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Grammaticalization and Head-initial/final: A Typological Study of Modification Markers in Formosan Nominals*

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Abstract:

A modifier-modifiee relation in Formosan nominals may be marked without any marker and/or with certain markers. Some of these nominal modification markers may also denote other kinds of syntactic relations like grammatical function, subordination and coordination in Formosan clauses. Two main questions then may arise with respect to marking of modification in Formosan nominals: (A) why is it that covert and/or overt ways of modification marking may be observed; and (B) why is it that markers like cases, subordinators and coordinators may be used as modification markers? To answer these and other relevant questions, it is proposed in this paper that the internal structure of Formosan nominals may have undergone a historical development of from a flat, juxtaposed type of structure to a hierarchical, non-juxtaposed type of structure and that two distinct ways of juxtaposition DP-DP*, without juxtaposition of the functional projection of case, and KP-KP*, with juxtaposition of the functional projection of case, may have been involved in the process of grammaticalization of Formosan subordination and case markers into nominal modification markers. The recursive DP-DP* pattern may have been accessible to all kinds of Formosan languages and have given rise to the appearance of unmarked and/or subordinator-marked modifiers, in the latter instance of which no adverbial/complementation or coordination relation may be obtained in syntax. With the recursive KP-KP* pattern, which may have been accessible only to case inflected Formosan languages, case-marked modifiers may have also appeared, in which case markers may no longer express grammatical function or referential interpretation. In other words, in Formosan languages these subordination and case markers may already have all been grammaticalized into a new kind of markers that may indicate a modifier-modifiee relation in the nominal. In addition, four other relevant historical processes may also be observed in Formosan languages, the first two of which may have been more generalized: (A) case and coordination markers may have developed first into subordination markers in clauses and then into modification markers in nominals; (B) modification markers may have been associated first with relativization type of modifiers and then with non-relativization type of modifiers; (C) an intrinsic case inflection of nominal modification expressions may have taken place; and (D) an SVO word order change may have taken place. An analysis along this line of thought seems to be able to account for the seemingly idiosyncratic synchronic variations in marking and ordering of nominal modification expressions within and cross Formosan languages. If an account of this kind may be on the right track, six implications may appear concerning the functional projections of Formosan nominals and modifiers: in Formosan nominals (A) modification markers may not head functional projections like KP, DP and NumP, the heads of which may mark features like [+/- subject], [+/- definite] and [+/- plural], respectively; (B) case-grammaticalized modification markers may not denote the existence of internally headed relative clauses; (C) non-

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modifier-like elements may be generated in Spec positions, and modifier-like elements as well as relative clauses adjunction positions; (D) both N-initial and N-final patterns may be found, the latter of which may however be diachronically and pragmatically more predominant; (E) other word order types of languages like Chinese may have developed from the historical process of DP-DP* juxtaposition into the synchronic nominal structures; and (F) Remnant TP-movement of relative clauses may not take place in Formosan and Chinese-type of languages.

Key words: grammaticalization, head-initial/final, nominal modification markers, Formosan languages, Chinese languages

1. Introduction

It is well known that in Formosan languages elements of identical forms may be used for different marking. In Paiwan nominals, for instance, a marker identical to nominative *a* in (1a) may also be found to obligatorily co-occur with demonstratives, as in (1b), and relative clauses, as in (1c).

Paiwan (Tang et al. 1998)

(1) a. v-in-eLi ni kai *(a) kun.
buy-PV Gen Kai Nom skirt
'The skirt was bought by Kai.'

b. icu *(a) kun[1]
this A skirt
'this skirt'

c. [k-in-asengseng ni kui] *(a) kun
make-PV Gen Kui A skirt
'skirts that were made by Kui'

In view of Paiwan examples like (1a-c), as discussed in Tang et al. (1998), three questions need to be answered: (A) whether may nominative marker *a* in (1a) be related to nominal modification marker *a* in (1b-c); (B) how may the demonstrative modifier in (1b) be related to the relative clause modifier in (1c); and (C) whether may the *a*-marked *kun* 'skirt' in (1c) be interpreted as head noun that is internally located within a relative clause?

Nominal modification facts different from Paiwan (1a-c) may also be observed with other Formosan languages. In Bunun nominals, to give an example, the demonstrative and relative clause modifiers in (2b-c) may be associated with subordination marker *tu* in (2a), which, according to Zeitoun (2000a), may not act as case and coordination markers in Bunun clauses.

Bunun

(2) a. haiyap saikin [tu kusian-as taihuku']. (Zeitoun 2000a)
know I TU go-you Taipei
'I know that you go to Taipei.'

b. [[saitan tu] uvað] a kaðima-un-ku. (Zeng 2006)
that.Neu TU kid A like-PV-I.Obl
'I like that kid.'

c. [[maliba' vai' tu] tina'] hai masial. (Zeitoun 2000a)
carry kid TU mother Top good

[1] See Tang et al. (1998) and Tang (1999) for a detailed discussion of the morphological and syntactic structures of various kinds of *a* in Paiwan nominals and clauses, in which *a* may also function as subordination marker, but not as coordination marker.

‘The mother that carries the kid is good.’

To give another example, in Amis nominals, as stated in Liu (2003), the demonstrative and relative clause modifiers in (3b-c) may be associated with coordination marker *a* in (3a), which, according to Wu (1995, 2000), does not function as case and subordination markers in Amis clauses (cf. Liu 2003, in which *a* may serve as subordination marker).

Amis (Liu 2003)

(3) a. mi-aca’ kaku [tu-pa’h] *(a) [tu-fadisusu’].
AV-buy Nom-I Acc-wine Conj Acc-grapes
‘I am buying wine and grapes.’

b. ma-’ulah kaku [[tu-ni (a)] tamdaw].
AV-like Nom-I Acc-this A person
‘I like this person.’

c. ma-sidaj [ku-ja [sa-pi-pacuk ni-aki tu-fafuj (a)]
AV-lost Nom-that IV-PI-kill Gen-aki Acc-pig A
pu’ut].
knife
‘The knife which Aki used to kill pigs was lost.’

Taking into consideration the above-given observations like Bunun (2a-c) and Amis (3a-c), two more questions remain unanswered. For one thing, how may Bunun subordinator *tu* in (2a) and Amis coordinator *a* in (3a) be related to the nominal modification markers in (2b-c) and (3b-c), respectively? For another, why is it that while in Amis (3a) the presence of the coordination marker may be required, in Amis (3b-c) the absence of the nominal modification markers may be permitted? By contrast, as illustrated in Paiwan (1b-c), nominal modification markers in Paiwan may never be absent.

To answer these and other relevant questions concerning the functional projections of Formosan nominals, it is posited in this paper that the internal structure of Formosan nominals may have undergone a historical development of from a flat, juxtaposed type of structure to a hierarchical, non-juxtaposed type of structure and that two distinct ways of juxtaposition DP-DP*, without juxtaposition of the functional projection of case, and KP-KP*, with juxtaposition of the functional projection of case, may have been involved in the process of grammaticalization of Formosan subordination and case markers into nominal modification markers (cf. Teng 2007).

The recursive DP-DP* pattern may have been accessible to all kinds of Formosan languages and have given rise to the appearance of unmarked and/or subordinator-marked modifiers, in the latter instance of which no adverbial/complementation or coordination relation may be obtained in syntax (see also footnote 24). With the recursive KP-KP* pattern, which may have been accessible only to case inflected Formosan languages, case-marked modifiers may have also appeared, in which case markers may no longer express grammatical function or referential interpretation. In other words, in Formosan languages these subordination and case markers may already have all been grammaticalized into a new kind of markers that may indicate a modifier-modifiee relation in the nominal.

In addition, four other relevant historical processes may also be observed in Formosan languages, the first two of which may have been more generalized: (A) case and coordination markers may have developed first into subordination markers in clauses and then into modification markers in nominals (see also footnote 17, Tang 1999 and Tsai 2006b); (B) modification markers may have been associated first with

relativization type of modifiers and then with non-relativization type of modifiers (see also Hilmmelmann 1997 and Tang 2006a); (C) an intrinsic case inflection of nominal modification expressions may have taken place; and (D) an SVO word order change may have taken place.

Section 2 discusses the morphological and syntactic variations in co-occurrence of demonstratives, numerals, classifiers, possessives and relative clauses with nouns in Formosan nominals, in particular, the marked-unmarked contrast, the prenominal-postnominal contrast, the cased-caseless contrast and the free-bound contrast. Section 3 focuses on the grammaticalization processes from which modification markers may have come into appearance in Formosan nominals. In addition, the internal structure of Formosan nominals is also examined with respect to the functional projections of nouns and modification markers. Section 4 examines the prenominal-postnominal distinction in distribution of Formosan restrictive and non-restrictive relative clauses, a functional contrast that may also be relevant for the fact that both N-initial and N-final patterns may be observed with mostly predicate-initial languages like Formosan. Other historical processes that may have been involved with the synchronic headedness of the Formosan nominal structures will also be discussed. Section 5 concludes this paper with a discussion of the so-called stranded nominal modification markers and remnant TP-movement in Formosan nominals. It is first pointed out that both enclitic and proclitic types of nominal modification markers may be observed in Formosan nominals, only the former of which may be stranded. It is also shown that the so-called remnant movement of relative clauses in Formosan nominals may better be treated as operation of rightward movement.

2. Modifier-like elements vs. non-modifier-like elements

Most of the Formosan languages are the so-called predicate-initial languages, which may be further classified into VSO/VOS and VOS two major word order groups.[2] While Paiwan and Atayal, for example, are both predicate-initial Formosan languages, Paiwan exhibits VSO and VOS patterns, and Atayal only VOS pattern. As for the word order requirements in nominals, the observations are rather complicated. Depending on the types of co-occurring modifiers and non-modifiers, Paiwan and Atayal may exhibit N-initial and/or N-final constructions.

Consider first Paiwan nominals. As demonstrated in (1b), repeated below as (4a), the demonstrative needs to precede the noun and be marked with *a*.

Paiwan (Tang et al. 1998)

(4) a. icu *(a) kun
this A skirt
'this skirt'

b. *kun (a) icu
skirt A this

An *a*-marked numeral, by contrast, may precede or follow the noun, as in (5a-b).[3]

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[2] By comparison, according to Yeh (2000), Saisiyat is an SVO language and, according to Huang (2000a), the word order of Thao is changing from VSO to SVO.

[3] In Paiwan and other Formosan languages there may appear some sort of agreement requirement between the numeral and the [+/- human] noun.

Paiwan (Tang et al. 1998, Tang 2004)

(i) a. *(ma-)telu a kakeDian
MA-three A kid
'three kids'

b. (*ma-)telu a kun

Paiwan (Tang et al. 1998)

(5) a. telu *(a) kun
three A skirt
'three skirts'

b. kun *(a) telu
skirt A three
'three skirts'

The possibility of appearing in either prenominal or postnominal position may also be found with the relative clause type of modifiers, as in (6a-b) and (7a-b).[4]

Paiwan (Tang et al. 1998)

(6) a. va'uan *(a) kun
new A skirt
'new skirts'

b. kun *(a) va'uan
skirt A new
'new skirts'

(7) a. [k-in-asengseng ni kai] *(a) kun
make-PV Gen Kai A skirt
'the skirt that is made by Kai'

b. kun *(a) [k-in-asengseng ni kai]
skirt A make-PV Gen Kai
'the skirt that is made by Kai'

And an *a*-marked possessive needs to precede the noun, as in (8a), and a non-*a*-marked possessive needs to follow the noun, as in (9b).[5]

Paiwan (Tang et al. 1998)

(8) a. [ni kai] a kun
NI Kai A skirt
'Kai's skirt'

b. *kun a [ni kai]
skirt A Gen Kai

(9) a. *[ni kai] kun
NI Kai skirt

b. kun [ni kai]
skirt Gen Kai
'Kai's skirt'

In the case of Squliq Atayal nominals, by comparison, the demonstrative must occur in postnominal position, as in (10a-b) and (11a), and no markers may intervene between the noun and the demonstrative, as in (11b-e).

Squliq Atayal (Wulai) (Huang 1993)

(10) a. kuzu qani

MA-three A skirt
'three skirts'

See Tang (2004) for a detailed typological study of the syntactic and semantic variations between non-classifier languages like English and classifier languages like Chinese, Formosan and Tibetan-Burman. See also Tang (2006a) for a discussion of the [+/- V] properties of the numeral expressions in Formosan languages like Paiwan and Kavalan.

4 See Tang (2002a) for a discussion of the syntactic distinction between Paiwan nominalization and relativization, and Tang (2006a) that between Paiwan attributive and predictive modification (cf. Kayne 1994, Dikken 2003 and Simpson 2001).

5 In Paiwan, as discussed in Tang (2006a), the prenominal, not postnominal, possessive may act as nominal predicate of a relative clause.

shoe this
'this shoe'

b. laqi' qasa
kid that
'that kid'

Squliq Atayal (Taoshan) (Yayut Isaw, personal communication, 2003)

(11) a. *qasa laqi'
that kid

b. *[qasa na] laqi'
that NA kid

c. *[qasa ka] laqi'
that KA kid

d. *laqi' [na qasa]
kid NA that

e. *laqi' [ka qasa]
kid KA that

na in (11b, d) and *ka* in (11c, e) are the markers that may be found with possessives and relative clauses in Taoshan Squliq Atayal, respectively.

In addition to the above-mentioned marked-unmarked and prenominal-postnominal contrasts, a third nominal distinction between Paiwan and Squliq Atayal is that various kinds of modification marking may be found in Squliq Atayal, not Paiwan, as exemplified by the obligatorily unmarked numeral in (12a) and the optionally *na*-marked stative type of modifiers in (12b-c), to be compared with the optionally *na*-marked possessive in (13a) and the optionally *ka*-marked relative clause in (13b).[6]

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[6] As discussed in Tang (2006a), variations in nominal modification marking may also be found in Formosan languages like Thao and Saisiyat, for instance (see also footnote 16).

Thao (Huang 2000a)

(i) a. [haya wa] 'azazak mi-La-liLi'.
that WA kid AF-Red-stand
'That kid is standing.'

b. [mihu wa] ranaw
your WA chicken
'your chicken'

c. [larima wa] atu
five WA dog
'five dogs'

d. yaku' myaran m-ang-qtu-qtu [[nak a] 'azazak
I often AF-miss-Red my A kid
[i tuLi m-acupiS pataSan]].
Loc Kaoxiong AF-study book
'I often miss my son that studies in Kaoxiong.'

