

Functional Extension vs. Grammaticalization: A Typological Study of Modification Markers in Formosan Nominals*

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It is proposed in this paper that the internal structure of proto-Formosan nominals may have undergone a historical development from juxtaposed to non-juxtaposed type of syntactic structure, in which 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 historical processes of using subordination and case markers as modification markers for Formosan non-juxtaposed nominal structures, the recursive DP-DP* pattern may have been accessible to all kinds of Formosan languages and, via functional extension, may have given rise to the appearance of subordinator-marked modifiers, in which no adverbial/complement or coordination relation is still obtained in synchronic syntax. With the recursive KP-KP* pattern, which may have been accessible only to intrinsically case-inflected Formosan languages, case-marked modifiers may also have appeared via grammaticalization, in which case markers no longer express grammatical function and referential specification. In addition, five other relevant historical processes may also be observed in Formosan languages. (a) Case and coordination markers may have been 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. (d) An SVO word order change may have taken place. And (e) an interpretational processing requirement may have taken place.

Key words: functional extension, grammaticalization, case markers, subordinators, coordinators, nominal modification markers, Formosan

1. Introduction

It is well known that in Formosan languages elements of identical forms may be found to mark distinct grammatical relations. In Paiwan, for instance, an element identical

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to the nominative *a* in (1a) is also observed to co-occur obligatorily with expressions like 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) kun¹
 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’

As discussed in Tang et al. (1998) and Tang (2006a), in view of Paiwan examples like (1a-c), three language-specific questions need to be answered. (i) Can the nominative marker *a* in (1a) be grammatically associated with the nominal modification marker *a* in (1b-c)? (ii) Can the demonstrative in (1b) be structurally related to the relative clause in (1c)? And (iii) Can the *a*-marked *kun* ‘skirt’ in (1c) be syntactically analyzed as head noun that is internally located within a relative clause?

Nominal observations different from Paiwan (1b-c) are also found with other Formosan languages. In Bunun, to give an example, the demonstrative and relative clause in (2b-c) are both marked with *tu*, an element that is morphologically identical to the subordination marker *tu* in (2a). In Bunun, according to Zeitoun (2000a), *tu* does not act as case or coordination marker.

Ting-chi Tang, Xian-Hui Tang, Stacy F.-C. Teng, Jing-Lan Joy Wu, Elizabeth Zeitoun, and Siqi Zeng for the discussion of some related data in various kinds of languages.

Abbreviations used in the paper are as follows: Acc: Accusative; AF: Agent Focus; Aux: Auxiliary; AV: Agent Voice; BG: Bound Genitive; Caus: Causative; CL: Classifier; Conj: Conjunction; DAT: Dative; DEM: Demonstrative; DF: Definite; F: Feminine; FOC: Focus; Fut: Future; Gen: Genitive; ID, Indef: Indefinite; IF: Instrument Focus; Impf: Imperfective; Itr: Intransitive; IV: Instrumental Voice; LF: Locative Focus; lin, LK: linker; Loc: Locative; LV: Locative Voice; M: Masculine; NAF: Non-Agent Focus; NCM: Noun-class Marker; NEG: Negation; Neu: Neutral; Nom: Nominative; NPRS: Non-personal; nsp: non-specific; Obl: Oblique; Part: Particle; per: personal; Perf: Perfective; PJ: Projective; Pl: Plural; PRED: Predicate; Prep: Preposition; Pt: Past; PV: Patient Voice; Rea: Realis; Red: Reduplication; Rel: Relativizer; RF: Referential Focus; RV: Referential Voice; sg, S: Singular; sp, SPEC: Specific; Top: Topic.

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.

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 child A like-PV-I.Obl
 'I like that child.'
- c. [[maliba' vai' tu] tina'] hai masial. (Zeitoun 2000a)
 carry child TU mother Top good
 'The mother that carries the child is good.'

To give another example, in Amis, as claimed in E. Liu (2003), the marking of the demonstrative and relative clause in (3b-c) is syntactically associated with the coordination marker *a* in (3a). In Amis, according to E. Liu (2003), *a* also serves as subordination marker, though, as stated in Wu (1995, 2000), it does not function as case marker.

Amis (E. 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) pu'tu].
 AV-lost Nom-that IV-PI-kill Gen-aki Acc-pig A knife
 'The knife which Aki used to kill pigs was lost.'

With the aforementioned morphosyntactic comparisons between Paiwan (1a-c) and Bunun (2a-c), as well as Amis (3a-c), two main cross-linguistic issues remain unaddressed concerning the origin of modification markers in Formosan nominals. For one thing, how are elements like Paiwan nominative *a*, Bunun subordinator *tu* and Amis coordinator *a* grammatically related to nominal modification markers in these and other Formosan languages? For another, why is it that, for instance, while in Amis (3a) the presence of the coordination marker is required, in Amis (3b-c) the absence of the nominal modification markers is however permitted? By contrast, as illustrated in Paiwan (1b-c), nominal modification markers in Paiwan may never be absent. Is this a result simply from a distinction in phonological deletion or, more significantly, from contrasts in historical development and word order (see Tang 2006a)?

Before going into a detailed discussion of how case, subordination, and coordination

markers may have become modification markers in Formosan nominals, note first that in Formosan languages like Tsou, Amis, and Sqliq Atayal, for example, coordinators may also be used as adverbial, complement, or subordination markers. To capture this kind of morphosyntactic variation in these three languages, Tsai (2006, 2007) proposes that in proto-Formosan clauses a conjunctive projection may either evolve into a head-complement/subordination projection or into a modifier-head projection, in which coordinators may have been grammaticalized into complement, subordination and adverbial markers.

