The Scope Order of Modifiers and Embedded Constructions in Japanese

Chidori NAKAMURA*

Abstract

It has been repeatedly pointed out in literature that the structure of Japanese sentences reflects the syntactic or semantic hierarchical arrangement of words and phrases. Among them, Minami (1974)'s classification of adverbial subordinate clauses, which shows the hierarchical embeddings of clauses from the innermost level A, to B, C, and the outermost D, is widely mentioned not only in analyses of subordinate clauses but also for noun modifying clauses and simple sentences (Noda 1986, Takubo 1987, Oshima 1989, Yoshimoto 1998, and others). However, despite the general assumption that the hierarchical structure originates in sentential meanings or interpretations, semantics behind the embeddings between 'four stages in sentence production (Minami 1993)' or 'types in meaning (Takubo 1987),' is not given.

This paper, assuming that a sentence consists of a predicate and its modifiers, presents a semantic scope order of modifiers, whose logical properties result in the hierarchical nesting structure.

The internal elements within complement clauses, noun modifying clauses, temporal clauses, and other adverbial clauses are examined; and some primitive constructions in the order, namely, event, thought, speech act, and utterance, which play crucial roles in embeddings, are shown.

It is also claimed that the scope order is stable among constructions, and the coincidence and discordance of internal elements among clauses are explained by the function/meaning of the embeddings.

Keywords:

scope, partial order, hierarchical structure, complement, noun modifying clause, subordinate clause

* College of Information Science and Engineering, Ritsumeikan University, Professor

1. Introduction

It has been pointed out in literature that the sentence structure of Japanese reflects the syntactic/semantic hierarchical arrangement or nesting structure of words and phrases (Tokieda 1941, Kitahara 1970, Minami 1974, and others). Among them, Minami (1974)'s classification of adverbial subordinate clauses, which shows the hierarchical embeddings of clauses from the innermost level A, to B, C, and the outermost D, is widely mentioned not only in analyses of subordinate clauses but also for noun modifying clauses and simple sentences (Noda 1986, Takubo 1987, Oshima 1989, Yoshimoto 1998, and others); and its syntax is demonstrated in Takubo (1987) and Yoshimoto (1998). However, as Onoe (1999a, 1999b) points out, Minami's subordinate clause classification contains inconsistencies between criteria. For instance, the subordinate clause with *node* (because) is classified into level B by the exclusion of tentative auxiliaries such as *darō* (may), but into level C by the inclusion of the topic marker *wa*.[1)] In addition, Minami (1974, 1993) regards temporal, locative, and subject as level B elements in subordinate clauses, but as both A and B elements in noun modifying clauses. Within his 'four stages in sentence production (1993),' temporal and locative are in B, but subject is in A.

More significantly, despite the general assumption that the hierarchical structure originates in sentential meanings or interpretations, semantics behind the embeddings between 'four stages in sentence production (Minami 1993)' or 'types in meaning (Takubo 1987),' is not given. Only Bekki (2007) shows precise semantic interpretations of subordinate clauses in Combinatory Categorial Grammar, but it does not intend to explain the nature of the hierarchical (cognitive conceptual) layers, and ascribes the mapping between the cognitive layers and syntactic ones only to the semantic structure and conjugation rather than Minami's hierarchy. It seems to require additional semantic specifications besides

conjugations for explaining the exclusion/inclusion of certain elements, for instance, topic in the C level *-te* clauses and its absence in the A/B level *-te*, since their conjugation constraints are the same.