Saisiyat (Yeh 2000)

(ii) a. hini' korkoring
this kid
'this kid'

b. sia sarara' ka 'amana'a taw'an.
he like Acc my house
'He likes my house.'

c. hiza' ['an 'iban a] tatpo'.
that Gen 'iban A hat
'That is 'iban's hat.

d. hiza' 'aehae' 'alaw
that one fish

Squliq Atayal (Taoshan) (Yayut Isaw, personal communication, 2004)

(12) a. [cyugal (*na/*ka)] lukus
three NA KA clothes
'three clothes'

b. [mtalah (na)/*ka] lukus
red NA KA clothes
'red clothes'

c. [giqas (na)/*ka] lukus
new NA KA clothes
'new clothes'

(13) a. laqi' [*ka/(na) sayun]
kid KA Gen Sayun
'Sayun's kid'

b. s-m-awya [[b-n-aziy-an na tali'] *na/(ka)] ucya' quw sayun.[7]
AV-like Perf-buy-PV Gen Tali' NA KA tea Nom Sayun.
'Sayun likes the tea that Tali' bought.'

It should be clear by now that in Formosan nominals the typology of the form and distribution of elements like demonstratives, numerals, possessives and relative clauses are rather complicated. To make the comparison more exhaustive, for example, in languages like Kavalan (14), as opposed to Paiwan (4), with prenominal marked demonstratives, and Squliq Atayal (10)-(11), with postnominal unmarked demonstratives, the demonstrative may appear in either side of the noun, though their form may be distinct.

Kavalan (Chang 2000a)

(14) a. razat zau/'nay
man this that
'this/that man'

b. [zau/'nay ay] razat[8]
this that AY man
'this/that man'

c. razat [a yau]
man A that
'that man'

'that fish'

e. ['ima sekela' hi 'obay] ka ma'i:aeh m-wa:i' ila.
'IMA know Acc 'obay Nom man AV-come ILA
'The man that knew 'obay came.'

f. tatini' sarara' ka [kama ra'oe: kapinobae:aeh] kapinna:o.
old-man like Acc KAMA drink wine lady
'The old man likes the lady that drinks wine.'

7 In Taoshan Squliq Atayal, according to Su (2004), *ka* does not act as case, subordination and coordination markers (see also Liu 2004).

8 In Kavalan, as stated in Chang (2000a), *ay*, which may also appear with the relative clause, may not mark any case or coordination relation and *a* may only mark nominative.

Other instances of postnominal marked demonstratives and prenominal unmarked demonstratives may be found with C'uli' Atayal (15)-(16) and Rukai (17), respectively.

C'uli' Atayal (Mayrinax) (Huang 1995)

(15) si-pakahuy=mu ku' takiis ka' hani.[9]
IF-cut:wood=1S.BG Nom.Rf knife KA' this
'I cut the meat with this knife.'

C'uli' Atayal (Daai) (Ciwa Taymu', personal communication, 2004)

(16) sawgal-an ni' Sayun ku' 'ala'i' (ka') hani.
like-LF Gen Sayun Nom kid KA' this
'Sayun liked this kid.'

Rukai (Budai) (Zeitoun 2000b)

(17) a. kai ababayane
this woman
'this woman'

b. *ababayane kai
woman this

Before turning to section 3 for a discussion of the historical development of modification markers in Formosan nominals, three more things need to be pointed out concerning the morphological and syntactic properties of demonstratives. First, in view of the discussed covert-overt contrast in marking and the prenominal-postnominal contrast in distribution of demonstratives between Formosan languages like Paiwan (4a), Kavalan (14b-c), C'uli' Atayal (15)-(16) and those like Squliq Atayal (10), Kavalan (14a), Rukai (17a), it does not seem true that the bare Formosan demonstratives and the non-bare Formosan demonstratives should be all generated in the same position (cf. Chung 1998 and Kahnemuyipour and Massam 2004). In other words, it seems that demonstratives may not be syntactically homogeneous cross-linguistically (cf. Bernstein 1997). We thus assume in this paper with Tang (2006a, b) that in Formosan nominals overtly marked non-bare demonstratives, numerals and possessives may act as modifier-like elements and appear in adjunct positions, an option that may not hold for their unmarked non-modifier-like bare counterparts.[10]

Second, on the basis of the grammatical co-occurrence of the demonstrative with the possessive in Paiwan (18), to be compared with grammatical Chamorro (19), Chinese (20), on the one hand, and ungrammatical English (21), on the other, we also assume with Tang (2006a, 2007), among others, that cross-linguistically both demonstratives and possessives need not occur as D.

Paiwan (Tang et al. 1998)

(18) icu a kun ni kai
this A skirt Gen Kai
'(lit) Kai's this skirt'

Chamorro (Chung 1998)

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9 Like Squliq Atayal, C'uli' Atayal is also a VOS language. In Mayrinax and Daai C'uli' Atayal *ka'* is also found with the relative clause which, unlike the demonstrative, may appear before or after the noun. In addition, according to Huang (2000c), *ka'* may mark subordination, but not case and coordination, in Mayrinax.

10 For a discussion of the problems for an anti-symmetric kind of account, as in Kayne (1994), Bruge (2002), Kahnemuyipour and Massam (2004) and Simpson (2001), of word order variations in Formosan and Chinese nominals, see Tang (2006a) and (2007), respectively. For a discussion of the problems for an anti-symmetric kind of account, as in Alexiadou (1997) and Cinque (1999), of word order variation in Chinese clauses, see Tang (2001).

(19) i gima' Maria gi halum tanu'
the house-agr Maria Loc inside land
'Maria's house in the forest'

Chinese (Tang 1990, 1993, 2007)

(20) Zhangsan de na yi ben shu
Zhangsan DE that one CL book
'(lit) Zhangsan's that book'

English

(21) *that John's book/*John's that book

We assume further with Tang (2006a, 2007) that in languages like Formosan and Chinese the demonstrative may be licensed by the head of FP, a nominal functional projection that may be projected between DP and NumP (cf. Bernstein 1997, Bruge 2002 and Kahnemuyipour and Massam 2004).

Third, in some Formosan languages demonstratives themselves may have been claimed to exhibit case inflection. In Puyuma (22), for instance, the modifier-like demonstrative may precede the noun and exhibit case property (cf. Teng 2007).

Puyuma (Huang 2000b)

(22) a. maDina iDini na samekan.
big-AV this.Nom NA mosquito
'This mosquito is big.'

b. sagar=ku kanDini na buLabuLayan.
AV-like=1sg.Nom this-Obl NA girl
'I like this girl.'

In (22a) the modifier-like demonstrative is marked with nominative case, and in (22b) with oblique case.

The four kinds of case marking of Puyuma nominals, according to Huang (2000b), are as in (23) below.

Puyuma (Huang 2000b)

(23)

		Nom	Obl	Loc
a.	Proper Nouns (per, pl):	na	kana	
b.	Proper Nouns (per, sg):	i	kan	i
c.	Common Nouns (sp):	na	kana	i
d.	Common Nouns (nsp):	a	Da	

And in accordance with grammatical factors like distance, visibility, etc., the six kinds of case inflection of Puyuma modifier-like demonstratives are as in (24).

Puyuma (Huang 2000b)

(24)

	Nom		Obl	
a.	iDi	naDi	kanDi	kanaDi
b.	iDini	naDini	kanDini	kanaDini
c.	iDu	naDu	kanDu	kanaDu
d.	iDunu	naDunu	kanDunu	kanaDunu
e.	iDiyu	naDiyu	kanDiyu	kanaDiyu
f.	iDi:yu	naDi:yu	kanD:yu	kanaDi:yu

In (24) above, according to Huang (2000b), the *i*-marked and *kan*-marked demonstratives are of [+ human, - plural] as well as [- human, α plural] nouns, and the *na*-marked and *kana*-marked demonstratives of [+ human, + plural] nouns. In other words, the case realization of the Puyuma modifier-like demonstrative may be composed of the demonstrative itself and the case marking of the singular person proper noun or that of the plural person proper noun.

In Amis (25), by contrast, the case inflected demonstratives may be composed of the demonstrative itself and the case marking of the common noun, as stated in Wu (2000).

Amis (Wu 2000)

(25) a. k<um>aen-an ni dongi kuni (a) tali.
PF-eat-PV Gen Dongi this.Nom A taro
'Dongi ate this taro.'

b. ma-fana' kaku tuni (a) demak.
AV-know I.Nom this.Acc A matter
'I know this matter.'

Note that bound demonstratives, according to Zeitoun (2000a), may also be inflected for case.

Bunun (Zeitoun 2000a)

(26) a. 'is'anat mas tina' 'uvaz-a'
RV-cook-soup Obl mother kid-that.Nom
pandian.
vegetable
'Mother cooks the soup for that kid.'

b. 'isubu' tina' baial 'iskaan-tan.
RV-wrap mother leaf fish-that.Obl
'Mother wraps that fish with the leaf.'

To capture the case inflection of the demonstratives in Formosan languages like Puyuma and Amis, we assume with Tang (2006a) that, via some kind of historical development of fusion of case markers and demonstratives,[11] the case inflection under

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[11] In Formosan languages not every demonstrative preceding or following the noun may be treated as case inflected itself. Paiwan and Kavalan, for instance, do not seem to have undergone the fusion process under consideration.

Paiwan

(i) a. na-v-en-eLi ti kai tua icu a kun.
Perf-buy-AV Nom Kai Obl this A skirt
'Kai bought this skirt.'

b. v-in-eLi ni kai a icu a kun.
buy-PV Gen Kai Nom this A skirt
'This skirt was bought by Kai.'

Kavalan (Chang 2000a)

(ii) a. qan-an-ku=pa ya tiRuR 'nay
eat-PV-I=Imp Nom egg that
'That egg will be eaten by me.'

b. supaR=iku tu sunis 'nay
know(AV)=I Acc kid that
'I know that kid.'

By comparison, like the demonstratives in Puyuma and Amis, those in Rukai (iii) below seem to have been derived from the operation of fusion with the case markers in (iv).

Rukai (Budai) (Zeitoun 2000b)

(iii) a. samakakanenga lepenge kai karaza kuiDa icibilini la kela
eat-finish finish this pangolin that baked-by-them then arrive
ki laini.
Obl his-friend
'After eating what they baked, the pangolin went to his friend.'

b. kikay lalake-numi.
this kid-your
'(lit) This is your kid.'

c. la LiaLingulu sasada kuini lasu.
then outside rest that man

consideration seems to be lexically specified rather than syntactically assigned. In addition, the ungrammaticality of Puyuma and Amis demonstratives preceded by other agreeing case markers seems to suggest further that case inflected demonstratives of this kind may have a strong case feature that needs to be checked in syntax with the head of KP.[12]

As for Formosan languages like Bunun, in which case inflected bound/free demonstratives may have not resulted from the posited process of historical fusion, the optional appearance of an agreeing case marker may be permitted.

Bunun (Zeng 2006)

(27) a. apul-un (a) bunun-in.
miss-PV Nom man-this.Nom
'This man was missed.'

b. adas-av (a) sain.
bring-PV.Imp Nom this.Nom
'Bring this.'

'That man is resting outside.'

(iv)

		Nom	Obl	
			[+ animate]	[- animate]
a.	[+ visible]	ka		ka
b.			ki	
c.	[- visible]	ku		ku

For a discussion of case fusion that may be found with postnominal demonstratives in languages like Atayal, see Huang (2006).

[12] Two more kinds of Puyuma observations need to be pointed out here concerning the syntactic properties of modification markers and case fusion discussed so far. First, according to Teng (2007), the presence of a marker between the case inflected demonstrative and the noun is obligatory, as in (i).

Puyuma (Teng 2007)

(i) aDi m-ua'i pa-kurenang naDu *(na) lalak
NEG ITR-willing CAUS-follow those.NOM DF.NOM child
'Those children were not willing to make her follow.'

Second, as also stated in Teng (2007), while in Puyuma free possessives themselves may also be case inflected, which, like their demonstrative counterparts, may be followed by the noun and may not be preceded by other agreeing case markers, no intervening marker between the possessive and the noun may be allowed.

Puyuma (Teng 2007)

(ii) a. nantu ngaLad
DF.NOM/3.PSR name
'his/her/their name(s)'

b. kanta ruma'
DF.OBL/1P.PSR house
'our house'

With Teng's claim that in Puyuma both the demonstrative and the possessive may be case inflected and our postulation that these elements may have strong case features to be checked in syntax, a question then may arise as to whether in Puyuma the noun may co-occur with both the demonstrative and the possessive. The answer seems to be positive, as illustrated in (iii) below, though some kind of case feature absorption between the demonstrative and the possessive seems to have taken place via the obligatory absence of the considered modification markers between the demonstrative and the possessive as well as between the possessive and the noun.

Puyuma (Stacy F.-C. Teng, personal communication, 2006)

(iii) a. naDu tu=walak
those.Nom her.Nom=child
'(lit) those her children'

b. maruwa=mu tubang kandi kananku kiaumalan.
can=2P.Nom answer this.Obl my.Obl question
'you can answer this question of mine.'

c. maun-in a naung-in (mas) iskan-tia.[13]
eat-IN Nom cat-this.Nom Obl fish-that.Obl
'This cat ate that fish.'

In other words, as opposed to the fused type of case inflected demonstratives in Puyuma and Amis, their non-fused counterparts in Bunun may not carry a strong case feature that needs to be checked in syntax.

3. DP-DP* juxtaposition vs. KP-KP* juxtaposition

So far we have shown in section 2 that in Formosan nominals the noun may appear with elements like demonstratives, numerals, possessives and relative clauses. These expressions may be unmarked and/or marked, in which more than one kind of modification marking may be observed within and cross Formosan nominals. The prenominal/postnominal distribution of these non-modifier-like and modifier-like elements may also vary greatly within and cross Formosan nominals.

The eight types of modification markers discussed in section 2 may be summarized as in (28) below, in accordance with whether in clauses they may also mark case, subordination and coordination.

Summary of the Clausal Counterparts of Formosan Nominal Modification Markers

(28)

		case	subord	coord	none
a.	Paiwan: *a*	+ (Nom)	+	-	-
b.	Bunun: *tu*[14]	-	+	-	-

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[13] According to He et al. (1986) and Zeng (2006), the oblique free demonstrative as in Bunun (i), to be compared with (27c), may, however, be treated as resulting from the fusion process in question.

Bunun (Zeng 2006)
(i) maun-in a naung-in masaitan tu iskan.
eat-IN Nom cat-this.Nom that.Obl TU fish
'This cat ate that fish.'