In this paper it is posited that proto-Formosan nominals may have undergone a historical development from a juxtaposed to a non-juxtaposed type of syntactic structure, in which 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. Also, like the historical evolution of Formosan clausal coordinate structures into subordinate structures suggested in Tsai (2006, 2007), proto-Formosan non-juxtaposed nominal structures may have been further developed into a head-modifier or modifier-head relation (cf. E. Liu 2003 and 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 null and/or subordinator-based nominal modification marking, in the latter instance of which no adverbial/complement or coordination relation is still obtained in syntax (see also footnote 40). With the recursive KP-KP* pattern, which may have been accessible only to intrinsically case-inflected Formosan languages, case-based nominal modification marking may have also appeared, in which case markers no longer express grammatical function or referential interpretation. Note however that two different mechanisms may have been used in the historical development of subordination and case markers into nominal modification markers: an operation of functional extension in the case of DP-DP* juxtaposition and an operation of grammaticalization in the case of KP-KP* juxtaposition.

In addition, five other relevant historical processes may also be observed in Formosan languages: (a) Case and coordination markers may have been developed first into subordination markers in clauses and then into modification markers in nominals (see also footnote 17, Tang 1999 and Tsai 2007). (b) Nominal modification markers may have been associated first with relativization type of modifiers and then with non-relativization type of modifiers (see also Himmelmann 1997 and Tang 2006a). (c) An intrinsic case inflection of nominal modification expressions may have taken place. (d) An SVO word order change may have taken place. And (E) an interpretational processing requirement 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 languages, in particular, the marked-unmarked contrast, the prenominal-

postnominal contrast, the cased-caseless contrast and the free-bound contrast. Section 3 examines the two distinct ways by which modification markers may have come into appearance in Formosan nominals. In addition, the internal structure of Formosan nominals is also touched upon with respect to the functional projections of nouns and modification markers. Section 4 investigates the prenominal-postnominal difference in distribution of Formosan restrictive and non-restrictive relative clauses, an interpretational contrast that, in addition to the structural specifier-adjunction distinction, may also be relevant for the observation that both N-initial and N-final patterns are found with mostly predicate-initial languages like Formosan. Other historical processes that may have been involved with the synchronic headedness of Formosan nominal structures will also be discussed. Section 5 concludes this paper with a discussion of the historical development of complement and subordination markers in Formosan clauses, in which two different kinds of conjunctive projections are proposed: one with overt realization of the conjunctive head and the other with covert realization of the conjunctive head (cf. Tsai 2006, 2007). The former type may have given rise to the coordinator-grammaticalized complement/subordination markers, and the latter type the non-coordinator-grammaticalized complement/subordination markers.

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 more 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

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

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

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'

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 child
'three children'
b. (*ma-)telu a kun
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, or Tibeto-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 (2002) for a discussion of the syntactic distinction between Paiwan nominalization and relativization, and Tang (2006a) for that between Paiwan attributive and predicative modification (cf. Kayne 1994, den Dikken 2003, and Simpson 2001).

- 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) (L. Huang 1993)

- (10) a. kuzu qani
 shoe this
 ‘this shoe’
 b. laqi’ qasa
 child that
 ‘that child’

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

- (11) a. *qasa laqi’
 that child
 b. *[qasa na] laqi’
 that NA child

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

- c. *[qasa ka] laqi'
that KA child
- d. *laqi' [na qasa]
child NA that
- e. *laqi' [ka qasa]
child KA that

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

In addition to the aforementioned marked-unmarked and prenominal-postnominal contrasts, a third nominal distinction between Paiwan and Squliq Atayal is that various kinds of modification marking are 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

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 (L. Huang 2000a)

- (i) a. [haya wa] 'azazak mi-La-liLi'.
that WA child AF-Red-stand
'That child 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 child
[i tuLi m-acupiS pataSan]].
Loc Kaohsiung AF-study book
'I often miss my son that studies in Kaohsiung.'

Saisiyat (Yeh 2000)

- (ii) a. hini' korkoring
this child
'this child'
- 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.'

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]
 child KA Gen Sayun
 ‘Sayun’s child’
 b. s-m-away [[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, or relative clauses are rather complicated. To make the comparison more exhaustive, 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 on either side of the noun, though their form is distinct.

Kavalan (H. Chang 2000a)

- (14) a. razat zau/’nay
 man this that
 ‘this/that man’

-
- d. hiza’ ’aehae’ ’alaw
 that one fish
 ‘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 A. Liu 2004).

- b. [zau/'nay ay] razat⁸
this that AY man
'this/that man'
c. razat [a yau]
man A that
'that man'

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

C'uli' Atayal (Mayrinax) (L. 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 child KA' this
'Sayun liked this child.'

Rukai (Budai) (Zeitoun 2000b)

- (17) a. kai ababayane
this woman
'this woman'
b. *ababayane kai
woman this

Before turning to §3 for a discussion of the historical development of modification markers in Formosan nominals, three more things need to be pointed out here concerning the morphological and syntactic properties of demonstratives. First, in view of the discussed ordering contrasts of the overtly and covertly marked demonstratives between Formosan languages like Paiwan (4a), Kavalan (14b-c), C'uli' Atayal (15)-(16) and those like Sqliq Atayal (10), Kavalan (14a), Rukai (17a), it does not seem true that the Formosan

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

⁹ Like Sqliq 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 L. Huang (2000c), in Mayrinax *ka'* may mark subordination, but not case or coordination.

bare and non-bare demonstratives should be all generated in the same position (cf. Chung 1998 and Kahnemuyipour & 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, like relative clauses, overtly marked non-bare demonstratives, numerals, or possessives may act as modifier-like elements and appear in adjunction position, a non-specifier position that is not subject to the Formosan head-initial constraint and is not available for the base generation of 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 example (19), Chinese (20), on the one hand, and ungrammatical English (21), on the other, we also assume with Tang (2006a, 2007a), 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)

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

Chinese (Tang 1990, 1993, 2007a)

- (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, 2007a) that in languages like Formosan or Chinese the demonstrative is licensed by the head of FP, a nominal functional phrase that is projected between DP and NumP (cf. Bernstein 1997, Bruge 2002, and Kahnemuyipour

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

& Massam 2004).