This paper, approaching the semantic ground of the hierarchy, aims to demonstrate the common internal structure of embedded clauses, which includes Minami's layers and by which the occurrences/non-occurrences of internal elements are provided. Complement clauses, noun modifying clauses, and temporal/locative clauses, which Minami and others do not deal with intensively, are examined; and the significance of some primitive constructions is shown. In the following sections, it is assumed that a predicate sentence ('jutsugo-bun') is a projection of a verbal/nominal/adjectival predicate, and anything other than the predicate is a modifier which has semantic scope. Section 2 shows that the interactions of scope exhibit a partial order, namely, the scope order of a predicate and modifiers, whose logical properties result in a hierarchical structure. Section 3 presents several primitives in the scope order, which are common within various embedded clauses; and the coincidence and discordance of internal elements among embedded constructions are explained by their functions or meanings. It is shown that the scope order is stable among constructions, and the primitives in the order explain Minami's subordinate clauses and his counterexamples too.

2. The scope of predicate modifiers in a sentence

In a sentence such as '*Sora-ga aoi* (The sky is blue),' the adjective *aoi* (be blue) can be regarded as a main predicate whose projection amounts to a sentence. And anything other than the main predicate in a sentence is considered to be a modifier which has semantic scope. Modifiers have bigger scope than that of their modifyees or modified elements, thus the nominative *sora-ga* (the sky-NOM) above is a modifier which scopes over the predicate *aoi* (be blue), and *aoi* is a modifyee which enters the scope of *sora-ga*. Accordingly, the notion of 'modifier' here can designate, for instance, 'renyōshūshoku seibun (modifiers of verbal/adjectival/nominal main predicates)' and auxiliaries in traditional Japanese Grammar.

Then, if several modifiers exist in a sentence, interactions of scope are created. In a sentence such as '*Kare-ga ki-ta* (He came),' *kare-ga* (he-NOM) and ta (PST) create scope interactions such as *kare-ga* scopes over *kuru* (come), and *ta* scopes over both *kare-ga* and *kuru*. The scope interaction between modifiers can be represented by a binary relation > ('is

wider/greater than') as in (1), which is a strong partial order, i.e., the transitive, reflexive, and asymmetric order, on the set of scope of modifiers and modifyees.

(1) A binary relation R is a strong partial order on a set S iff for arbitrary x, y, and z in S:

(i) transitivity: $\forall x \forall y \forall z\ ((Rxy \wedge Ryz) \rightarrow Rxz)$

(ii) irreflexivity: $\forall x\ (\neg Rxx)$

(iii) asymmetry: $\forall x \forall y\ (Rxy \rightarrow \neg Ryx)$.

If R stands for the relation $>$ ('is wider than'), S for the set of scope of modifiers and modifyees, then the following can be said. If scope a is wider than scope b, represented as $a > b$, then $\neg (a > a)$, by irreflexivity; if $a > b$ then $\neg (b > a)$, by asymmetry; if $a > b$ and $b > c$, then $a > c$, by transitivity. Thus, if a is tense's scope, b is nominative's, c is main predicates' in the order of $a > b > c$, then it holds that tense has bigger scope than both nominative's and main predicates'. Accordingly, tense can modify both nominative and a predicate, but a predicate cannot modify tense: the scope order determines the possible and impossible modifications, and creates a hierarchical structure in a sentence.

The scope of major words and phrases which modify a verbal/adjectival/nominal predicate can be shown as in (2).

(2) modifiers' scope in a sentence with a main predicate

vocative
communicative modal
mood
topic
epistemic modal [2)]
tense, temporal
locative
NPs of nominative, accusative, dative, or oblique case
main predicate

Upper items have wider scope than lower items, and items in the same line have equal scope: the scope of vocative is wider than that of communicative modal, and the scope of communicative modal is wider than that of mood. Nominative and accusative have the same scope, thus the scope is identical. Every item is both a modifier and a modifyee, except the main predicate and vocative, as the former is nothing but a modifyee, the latter a modifier. However, A word which is exclusively used as a holophrase such as '*Achi!* (Ouch!)' in Japanese does not have to modify or be modified, and is not connected to other items by the

relation >. Thus, the strong partial order with > on the set of scope of modifiers/modifyees is not necessarily a total order, but a nonconnected partial order, which lacks a property of connectedness, i.e., $\forall x \forall y\ (x \neq y \rightarrow (Rxy \vee Ryx))$. And the set cannot be well-formed with this relation.

