top each-Rel house Irr take-one Obl wild.boar
'Every family will be given a wild boar.'

As shown in (27a-c), despite the same distribution, the noun associated with *macicihi* gets reduplicated to encode plurality while the ones associated with *macoconi* and *macocono* do not.

Unlike *macicihi*, *macoconi*, and *macocono*, the distributive quantifier *acuhu* can apply either to human nouns or nonhuman nouns. When its quantifee is a

3. Interestingly, the use of singular pronoun is grammatical in the corresponding sentences in English and Chinese, known as bound pronoun use in the literature. Since this is beyond the scope of this paper, we will not go into the details here. Chin (1998) touched upon this issue, but her analysis is very preliminary and incomplete. More work should be done.

human noun, it must appear with overt plural marking as required. For example:

(28) a. mo acuh-u bon-u ta tacumu 'e **'o'oko/*oko**
AF all-AF eat-AF Obl banana Nom children/child
'The children all ate bananas.'
b. mo acuh-u tma'congo 'e **mamameoi**/*mameoi
AF all-AF sick(AF) Nom old men/old man
'The old men are all sick.'

As shown in (28a-b), the subject noun phrases that are quantified over by *acuhu* are required to undergo reduplication to represent plurality.

In the meantime, some nouns that refer to human entities but are inherently plural can be exempted from the requirement. For example:

(29) a. la acuh-u mcoi 'e **eatatiskova**
Hab all-AF die Nom **people**
'Human beings are mortal.'
b. (mo) acuh-u mealu 'e **cou**,
AF all-AF generous Nom Tsou.people
(mo) acuh-u mauto'tohungu 'e **puutu**
AF all-AF intelligent Nom Han.people
'Tsou people are generous and Han people are intelligent.'

The word *eatatiskova* literally means 'those who live in the light' (Tung 1964:458). It refers to 'people' generally. It is inherently plural and thus does not have to undergo any further plural marking. Likewise, the words *cou* and *puutu* refer to the people of a tribe and are normally interpreted as plural. They can also evade the requirement.

By contrast, nonhuman nouns remain bare when they co-occur with *acuhu*:

(30) a. moh-cu nana acuh-u us-o na **fkoi**
AF-Asp all-AF come-AF Nom snake
'The snakes all came.' (Tung 1964:268/270)
b. i-he acuh-a haf-a mane'e 'o **tacumu**
NAF-3P all-NAF bring-PF come.home Nom banana
'The bananas are all brought home by them.'
c. os-'o-cu acuh-a an-a 'e **kamae**
NAF-1S-Asp all-NAF eat-PF Nom guava
'All the guavas have been eaten up.'

However, when nonhuman nouns refer to various entities, they will show up with overt plural markings. For example:

(31) a. mo acuh-u tma'congo 'o **ma-a-av'u**
AF all-AF sick Nom MA-Red-dog
'Dogs of various kinds are all sick.'
b. i-ta acuh-a haf-a 'o **ma-fo-fou**
NAF-3S all-NAF bring-PF Nom MA-Red-meat
'Meats of various kinds were all brought away by him.'

In (31a-b), while the roots *av'u* and *fou* are not human nouns, they behave like human nouns and take the overt plural morphology. We will return to nouns of this sort in the next section.

In summary, while human nouns are strict in overt plural marking, their nonhuman counterparts entertain more freedom. As a result, a bare noun that refers to a nonhuman entity would be ambiguous in interpretation. It can be either interpreted as singular or plural. For example:

(32) i-he-cu acuh-a poacofkoya 'e **emoo**[4]
NAF-3P-Asp all-NAF clean(PF) Nom house
'They already completely cleaned the house.'
Or 'They already cleaned all the houses.'

In (32), the nonhuman noun *emoo* can be singular or plural. On the singular reading, it refers to every part of a house. Meanwhile, it can also denote several houses. Of course, if the meaning 'various houses' is intended, overt plural marking will be present:

(33) i-he-cu acuh-a poacofkoya 'e **ma-emo-emoo**
NAF-3P-Asp all-NAF clean(PF) Nom MA-Red-houses
'They already cleaned all the houses (which are located at various places).'