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

Puyuma (L. 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.

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

Puyuma (L. 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 (L. 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 L. Huang (2000b), the *i*-marked and *kan*-marked demon-

stratives 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 is 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’ pandian.
 RV:cook-soup Obl mother child-that.Nom vegetable
 ‘Mother cooks the soup for that child.’
 b. ’isubu’ tina’ baial ’iskaan-tan.
 RV:wrap mother leaf fish-that.Obl
 ‘Mother wraps that fish with the leaf.’

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

¹¹ In Formosan languages, not every demonstrative preceding or following the noun may be treated as intrinsically case-inflected itself. Neither Paiwan nor Kavalan, for instance, seems 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.’

consideration seems to be lexically rather than syntactically derived. In addition, the ungrammaticality of Puyuma and Amis demonstratives preceded by other agreeing case markers seems to suggest further that intrinsically 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

Kavalan (H. Chang 2000a)

- (ii) a. qan-an-ku=pa ya tiRuR 'nay.
 eat-PV-I=Fut Nom egg that
 'That egg will be eaten by me.'
 b. supaR=iku tu sunis 'nay.
 know(AV)=I Acc child that
 'I know that child.'

By comparison, like the demonstratives in Puyuma or 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 child-your
 '(lit) This is your child.'
 c. la LiaLingulu sasada kuini lasu.
 then outside rest that man
 '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 is found with postnominal demonstratives in languages like Atayal, see L. Huang (2006).

¹² Two more kinds of Puyuma nominal 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 intrinsically 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

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

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 demonstratives and possessives themselves may both 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 possessive. The answer seems to be positive, as illustrated in (iii) below, though some kind of case-feature absorption between the demonstrative and 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 his/her/their.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 intrinsically 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 §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 across Formosan nominals. The prenominal/postnominal distribution of these non-modifier-like and modifier-like elements may also vary greatly within and across Formosan nominals.

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

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.'

Summary of the Clausal Counterparts of Formosan Nominal Modification Markers

(28)		case	subord	coord	none	
a.	Paiwan:	<i>a</i>	+ (Nom)	+	–	–
b.	Bunun:	<i>tu</i> ¹⁴	–	+	–	–
c.	Amis:	<i>a</i>	–	+	+	–
d.	S. Atayal:	<i>na</i> ¹⁵	+ (Gen)	–	–	–

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

Tsou (Zeitoun 2000c)

- (i) a. oko eni
 child this
 ‘this child’
- b. con ci oko
 one CI child
 ‘one child’
- c. kaebu ci oko
 happy CI child
 ‘child that is happy’
- (ii) a. uk’a ci oko-’u.
 not-have CI child-my
 ‘I have no child.’
- b. mainci mi-ko mongsi?
 why AF-you cry
 ‘Why do you cry?’

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

Yami (C. Chang 2000)

- (iii) a. ipangan ya
 knife this
 ‘this knife’
- b. zaku a among
 big A fish
 ‘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
 now everyday Nom uncle A AV-sing and AV-describe
 su kavavadanen.
 Obl story
 ‘My uncle sings and tells stories everyday.’

e.	S. Atayal:	<i>ka</i> ¹⁶	–	–	–	+
f.	C. Atayal:	<i>ka'</i>	–	+	–	–
g.	Kavalan:	<i>ay</i>	–	–	–	+
h.	Kavalan:	<i>a</i>	+ (Nom)	–	–	–

From the above-given summary, it is 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 no marking of case, subordination, or 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 is 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 subordination and case 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 a non-balanced, unidirectional

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

Squliq Atayal (Jianshi) (A. Liu 2004)

- (i) wal pong-an na' watan qu' hngyang [na' m-anik 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* nominal modification markers in Thao (i) of footnote 6 should be regarded as more like Squliq Atayal *ka* and Kavalan *ay* in that, according to L. 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 (L. Huang 2000a)

- (i) yaku' m-in-zay ya damadama-iza.
 I AV-Perf-say YA quiet-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 marker in Paiwan, a kind of observation that is rather common in Formosan languages.

matrix-complement or modifier-modifiee relation in the functional projections of the verb, it is hence rather natural that in the process of historical development the same kind of clausal subordination marker may also have been functionally extended to denote a 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 is expressed by the element conjoined to the noun by the coordinator (cf. E. Liu 2003). 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. E. Liu 2003). Such being the case, it is then not surprising that using a completely new marker may have also been considered a possible way of marking Formosan nominal modification.¹⁹

If our discussion thus far is on the right track, the accessibility hierarchy of functional extension of clausal elements to mark nominal modification in Formosan languages is summarized as in (29); cf. (39).

¹⁸ In Formosan languages the clausal subordination markers that are also used for marking nominal modification are mainly those introducing complement clauses rather than adverbial clauses, presumably because clausal complement markers may be regarded as semantically emptier than clausal adjunct markers (cf. Tsai 2007). The clausal subordination markers in question may introduce finite clauses, as in C'uli' Atayal, non-finite clauses, as in Paiwan, Amis, and Tsou, or both as in Bunun. It thus seems that in Formosan languages a non-finite complement marker may have been more easily developed into a nominal modification marker than a finite complement marker. In West Malayo-Polynesian languages like Yami, the nominal modification marker is also a subordination marker that may introduce non-finite clauses.