The scope order or modifying relation above can be regarded as a reflection of the structure of semantic interpretations which is determined by the ontology of the world, propositional attitudes, and speech acts for communication, etc.; thus universal. But it is possible for each language to have different grammatical items, so that the scope order of actual words and phrases possibly varies between languages according to the meanings or functions of words and phrases as seen in *achi* (ouch) in Japanese.[3)]

Vocative, which is targeted to the addressee/hearer of an utterance, scopes over communicative modal particles or 'shūjoshi/kantōjoshi' such as *yo/ne* which express a speaker's/addressee's knowledge or communicative attitude, and also mood such as imperative, interrogative, and assertive which are tied to speech acts or illocutionary forces (Austin 1962, Searle 1969).

(3) John kocchi-wa attakai-yo.
John.VOC here-NOM.TOP warm-MOD
'John, it's warm here.'

In (3), *John*, the addressee of the whole utterance, modifies the rest of the sentence, and is outside the scope of the speaker's insistence with the modal particle *yo*. This modal is also outside the scope of the assertion since the speaker insists the whole assertion '*kocchi-wa attakai* (it's warm here)' and not a part of it. Topicalization, however, which signals a topic and a comment within an assertion cannot scope over the assertive mood, thus *kocchi-wa* (here-TOP) is within the scope of mood.

Topicalization divides the content of an assertion, interrogation, etc., into two parts, i.e., a topic and a comment, as in (4), where the topicalized phrase *gakusei* (students) is commented on by the rest of the content of the assertion including epistemic modals. Epistemic modals which indicate probabilities of an event seen from a speech time, such as a tentative adverbial/auxiliary, *tabun/deshō* (perhaps/may), scope over the whole event with tense, thus '*John-ga kuru* (John will come).'

(4) Gakusei-wa tabun John-ga kuru-deshō.
student-TOP perhaps John-NOM come.NPST-may
'As for students, perhaps John will come.'

As well, locative and temporal and tense which scope over an event have wider scope than argument NPs as in (5).

(5) Yoru gakuseitachi-ga kōen-de odot-ta.
night students-NOM park-LOC dance-PST
'Students danced in the park at night.'

The temporal adverbial *yoru* (at night), the past tense auxiliary *ta*, and the locative *kōen-de* (in the park) modify the whole event of the students' dancing, but not a part of the event, thus they must scope over '*gakuseitachi-ga odot-* (students dance),' including the nominative NP.

NPs with nominative, accusative, dative, or oblique case modify the predicate as below.

(6) John-ga Mary-ni Sue-o shōkaishi-ta.
John-NOM Mary-DAT Sue-ACC introduce-PST
'John introduced Sue to Mary.'

The argument NPs i.e., nominative, dative, and accusative, in (6) all modify the verb; thus they all scope over the verb and there is no scope order between NPs.

The scope of other modifiers than (2) also exhibits an order with the relation > in a sentence. However, some modifiers which express logical negation, multiplication, or addition do not have a single fixed scope, but have different scope according to their modifyees: negation of an event has scope wider than argument NPs and tense such as in '*Gakusei-ga minna kitawake-dewa nai* (It is not the case that all students came),' but negation of someone's action/state scopes only over a main predicate such as in '*Gakusei-wa minna fumandat-ta* (All students were dissatisfied)'; multiplication *te* (and) and addition *ka* (or) also can scope over events as in '*John-ga denwa-o shi-te Sue-ga ki-ta* (John called and Sue came),' or only verbs as in '*John-ga hashit-te janpushi-ta* (John ran and jumped).'