[14] Like Bunun, as stated in Zeitoun (2000c), Tsou is another Formosan language, in which clausal subordination marker *ci* may also act as nominal modification marker (see also Tsai 2006a).

Tsou (Zeitoun 2000c)
(i) a. oko eni
kid this
'this kid'
b. con ci oko
one CI kid
'one kid'
c. kaeb~~u~~ ci oko
happy CI kid
'kid that is happy'
(ii) a. uk'a ci oko-'u.
not-have CI kid-my
'I have no kid.'
b. mainci mi-ko mongsi?
why AF-you cry
'Why do you cry?'

According to Chang (2000), the same syntactic behavior may also be said about Yami *a*, a West Malay-Polynesian language.

Yami (Chang 2000)
(iii) a. ipangan ya
knife this
'this knife'
b. zaku a among
big A fish

c.	Amis: *a*	-	+	+	-
d.	S. Atayal: *na*[15]	+ (Gen)	-	-	-
e.	S. Atayal: *ka*[16]	-	-	-	+
f.	C. Atayal: *ka'*	-	+	-	-
g.	Kavalan: *ay*	-	-	-	+
h.	Kavalan: *a*	+ (Nom)	-	-	-

From the above-given summary it may be found that (A) three of them may also act as case markers, in particular, nominative markers; (B) four of them may also function as subordination markers, one of which also has a nominative counterpart;[17] (C) one of them may also serve as coordination marker, in addition to subordination marker; and (D) two of them may exhibit none of marking of case, subordination and coordination.

If the observations in (28) about the clausal functions of the considered nominal modification markers in Formosan languages like Paiwan, Bunun, Amis, Atayal and Kavalan should be correct, though far from complete as will be demonstrated in this section, it seems that the clausal marker most frequently found for nominal modification marking may be the subordination marker. Other markers like case, something else and coordinator may also be observed according to this ordering of frequency. Two important questions then may be raised here: in Formosan languages why and how may these clausal markers be used in this ordering of frequency for marking of nominal modification?

With respect to the higher frequency of having clausal subordination markers used as some kind of modification marking in Formosan nominals, it is suggested that as an existing subordination marker may already be able to denote the non-balanced, unidirectional matrix-complement or modifier-modifiee relation in the functional projections of the verb, it is hence rather natural that in the process of historical

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'fish that is big'

c. man-pazeng a tau
AF-build A man
'man that built a house'

(iv) ya mangdai si mazan a mi-anuanuud kanu ma-kungnunung su kavavadanen.
now everyday Nom uncle A AV-sing and AV-describe Obl story
'My uncle sings and tells stories everyday.'

15 According to Liu (2004), in Jianshi Squliq Atayal *na* may also appear with the complement of the noun, as in (i).

Squliq Atayal (Jianshi) (Liu 2004)

(i) wal pong-an na? watan qu? hngyang [na? m-aniq qulih qu? sayun].
Aux.Pt hear-PV Obl Watan Nom sound NA? AV-eat fish Nom Sayun
'The sound of Sayun's eating fish was heard by Watan.'

He also claims that in Jianshi Squliq Atayal the *na*-marked modifier is non-predicative.

16 It is not clear whether the *wa*/*ya*/*a* modification markers in Thao (i) of footnote 6 may be regarded as more like Squliq Atayal *ka* and Kavalan *ay* in that, according to Huang (2000a), while their alternations are phonologically conditioned and they cannot function as case and coordination markers in the clause, *ya* may however be found with the complement clause.

Thao (Huang 2000a)

(i) yaku' m-in-zay ya damadama-iza.
I AV-Perf-say YA qiet-Part
'I told them "be quiet".'

17 In addition to nominative *a*, as discussed in Tang (1999), other case markers like nominative/genitive *nu* and oblique *t*(*u*)*a*, *tu* may also act as subordination markers in Paiwan, a kind of observation that is rather common in Formosan languages.

development a same kind of the clausal subordination marker may also have been applied to similar marking in the functional projections of the noun.[18]

The reason why subordination markers seem to have been more frequently found than coordination markers for marking of modification in Formosan nominals may be attributed to the different structural relations denoted by them. That is, unless a further historical process of grammaticalization of coordination marker into subordination marker has already taken place, as in Amis, or will take place, no modifier-modifiee relation may be expressed by the element conjoined to the noun by the coordinator (cf. Liu 2003 and Tsai 2006b). In other words, in the process of grammaticalization it may have been considered more costly to use a clausal coordination marker for nominal modification marking in Formosan languages (cf. Liu 2003 and Tsai 2006b). Such being the case, it is then may not be surprising that using a non-related marker may have also been considered as possible way of marking Formosan nominal modification (see also footnote 24).[19]

If our discussion so far may be on the right track, in Formosan languages the accessibility hierarchy of clausal elements to be grammaticalized into nominal modification markers may be summarized as in (29) (cf. (39)).

Grammaticalization Accessibility Hierarchy of Formosan Clausal Markers into Nominal Modification Markers

(29) a. subordination markers > case markers > coordination markers
b. complementation markers > adverbial markers (see the discussion in footnote 18)
c. non-finite complementation markers > finite complementation markers (see the discussion in footnotes 18 and 19)

As for the appearance of subordination and case markers as Formosan nominal modification markers, it is posited in this section that the internal structure of Formosan nominals may have undergone a historical development of from a flat, juxtaposed type of structure to a hierarchical, non-juxtaposed type of structure and that two distinct ways of juxtaposition DP-DP*, without juxtaposition of the functional projection of case, and KP-KP*, with juxtaposition of the functional projection of case, may have been involved in the process of grammaticalization of Formosan subordination and case markers into nominal modification markers (cf. Teng 2007).

The recursive DP-DP* pattern may have been accessible to all kinds of Formosan languages and have given rise to the appearance of unmarked and/or

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18 In Formosan languages the clausal subordination markers grammaticalized into nominal modification markers may be mainly those introducing complement clauses rather than adverbial clauses, presumably because clausal complementation markers may be regarded as semantically emptier than the clausal adjunct markers (cf. Tsai 2006b). The clausal subordination markers in question may introduce finite clauses, as in C'uli' Atayal, non-finite clauses, as in Paiwan, Amis, Tsou, or both, as in Bunun. It thus seems that in Formosan languages a non-finite complementation marker may have been more easily grammaticalized into a nominal modification marker than a finite complementation marker. In West Malay-Polynesian languages like Yami, the nominal modification marker is also the subordination marker that may introduce non-finite clauses.

19 It should be noted here that in Formosan languages like Squliq Atayal and Kavalan, in which an element different from the case, subordination and coordination markers may be used for nominal modification marking, the non-finite complement clause may be covertly marked, and the finite complement clause overtly marked. These two Squliq Atayal and Kavalan facts about the covert-overt contrast in marking of clausal complements and the presence of a distinct nominal modification marker seem to confirm to our observation in footnote 18 that in Formosan languages a non-finite subordination marker may have been more easily grammaticalized into a nominal modification marker than a finite subordination marker.

subordinator-marked modifiers, in the latter instance of which no adverbial/complementation or coordination relation may be obtained in syntax (see also footnote 24). With the recursive KP-KP* pattern, which may have been accessible only to case inflected Formosan languages, case-marked modifiers may have also appeared, in which case markers may no longer express grammatical function or referential interpretation. In other words, in Formosan languages these subordination and case markers may already have all been grammaticalized into a new kind of markers that may indicate a modifier-modifiee relation in the nominal.

In addition, four other relevant historical processes may also be observed in Formosan languages, the first two of which may have been more generalized: (A) case and coordination markers may have developed first into subordination markers in clauses and then into modification markers in nominals (see also footnote 17, Tang 1999 and Tsai 2006b); (B) modification markers may have been associated first with relativization type of modifiers and then with non-relativization type of modifiers (see also Hilmmelmann 1997 and Tang 2006a); (C) an intrinsic case inflection of nominal modification expressions may have taken place; and (D) an SVO word order change may have taken place.

To illustrate how the above-given mechanism of grammaticalization may have been put into action in Formosan languages, two things will be assumed in the following discussion concerning the historical development of the functional projection of Formosan nominal modification expressions. First, recall that, as shown in section 2, demonstratives in Formosan languages like Puyuma, Amis, Rukai and Bunun may have been intrinsically case inflected, in the first three languages of which it may be due to some historical process of fusion with adjacent case markers. We thus assume that in the historical process of the considered grammaticalization the nominal projection of such intrinsically case specified elements may have been treated as DP, without the functional projection of case, or KP, with the functional projection of case.

Second, during this historical process of grammaticalization elements like non-case inflected demonstratives, numerals and relative clauses may all have been treated as nominals in the sense that, like nouns, they may have been projected as DP or KP in accordance with the absence or presence of co-occurring overt case markers, respectively (see also the discussion in footnotes 3-5).

With these two assumptions and the general assumption that juxtaposed phrases need to be of the same categorical type, then, in the postulated flat, juxtaposed Formosan nominal structures like (30a) and (31a) below, depending on the position to which the head noun may have been juxtaposed, parts of the juxtaposed DPs or KPs may have developed via some kind of historical process into non-juxtaposed, unmarked and/or marked nominal modification expressions as in (30b-c) and (31b-c), respectively (cf. (45) and (46)).

DP-DP* Juxtaposition

(30) a.

b. N-final: DP_1 → XP and/or XP-α

c. N-initial: DP_2 → XP and/or α-XP

KP-KP* Juxtaposition

(31) a.

b. N-final: $KP_1 \rightarrow XP\text{-}\kappa$

c. N-initial: $KP_2 \rightarrow \kappa\text{-}XP$

And the historical process involved may have to do with a development of Formosan nominals from a flat type of structural configuration to a hierarchical type of structural configuration (cf. Teng 2007 and Liu 2003).[20]

In the case of (30b-c), with juxtaposition of DP projection, the possible overt α modification markers would be those grammaticalized or distinct from clausal subordination markers. The former may include Paiwan *a*, Bunun *tu*, Amis *a* and C'uli' Atayal *ka'*, and the latter Squliq Atayal *ka* and Kavalan *ay* (see also footnotes 21 and 24).

In the case of (31b-c), with juxtaposition of KP projection, the most accessible markers to be grammaticalized into nominal modification markers would be the case markers themselves. The existence of this kind of grammaticalization has indeed been observed with Puyuma examples like (i) of footnote 12, repeated here as (32a), (cf. Huang 2000b).

Puyuma (Teng 2007)

(32) a. aDi m-ua'i pa-kurenang naDu na lalak
NEG ITR-willing CAUS-follow those.NOM DF.NOM child
'Those children were not willing to make her follow.'

b. saygu tubang kanDi kana teLu-a
able <ITR>answer this.OBL ID.OBL three-NPRS
<RED>ask-NMZ
ki<a>umal-an.
'He was able to answer these three questions.'

Like Paiwan, as stated in Teng (2007) and shown in (32a-b), Puyuma may require a demonstrative to precede the noun with an overt marker. Unlike Paiwan, however, the marker associated with the Puyuma demonstrative may be a marker that not only has a case counterpart but also agrees with the case feature of the intrinsically case inflected modifier-like demonstrative, hence a nominative marker in (32a) and an oblique marker in (32b). This observed agreement pattern may be attributed to a postulation that in flat, juxtaposed nominal structures like (31a) the juxtaposed KPs need to share the same categorical and case features.

According to Teng, this co-occurrence agreement in case feature between the modifier and modifiee may also be found with Puyuma elements like numerals and relative clauses which are not intrinsically case inflected, as in (33a-c). And in Puyuma these seemingly case marked non-demonstrative modifiers may appear in either side of the noun, as in (33c).

Puyuma (Teng 2007)

(33) a. mi-walak Da mia-pat Da walak.
have-child ID.OBL PRS-four ID.OBL child
'She has four children.'

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[20] An analysis of this kind differs from the relevant claims about Puyuma in Teng (2007) and Amis in Liu (2003). Synchronically speaking, according to Teng (2007), the noun phrase structure of Puyuma remains flat. Liu (2003), by contrast, suggests that synchronically, the hierarchical structure of the Amis nominal is that of coordination.

b. na maTina na suan
DF.NOM big DF.NOM dog
'the big dog'

c. Da Duma Da suan Da saygu me-Lilu'
ID.OBL other ID.OBL dog ID.OBL can ITR-hunt
'other dogs that are capable of hunting'

Bunun, a Formosan language with non-fused case inflected demonstratives (cf. footnote 13), may also exhibit modification markers that may have been grammaticalized from case markers. According to He et al. (1986) and Zeng (2006), in addition to subordination marker *tu*, as in (2b-c) and (i) of footnote 13, the Bunun nominal modification may also be marked with nominative *a*, as in (34).

Bunun (Zeng 2006)

(34) a. apul-un-in a [[sain tu/a] bunun].
miss-PV-Perf Nom this.Nom TU A man
'This man was missed.'

b. imita a [[dadusa tu/a] uvað-in].
ours Nom Red.-two TU A kid-this.Nom
'These two kids are ours.'

c. saitin a [[baliv-un-su tu/a] tamung].
that.Neu Nom buy-PV-you.Obl TU A hat
'Is this the hat that you bought?'

Similarly, like in Puyuma, in Bunun the seemingly nominative marked nominal modification expression may not appear in object position marked with oblique *mas*.

Bunun (Zeng 2006)

(35) maun-in a naung-in masaitan tu/*a iskan.
eat-IN Nom cat-this.Nom that.Obl TU A fish
'This cat ate that fish.'

Recall that in this paper Formosan case inflected elements, fused or non-fused, have been assumed in the historical development of grammaticalization to be treated as DP and/or KP. This assumption together with Bunun observations like (2b-c), (34a-c) and (35) then seem to indicate that both DP-DP* juxtaposition and KP-KP* juxtaposition may have been involved in the historical development of nominal modification markers in Bunun, in the latter of which nominative marker *a* may have undergone grammaticalization. However, unlike that in Puyuma, the grammaticalization of case markers into nominal modification markers in case inflected Formosan languages like Bunun has not been generalized to all kinds of noun phrases. This fact may be illustrated by the ungrammaticality of the oblique marked nominal modification expression in cases like (36).

Bunun (Zeng Si-Qi, personal communication, 2006)

(36) maun-in a naung-in masaitan tu/*mas iskan.
eat-IN Nom cat-this.Nom that.Obl TU MAS fish
'This cat ate that fish.'