¹⁹ It should be noted here that in Formosan languages like Sqliq Atayal and Kavalan, in which an element different from the case, subordination, and coordination markers is used for nominal modification marking, the non-finite complement clause is covertly marked, and the finite complement clause overtly marked. These two Sqliq 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 our observation in footnote 18 that in Formosan languages a non-finite subordination marker may have been more easily used as nominal modification marker than a finite subordination marker.

Accessibility Hierarchy of Functional Extension of Formosan Clausal Markers into Nominal Modification Markers:

- (29) a. subordination markers > coordination markers
- b. complement markers > adverbial markers (see the discussion in footnote 18)
- c. non-finite complement markers > finite complement 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 proto-Formosan nominals may have undergone a historical development from a juxtaposed to non-juxtaposed type of syntactic structure, in which 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 (cf. Teng 2007). Also, like the historical evolution of Formosan clausal coordinate structures into subordinate structures suggested in Tsai (2006, 2007), the proto-Formosan non-juxtaposed nominal structure may have been further developed into a modifier-head or head-modifier relation (cf. E. Liu 2003 and 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/complement or coordination relation is still obtained in syntax (see also footnote 40). With the recursive KP-KP* pattern, which may have been accessible only to intrinsically case-inflected Formosan languages, case-marked modifiers may have also appeared, in which case markers no longer express grammatical function and referential interpretation.

Note however that two different mechanisms may have been used in the historical development of subordination and case markers into nominal modification markers: an operation of functional extension in the case of DP-DP* juxtaposition and an operation of grammaticalization in the case of KP-KP* juxtaposition. Given the fact that most of the Formosan languages are not intrinsically case-inflected and the assumption that KP-KP* juxtaposition is accessible only to intrinsically case-inflected Formosan languages, it thus follows that in Formosan nominals case markers are less frequently found for nominal marking than subordinators.

In addition, five other relevant historical processes may also be observed in Formosan languages. (a) Case and coordination markers may have been developed first into subordination markers in clauses and then into modification markers in nominals (see also footnote 17, Tang 1999, Tsai 2007). (b) Nominal modification markers may have been first associated with relativization type of modifiers and then with non-relativization type of

modifiers (see also Himmelmann 1997, Tang 2006a). (c) An intrinsic case inflection of nominal modification expressions may have taken place. (d) An SVO word order change may have taken place. And (e) an interpretational processing requirement may have taken place.

To illustrate how the aforementioned proposals 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 §2, demonstratives in Formosan languages like Puyuma, Amis, Rukai, and Bunun may have been intrinsically case-inflected; in the first three languages it may have been due to some historical process of fusion with adjacent case markers. We thus assume that in juxtaposed nominal structures the functional projection of such intrinsically case specified elements may have been treated as DP, without the projection of case, or KP, with the projection of case.

Second, via an operation of analogy required by syntactic conditions on juxtaposed elements, expressions like non-case-inflected demonstratives, numerals and relative clauses may also have been treated as nominals in the sense that, like co-occurring head nouns, they may have been projected as DP or KP in accordance with the exclusion or inclusion of case markers (see also the discussion in footnotes 3-5).

With these two assumptions and the general requirement that the juxtaposed phrases need to be of the same categorial type, as shown in (30a) and (31a), respectively, the juxtaposed non-head DP and KP may have been developed into non-juxtaposed, unmarked and/or marked nominal modification expressions (see footnote 28 for a brief discussion of the non-juxtaposed structures).

DP-DP* Juxtaposition (cf. (45))

- (30) a. $XP/XP-\alpha + N \leftarrow DP_1 - DP_2 \rightarrow N + XP/\alpha\text{-}XP$
 b. α : functional extension of clausal subordinators, etc.

KP-KP* Juxtaposition (cf. (46))

- (31) a. $XP-\beta + N \leftarrow KP_1 - KP_2 \rightarrow N + \beta\text{-}XP$
 b. β : grammaticalization of case markers

In the case of (30a-b), with juxtaposition of DP projection, the possible overt α modification markers would be those functionally extended or morphologically distinct from clausal subordination markers. The former may include Paiwan *a*, Bunun *tu*, Amis *a*, and C'uli' Atayal *ka'*, and the latter Squiliq Atayal *ka* and Kavalan *ay* (see also footnotes 20 and 23).

In the case of (31a-b), 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. L. 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 ki<a>umal-an.
 able <ITR>answer this.OBL ID.OBL three-NPRS <RED>ask-NMZ
 'He was able to answer these three questions.'

Like Paiwan, as stated in Teng (2007) and shown in (32a-b), Puyuma requires the demonstrative to precede the noun with an overt marker. Unlike Paiwan, however, the marker associated with the Puyuma demonstrative is 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 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 on 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.'
- 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 intrinsic non-fused case-inflected demonstratives (cf. footnote 13), also exhibits nominal 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 child-this.Nom
'These two children 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 as 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 intrinsically 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 intrinsically 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 (Siqi Zeng, 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 be 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 on 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 child-my
 ‘The girl that wears a red coat is my child.’
- 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), the grammaticalized nominative *na* may have also been further functionally extended into a non-agreeing kind of generalized nominal modification marker.²⁰

²⁰ In non-case-inflected Formosan languages like Seediq, in which, according to H. Chang (2000b), non-finite and finite complement clauses are both covertly marked, it is also nominative *ka* that has been chosen for grammaticalization into nominal modification marker associated with relative clauses, as exemplified in (ii), to be compared with (i).