The option of ambiguity does not hold of human nouns though. Compare:

(34) a. i-he-cu acuh-a poacofkoya 'e **oko**
NAF-3P-Asp all-NAF clean(PF) Nom child
'They already completely cleaned the child.'

4. We are grateful to the anonymous reviewer for bringing this example to our attention.

b. i-he-cu acuh-a poacofkoya 'e **'o-'oko**
NAF-3P-Asp all-NAF clean(PF) Nom Red-child
'They already completely cleaned the child.'

In (34a), the human noun is in its bare form and unambiguous, as opposed to its nonhuman counterpart in (32). It can only refer to a specific child. To get the 'many children' reading, the noun should be reduplicated, as shown in (34b).

4. REDUPLICATION AND QUANTIFICATION

It is well-observed in the literature that reduplication can give rise to quantification. This is also attested in Tsou. In Tsou, quantification-creating reduplications usually appear with the prefix *ma-*. In addition to the quantifiers *macicihi/macoconi/macocono* presented above, Tsou also has reduplicated expressions such as *mamomocni* (*ma-* plus reduplicated verbal affix plus numeral), *ma'o'oko* (*ma-* plus reduplicated noun), and *macucuma* (*ma-* plus reduplicated wh-words), etc. It is noted in passing in the previous literature that the prefix *ma-* should be treated as a morpheme of quantifier. In Tung (1964), *ma-* is interpreted as 'every, variety of all kinds', where *ma-* seems to be identified as a distributive quantifier. Recently in Szakos (1999:3), *ma-* is identified as a collective/plural marker. In this section, we will take a closer look at the grammar and meaning of the reduplicated expressions and identify the status of the prefix.

Reduplications with the prefix can be classified into three types with respect to their grammar and meanings, as illustrated below:

(35) a. ma-Red-numeral
b. ma-Red-noun
c. ma-Red-wh

We will take up these types one by one in the following sections.

4.1 *ma*-Red-Numeral: distributive quantification

The *ma*-Red-numeral pattern has two sub-types: one is *ma-* plus a reduplicated numeral and the other is *ma-* plus a reduplicated verbal affix plus a numeral. Reduplications of the first type, that is, *macicihi/macoconi/macocono*, have been thoroughly discussed and proven to be distributive in interpretation in the previous sections. Reduplications of the second type can be used as the paraphrases of the first type and should thus be distributive as well. Compare:

(36) a. te-mu macicihi mo-cni to tposu
Irr-2P each take-one Obl book
'You each take one book.'
= b. te-mu ma-mo-mo-cni to tposu
Irr-2P MA-Red-take-one Obl book
Meaning is identical to (a)

Sentence (36b) is synonymous with sentence (32a). The distributive quantification can be expressed either by the verbal quantifier *macicihi*, as in (32a), or by the verbal expression *mamomocni*, as in (36b). The element *mo-* is a morphologically bound verb, meaning 'to take'; the suffix *—cni* is the shortened form of the cardinal numeral *coni* 'one'. It should be noted that the morphological complex *mocni* does not involve distributive quantification by itself. Thus,

(37) te-mu-c'o mo-cni to tposu
Irr-2P.Nom-only take-one Obl book
'You altogether can only take one book.'

sentence (37) is meant for collectivity instead of distributivity, as indicated in the English translation. This suggests that *mocni* is not inherently distributive.

As will be demonstrated shortly, reduplication with the prefix *ma-* may not yield quantificational force. It is likely that the prefix *ma-* in question does not convey distributivity at all. It should be the reduplication of numerals and verbal affixes that contribute distributivity to the compound. This is not surprising though. In English and Chinese, for example, numeral reduplication gives rise to distributive quantification as well. For example:

(38) a. xiesheng-meng yi-ge yi-ge shang tai lingjiang
student-Pl one-CL one-CL come.up platform receive award
'The students came to receive awards one by one' (individual award)
b. Cranes were removing the logs gingerly, one by one, to search for survivors. (CNN report on bonfire log collapse in Texas, individual log)

It is very likely that numeral reduplication is distributive in nature.

4.2 *ma*-Red-noun: no quantificational force

Nominal reduplication differs from numeral reduplication in interpretation. It does not seem to yield quantification, given that they can co-occur with

quantifiers. Consider:

(39) a. i-si ma-ci-cihi eobak-a 'o **ma-'o'-oko**
NAF-3S MA-Red-one beat-PF Nom MA-Red-child
lit. 'Children of various kinds were each beaten by him.'
b. mo acuhu tma'congo 'o **ma-a-av'u**
AF all(AF) sick Nom MA-Red-dog
'Dogs of various kinds are all sick.'