A reason as to why it is the nominative, not oblique, marker that may have been more accessible for the considered grammaticalization may be attributed to the fact that in Formosan languages the nominative subject is the most prominent nominal in that the clausal agreement requirement in theta marking may have been found only between the nominative subject and the verb. Other similar instances of higher accessibility of nominative markers to have been grammaticalized into modification markers may also be observed in other case inflected languages like Rukai and Puyuma.

In Rukai, for example, nominative *ka* and *ku* may also both act as nominal modification markers associated with relative clauses and appear in either side of the noun, as shown in (37a-b).

Rukai (Budai) (Zeitoun 2000b)

(37) a. [ka [[sy-a-ebele ka] duduli ka] ababay] ay lalake-li.
Nom wear-Rea-coat KA red KA girl Top kid-my
'The girl that wears a red coat is my kid.'

b. yakai [ku ababay [ku madalame-li turamuru]].
have Nom girl KU like-my very
'There is a girl that I like very much.'

According to Zeitoun (2000b), in Rukai nominative *ka* differs from nominative *ku* in the specification of the feature [+/- visibility]. In view of this [+/- visibility] agreement pattern in (37a-b), it seems to be further evidenced that, like Puyuma and Bunun, Rukai may also exhibit the KP-KP* juxtaposition pattern of nominative markers grammaticalized into nominal modification markers.

In Puyuma, as shown in (22b) and (38) below, nominative *na* may also have been further grammaticalized into a non-agreeing kind of nominal modification marker (see also footnote 24).[21]

Puyuma (Teng 2007)

(38) a. taita na [pa-la-ladam kanaDi na
1P.NEU LK CAUS-RED-teach those.OBL LK
teLu-a-ami].
three-NPRS-year
'we, who teach these third grades'

b. m-uka ma-rengay-a kanaDu na [kur-dikes=Diya
ITR-go ITR-tell-PJ those.OBL LK get-hold=IMPF
kanDu kana kiakarunan].
that.OBL DF.OBL job
'He went to tell those people who got hold for that job.'

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[21] In non-case inflected Formosan languages like Seediq, in which, according to Chang (2000b), non-finite and finite complement clauses are both covertly marked, it is also nominative *ka* that has been chosen for further grammaticalization into nominal modification marker associated with relative clauses, as exemplified in (ii), to be compared with (i).

Seediq (Chang 2000b)

(i) a. laqi nii
kid this
'this kid'

b. kingan huling
one dog
'one dog'

c. huling paru
dog big
'big dogs'

(ii) a. egu riyung [wada puq-un na laqi] ka ido.
many very Perf eat-PV Gen kid KA rice
'The rice that the kid ate is a lot.'

b. egu riyung ido ka [wada puq-un na laqi].
many very rice KA Perf eat-PV Gen kid
'The rice that the kid ate is a lot.'

Similar observation may also be said about Kavalan nominative *a* grammaticalized into nominal modification marker as in (14c), because, as pointed out in footnote 19, non-finite complement clauses in Kavalan, according to Chang (2000a), are also covertly marked.

Taking into consideration the observed higher accessibility of nominative markers grammaticalized into nominal modification markers in case inflected Formosan languages like Puyuma, Bunun and Rukai, the grammaticalization accessibility hierarchy in (29) may be revised as (39).

Grammaticalization Accessibility Hierarchy of Formosan Clausal Markers into Nominal Modification Markers

(39) a. subordination markers > case markers > coordination markers
b. complementation markers > adverbial markers (see the discussion in footnote 18)
c. non-finite complementation markers > finite complementation markers (see the discussion in footnotes 18 and 19)
d. nominative markers > non-nominative markers (see also the discussion in footnote 21)

Compared to Puyuma, Bunun and Rukai, Amis, which is also a case inflected Formosan language, does not seem to exhibit modification markers grammaticalized from case markers, as already illustrated in (28c). In other words, it seems to be the DP-DP* juxtaposition pattern that may have been involved in the historical development of nominal modification markers in Amis.[22] By contrast, recall that it has been demonstrated that in Bunun both the DP-DP* and KP-KP* patterns may have been accessible for the grammaticalization of subordination marker *tu* and nominative marker *a* into nominal modification markers, respectively. Further evidence may be found with case inflected languages like Bunun, Puyuma and Rukai for the involvement of these two distinct types of juxtaposition in the historical development of marking of nominal modification expressions.

It has been pointed out that, for instance, in Bunun examples with case inflected demonstratives projected as DP, *tu*-marking may be present, as in (2b-c) and (34)-(35), and in Bunun examples with case inflected demonstratives projected as KP, *a*-marking may be present, as in (34a-c). In (2b) and (35) the Bunun demonstratives are inflected with neutral case and oblique case, respectively, and in (34a) with nominative case.

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[22] Note, however, that according to Wu (1995, 2006), a case bearing demonstrative following the head noun may be found with Amis non-restrictive relative clauses, as in (i).

Amis (Wu 1995, 2006)

(i) a. Ma-nengneng aku k-u-ya fafuy n-i panay,
UV-see 1S.GEN NOM-NCM-that pig GEN-NCM Panay
u-ya kuhting-ay.
NCM-that black-REL
'I saw that pig of Panay, that black one.'

b. Ma-ulah ϕ-ci aki ci panay-an, t-u-ra maroq-ay
AV-like NOM-NCM Aki NCM Panay-DAT DAT-NCM-that live-REL
i fiyaw nira.
PREP neighborhood 3S.GEN
'Aki likes Panay, who lives in his neighborhood.'

Using demonstratives to mark relative clauses of some sort may also be observed with Rukai (ii).

Rukai (Budai) (Zeitoun 2000b)

(ii) kai aagaane-li kai urasi ay akanaane ki bazabaza.
this will-cook-my this taro AY will-eat KI guest
'This taro that I will cook is for the guest to eat.'

We will leave for future research whether the demonstratives in question may act as relative pronouns in Amis and Rukai.

As for the instance of Bunun demonstratives inflected with genitive case, it seems that both the DP-DP* and KP-KP* juxtaposition patterns may have been involved in the historical process of marking of genitive nominal modification expressions. Consider, for example, the operation of DP-DP* juxtaposition of genitive nominal modification expressions in examples like (40a-c) and their internal bracketing like (40d) below, in which the genitive expressions do not appear in subject positions. [23]

Bunun (Zeng 2006)

(40) a. [isaitin tu/*a itu binanauvað] a halubangbang-in.
this.Gen TU A Gen girl Nom skirt-this.Nom
'This skirt is this girl's.'

b. [[isaitan tu/*a itu hangvang] tu/*a] vaha
that.Gen TU A Gen cow TU A horn
'that cow's horn'

c. [[isaitin tu/*a is mahasan] tu/*a] mainduduað
this.Gen TU A Gen Mahasan TU A boy
'this boy of Mahasan'

d. [DP [DP Dem.Gen] tu [DP Gen N]] tu [DP N]

As shown in (40d), Bunun genitive nominal modification instances like (40a-c) may suggest two grammatical properties concerning this kind of grammaticalization of genitive nominal modification marking: (A) it is the generalized nominal modification marker *tu* rather than the non-generalized nominative or genitive marker that may be allowed with non-subject genitive nominal modification marking; and (B) the genitive possessive may have been historically treated as DP rather than KP due to its nature of being an inherent case, but not structural case (cf. Woolford 2006).

As for the relevancy of the DP-DP* juxtaposition pattern with marking of the Puyuma and Rukai nominal modification expressions, for example, it has already been demonstrated in Puyuma (ii) of footnote 12 as well as Rukai (17a) and (iii) of footnote 11, repeated below as (41) and (42), that no overt marking may be permitted between the possessor and the noun as well as between the demonstrative and the noun, respectively (see also footnote 24).

Puyuma (Teng 2007)

(41) a. nantu ngaLad
DF.NOM/3.PSR name
'his/her/their name(s)'

b. kanta ruma'
DF.OBL/1P.PSR house
'our house'

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[23] Bunun examples like (40a-c) may not be analyzed as combination of KP-KP* juxtaposition and *tu*-marking in that in (40a-c) the head nouns *vaha* 'horn' and *mainduduað* 'boy' may not be preceded by an agreeing genitive marker.

By contrast, in the case of marking of Bunun subject genitive nominal modification, as predicted by our analysis, *a*-marking may be permitted.

Bunun (Zeng Si-Qi, 2007, personal communication)

(i) a. madaingað a inak a lumah.
big Nom my A house
'My house is big.'

b. makavung a isaitan a itu hangvang a vaha.
curve Nom that.Gen A Gen cow A horn
'That cow's horn is curved.'

Rukai (Budai) (Zeitoun 2000b)

(42) a. kai ababayane
this woman
'this woman'

b. samakakanenga lepenge kai karaza kuiDa icibilini
eat-finish finish this pangolin that baked-by-them
la kela ki laini.
then arrive Obl his-friend
'After eating what they baked, the pangolin went to his friend.'

c. kikay lalake-numi.
this kid-your
'(lit) This is your kid.'

d. la LiaLingulu sasada kuini lasu.
then outside rest that man
'That man is resting outside.'

A further point concerning the historical development of nominal modification markers in Formosan languages may have to do with Bunun examples like (40a-c), in which nominal modification marker *tu* may relate two genitive expressions. That is, if Bunun (40a-c) may have been involved with juxtaposition of DP-DP*, a question then may arise as to why a similar kind of DP-DP* juxtaposed examples like Paiwan (44), with two genitive expressions related by nominal modification marker *a*, for instance, are ungrammatical, to be compared with grammatical (43), in which genitive marker *n*(*u*)*a* is marked with the whole sequence of the demonstrative-*a*-noun.

Paiwan

(43) a. kun [n(u)a [zua a vavayan]]
skirt Gen that A girl
'that girl's skirt'

b. [n(u)a [zua a vavayan]] a kun
Gen that A girl A skirt
'that girl's skirt'

(44) a. *kun [[n(u)a zua] a [n(u)a vavayan]]
skirt Gen that A Gen girl

b. *[[n(u)a zua] a [n(u)a vavayan]] a kun
Gen that A Gen girl A skirt

A plausible answer then seems to be that typologically speaking, only in case inflected Formosan languages like Bunun, in which genitive marking may have been diachronically incorporated into and synchronically inseparable from demonstratives, may two genitive expressions co-occur to modify the head noun (see also footnote 31).[24]

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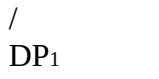
[24] Under this analysis Kavalan nominal modification marker *a* that is found only with the postnominal demonstrative in (28h) may not be treated as resulting from the general, productive pattern of KP-KP* juxtaposition. The same may be said about Squliq Atayal *na* in (28d). In other words, while the DP-DP* pattern of juxtaposition may have given rise to the grammaticalization of Formosan subordination markers and case markers into nominal modification markers, the latter origin may however be more restrictive and less productive, in addition to the absence of the co-occurrence agreement in case feature required with the KP-KP* pattern of juxtaposition.

A third example of case-grammaticalized nominal modification marker from the postulated DP-DP* juxtaposition may be observed in the above-mentioned non-case agreeing nominal modification marker *na* in Puyuma (22b) and (38). And, as stated in Huang (2000b), in Puyuma case markers like oblique *Da* may also function as clausal subordination marker.

Note that if an analysis along this line of thought may be on the right track, that is, case inflected Formosan languages should be typologically distinguished from non-case inflected Formosan languages in the historical process of grammaticalization of nominal modification marking, the postulated juxtaposition patterns in (30) and (31) may be revised as (45) and (46).

DP-DP* Juxtaposition (for both non-case and case inflected Formosan languages):

(45) a.

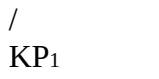


b. N-final: $DP_1 \rightarrow$ XP and/or XP-α

c. N-initial: $DP_2 \rightarrow$ XP and/or α-XP

KP-KP* Juxtaposition (only for case inflected Formosan languages):

(46) a.



b. N-final: $KP_1 \rightarrow$ XP-κ

c. N-initial: $KP_2 \rightarrow \kappa$-XP

A final point about the historical process of marking the modifier-modifiee relation in Formosan languages may be concerned with the presence/absence of an overt marker. It is shown in the previous discussion that in Formosan languages like Paiwan, Kavalan, Thao, Amis, Bunun and Puyuma, nominal modification expressions other than relative clauses may also be overtly marked and that in Formosan languages like Atayal and Seediq, by contrast, overt marking seems to be found only with relative clauses.[25]

Similarly, as stated in Himmelmann (1997), in Tagalog, for instance, noun modifiers like adjectives, as in (47a), relative clauses, as in (47b), numerals, as in (47c), and demonstratives, as in (47d), are all associated with the following nouns by the marker *na* (allomorph *-ng*).

Tagalog (Himmelmann 1997)

(47) a. ang maliit na langgam
SPEC small LK ant
'the little ant'

b. ang paa ng mama . . . na babaril sa kanya
SPEC foot GEN man LK gun LOC 3sg.DAT
'the feet of the man who was going to shoot at him'

c. sa isa-ng manlalakbay
LOC one-LK traveler
'about a traveler'

d. ay yuu-ng mama
PRED DEM-LK man
'when that man'

In Albanian, by contrast, the considered markers are obligatory with adjectives in (48a) and genitive nouns in (48b) but do not occur with demonstratives in (48c).

Albanian (Himmelmann 1997)

(48) a. (nje) shok i mire

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25 With the possibility of overt marking of some, but not all, of the non-relative clause expressions, Formosan languages like Tsou, Saisiyat and Rukai may be placed in between these two types of languages.

one friend.INDEF.M LK.NOM.SG.M good
'a good friend'

b. nen-a e vajz-e
mother.DEF.NOM.SG.F LK girl.INDEF.GEN.SG.F
'a girl's mother'

c. ky liber
this.NOM.SG.M book.INDEF.M
'this book'

It then seems that the so-called linkers occur more frequently with lexical attributes such as adjectives and relative clauses than with noun operators like demonstratives. Himmelmann (1997) thus argues that the grammaticalization of linkers originates in constructions involving a noun and a lexical attribute and that the use of linkers with noun operators is due to later extensions. If Himmelmann's claim is correct, the linkers in Tagalog may be considered as further grammaticalized than those in Albanian. In other words, in languages where the so-called linkers may have undergone further grammaticalization, demonstratives may have developed further into modifier-like elements.