Seediq (H. Chang 2000b)

- (i) a. laqi nii
 child this
 ‘this child’
- b. kingan huling
 one dog
 ‘one dog’

Puyuma (Teng 2007)

- (38) a. taita na [pa-la-ladam kanaDi na teLu-a-ami]
 IP.NEU LK CAUS-RED-teach those.OBL LK 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 of that job.’

Taking into consideration the observed higher accessibility of nominative markers to be grammaticalized into nominal modification markers in case-inflected Formosan languages like Puyuma, Bunun, or Rukai, the grammaticalization accessibility hierarchy under consideration is given in (39).

Accessibility Hierarchy of Grammaticalization of Formosan Case Markers into Nominal Modification Markers

- (39) nominative markers > non-nominative markers (see also the discussion in footnote 21)

Compared to Puyuma, Bunun, or 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.²¹ By contrast, recall that it has been demonstrated that in Bunun both

-
- c. huling paru
 dog big
 ‘big dogs’
- (ii) a. egu riyung [wada puq-un na laqi] ka ido.
 many very Perf eat-PV Gen child KA rice
 ‘The rice that the child ate is a lot.’
- b. egu riyung ido ka [wada puq-un na laqi].
 many very rice KA Perf eat-PV Gen child
 ‘The rice that the child ate is a lot.’

A similar observation may also be made 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 H. Chang (2000a), are also covertly marked.

²¹ 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).

the DP-DP* and KP-KP* patterns may have been accessible for the development 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, or Rukai for the involvement of these two distinct types of juxtaposition in the historical development of the 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 is present, as in (2b-c) and (34)-(35), and in Bunun examples with case-inflected demonstratives projected as KP, *a*-marking is 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.

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.²²

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 shall leave to future research the question of whether the demonstratives at issue may act as relative pronouns in Amis or Rukai.

²² 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' is not preceded by an agreeing genitive marker.

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

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) suggest two grammatical properties concerning this kind of development of genitive nominal modification marking. (a) It is the generalized nominal modification marker *tu* rather than the non-generalized nominative or genitive marker *that* is 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, not a structural case (cf. Woolford 2006).

As for the relevancy of the DP-DP* juxtaposition pattern for marking of 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 is permitted between possessor and noun nor as well between demonstrative and noun, respectively.

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’

Bunun (Siqi Zeng, 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 child-your
 ‘(lit) This is your child.’
- 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* relates 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.²³

Note that if an analysis along this line of thinking is on the right track, that is, intrinsically case-inflected Formosan languages should be typologically distinguished from non-case-inflected Formosan languages in the historical process of development of nominal modification marking, the postulated juxtaposition patterns in (30a-b) and (31a-b) need to be typologically specified as (45a-b) and (46a-b).

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

- (45) a. $XP/XP-\alpha + N \leftarrow DP1 - DP2 \rightarrow N + XP/\alpha-XP$
 b. α : functional extension of clausal subordinators, etc.

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

- (46) a. $XP-\beta + N \leftarrow KP1 - KP2 \rightarrow N + \beta-XP$
 b. β : grammaticalization of case markers

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, or Puyuma, nominal modification expressions other than relative clauses may also be overtly marked and that in Formosan languages like Atayal or Seediq, by contrast, overt marking seems to be found only with relative clauses,²⁴ a marking distinction in nominal modification that, as discussed in Tang (2006a), further results in a structural prenominal-postnominal contrast in base generation of their various kinds of marked/unmarked nominal modification expressions.

Similarly, as stated in Himmelmann (1997), in Tagalog, for instance, noun modifiers

²³ Under this analysis, Kavalan nominal modification marker *a* that, in addition to the absence of the required co-occurrence agreement in case feature, 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 Sqliq Atayal *na* in (28d). In other words, while the DP-DP* pattern of juxtaposition may have given rise to the historical development of Formosan subordination markers and case markers into nominal modification markers, the latter origin may however be more restrictive and less productive.

Note that an example of further functional extension of case-grammaticalized nominal modification marker is observed in the aforementioned non-case-agreeing nominal modification marker *na* in Puyuma (22b) and (38). And, as stated in L. Huang (2000b), in Puyuma case markers like oblique *Da* may also function as clausal subordination marker.

²⁴ With the possibility of overt marking of some, but not all, of the non-relative clause expressions, Formosan languages like Tsou, Saisiyat, or Rukai may be placed between these two types of languages.

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 (Himmelman 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 (Himmelman 1997)

- (48) a. (nje) shok i mire
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. Himmelman (1997) thus argues that the historical development 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 functional extensions. If Himmelman's claim is correct, the linkers in Tagalog may be considered as more functionally extended than those in Albanian. In other words, in languages where the so-called linkers may have undergone the process

of functional extension, demonstratives may have been developed 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, or Puyuma as well as in non-case-inflected Formosan languages like Paiwan, Kavalan, or Thao, for instance, those nominal modification expressions that are overtly marked include both demonstratives and relative clauses, to be compared with Formosan languages like Atayal or Seediq, in which only relative clauses are overtly marked. And, as stated in footnote 24, Formosan languages like Tsou, Saisiyat, or Rukai are placed between these two types of languages, in which demonstratives are not overtly marked. In other words, the degree hierarchy of functional extension of nominal modification markers in Formosan languages may be shown as in (49).