As shown in examples (39a-b), *ma'o'oko* and *maaav'u* are quantified over by the distributive quantifiers *macicihi* and *acuhu*. Assuming with the standard theory of quantification that one variable cannot be bound by two operators, we would argue that *ma'o'oko* and *maaav'u* occur as variables rather than as operators, viz., they do not involve quantificational force by themselves.[5]

The expression *ma-Red-noun* denotes the entities of various kinds or various sub-kinds of an entity (see also Tung 1964:483). It contrasts with the simple nominal reduplication, which yields only plurality. Compare the following examples:

(40) a. i-si ma-ci-cihi eobak-a 'o 'o-'oko
NAF-3S MA-Red-one beat-PF Nom Red-child
'The children was beaten by him.'
b. i-si ma-ci-cihi eobak-a 'o ma-'o'-oko
NAF-3S MA-Red-one beat-PF Nom MA-Red-child
'The various kinds of children were each beaten by him.'

The result of the simple nominal reduplication *'o'oko* only denotes plural individuals, as shown in (40a). However, as shown in (40b), the combination of the prefix *ma-* and the nominal reduplication means more: it has the sense of 'various kinds' in addition to its plurality denotation. It can refer to the children

5. The anonymous reviewer expressed reservation about our analysis. His/Her concern is understandable, given that there seem to be co-occurrences of two quantifiers in a clause. The following Mandarin Chinese example is a case in point.

(i) Mei-ge ren *(dou) mai-le yi-ben shu
Every-Cl person all buy-Asp one-Cl book
'Everyone bought a book.'

Perhaps the standard assumption is not right. Or, the standard assumption still holds, but one of the two seemingly quantifiers is degenerated and disqualified as an operator. The choice from among the two options is beyond the scope of this paper. We will leave it open for further study. Interested readers are referred to Lin (1998) for an effort to resolve the problem from a formal semantics perspective.

coming from different families or the children of different parents in the same family. Simply put, *ma'o'oko* denotes individuals of various kinds but *'o'oko* just many individuals. It seems that the prefix *ma-* has a similar function to the taxonomic kind-referring classifier *zhong* 'kind' in Mandarin Chinese and the classifying suffix *—sorte* in German (Krifka et al. 1995:75). Compare:

(41) a. yi-zhi xiong
one-Cl bear
'an individual bear'
b. yi-zhong xiong
one-Cl bear
'a kind of bear, a bear species'

While the classifier *zhi* is associated with an object as in (41a), the classifier *zhong* is referring to kind as in (41b). By the same token, *ma'o'oko* denotes kinds while *'o'oko* denotes individuals.

As noted by Krifka et al. (1995:74), taxonomic noun phrases behave like count nouns. They can be either definite or indefinite. Also, they can be associated with existential quantification or universal quantification. They can even be non-referential. This seems to hold true of Tsou taxonomic noun phrases as well. In addition to being present in distributive contexts as shown above, taxonomic noun phrases like *ma'o'oko* can also occur in existential constructions in Tsou, as in (42a), or occur as the topic, as in (42b):

(42) a. pan to mo tma'congo to ma-'o'-oko
there is Obl AF sick Obl MA-Red-child
'There are children of various kinds sick.'
b. 'e ma-'o'-oko te-c'o mo-cni to tposu
Top MA-Red-child Irr-only take-one Obl book
'Children of various kinds can only take one book.'

Besides, reduplication of this type can also apply to mass nouns. Compare:

(43) ma-chu-chumu si poneo
MA-Red-water Nom plain
'The plain is full of water/ponds of various kinds' or
'The plain is full of water everywhere.'

As in (43), *machuchumu* involves the mass noun *water*. It can mean either 'water of various kinds', 'ponds of various kinds', or 'water everywhere'. In spite of the slight differences in interpretation, it is clear that *machuchumu* does

not have inherent quantificational force.