We assume with Tang (2006a) that Himmelmann's claim may be further evidenced in languages like Formosan. In case inflected Formosan languages like Amis, Bunun and Puyuma as well as non-case inflected Formosan languages like Paiwan, Kavalan and Thao, for instance, those nominal modification expressions that may be overtly marked include both demonstratives and relative clauses, to be compared to Formosan languages like Atayal and Seediq, in which only relative clauses may be overtly marked. And, as stated in footnote 25, Formosan languages like Tsou, Saisiyat and Rukai may be placed in between these two types of languages, in which demonstratives may not be overtly marked. In order words, the degree hierarchy of grammaticalization of nominal modification markers in Formosan languages may be shown as in (49) (see also footnote 52).

Degree Hierarchy of Grammaticalization of Formosan Nominal Modification Markers

(49) a. Paiwan, Kavalan, Thao, Amis, Bunun, Puyuma[26] >
b. Tsou, Saisiyat, Rukai >
c. Atayal, Seediq

Before turning to section 4 for a discussion of the correlation between the prenominal/postnominal distribution of the noun and the historical processes of grammaticalization involved with Formosan nominals, it should be pointed out here that if our analysis of the grammaticalization of Formosan subordination and case markers into nominal modification markers may be on the right track, these nominal modification markers, as claimed in Tang (2006a), may not be treated as heading the nominal functional projections of KP, DP, FP, NumP, etc., in that the interpretation of the features of [+/- subject], [+/- definite], [+/- specific], [+/- plural], etc. of the co-occurring nouns may not be determined by these subordinator- or case-based grammaticalized nominal modification markers themselves (cf. Kahnemuyipour and

[26] As already discussed in this section, in Formosan languages like Paiwan, Kavalan, Thao, Amis and Bunun, overt marking of nominal modification expressions may be found with relative clauses as well as demonstratives, numerals and possessives, the last of which, however, needs to be covertly marked in Puyuma. Also, among case inflected Formosan languages like Bunun, Puyuma and Rukai, grammaticaliztion of case markers into nominal modification markers in Puyuma may be considered more generalized than that in Bunun and Rukai.

Massam 2004).[27] By contrast, they may better be analyzed as involving a functional projection of Mod(ifier) P(hrase) that may express modification relations of various sorts, nominal or clausal (see also footnote 29).[28]

With respect to the synchronic hierarchical structure of the Formosan covertly and/or overtly marked nominal modification expressions, we assume with Tang (2006a, b) that in Formosan nominals relative clauses dominated by ModP, marked or unmarked, may be located in adjunct positions and that while unmarked non-modifier-like demonstratives, numerals and possessives may be generated in Spec positions, their marked modifier-like counterparts dominated by ModP may be placed in adjunct positions. By adjunct position, it refers to the recursive X' and/or XP in accordance with their licensing heads and scope of modification along the lines of Travis (1988) and Tang (1990, 2001, 2005, 2007) (cf. Camacho 2003).[29]

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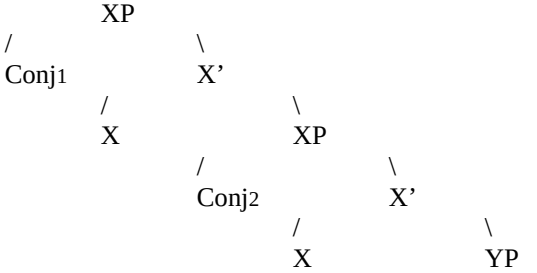
[27] In other words, for instance, it does not mean that synchronically, for Formosan languages like Bunun, in which both subordination marker *tu* and nominative marker *a* may have been grammaticalized into nominal modification markers, *tu*-marking may denote singular subject, whereas *a*-marking may imply multiple subjects. Nor does it mean that in Bunun *a*-marking may denote internally headed relative clauses, whereas *tu*-marking may not.

[28] Among others, see also Tang (1990, 1993, 2007) for a non-determiner analysis of nominal modification marker *de* in Chinese type of languages (see also footnote 31).

[29] A structural representation of coordination construction like (i) is posited in Camacho (2003) to satisfy two basic properties: c-command asymmetry and licensing symmetry (cf. Johannessen 1998). The first property argues that one of the conjuncts needs to c-command the other(s); the second property argues that each conjunct needs to be symmetric with respect to a licensing head.

Camacho (2003)

(i)

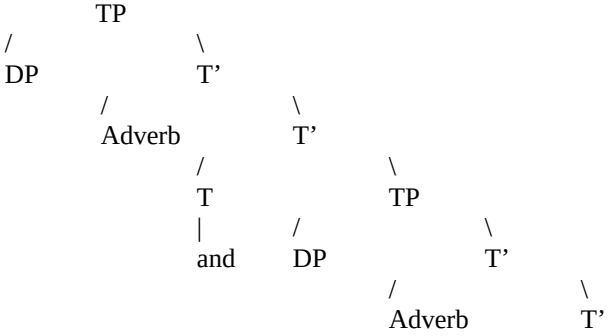


Under the relevant claims about the coordination structure in (i) Spanish sentences like (iia), for example, may be represented as (iib).

Spanish (Camacho 2003)

(ii) a. Viviana siempre y Lucia a veces comen manzanas.
Viviana always and Lucia sometimes eat apples
'Viviana always, and Lucia sometimes, eat apples.'

b.

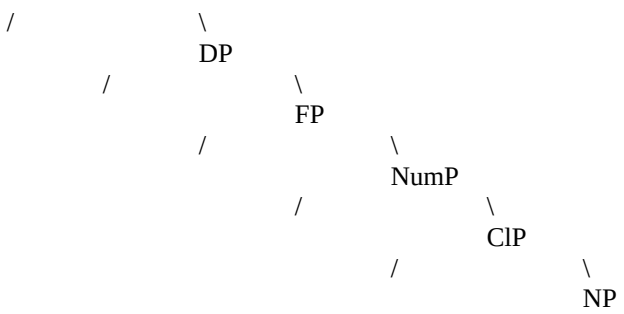


Assuming Camacho's claims about coordination of adverbs in (iib), together with the assumptions that juxtaposition may involve coordination with null conjunction and that the extended functional projection of the noun may include KP and DP, it is then not surprising that in Formosan languages nominal modification expressions may have developed via historical processes from flat, juxtaposed nominal structures like (45a) and (46a) to a simplified version of hierarchical, non-juxtaposed nominal structures like (iii), in which demonstratives, numerals, possessives and relative

clauses may be licensed by distinct heads like K, D, F, Num, Cl, N and be projected in respective head, Spec or adjunction positions in accordance with their morphological properties like free or bound, syntactic properties like non-modifier-like or modifier-like and semantic properties like scope of modification (see also Tang 2007).

Tang (2006a, b)

(iii)



In addition, Formosan nominal modification expressions in (45b-c) and (46b-c) may have been historically grammaticalized into the following three types of XPs in accordance with the presence/absence of overt marking and the possibility/impossibility of predicative modification (cf. Dikken 2003, 2006).

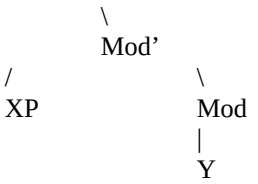
Three Types of Formosan Non-juxtaposed XPs Grammaticalized from Juxtaposed Nominal Modification Expressions (cf. Tang et al. 1998):

(iv) unmarked, non-predicative, non-modifier-like XPs: bare DemP, NumP, PosP, etc.

(v) a. marked, non-predicative, modifier-like XPs: DemP/NumP/PosP/DP-Y, etc. and/or Y-DemP/NumP/PosP/DP, etc.

b. XP may be projected as complement of Mod, which in turn may be lexically realized as Y, a functional item that may be more grammatical than a complementizer:

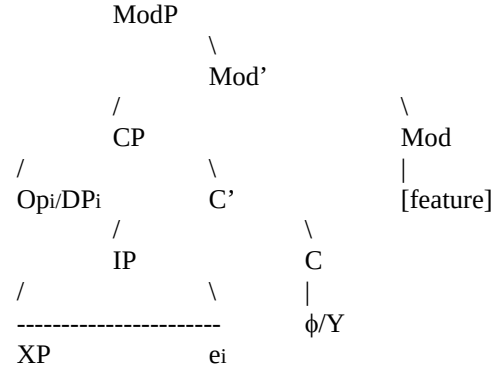
c.



(vi) a. unmarked/marked, predicative, modifier-like XPs: NumP/PosP/DP/ VP-ϕ/Y, etc. and/or ϕ/Y-NumP/PosP/DP/VP, etc.

b. XP may be a predicate of a relative clause CP, which may be projected as complement of Mod and the head of which may be phonetically null and/or lexically realized as Y, a functional item that may be less grammatical than the one generated as Mod.

c.



And, among others, see Tang et al. (1998) for a discussion of the non-pronominal nature of the empty category in Paiwan relative clauses and Chang (1998) for that of the operator nature of the co-indexed element in Tsou relative clauses.

4. Head-initial vs. head-final

We have shown in sections 2 and 3 that various kinds of word order variations may be observed with nominal modification expressions in Formosan languages. Compare, for instance, the relevant word order patterns of non-case inflected languages like Paiwan in (50), a Formosan language with the most generalized subordinator-grammaticalized nominal modification marker, with those of case-inflected languages like Puyuma in (51), a Formosan language with the most generalized case-grammaticalized nominal modification marker.

Paiwan: VSO and VOS (Tang et al. 1998)

(50) a. The demonstrative must be overtly marked and precede the noun.
b. The numeral must be overtly marked and may appear in either side of the noun.
c. The overtly marked possessive must precede the noun, whereas the unmarked possessive must follow the noun.
d. The relative clause must be overtly marked and may appear in either side of the noun.

Puyuma: VSO and VOS (Teng 2007)

(51) a. The demonstrative must be overtly marked and precede the noun.
b. The numeral must be overtly marked and may appear in either side of the noun.
c. The possessive must be unmarked and precede the noun.
d. The relative clause must be overtly marked and may appear in either side of the noun.

From the similarities and differences in overt marking and flexible distribution of nominal modification expressions between Paiwan (50a-d) and Puyuma (51a-d), an accessibility hierarchy of Formosan nominal expressions grammaticalized into nominal modifiers may be given in (52) below (see also (49) and footnote 29).

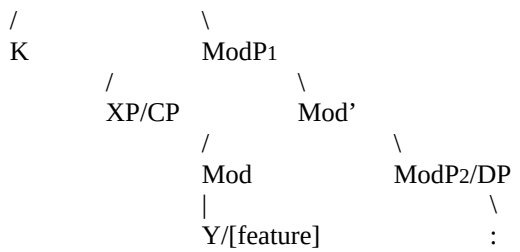
Grammaticalization Accessibility Hierarchy of Formosan Juxtaposed Nominal Expressions into Non-juxtaposed Nominal Modifiers

(52) relative clauses > numerals > possessives > demonstratives

And the more accessible the nominal expression may be grammaticalized, the more flexible the nominal expression may appear. Hence, in Paiwan and Puyuma while overtly marked relative clauses and numerals may appear in either side of the noun, overtly marked possessives and demonstratives may not (see also footnotes 3-5).

It should be pointed out here that in addition to adjunction structures, one may propose that the functional projection of the posited ModP may be generated as heads along the backbone of nominal, as shown in (vii) below (cf. Alexiadou 1997 and Cinque 1999).

(vii)



We will leave this issue for further research with respect to the choice of adjunction and/or head approach(es) in Formosan and other types of languages (cf. Kahnemuyipour and Massam 2004).

Next, examine against Paiwan (50) and Puyuma (51) non-case inflected Formosan languages like Kavalan (53), in which non-subordination/case marker *ay* may be used as nominal modification marker.

Kavalan: VSO and VOS (Chang 2000a)

(53) a. The unmarked demonstrative must follow the noun.
b. The *ay*-marked demonstrative must precede the noun, whereas the *a*-marked demonstrative must follow the noun.
c. The overtly marked numeral must precede the noun.
e. The overtly marked possessive must precede the noun, whereas the unmarked possessive must follow the noun.
f. The relative clause may be overtly or covertly marked and may appear before or after the noun.

In view of Kavalan (53a, d, e), to be compared with Paiwan (50a, c, d) and Puyuma (51a, c, d), one more tendency concerning the correlation between the form and distribution of Formosan nominal modification expressions may be summarized in (54).

Correlation Between the Form and Distribution of Formosan Nominal Modification Expressions

(54) a. Non-modifier-like bare elements tend to appear postnominally.
b. Non-predicative modifier-like non-bare elements tend to appear prenominally.
c. Relative clauses tend to appear prenominally and postnominally.

Based on Formosan nominal observations like (50)-(54), it is thus posited in Tang (2006a) and assumed in this paper that in Formosan nominals non-modifier-like bare elements may be generated in Spec positions, and modifier-like non-bare elements and relative clauses in adjunction positions. In addition, while the nominal Spec positions may be mostly head-initial, the nominal adjunction positions may be head-initial or final. In other words, in Formosan nominals the Spec and adjunction positions may be subject to two distinct directionality requirements.[30]

As already discussed in section 3, several grammatical factors may have been historically involved in Formosan languages to have given rise to the mentioned seemingly idiosyncratic contrasts in headedness between non-modifier-like elements and modifier-like elements/relative clauses, on the one hand, as well as between nominal Spec positions and adjunction positions, on the other. For one thing, a distinct choice of DP-DP* juxtaposition in (45) and/or KP-KP* juxtaposition in (46) would make a difference in the synchronic structures of the Formosan nominals. For another, a distinction in the degree of grammaticalization of nominal modification markers in (49) would also result in a difference in the degree of grammaticalization of Formosan juxtaposed nominal expressions like relative clauses, numerals, possessives and demonstratives in (52).[31]

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30 In Huang's (1982) and Chung's (1998) analyses of phrase structure of Chinese and Chamorro, similar proposals are also suggested. For example, demonstratives may be projected as specifiers; modifiers may appear in adjunction structure; and the directionality of the projections of specifiers and non-specifiers may be distinct.

31 As pointed out in Tang (1993, 2005, 2006a, 2007), among others, in Chinese type of languages nominal modification markers like Mandarin *de* may appear with relative clauses, numerals and possessives, but not with deictic demonstratives, though, being an SVO language, these Mandarin nominal modification expressions, marked or unmarked, all need to occur in prenominal positions.