Degree Hierarchy of Functional Extension of Formosan Nominal Modification Markers

- (49) a. Paiwan, Kavalan, Thao, Amis, Bunun, Puyuma²⁵ >
 b. Tsou, Saisiyat, Rukai >
 c. Atayal, Seediq

Before turning to §4 for a discussion of the correlation between the prenominal/postnominal distribution of Formosan modification expressions and the posited historical processes, it should be pointed out here that if our analysis of the development of Formosan subordination and case markers into nominal modification markers is on the right track, these nominal modification markers, as claimed in Tang (2006a), should 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], [+/-referential], [+/-plural], etc. of the co-occurring nouns is not determined by these subordinator- or case-based nominal modification markers themselves (cf. Kahnemuyipour & Massam 2004).²⁶ By contrast, they may better be analyzed as involving a functional projection of Mod(ifier) P(hrase) that

²⁵ As already discussed in this section, in Formosan languages like Paiwan, Kavalan, Thao, Amis, or 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, or Rukai, grammaticalization of case markers into nominal modification markers in Puyuma may be considered more generalized than that in Bunun or Rukai.

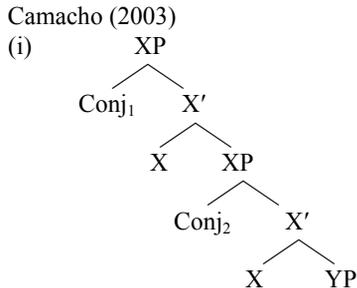
²⁶ In other words, for instance, it does not mean that synchronically, for Formosan languages like Bunun, in which both subordination marker *tu* and nominative marker *a* may have been developed into nominal modification markers, *tu*-marking denotes singular subjects, whereas *a*-marking implies multiple subjects. Nor does it mean that in Bunun *a*-marking denotes internally headed relative clauses, whereas *tu*-marking does not.

expresses modification relations of various sorts, nominal or clausal (see also footnote 28).²⁷

With respect to the synchronic hierarchical non-juxtaposed structure of the Formosan covertly and overtly marked nominal modification expressions, we assume with Tang (2006a, b) that in Formosan nominals relative clauses dominated by ModP, marked or unmarked, are located in adjunction positions and that while unmarked non-modifier-like demonstratives, numerals, and possessives are generated in Spec positions, their marked modifier-like counterparts dominated by ModP are placed in adjunction positions. By adjunction 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, 2007a; cf. Camacho 2003).²⁸

²⁷ Among others, see also Tang (1990, 1993, 2007a) for a non-determiner analysis of nominal modification marker *de* in Chinese type of languages.

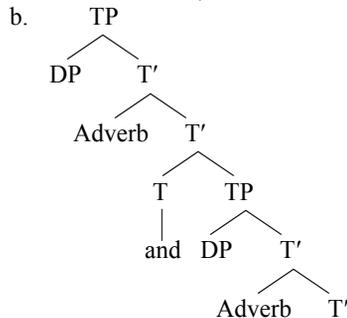
²⁸ A structural representation of coordination construction like (i) is posited in Camacho (2003) to satisfy two basic properties: c-command asymmetry and licensing symmetry (cf. Johannessen 1998). The first property argues that one of the conjuncts needs to c-command the other(s); the second property argues that each conjunct needs to be symmetric with respect to a licensing head.



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

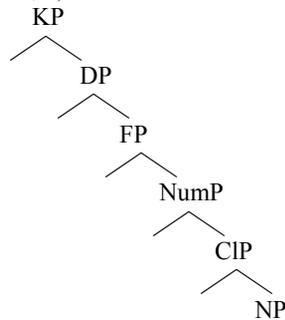
Spanish (Camacho 2003)

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



Assuming Camacho’s claims about coordination of adverbs in (iib), together with the assumptions that juxtaposition involves 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 been developed via historical processes from juxtaposed nominal structures like (45a) and (46a) to non-juxtaposed nominal structures like (iii), in which demonstratives, numerals, possessives, and relative clauses are licensed by distinct heads like K, D, F, Num, Cl, N and are 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 2007a).

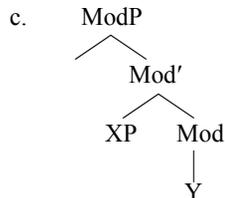
Tang (2006a, b)
(iii)



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

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

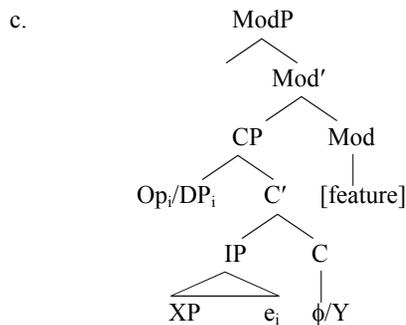
- (iv) unmarked, non-predicative, non-modifier-like XPs: bare DemP, NumP, PosP, etc.
- (v) a. marked, non-predicative, modifier-like XPs: DemP/NumP/PosP/DP-Y, etc. and/or Y-DemP/NumP/PosP/DP, etc.
- b. XP may be projected as complement of Mod, which in turn may be lexically realized as Y, a functional item that may be more grammatical than a complementizer:



- (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.

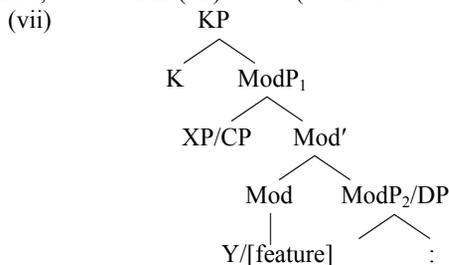
4. N-initial vs. N-final

We have shown in §2 and §3 that various kinds of word-order requirements are 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-extended 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.