To sum up, while the *ma*-reduplication of numerals yields distributive quantificational force, that of nouns does not involve any quantificational force at all. Instead, it creates taxonomic plural noun phrases. The prefix *ma-* seems to contribute to the *ma-Red-Noun* expression the meaning of classification.

4.3 *ma*-Red-wh

The last type of reduplication involves the reduplication of wh-words along with the prefix *ma-*. The derived expressions can either occur as main predicates or as arguments. When they function as main predicates, they must be interpreted as question words. For example:

(44) a. (zou) ma-si-sia si mo t-m-opsu
Emp MA-Red-who Nom AF read-AF
'Which persons are reading?'
b. ma-cu-cuma na i-ko phin-i
MA-Red-what Nom NAF-2S buy-LF
'Which things did you buy?'
c. ma-ne-nenu na te-hin'i eonni
MA-Red-where Nom NAF-3P stay
'Which places will they stay at?'

As shown in (44a-c), *macucuma* means 'which things', *masisia* means 'which persons', and *manenenu* means 'which places'. It seems that the reduplication in question gives rise to plurality. This observation is supported by the corresponding answers to these questions. For instance, an appropriate answer to question (40b) should be something like:

(45) a. mo mav'ov'o 'e os-'o phin-i
AF various Nom NAF-1S buy-LF
'I bought various things.'
b. mo 'enepio 'e os-'o phin-i
AF quite a few Nom NAF-1S buy-LF
'I bought quite a few things.'

Given that both *mav'ov'o* and *'enepio* refer to more than one object, we can infer that the question word *macucuma* is intended for plural things instead a singular object.

In the meantime, when the reduplicated wh-words plus *ma-* occur as gram-

matical objects, they can be either interrogative or affirmative in interpretation, depending upon how they are pronounced and the contexts in which they occur. Compare:

(46) a. mi-ta bait-o to ma-si-sia
AF-3S see-AF Obl MA-Red-who
(i) 'He saw some persons'
(ii) 'Which persons did he see?'
b. mi-ta m-ahafo to ma-cu-cuma
AF-3S AF-carry Obl MA-Red-what
(i) 'He bought some things.'
(ii) 'Which things did he carry along?'
c. te-hin'i uhn-o ma-ne-nenu
Irr-3P go to-AF MA-Red-where
(i) 'They will go to some places.'
(ii) 'Which places will they go to?'

However, if they co-occur with the affirmative emphatic marker *'a* or negators like *o'te*, they can only be interpreted as indefinite pronouns. Compare:

(47) a. 'a mi-ta bait-o to ma-si-sia
Emp AF-3S see-AF Obl MA-Red-who
'He did see some persons'
b. o'te ahuy-u m-ahafo no ma-cu-cuma
Neg(Irr) must-AF AF-carry Obl MA-Red-what
'You do not have to carry any things along.'
c. 'a te-hin'i uhn-o ma-ne-nenu
Emp Irr-3P go to-AF MA-Red-where
'They will surely go to some places.'

Compared with the examples given in (42a-c), the sentences in (43a-c) are interpreted solely as declarative sentences, in which the reduplicated expressions *masisia*, *macucuma*, and *manenenu* are interpreted as 'some persons', 'any things', and 'some places' respectively. In this usage, they assert the existence of entities instead of asking questions. In other words, they are existential in interpretation.

It is now time to return to our main concern. The question is whether the reduplicated expressions at issue involve quantificational force. One test we can use is to see whether they can co-occur with genuine quantifiers. If they do,

they are more likely to function as variables; if not, they may bear quantificational force by themselves. Given that quantifiers are usually associated with grammatical subjects, we will restrict our test to the reduplicated expressions in the subject position. Since all these reduplicated expressions can be ambiguous between interrogative readings and indefinite readings when they surface as subjects, we will apply our test to either case. Consider the interrogative readings first:

(48) a. i-ta ait-i na ma-si-sia
NAF-3S see-LF Nom MA-Red-who
'Which persons did he see?'
b.* i-ta acuh-a ait-i na ma-si-sia
NAF-3S all-NAF see-LF Nom MA-Red-who

(49) a. i-ta haf-a na ma-cu-cuma
NAF-3S carry-PF Nom MA-Red-what
'Which things did he carry along?'
b.* i-ta acuh-a haf-a na ma-cu-cuma
NAF-3S all-NAF bring-PF Nom MA-Red-what