Three other kinds of factors will also be demonstrated in the following discussion, two of which may have been diachronically involved. First, recall that, as proposed in section 2, a historical process of fusion of case markers with demonstratives may have taken place in Formosan languages like Puyuma, Amis and Rukai. In these languages the case inflected demonstratives all must precede the nouns, regardless of whether they may be obligatorily marked, as in Puyuma, optionally marked, as in Amis, or obligatorily unmarked, as in Rukai.[32] The head-final pattern of the case inflected unmarked demonstratives in Amis and Rukai, as opposed to the head-initial pattern of the non-case inflected unmarked demonstratives in Formosan languages like Kavalan, may be attributed to the posited historical process of case fusion between the fused case markers in head positions and the fused demonstratives in Spec/adjunction positions. That is, an adjacency condition may have been historically required between the case markers and demonstratives in Formosan languages like Puyuma, Amis and Rukai so as to be able to be accessible to the considered historical development of case fusion,[33] a distributional constraint that may have been irrelevant for non-case inflected Formosan languages like Paiwan and Kavalan.

A second historical factor that may have been related to the development of the synchronic word order pattern of Formosan nominals may be the development of the word order pattern of Formosan clauses. It is shown in the above discussion that in Formosan languages the diachronic unmarked or general pattern of the projection of nominal Spec positions may be head-initial, a word order pattern that may be considered as agreeable with the general clausal predicate-initial pattern of most of the Formosan languages. However, note that, as pointed out in footnote 2, among non-case inflected Formosan languages Saisiyat is an SVO language and Thao is changing from VSO to SVO. In addition, as demonstrated in footnote 6, in Thao and Saisiyat elements like demonstratives, numerals and possessives, marked or unmarked, may appear in prenominal positions,[34] a distributional pattern that may also be observed with SVO languages like Chinese (55) (see also footnote 31).[35]

Along the lines of the thought proposed in this paper, both the DP-DP* pattern of juxtaposition and grammaticalization of juxtaposed nominal expressions into non-juxtaposed nominal modifiers may have also been historically involved with non-case inflected, non-predicate-initial languages like Chinese. Among others, see Tang (2007) for a discussion of the grammaticalization and generation of Chinese nominal modification markers like Mandarin *de*.

32 According to Wu (2006), the default word order of Amis is Verb-Actor-Undergoer or, to put it differently, VSO and VOS in actor voice sentences and VOS in non-actor voice sentences. As for the word order of Rukai, as stated in Zeitoun (2000b), it is VSO and VOS.

33 In Puyuma, as pointed out in footnote 12 and (51c), the possessive must be unmarked and precede the noun, in which the possessive may also be case inflected, a synchronic nominal word order pattern that may also be attributed to the posited historical requirement of adjacency between case markers and possessives. Among others, see also Tang (2006a) for a discussion of the possibility of licensing of the possessive by a nominal head distinct from K, D, F, Num, CL and N as in footnote 29.

34 In Saisiyat the possessor may be marked with possessive or genitive marker. From the data exemplified in Yeh (2000), it seems that the Saisiyat possessor may precede the noun regardless of the case marker it may carry.

Saisiyat (Yeh 2000)

(i) a. niSo tatpo' si-pasibae:aeh hi hi:ae'?
your hat IV-lend Obl who
'To whom was your hat lent?'

b. ni 'obay taw'an si-ba:iw ila.
Gen 'obay house IV-buy Part
''obay's house was already seld.'

c. sia sarara' ka 'amana'a taw'an.

Chinese

(55) a. zhe haizi
this kid
'this kid'

b. san zhi gou
three CL dog
'three dogs'

c. [san bang] de rou
three pound DE meat
'three pounds of meat'

d. ta de meimei

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he like Acc my house
'He likes my house.'

d. hiza' ['an 'iban a] tatpo'.
that Gen 'iban A hat
'That is 'iban's hat.

[35] Another distributional similarity between Chinese and Saisiyat modifiers lies in the observation that in Chinese and Saisiyat the relative clause may precede the case and/or the demonstrative marker, a distributional possibility that may not be permitted in non-SVO Formosan languages like Paiwan and Puyuma. Compare, for instance, grammatical Chinese (i) and Saisiyat (ii) with ungrammatical Paiwan (iii).

Chinese

(i) [ta mai] de na ben shu
he buy DE that CL book
'that book that he bought'

Saisiyat (Yeh 2000)

(ii) a. ['ima sekela' hi 'obay] ka ma'i:aeh
'IMA know Acc 'obay Nom man
m-wa:i' ila.
AV-come ILA
'The man that knew 'obay came.'

b. yako sarara' ['ima kayzaeh kita'-en] ka hiza' kapina:o'.
I like Rel good see-PV Obl that lady
'I like that beautiful lady.'

Paiwan

(iii) a. *na-v-en-eLi ti kai [k-in-asengseng ni kui] a tua (zua a) kun.
Perf-buy-AV Nom Kai make-PV Gen Kui A Obl that A skirt

b. *na-v-en-eLi ti kai tua [k-in-asengseng ni kui] a zua a kun.
Perf-buy-AV Nom Kai Obl make-PV Gen Kui A that A skirt

Note, however, that while the word order pattern of Chinese nominals is strictly head-final, that of Saisiyat nominals is not, as shown in (iv).

Saisiyat (Yeh 2000)

(iv) a. raro:o' niSo si-ngowip ila ma'an.
name your IV-forget Part I-Gen
'I forgot your name.'

b. yako sarara' ka hiza' kapina:o' ['ima kayzaeh kita'-en].
I like Obl that lady Rel good see-PV
'I like that beautiful lady.'

A similar word order pattern may also be said about Thao.

Thao (Huang 2000a)

(v) yaku' myaran m-ang-qtu-qtu [[nak a] 'azazak
I often AV-miss-Red my A kid
[i tuLi m-acupiS pataSan]].
Loc Kaoxiong AV-study book
'I often miss my son that studies in Kaoxiong.'

he DE sister
'his sister'

e. [ni zoutian mai] de shu
you yesterday buy DE book
'book that you bought yesterday'

A third factor concerning the synchronic prenominal/postnominal distribution of Formosan nominal modification expressions may have to do with the different semantic readings generally denoted by Formosan prenominal and postnominal elements or, to put it differently, by Formosan N-final and N-initial constructions. Recall that in Formosan nominals, general speaking, the unmarked occurrence of non-modifier-like elements may be to the right of the nouns, whereas relative clauses may appear before or after the nouns. A similar distribution of Formosan nominal modification may also be found with restrictive and non-restrictive relative clauses. That is, while the unmarked occurrence of Formosan non-restrictive relative clauses may be to the right of the nouns (cf. Liu 2004), Formosan restrictive relative clauses may precede or follow the nouns.

To begin with, consider Formosan languages like Amis and Tsou, in which, according to Wu (1995) and Chang (1998), respectively, the distribution of restrictive and non-restrictive relative clauses seems to be the opposite of one another. In Amis (56a-b) and Tsou (57a-b), for instance, restrictive relative clauses need to occur in prenominal positions, as in (56a) and (57a), and non-restrictive relative clauses in postnominal positions, as in (56b) and (57b).

Amis (Wu 1995)

(56) a. ma-ulah ci aki tura [[maro?-ay i fiyaw
AF-like Nom Aki that.Acc live-AY Prep neighborhood
nira] a fafahiyan].
3S.Gen lin woman
'Aki likes the woman who lives in his neighborhood.'

b. Ma-ulah ϕ-ci aki ci [panay-an, [t-u-ra
AV-like NOM-NCM Aki NCM Panay-DAT DAT-NCM-that
maroq-ay i fiyaw nira]].
live-REL PREP neighborhood 3S.GEN
'Aki likes Panay, who lives in his neighborhood.'

Tsou (Chang 1998)

(57) a. io [[i-si ait-i ne hucuma] ci pasuya]
Nom NAF.Rea-3S see-PF Past the next day CI Pasuya
mo ma-ayo to fuzu.
AF-Past AF-catch Obl wild boar
'Pasuya who was seen yesterday caught the wild boar.'

b. a m-i-ta meel-u uh-ne tfuya 'e [pasuya ci
Foc AF-Rea-3S can go-Obl Tfuya Nom Pasuya CI
[m-i-ta t-m-acong-o]].
AF-Rea.3S sick-AF
'Pasuya, who is sick, cannot go to Tfuya.'

In Formosan languages like Paiwan and Puyuma, by contrast, while restrictive relative clauses may appear before or after the nouns, non-restrictive relative clauses need to follow the nouns, as pointed out in Tang et al. (1998) and Teng (2007), respectively.

Paiwan (Tang et al. 1998)[36]

(58) a. na-pacun ti kui tua zua a [[pu-?ulu] a ti kai].
Perf-see.AV Nom Kui Obl that A smart.AV A TI kai
'Kui saw that Kai who is smart.'

b. *na-pacun ti kui tai [[pu-?ulu] a ti kai].
Perf-see.AV Nom Kui Obl smart.AV A TI Kai

(59) a. na-pacun ti kui tua zua a [ti kai a [pu-?ulu]].
Perf-see.AV Nom Kui Obl that A TI Kui A smart.AV
'Kui saw that Kai who is smart.'

b. na-pacun ti kui tai [kai a [pu-?ulu]].
Perf-see.AV Nom Kui Obl Kai A smart.AV
'Kui saw Kai, who is smart.'

Puyuma (Teng 2007)

(60) a. na [[ma-ra-rengay] na Tau]
DF.NOM ITR-RED-tell DF.NOM person
'the person who's talking'

b. na [Tau na [ma-ra-rengay]]
DF.NOM person DF.NOM ITR-RED-say
'the person who is speaking'

(61) a. Dua=ku ki-a-edek-a [kanmu na
come=1S.NOM get-a-bless-PJ 2P.OBL LK
[ulaya kaDi Takuban]].
exist here Tabuban
'I came to ask for blessings from you, who live here in the Tabuban.'

b. an ma-ruwa=ta ki-ma-Dayar [taita na
when ITR-can=1P.NOM get-ITR-discuss 1P.NEU LK
[tara-puyuma na paseket]] i, ala
<ITR>speak-Puyuma DF.NOM clear TOP maybe
ma-laDam kilengaw.
ITR-know listen
'If we, those who speak Puyuma clearly, can converse, maybe they can understand (Puyuma).'

Differently from those like Amis and Tsou as well as those like Paiwan and Puyuma, Formosan languages like Atayal may exhibit prenominal/postnominal restrictive and non-restrictive relative clauses. Examine first Atayal restrictive relative clauses, as shown in (62).

Squliq Atayal (Wulai) (Huang 1993)

(62) a. sic-on-mu balay [[n-wah-an-mu m-ita? hira?]
like-UN-1S.G very Past-come-AN-1S.G M-see yesterday

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[36] In Formosan languages, as discussed in Tang (2006a), prenominal and postnominal relative clauses should not be treated as transformationally related to one another. That is, for example, object nominals in Paiwan (58a) and Paiwan (59a) as well as those in Paiwan (58a) and (59b) may not be related to one another via operation of movement of the relative clauses or nouns. Several reasons are given in Tang (2006a) to support such an analysis. First, the restrictive/non-restrictive interpretation of prenominal and postnominal relative clauses may be different. Second, in addition to the impossibility of a similar movement account of the word order variation between the prenominal and postnominal demonstratives/possessives, the location of the nominal modification markers may also be distinct in prenominal and postnominal relative clauses. Third, according to Chomsky (1995), operator movement is the only kind of movement that adjunct phrases are subject to (cf. Alexiadou 1997 and Cinque 1999).

squliq] qasa.
person that
'I like the person whom I went to visit yesterday very much.'

b. sic-on-mu balay [squliq [n-wah-an-mu mita?
like-UN-1S.G very person Past-come-AN-1S.G M-see
hira?]] qasa.
yesterday that
'I like the person whom I went to visit yesterday very much.'

c. *sic-on-mu balay squliq qasa [[n-wah-an-mu
like-UN-1S.G very person that Past-come-AN-1S.G
m-ita? hira?].
M-see yesterday

According to Huang (1993), in Wulai Squliq Atayal restrictive relative clauses may precede the nouns, as in grammatical (62a), and follow the nouns, as in grammatical (62b). They however may not appear after the demonstratives, as in ungrammatical (62c) (cf. Liu 2004).

Liu (2004), by comparison, points out that in Jianshi Squliq Atayal non-restrictive relative clauses may precede the nouns, as in (63a), and follow the nouns, as in (63b).[37]

Squliq Atayal (Jianshi) (Liu 2004)[38]

(63) a. siy-on na? sayun qu? [[m-n-aniq mqu?] tali?].
like-PV Obl Sayun Nom AV-Perf-eat snake Tali
'Tali, who has eaten snakes, is liked by Sayun.'

b. siy-on na? sayun qu? [Tali? [m-n-aniq mqu?]].
like-PV Obl Sayun Nom Tali AV-Perf-eat snake
'Tali, who has eaten snakes, is liked by Sayun.'

Recall that, as pointed out in footnote 5, Tang (2006a) observes that in Paiwan the prenominal overtly marked modifier-like possessive may act as nominal predicate of a relative clause, but the same may not be said about the postnominal unmarked non-modifier-like possessive. Wu (2006) also indicates that in Amis it is the prenominal marked/unmarked possessive, not the postnominal unmarked possessive, which may be used in a contrastive context. These two observations together with the discussed general postnominal distribution of non-modifier-like elements and non-restrictive relative clauses seem to further suggest that in mostly predicate-initial Formosan languages it is not without reasons that the postulated juxtaposed nominal structures like (45a) and (46a) may have been historically developed into the

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37 Based on an analysis of non-restrictive relative clauses as a kind of free relative clause which forms a coordinate structure with its antecedent, De Vries (2006) however claims that universally non-restrictive relative clauses must appear in postnominal positions (cf. Huang 1982 and Arnold 2007, among others).

In addition, De Vries (2006) claims that, as opposed to Kayne (1994), restriction should be represented by complementation, and apposition by coordination. That is, restrictive relative clauses are of complementation structure of D, and non-restrictive relative clauses of coordination structure with DP. However, as discussed in Tang (2006a, 2007) and this paper, both Formosan and Chinese-type of languages may exhibit non-predicative nominal elements that may be covertly or overtly marked and may appear in prenominal or postnominal positions.

38 In Jianshi Squliq Atayal, according to Liu (2004), *ka?*-marked relative clauses are restrictive externally headed relative clauses, whereas unmarked relative clauses are non-restrictive internally headed relative clauses. See also Liu (2004) for a discussion of the problems that Jianshi Squliq Atayal nominals may raise for an anti-symmetric kind of word order account as in Kayne (1994).

synchronic non-juxtaposed N-final constructions like (45b) and (46b) or into the synchronic non-juxtaposed N-initial constructions like (45c) and (46c).