We shall leave for future study the complementizer-modifier contrast in base generation of various kinds of Formosan nominal modification marking. 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 M. Chang (1998) for that of the operator nature of the co-indexed element in Tsou relative clauses.

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).



We shall also 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 & Massam 2004).

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 on 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 on 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 on 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 on either side of the noun.

From the correlation between covert/overt marking and prenominal/postnominal distribution of nominal modification expressions in Paiwan (50a-d) and Puyuma (51a-d), for example, an accessibility hierarchy of Formosan nominal expressions developed into relative clause type of modifiers is given in (52) below (see also (49) and footnote 25).

Accessibility Hierarchy of Formosan Nominal Expressions Developed into Relative Clause Type of Modifiers

- (52) numerals > possessives > demonstratives

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

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

Kavalan: VSO and VOS (H. 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.

- d. The overtly marked possessive must precede the noun, whereas the unmarked possessive must follow the noun.
- e. 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 is 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 are 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, in which prenominal and postnominal relative clauses should not be treated as transformationally related (see Tang 2006a, 2007b).²⁹

As already discussed in §3, several grammatical factors may have been historically involved in Formosan languages to have given rise to the aforementioned 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 Formosan nominals. For another, a distinction in the degree of functional extension of nominal modification markers in (49) would also result in a

²⁹ In J. 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; the directionality of the projections of specifiers and non-specifiers may be distinct.

difference in the development of Formosan numerals, possessives, and demonstratives into relative clause type of modifiers in (52).³⁰

Three other kinds of factors will also be demonstrated in the following discussion, all of which may have been diachronically involved: presence/absence of case fusion, V-initial to SVO, and interpretational processing requirement. To begin with, recall that, as proposed in §2, a historical process of fusion of (specific) case markers with demonstratives may have taken place in Formosan languages like Puyuma, Amis, and Rukai. In these languages the case-inflected demonstratives must all precede the nouns, regardless of whether they are obligatorily marked as in Puyuma, optionally marked as in Amis, or obligatorily unmarked as in Rukai.³¹ The N-final pattern of the case-inflected unmarked demonstratives in Amis and Rukai, as opposed to the N-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, or Rukai so as to be able to be accessible to the considered historical development of case fusion,³² a distributional constraint that may have been irrelevant for non-case-inflected Formosan languages like Paiwan or 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

³⁰ As pointed out in Tang (1993, 2005, 2006a, 2007a), among others, in the Chinese type of languages, nominal modification markers like Mandarin *de* 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.

Along the lines of the thought proposed in this paper, both the DP-DP* pattern of juxtaposition and development 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 (2007a) for a discussion of the grammaticalization and generation of Chinese nominal modification markers like Mandarin *de*.

³¹ 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, it is VSO and VOS as stated in Zeitoun (2000b).

³² 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 28.

word-order pattern of Formosan clauses. It is shown in the discussion above that in Formosan languages the diachronic unmarked or general pattern of the projection of nominal Spec positions is head-initial, a word-order pattern that is considered as agreeable with the general clausal predicate-initial pattern of most of the Formosan languages. Note however 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, marked or unmarked as well as relative clause or non-relative clause, elements like demonstratives, numerals, and possessives appear in prenominal positions,³³ a distributional pattern that is also observed with SVO languages like Chinese (55) (see also footnote 30).³⁴

³³ 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 bear.

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

³⁴ 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 is not permitted in non-SVO Formosan languages like Paiwan or 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 m-wa:i' ila.
 'IMA know Acc 'obay Nom man 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.'

Chinese

- (55) a. zhe haizi
this child
'this child'
- 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
he DE sister
'his sister'
- e. [ni zuotian mai] de shu
you yesterday buy DE book
'book that you bought yesterday'

Note further that, as discussed in Tsai (2007), even clauses of Formosan predicate-initial languages like Tsou or Amis, for instance, exhibit base-generated head-final adverbials, marked or unmarked.

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 is also found with Thao.

Thao (L. Huang 2000a)

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

A possible reason for this cross-linguistic variation in ordering of nominal modifiers is that, as opposed to Chinese, Saisiyat and Thao are not yet developed into strict SVO patterns.

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 another way, by Formosan N-final and N-initial constructions. Recall that in Formosan nominals, general speaking, the unmarked occurrence of non-modifier-like elements is to the right of nouns, whereas relative clauses may appear before or after nouns. A similar word-order pattern may also be found with the interpretation of restrictive and non-restrictive relative clauses. That is, while the unmarked occurrence of Formosan non-restrictive relative clauses is to the right of nouns (cf. A. Liu 2004), Formosan restrictive relative clauses may precede or follow nouns.

To begin with, consider Formosan languages like Amis or Tsou, in which, according to Wu (1995) and M. Chang (1998), respectively, the distribution of restrictive and non-restrictive relative clauses seems to be converse. 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 (M. 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 or 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)³⁵

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

³⁵ In Formosan languages, as discussed in Tang (2006a, 2007b), prenominal and postnominal relative clauses should not be treated as transformationally related to one another. That is, for example, object nominals in (58a) and (59a) as well as those in (58b) and (59b) are not 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 are 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 nominal modification markers is also 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, Cinque 1999).

- 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 languages like Amis, Tsou, Paiwan, or 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) (L. 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
 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 L. 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. A. Liu 2004).

A. Liu (2004), by comparison, points out that, in Jianshi Squliq Atayal, non-restrictive relative clauses may precede nouns as in (63a), or follow nouns as in (63b).³⁶

³⁶ 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. J. Huang 1982 and Arnold 2007, among others).