(50) a. te-hin'i us-a na ma-ne-nenu
Irr-3P go-PF Nom MA-Red-where
'Which places will they go to?'
b.* te-hin'i acuh-a us-a na ma-ne-nenu
Irr-3P all-NAF go-PF Nom MA-Red-where

As shown in (48-50a), *masisia*, *macucuma*, and *manenenu* can be also meant for question when they occur as subjects. On this reading, they cannot co-occur with the quantifier *acuha*, as illustrated in the b-examples in (44-46). This suggests that they may be quantificational in interpretation.[6]

Likewise, *masisia* and *manenenu* cannot co-occur with quantifiers on their non-interrogative readings. Compare:

6. The anonymous reviewer contended that our analysis is not free of challenge. (S)he offered the following English examples to demonstrate that interrogative words can co-occur with quantifiers:

(i) Which persons have all been seen by him?
(ii) Which things have all been brought by him?
(iii) Which places have all been visited by him?

However, these sentences are all rendered ungrammatical by the English native speakers we consulted.

(51) a. i-ta ait-i 'o ma-si-sia
NAF-3S see-LF Nom MA-Red-who
'He saw some persons.'
b.* i-ta acuh-a ait-i 'o ma-si-sia
NAF-3S all-NAF see-LF Nom MA-Red-who
Intended for 'He saw all the persons.'

(52) a. i-ta us-a 'o ma-ne-nenu
NAF-3S go-PF Nom MA-Red-where
'He went to some places.'
b.* i-ta acuh-a us-a 'o ma-ne-nenu
NAF-3S all-NAF go-PF Nom MA-Red-where
Intended for 'He went to all the places.'

This suggests, while it is not conclusive, that they may also bear quantificational force when they serve as subjects.

Nevertheless, the case of *macucuma* is different. When it is present in the subject position and affirmative in interpretation, it can co-occur with quantifiers like *acuha* 'all'. For example:

(53) a. i-ta haf-a 'o ma-cu-cuma
NAF-3S carry-PF Nom MA-Red-what
'He carried along the things.'
b. i-ta acuh-a haf-a 'o ma-cu-cuma
NAF-3S all-NAF carry-PF Nom MA-Red-what
'He carried along all the things.'

It seems that unlike the other two, *macucuma* can function as a variable, bound by an operator. This also explains why *macucuma* is glossed as a plain noun 'things' in the previous literature while *masisia* and *manenenu* are never identified that way.

4.4. Summary

In the previous section, we have shown three types of reduplication. Each type is different from the others in its morphology, syntax, and semantics, as summarized in the following table:

Morphology	*ma*-Red-numeral	*ma*-Red-noun	*ma*-Red-wh
Meaning	plural	plural; various kinds of entities or various sub-kinds of an entity	plural
Quantificational force	Distributive	No	Yes (for interrogative readings and indefinite readings of *masisia* and *manenenu*) No(for non-interrogative use of *macucuma*)
Distribution	Follow an auxiliary and precedes the main verb	Occur as arguments	Occur as main predicates or arguments
Syntactic category	Verb	NP	NP
The function of *ma-*	Grammatical marker	taxonomic prefix	Grammatical marker

These three types of reduplication have two things in common: they must take the prefix *ma-* and all of them yield plurality. The function of *ma-* is clear in the nominal reduplication, that is, it is meant for nominal taxonomy. By contrast, *ma-* does not seem to contribute any meaning in the other two types of reduplication, that is, it may simply function as a grammatical marker. Both of the nominal reduplication and the wh-word reduplication occur as noun phrases while the numeral reduplication occurs as verbs. Thus, the former two can surface as arguments while the latter can bear focus inflection and be preceded by an auxiliary verb. As to quantificational force, the numeral reduplication could involve distributive quantification; the wh-word reduplication would create quantificational force when they occur as question words; the nominal reduplication does not involve any quantification at all.