That is, in addition to the above-mentioned distinctions in the degree of grammaticalization of nominal modification markers and nominal modification expressions as well as in the occurrence of intrinsic case inflection and clausal word order change, pragmatic/discourse factors may also have been involved in the historical processes of word order variation in Formosan nominals, the last of which may have resulted in the tendency of the unmarked postnominal distribution of Formosan non-predicative non-modifier-like elements and non-intersective non-restrictive relative clauses (see also footnote 29).[39]

5. Conclusion

So far we have shown in the previous discussion that the internal structure of Formosan nominals may have undergone a historical development of from a flat, juxtaposed type of structure to a hierarchical, non-juxtaposed type of structure and that two distinct ways of juxtaposition DP-DP* and KP-KP* may have been involved in the process of the grammaticalization of Formosan subordination and case markers into nominal modification markers. In addition, a distinction in the degree of the grammaticalization of Formosan nominal modification markers may also have resulted in a difference in the degree of the grammaticalization of Formosan nominal modification expressions.

As a result, synchronically three kinds of nominal modification elements may be observed in Formosan nominals: (A) unmarked non-predicative non-modifier-like XPs, (B) marked non-predicative modifier-like XPs, and (C) unmarked/marked relative clauses. While the general distribution of Formosan non-modifier-like elements may be to the right of the nouns, the word order pattern of which may agree with the mostly predicate-initial word order pattern of Formosan clauses, other diachronic factors like the presence/absence of intrinsic case inflection and clausal word order change may also have given rise to a distinct N-final word order pattern. All these and other relevant historical processes may thus have yielded the seemingly idiosyncratic synchronic variations in marking and ordering of nominal modification expressions within and cross Formosan languages.

Two other kinds of syntactic differences among Formosan nominals will be discussed here, the first of which is concerned with the grammaticality/ungrammaticality of stranded Formosan nominal modification markers. In Formosan languages like Paiwan, for instance, nominal modification marker *a* may not be stranded, as pointed out in Tang et al. (1998).

Paiwan (Tang et al. 1998)

(64) a. na-v-en-eLi ti kai tua zua (*a)
Perf-buy-AV Nom Kai Obl that A
'Kai bought that.'

b. na-v-en-eLi ti kai tua [ni kui] (*a)
Perf-buy-AV Nom Kai Obl NI Kui A
'Kai bought Kui's.'

c. na-v-en-eLi ti kai tua telu (*a)
Perf-buy-AV Nom Kai Obl three A
'Kai bought three.'

[39] Among others, see De Vries (2006) and Arnold (2007) for a discussion of more syntactic and semantic contrasts between restrictive and non-restrictive relative clauses.

d. na-v-en-eLi ti kai tua va?uan (*a)
Perf-buy-AV Nom Kai Obl new A
'Kai bought a new one.'

e. na-v-en-eLi ti kai tua [k-in-asengseng ni kui] (*a)
Perf-buy-AV Nom Kai Obl make-PV Gen Kui A
'Kai bought the one that Kui made.'

f. na-v-en-eLi ti kai tua kun (*a).
Perf-buy-AV Nom Kai Obl skirt A
'Kai bought a skirt.'

In Formosan languages like Kavalan, by contrast, nominal modification marker *ay* may be stranded, as stated in Chang (2000a).

Kavalan (Chang 2000a)

(65) niana-su t-um-ibuq ay.
what-you fall-AV AY
'(lit) The thing that fell down is your what?'

There seem to be two plausible reasons for the grammaticality contrast between Paiwan (64) and Kavalan (65) in the stranding of nominal modification markers. First, recall that, as shown in section 3, in Paiwan, not Kavalan, the nominal modification marker may have clausal counterparts that may act as nominative and subordination markers. And, as also pointed out in Tang et al. (1998) and Tang (1999), none of these two grammatical markers may be stranded, either.

Paiwan

(66) a. v-in-eLi ni kai (*a). (Tang. et al. 1998)
buy-PV Gen Kai Nom
'Kai bought something.'

b. l-em-auy ti kai (*a). (Tang 1999)
agree-AV Nom Kai A
'Kai agrees.'

According to IJbema (2002), the etymology of a grammaticalizing element may constraint its subsequent grammatical functions. If this kind of hypothesis of the origin of grammaticalization may be correct, it is not surprising that the Paiwan, not Kavalan, nominal modification marker may be subject to a non-stranding constraint similar to that of the nominative and subordination markers. That is, in Paiwan case markers, complementizers and nominal modification markers all need to be cliticized to a certain element following them. And, as will be shown in the following discussion, the host in question may be either the whole noun phrase or the XP in (v)-(vi) of footnote 29.

Second, Paiwan nominal modification marker *a* and Kavalan nominal modification marker *ay* seem to differ in the nature of cliticization. That is, Paiwan nominal modification marker *a* seems to act as proclitic, and Kavalan nominal modification marker *ay* enclitic. For instance, in Paiwan, as illustrated in Tang (1999), temporal adjuncts may occur sentence-initially, among other positions.

Paiwan (Tang 1999)

(67) a. katiaw na-v-en-eLi ti kai tua zua a kun.
yesterday Perf-buy-AV Nom Kai Obl that A skirt
'Yesterday Kai bought that skirt.'

b. na-v-en-eLi katiaw ti kai tua zua a kun.
Perf-buy-AV yesterday Nom Kai Obl that A skirt
'Yesterday Kai bought that skirt.'

c. na-v-en-eLi ti kai katiaw tua zua a kun.

Perf-buy-AV Nom Kai yesterday Obl that A skirt
'Yesterday Kai bought that skirt.'

d. na-v-en-eLi ti kai tua zua a kun katiaw.
Perf-buy-AV Nom Kai Obl that A skirt yesterday
'Yesterday Kai bought that skirt.'

However, as also demonstrated in Tang (1999), in the case of Paiwan finite clausal complements like (68) the only position that temporal expressions may not appear in is the one between complementizer *tu* and predicate complexes *na-v-en-eLi* 'bought'.

Paiwan (Tang 1999)

(68) k-em-elang ti kui tu [(*katiaw) na-v-en-eLi (katiaw)
know-AV Nom Kui TU yesterday Perf-buy-AV yesterday
ti kai (katiaw) tua zua a kun (katiaw)].
Nom Kai yesterday Obl that A skirt yesterday
'Kui knows that Kai bought that skirt yesterday.'

And, based on a similar asymmetric distribution of temporal adjuncts in other Formosan languages like Tsou, Tang (1999) attributes the ungrammaticality of the separation of Paiwan complementizer proclitic *tu* and embedded predicate complexes *na-v-en-eLi* to the failure of proper cliticization between them in (68) (see also footnotes 40-41).

In the case of Paiwan relative clauses, by comparison, nominal modification marker *a* may be cliticized to the head noun, as in (69b), in a way similar to the cliticization of nominative marker *a* to the subject noun phrase, as in (69a).

Paiwan

(69) a. v-in-eLi ni kai a kun.
buy-PV Gen Kai Nom skirt
'Kai bought the skirt.'

b. v-in-eLi ni kai a [k-in-asengseng ni kui] a kun.
buy-PV Gen Kai Nom make-PV Gen Kui A skirt
'Kai bought the skirt that was made by Kui.'

In addition, like complementizer *tu* in (70a), nominal modification marker *a* in (70b) may also be cliticized to the predicate complexes.

Paiwan

(70) a. k-em-elang ti kui tu [na-v-en-eLi ti kai tua kun].
know-AV Nom Kui TU Perf-buy-AV Nom Kai Obl skirt
'Kui knows that Kai bought a skirt.'

b. na-v-en-eLi ti kai tua kun a [k-in-asengseng ni kui].
Perf-buy-AV Nom Kai Obl skirt A make-PV Gen Kui
'Kai bought a skirt that was made by Kui.'

Sentences like (71) below are however ungrammatical, in which Paiwan nominal modification marker *a* fails to be properly cliticized to predicate-complexes *k-in-asengseng* 'made', an adjacency requirement that is also found in (68).[40]

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[40] In Paiwan the same kind of adjacency requirement may also be found between case markers and predicate-complexes of relative clauses.

Paiwan

(i) na-v-en-eLi ti kai tua [(*katiaw) k-in-asengseng ni kui] a kun.
Perf-buy-AV Nom Kai Obl yesterday made-PV Gen Kui A skirt
'Kai bought the skirt that was made by Kui.'

Paiwan

(71) *na-v-en-eLi ti kai tua kun a [katiaw k-in-asengseng ni kai].
Perf-buy-AV Nom Kai Obl skirt A yesterday make-PV Gen Kai

In Kavalan, according to Chang (2000a), nominal modification marker *ay* may be cliticized to the relative clause preceding it, as in (72a), or to the predicate complexes of the preceding relative clause, as in (72b).

Two other things need to be mentioned here. For one thing, as discussed in Tang (2002b), in Paiwan complementizers like *ka*, which have not been grammaticalized from case markers, may also act as proclitic, as in (iib) and (iiib-c).

Paiwan (Tang 2002b)

(ii) a. ti kai timadu?
TI Kai she
'Is she Kai?'

b. ini (*ka), ini *(ka) ti kai.
not KA not KA TI Kai
'No, she is not Kai.'

(iii) a. ini ka [na-k-em-an ti kai tua vutu katiaw].
not KA Perf-eat-AF Nom Kai Obl meat yesterday
'Kai did not eat meat yesterday.'

b. *ini ka [katiaw na-k-em-an ti kai tua vutu].
not KA yesterday Perf-eat-AF Nom Kai Obl meat

c. *ini ka [ti kai na-k-em-an tua vutu katiaw].
not KA TI Kai Perf-eat-AF Obl meat yesterday

For another, the ungrammaticality of (iiib-c), (68) and (71) seems to suggest further that an embedded topic may not be permitted in Paiwan. Similar observations may also be found with Mandarin enclitic *de* (cf. Aldridge 2004).

Chinese

(iv) a. wo renshi [ni zuotian kandao] de ren.
I know you yesterday see DE man
'I know the man that you saw yesterday.'

b. ?*wo renshi [zuotian ni kandao] de ren.
I know yesterday you see DE man

(v) a. wo renshi [mai ne ben shu] de ren.
I know buy that CL book DE man
'I know the man that bough that book.'

b. *wo renshi [ne ben shu, mai] de ren.
I know that CL book buy DE man

In view of the impossibility of embedded topics in Paiwan and Chinese, one may assume with Saito and Murasugi (1990) and propose that in Kavalan and Chinese-type of languages, with the grammaticality of stranded nominal modification markers, the functional projection of ModP may be of head structure as in (vii) of footnote 29, whereas in Paiwan-type of languages, with the ungrammaticality of stranded nominal modification markers, it may be of adjunction structure (cf. Tang 2007, the discussion below, and footnote 41).

Note that Liu (2004) attributes the ungrammaticality of Jianshi Squliq Atayal nominal modification marker *ka?* in free relatives like (vi) below to the same reason that rules out its English counterpart *that* in (vii).

Squliq Atayal (Jianshi) (Liu 2004)

(vi) yaba-maku? qu? (*ka?) m-n-aniq ngta? qasa (*ka?).
father Nom Lin AV-Perf-eat chicken that Lin
'Who has eaten that chicken is my father.'

English (Liu 2004)

(vii) a. *(What) Mr. Birkway likes is literature.

b. *That Mr. Birkway likes is literature.

That is, Jianshi Squliq Atayal nominal modification marker *ka?* and English *that* may act as complementizers, but not relative pronouns (see also footnote 41).

Kavalan (Chang 2000a)

(72) a. me-rizaq=iku tu [m-Ramaz tu tamun]-ay tazungan.
AV-like=I Obl AV-cook Obl vegetable-AY woman
'I like the woman that is cooking.'

b. me-rizaq=iku tu [m-Ramaz-ay tu tamun] tazungan.
AV-like=I Obl AV-cook-AY Obl vegetable woman
'I like the woman that is cooking.'

In other words, unlike that of Paiwan nominal modification marker *a*, the stranding of Kavalan nominal modification marker *ay* may not violate any condition on proper cliticization in Kavalan, hence the grammaticality of (65).

Similarly, in non-predicate-initial languages like Chinese, in which Mandarin nominal modification marker *de* may also act as enclitic (see Huang 1987 and Tang 1990, among others), the stranding of Mandarin nominal modification marker may also be permitted.[41]

Chinese

(73) wo mai-le [ta xie gei nuer] de (shu).
I buy-LE he write for daughter DE book
'I bought the book that he wrote for his daughter.'

However, as opposed to Kavalan *ay* in grammatical (72b), cliticization of Mandarin *de* to the predicate of the preceding relative clause is ungrammatical in (74).

Chinese

(74) *wo mai-le [ta xie de gei nuer] (shu).
I buy-LE he write DE for daughter book

The well-formedness distinction between Kavalan (72b) and Chinese (74) seems to suggest further that while they are both enclitics, Kavalan and Mandarin nominal modification markers may differ in the level of the operation of cliticization.

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41 Among others, see Tang (2007) for a discussion of other relevant issues concerning the possibility/impossibility of the stranding of Mandarin nominal modification marker *de*.

Note that, as pointed out in footnote 40, most, if not all, of the Formosan nominal modification markers co-occurring with relative clauses may function as complementizers, not relative pronouns, given the fact that they may not appear in free relative clauses. If this line of thought may be correct, the grammaticality of Chinese sentences like (i) seems to suggest further that Mandarin *de* may have the dual function of complementizer and relative pronoun.

Chinese

(i) [wo xihuan] de shi shu.
I like DE be book
'What I like is books.'

This kind of claim may be diachronically evidenced in that, as discussed in Tang (2007), *zhi* in classical Chinese (i) carries the meaning of 'these' and it is diachronically related to *de*. And it is well known that cross-linguistically relative pronouns may have been grammaticalized from demonstratives and interrogatives.

Chinese (Zhuangzi 1.10)

(ii) zhi er chong you he zhi
these two worm again what know
'And what do these two worms know?'

Note also that, as pointed out in Tang (2007), Mandarin *de* marked with noun complement clauses may not be stranded.

Chinese (Tang 2007)

(ii) tajia dou zhidao [ni shengbing] de *(xiaoxi).
everyone all know you sick DE news
'Everyone knew the news that you were sick.'

A plausible account of the ungrammaticality of (ii) may be that in cases with noun complement clauses, Mandarin nominal modification marker *de* may act only as complementizer, but not as relative pronoun.

In addition to the above-discussed grammaticality contrast in the occurrence of stranded Formosan nominal modification markers, another syntactic distinction among Formosan nominals may have to do with the possibility/impossibility of the so-called remnant TP-movement of the elements contained in the relative clauses. According to Aldridge (2004), for example, in Formosan languages like Seediq a topicalized agent may follow the head noun of a relative clause.