Squliq Atayal (Jianshi) (A. Liu 2004)³⁷

- (63) a. siy-on na' sayun qu' [[m-n-anig 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-anig 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 reason that both base-generated non-juxtaposed N-final and N-initial constructions may have been historically developed from the postulated juxtaposed nominal structures like (45a) and (46a) (cf. Tsai 2006, 2007).

That is, in addition to the aforementioned distinctions in the development 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 have also 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 or preferred postnominal distribution of Formosan non-predicative non-modifier-like elements and non-intersective non-restrictive relative clauses (see also footnote 28).³⁸ In (45a) and

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

³⁷ In Jianshi Squliq Atayal, according to A. 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 A. 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).

³⁸ 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.

(46a), in other words, an interpretational processing condition may have been involved in the choice of directionality of the development of Formosan non-juxtaposed nominal modification expressions. General speaking, when the new information is more on the expression of nominal modification rather than the head noun itself, the N-final but not N-initial pattern tends to be used, a pragmatic reason which may have resulted in the predominant prenominal ordering of Formosan nominal modifier-like elements, relative clause or non-relative clause.

It should be noted here that, as discussed in Tang (2006a) and pointed out in footnote 35, in Formosan languages prenominal and postnominal relative clauses may not be treated as transformationally related to one another, either by movement of head nouns or (part of) relative clauses (cf. Aldridge 2004).³⁹ Instead, they ought to be treated as two distinct base-generated nominal structures due to the fact that prenominal and postnominal modification expressions may be overtly marked differently, in which the former may include elements that do not act as predicates. Moreover, in addition to the possibility of movement of non-constituent and non-phrasal elements, an operation of synchronic movement of this kind will also be forced to be either strictly disallowed or optionally/obligatorily allowed within and across Formosan nominals.

5. Conclusion

So far we have shown in the previous discussion that the internal structure of Formosan nominals may have undergone a historical development from a juxtaposed to a 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 development of Formosan subordination and case markers into nominal modification markers. In addition, a distinction in the degree of the functional extension of Formosan nominal modification markers may have also resulted in a difference in the development of Formosan nominal modification expressions into relative clauses.

As a result, synchronically three kinds of nominal modification elements are observed in Formosan nominals: (a) unmarked non-predicative non-modifier-like expressions, (b) marked non-predicative modifier-like expressions, 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

³⁹ See also Tang (2007b) for a discussion of the problems for a remnant TP-movement analysis of marked/unmarked relative clauses along the lines of Aldridge (2004) in Formosan languages like Seediq, Sqliq Atayal, Amis, Puyuma, and Paiwan.

presence/absence of intrinsic case inflection, clausal word order change and interpretational processing requirement may have also given rise to a distinct N-final word-order pattern. All these and other relevant historical processes, together with the adjunction-specifier contrast in structural projection of modifier- and non-modifier-like elements, may thus have yielded the seemingly idiosyncratic synchronic variations in marking and ordering of nominal modification expressions within and across Formosan languages.

It seems that the historical processes involved with the nominal functional extension of (45b) and the nominal grammaticalization of (46b) may in fact have to do with a more generalized diachronic development of Formosan coordinate structures into subordinate structures, clausal or nominal (cf. E. Liu 2003, Tsai 2006, 2007 and Teng 2007).⁴⁰ That is, for the conjunction projection of proto-Formosan clauses, the realization of the coordinator head may have been either overt, in which coordinators themselves may have been grammaticalized into clausal subordinators, or covert, in which other kinds of grammatical markers may have been used as clausal subordinators (cf. Tsai 2006, 2007). And, as discussed in Tang (1999), among others, the clausal non-coordinator-grammaticalized subordinators may include case-grammaticalized and non-case-grammaticalized elements.

From the relevant discussions in Tang (1999) and Tsai (2006, 2007), among others, it also seems to be the case that non-coordinator-grammaticalized subordinators are of the majority of Formosan clausal subordinators. In other words, the clausal conjunction projection with null coordinator may have been historically more predominant than the one with lexical coordinator. It is then not surprising that, as claimed in this paper, proto-Formosan nominals may have been of juxtaposed structures in which clausal coordinators may not have been accessible for grammaticalization into nominal modification markers.

⁴⁰ An analysis of this kind differs from the relevant claims about Puyuma in Teng (2007) and Amis in E. Liu (2003). Synchronically speaking, according to Teng (2007), the noun phrase structure of Puyuma is flat. E. Liu (2003), by contrast, suggests that synchronically, the hierarchical structure of the Amis nominal is that of coordination.

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功能延伸與語法化： 台灣南島語名詞組修飾標誌的類型研究

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本文探討原始台灣南島語的名詞組結構有可能歷經由並列結構到非並列結構的歷史演變，而其中又可分為不帶有格位標誌以及帶有格位標誌兩種不同語言類型的並列結構。第一種並列結構適用於所有台灣南島語，且經由功能延伸的方式，產生了借用已有的從屬結構標誌做為名詞組修飾標誌的新句法現象。第二種並列結構則只適用於格位固有內化的台灣南島語，且經由語法化的方式，造成了格位標誌也能做名詞組修飾標誌的新句法功用。除此之外，還有其他五種相關的歷史演變也似乎見存於台灣南島語：(一) 格位和對等標誌先變成句子的從屬標誌再變成名詞組的修飾標誌，(二) 名詞組修飾標誌先出現於關係子句再出現於非關係子句，(三) 曾發生名詞修飾成份的固有格位內化，(四) 曾發生 SVO 的語序變化，以及 (五) 曾出現詮釋條件的規範。

關鍵詞：功能延伸，語法化，格位標誌，從屬標誌，對等標誌，名詞組修飾標誌，台灣南島語