5. CONCLUSION

In this paper, we have addressed a variety of issues pertaining to distributivity, plurality, and reduplication. After a systematic and thorough study, we are now in a position to discuss its implications:

MARKEDNESS: Distributivity and plurality, as opposed to collectivity and singularity, involve marked grammatical operations. A sentence without any marking are typically interpreted as collective rather than distributive. Likewise, a noun without any marking is normally interpreted as singular rather plural. It is shown above that human nouns are richer in overt plural markings than their nonhuman counterparts. However, it should not be claimed on the basis of this discrepancy that human nouns are more marked than their nonhuman counterparts. A more adequate generalization should be instead that human nouns make finer distinction than their nonhuman counterparts. This might be derived from human ego-centralism. Human beings pay more attention to themselves than to the nonhuman objects. If this self-centered conception is projected onto language, more grammatical distinctions will be made among human nouns. Similar phenomena are found with the noun-class markers in Western Austronesian languages (Chang et al. 1998). Take Kavalan for example. In Kavalan, human nouns have three noun-class markers (i.e. *kin/ti/ni*) while their nonhuman counterparts have only one (i.e. *u*).

QUANTIFIERS AS VERBS: It seems to be bizarre at first glance that distributive quantifiers occur as verbs. However, upon deeper reflection, we will understand that this does not go nuts. Actually, in addition to quantifiers, modifiers denoting degree, frequency, possibility, etc. all surface as verbs in Tsou. One property common to these expressions is that they are relational terms. As opposed to terms denoting objects, these expressions assign properties to corresponding objects. In this sense, they are dynamic like a verb. Thus, it is not nonsensical when they appear as verbs. Similar story can also be found in Paiwan (Wu 2003). As verbs, quantifiers are not structurally adjacent to their quantifees in Tsou. In a sense, they inherently and invariably "float" away from their quantifees. The so-called quantifier floating, which is widely discussed in the generative linguistic literature, is not attested in Tsou. Moreover, as verbs, quantifiers can be inflected for focus, attached to the verb to form a compound, and harbor richer meanings in Tsou. This might account for why quantifiers are highly sensitive in the selection of their quantifees in Tsou. Unlike determiner-like distributive quantifiers, verbal distributive quantifiers in

Tsou are associated with a noun phrase rather than a noun. This leads to an otherwise mysterious restriction on distributive quantification - the quantifees must be plural instead of singular.

REDUPLICATION: Given that plurality and distributivity are marked linguistic phenomena, it is expected that reduplication, a morphological marking device, can be used to represent distributivity and plurality in Tsou. The fact that plurality is invariably encoded by reduplication in Tsou supports the cognitive assumption that form and meaning can be iconic, in particular, more meanings need more forms, or larger quantity needs more forms. Besides, not all of the three types of reduplication plus the prefix *ma-* create quantificational force. This indicates that *ma-* should not be analyzed as a marker of quantification (cf. Tung 1964, Szakos 1999).

In this paper, we have dealt with several thorny questions including the exotic sensitivity effects in Tsou. We would take our analyses as a starting point for a probing journey rather than a conclusive solution. It is beyond question that more work should be done to verify our analyses or to come up with other alternatives.

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鄒語的分配量化、複數標記與重疊現象

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摘　要

本文主要探討分配量化在鄒語的語法裏如何呈現，以及如何與複數標記和重疊現象互動。在分佈和句法限制上，鄒語的分配數量詞表現得比較像是英語副詞性的 *each* 而不像限定詞性的 *each*。因此，鄒語的分配數量詞只能出現在助動詞之後、主動詞之前的位置，而且必須搭配複數的代詞和名詞組。然而，鄒語的分配量化有三大特色：㈠通常有焦點變化，因此詞類應該是動詞；㈡所搭配的名詞組只有屬人和表各式各樣的物體才會有顯形的複數標記；㈢量化對象相當受侷限——*acuhu* 和 *acuh* 'all' 只能量化主語，但是其黏著形式 *-cucuhu* 和 *-cucuha* 卻只能量化受事者，*ianan'ou*和*ianan'ova* 'individually/separately' 則只能量化主事者。另外，重疊都會產生複數的意義，但並非都會衍生量化意義：單純的名詞重疊只有複數意義，沒有量化的意義，但如果再加前綴 *ma-* 則衍生各式各樣物體或分配量化的意義；數詞的重疊加前綴 *ma-* 則相當一致地衍生分配量化的意義；疑問詞的重疊則一般都會涉及存在量化。

關鍵詞：鄒語，分配量化，複數標記，重疊現象，主語感應，主事者感應，受事者感應，數詞，疑問詞