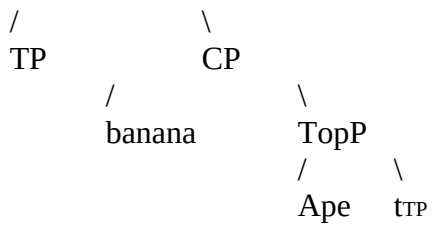
Seediq (Aldridge 2004)

(75) b-n-ari-na chiiga bulebun ka Ape.[42]
-Perf-buy-3sErg yesterday banana Top Ape
'the banana(s) that Ape bought yesterday'

Moreover, she claims that under Kayne's (1994) D-CP analysis of Seediq relative clauses as in (76), the stranded word order in (75) may be accounted for straightforwardly. That is, topicalization may take place first, moving the agent *Ape* to clausal-initial topic position. The relative head noun then may move to the Spec of CP. Finally, the remnant TP fronts to the Spec of DP (cf. footnote 40).

Seediq (Aldridge 2004)

(76)



Recall that, as shown in example (ii) of footnote 21, repeated below as (77), in Seediq a *ka*-marked relative clause may appear before or after the head noun.

Seediq (Chang 2000b)

(77) a. egu riyung [wada puq-un na laqi] ka ido.
many very Perf eat-PV Gen kid KA rice
'The rice that the kid ate is a lot.'

b. egu riyung ido ka [wada puq-un na laqi].
many very rice KA Perf eat-PV Gen kid
'The rice that the kid ate is a lot.'

And, as also pointed out in Chang (2000b), in Seediq an unmarked relative clause may also precede or follow the head noun.

Seediq (Chang 2000b)

(78) a. egu riyung [wada puq-un na laqi] ido.
many very Perf eat-PV Gen kid rice
'The rice that the kid ate is a lot.'

b. egu riyung ido [wada puq-un na laqi].

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[42] Recall that, as pointed out in footnote 21, in Seediq *ka* may function as nominal modification and nominative markers, the latter occurrence of which may be optional.

Seediq (Chang 2000b)

(i) m-ege pila walis (ka) pawan.
AV-give money Walis Nom Pawan
'Pawan gave Walis money.'

And, as pointed out in Chang (2000b), a head noun unmarked with case and nominal modification markers may be observed within the Seediq relative clause (cf. Aldridge 2004).

Seediq (Chang 2000b)

(ii) egu riyung [wada puq-un ido laqi].
many very Perf eat-PV rice kid
'The rice that the kid ate is a lot.'

many very rice Perf eat-PV Gen kid
'The rice that the kid ate is a lot.'

Note that, compared to Seediq externally headed *ka*-marked relative clauses like (77) and unmarked relative clauses like (78), Seediq remnant relative clauses like (75) may exhibit two syntactic peculiarities. That is, in (75) the remnant relative clause is not overtly marked with modification marker *ka* and the location of the head noun patterns with that of the head noun in the so-called internally headed relative clause as in Seediq (79) below.[43]

Seediq (Aldridge 2004)

(79) s-n-malu sapah na tama
-Perf-build house Erg father
'the house Father built'

In addition to Seediq, there appear other kinds of Formosan relative clauses in which the heads of the relative clauses may be claimed to be internally located. Consider first Formosan languages like Squliq Atayal, in which, according to Huang (1993), the head noun of a relative clause may precede a temporal expression, as demonstrated in (80), to be compared with Squliq Atayal externally headed relative clauses like (62a-b).

Squliq Atayal (Wulai) (Huang 1993)

(80) sic-on-maku? balay nbuw [b-in-azi-su? abaw hira?] qasa.
like-UN-1S.G very drink =Past=buy-2S.G tea yesterday that
'I like the tea you bought yesterday very much,'

Liu (2004) claims further that Jianshi Squliq Atayal relative clauses like (81) ought to be treated as internally headed relative clauses.

Squliq Atayal (Jianshi) (Liu 2004)

(81) [m-n-aniq sayun ngarux hira?] ga? kut-un na? tali?.
AV-Perf-eat Sayun bear yesterday Top behead-PV Obl Tali
'As for the bear which ate Sayun yesterday, it will be beheaded by Tali.'

Note here that a closer examination of Squliq Atayal internally headed relative clauses (80)-(81) against Seediq remnant relative clause (75) and internally headed relative clause (79) may indicate that all these relative clauses under consideration are not overtly marked with nominal modification markers, nor are their head nouns overtly marked with case markers.

Examine next Formosan languages like Amis, in which, according to Wu (1995), the head noun modified by an overtly marked relative clause may be followed by an object noun phrase.[44]

Amis (Wu 1995)

(82) a. ma-patay tu kuya [mi-kalat-ay a wacu ci aki-an].
AF-die Asp that.Nom AF-bite-AY Lin dog Acc1 Aki-Acc2
'The dog that bit Aki is dead.'

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43 In Aldridge's (2004) movement analysis of Seediq relative clauses like (75), they are related to externally headed relative clauses, but not internally headed relative clauses (see also footnote 42).

44 Wu (1995) points out that the seeming internal structure in (82a-b) may be observed only with Amis relative clauses in which the head nouns express the agent participation.

Amis (Wu 1995)

(i) *ma-ulah kuya [mi-paku'-an a matuasay aku ci panay-an].
AF-like that.Nom PF1-beat-PF2 Lin old:man 1S.G Acc1 Panay-Acc2

She also contends that as in Amis the predominant word order is VSO, cases like (82a-b) may be derived to agree with this word order pattern.

b. ma-stu' aku ku [sa-pi-cikcik a pu'ut tu dateng].
PF-break 1S.G Nom IF-PI-cut Lin knife Acc vegetable
'I broke the knife which Aki will cut the vegetable with.'

As opposed to internally headed relative clauses like Squliq Atayal (80)-(81) and Seediq (79), Amis relative clauses like (82a-b) may be treated as resulting from an operation of the so-called remnant movement posited in (76) to Amis externally headed relative clauses.

Such an analysis may however be problematic in that these sentence-final object noun phrases, which do not semantically agree with the verbs of the relative clauses, may not act as topics of the relative clauses.[45] In fact, as pointed out in footnote 40, embedded topics are generally not allowed within relative clauses in languages like Paiwan and Chinese.

In addition, with the presence of an overt nominal modification marker *a* in Amis (82), it is also impossible to apply Aldridge's (2004) postulation of remnant movement of TP in Seediq (76) to Amis (82). For one thing, in (76) the complementizer in C and the remnant elements in TP do not form a constituent. For another, in (76) C', which is not a maximal projection, is generally not accessible for the considered operation of phrasal movement.[46]

In Formosan languages like Paiwan, by contrast, no such remnant movement may be allowed for a relative clause, regardless of whether the relative clause-final element may be a non-topicalized argument, as in (83b) and (84b), or a temporal adjunct, as in (85b).

Paiwan

(83) a. d-em-ukudukuL ti kui tua zua a [p-in-acun-an
beat-AV-Red Nom Kui Obl that A see-PV
ni kai] a caucau.
Gen Kai A person
'Kui is beating that man whom Kai saw.'

b. *d-em-ukudukuL ti kui tua zua a [p-in-acun-an
beat-AV-Red Nom Kui Obl that A see-PV
a caucau ni kai].
A person Gen Kai

(84) a. na-pacun-aken tua zua a [na-d-em-ukuL
Perf-see-AV-I Obl that A Perf-beat-AV

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45 Among others, see Watanabe (2004) for a typological parametrization of the possibility-impossibility contrast in existence of the internally headed relative clause.

46 In Teng (1997) and Huang (2000b) Puyuma examples like (i) and (ii), respectively, are analyzed as involving internally headed relative clauses.

Puyuma (Teng 1997)

(i) a. alupe la [na sagar mi-kabung na walak].
sleep.AF Asp Nom like.AF AF-wear hat Nom child
'The child that likes to wear a hat has slept.'

b. ku-ekan-aw [tu-d-in-eru na bitenun kan pilay].
1BG-eat-NAF 3BG-cook<Asp>cook Nom egg Obl Pilay
'I ate the egg cooked by Pilay.'

Puyuma (Huang 2000b)

(ii) me-nau=ku Da [penu-a-kpuk Da Tau Da walak].
AV-see=I.Nom Obl beat.AV-Red Obl man Obl kid
'I saw a man that is beating the kid.'

However, it seems that along the lines of thought proposed in Teng (2007), Puyuma sentences like (ia) and (ib), (ii) may better be treated as externally headed relative clauses, the latter of which may syntactically parallel with Amis (82a-b) and Seediq (75).

tai kai] a caucau.
Obl Kai A person
'Kui saw that man who beat Kai.'

b. *na-pacun-aken tua zua a [na-d-em-ukuL
Perf-see-AV-I Obl that A Perf-beat-AV
a caucau tai kai].
A person Obl Kai

(85) a. tengLay ti kui tua zua a [su-k-in-cu
like.AV Nom Kui Obl that A you-bring-PV
katiaw] a ?ucia.
yesterday A tea
'Kui likes that tea which you brought yesterday.'

b. *tengLay ti kui tua zua a [su-k-in-cu
like.AV Nom Kui Obl that A you-bring-PV
a ?ucia katiaw].[47]
A tea yesterday

Similarly, in SVO languages like Chinese the remnant movement in question may also be not allowed, topics or non-topics (see also Tang 2007).

Chinese

(86) a. wo renshi [xie ne ben shu] de ren.
I know write that CL book DE man
'I know the man that wrote that book.'

b. *wo renshi [xie de ren ne ben shu].
I know write DE man that CL book

(87) a. wo renshi [zuotian lai] de ren.
I know yesterday come DE man
'I know the man that came yesterday.'

b. *wo renshi [lai de ren zuotian].
I know come DE man yesterday

Taking into consideration all the above-mentioned different kinds of contrasts, the following four points ought to be noted. First, sentences like Seediq (75), Amis (82) and Puyuma (ib), (ii) of footnote 46 may not be derived from the so-called remnant movement of TP in Aldridge (2004). Instead, what is involved in these sentences seems to be a kind of rightward movement of the non-head elements in the relative clauses.

Second, the observed rightward movement of the non-head element in the relative clause to the right of the head noun of that relative clause seems not to be constrained by the overt/covert realization of the nominal modification markers. Hence, the grammaticality of Seediq (75), without overt nominal modification markers, as well as that of Amis (82), Puyuma (ib), (ii) of footnote 46, with overt nominal modification markers.

Three, if what is relevant is indeed an operation of rightward movement, the syntactic structure of relative clauses in languages like Paiwan and Chinese may be distinct from that in languages like Seediq, Amis and Puyuma, hence the

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[47] Paiwan cases like (i) are however grammatical, in which the temporal adjunct is associated with the matrix predicate, not the predicate of the relative clause.

Paiwan

(i) na-pacun-aken tua zua a [su-k-in-cu] a ?ucia katiaw.
Perf-see.AV-I Obl that A you-bring-PV A tea yesterday
'Yesterday I saw that tea which you brought.'

ungrammaticality of the rightward movement under consideration in the former type of languages.[48]

Fourth, the so-called internally headed relative clauses in predicate-initial languages like Seediq and Squliq Atayal seem to be found only with relative clauses that are not overtly marked. In SOV languages like Japanese, Imbabura Quechua and Navajo, however, internally headed relative clauses may be overtly marked.[49]

Japanese (Watanabe 2004)

(88) Mary-ga [John-ga [zibun-no gakusei-ga juuyouna
Mary-NOM John-Nom self-GEN student-NOM important
kasetsu-o teianshita to] jimanshite-no]-no kekkan-o
hypothesis-ACC proposed C boasted-had C-GEN defect-ACC
shitekishita.
pointed out
'Mary pointed out a defect of the important hypothesis which John had boasted that his student proposed.'

Imbabura Quechua (Cole and Hermon 1994)

(89) [Wambra wagra-ta randi-shka] ali wagra-mi.
boy cow-ACC bought-C good cow-VALIDATOR
'The cow that the boy bought is a good cow.'

Navajo (Platero 1974)

(90) [Ashkii t'iis yi-yaa-di sida-(h)aa] naa'iikeez.
boy tree 3-beneath-at PERF.3.sit-C PERF.3.fall
'The three under which the boy was sitting fell over.'

Due to the limited sets of data available now, we will leave for further study these issues and their implications for the analysis assumed in this paper.[50]

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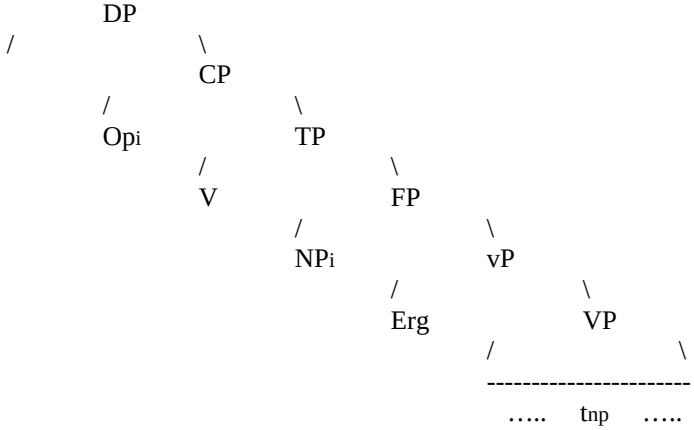
48 Is this contrast in the possibility of rightward movement an indication that in Seediq, Amis and Puyuma, not Paiwan and Chinese, relative clauses may be projected as Spec of ModP in (vi c) or (vii) of footnote 29, in which some sort of Spec-head agreement chains may be linked to make the relative clause transparent for the considered rightward movement? We will leave for further research this issue and the properties of the posited rightward movement.

49 According to Aldridge (2004), the head noun of an internally headed relative clause moves to a position called Spec of FP, below T and above the base position of the agent. The head noun then may be co-indexed with and bound by an operator in the Spec of CP, as shown in (i) (cf. Liu 2004).

Aldridge (2004)

(i)



An analysis of this sort then may have no bearing with the overt/covert realization of nominal modification markers in Formosan nominals.

50 A research of ours that has also been in progress is concerned with the clausal modification structure in Chinese and Formosan-type of languages. In Formosan languages, for instance, elements

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denoting adverbial meanings may be projected as predicates, adverbs and adjunct clauses, each with a distinct syntactic structure.

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