Other modifiers such as adverbial, honorification, and politeness also have different scope according to their modifyees, i.e., a verb, an event, or a modal, etc. For instance, a sentential adverb which modifies an event scopes over NPs and main predicates and tense, as seen in *saiwainimo* (fortunately) in '*Saiwainimo kare-wa shippaishita* (Fortunately he failed),' whereas a manner adverb such as *yukkuri* (slowly) in '*Kare-wa yukkuri aruita* (He walked slowly)' scopes only over a verb.

If passive or causative auxiliaries, which change the argument structure of a main predicate, appear in a sentence, the scope order between a main predicate, causative, passive, and adverbial is determined by the actual modifying relation between them in an

event. Thus in '*damatte nagur-are-sase-ta* (submissively beat-PASS-CAUS-PST),' meaning 'forced to be beaten submissively,' the causative scopes over the direct passive and the main predicate, and the adverbial *damatte* (submissively) only over the direct passive; while in '*muriyari ko-sase-rare-ta* (forcibly come-CAUS-ADV.PASS-PST)' meaning 'be forced to come,' the adverbial *muriyari* (forcibly) which covers the causative, enters the scope of the adversative passive of annoyance. And the altered argument NPs, for instance patient-NOM and actor-DAT in passivization, modify only after the alteration of the argument structure, with wider scope than voice or causation.

In addition, modification which scopes only over (a part of) a single modifier does not have to be affected by the scope order of main predicate modifiers in (2). Modifiers of a noun cannot scope over other modifiers than the noun: neither a negation within a noun phrase such as *hi* in '*hi-kyōryoku-sha* (noncooperative person)' nor an attribute such as *muzukashī* (difficult) or *kinō-no* (yesterday's) in '*kinō-no muzukashī shukudai* (yesterday's difficult homework)' can scope over a main verb.

It is assumed, however, that the scope order between the main predicate modifiers exerts a great influence on embeddings of constructions such as complements, noun modifying clauses, and adverbial clauses. We see next how the scope order is realized within them, assuming that each embedded construction has a different constraint according to the meaning of a head or a conjunction.

3. The scope order in embedded clauses

A construction which is created by a main predicate and modifiers such as seen in (2) is called hereafter a clause, and its variations in embedded clauses are examined.

Embeddings of clauses in sentences, which can be regarded as combinings of at least two clauses or two scope orders, may alter the scope orders in complements, noun modifying clauses, temporal clauses, and other adverbial clauses, within sentences.

3.1 Complements

If a verb takes a clausal complement as a semantic argument such as '*kare-ga kuru* (he will come)' in '*Kare-ga kuru-to omou* (I think he will come),' the embedded clause is considered to be substituted for a noun phrase. A clausal complement is introduced into a sentence by a complementizer: either with a case/conjunctive postposition such as *to* (that)

or *ka* (whether), or with a formal noun such as *no/koto* (that) preceding a case marking. The whole clause, which amounts to an NP, modifies a main predicate and has the same scope as argument NPs; thus, the scope order of a clause is embedded in a position of NPs within another scope order of a bigger clause/sentence.

For the internal elements or modifiers within clauses, various constraints are seen according to the main predicate's meaning. The postposition *to* such as in (7) can embed any modifiers in the scope order when it specifies an argument of a verb of 'utterance' such as *iu/hanasu/noberu* (say) (Noda 1986, Takubo 1987), since the arguments of these verbs denote a whole utterance.

(7) John kocchi-ni koi-yo-to kare-wa it-ta.
John.VOC here-to come.IMP-MOD-COMP he-TOP say-PST
'He said "John, come here".'

In (7), the whole utterance with the vocative *John*, imperative *koi*, and communicative modal *yo*, is included in the complement clause.

By contrast, verbs of 'speech acts' such as *meireisuru* (order), *yakusokusuru* (promise), and *negau* (wish), include no communicative modals, but mood which conveys certain illocutionary forces of speech acts as in (8).[4)]

(8) Myōnichi, tettaishi-ro-to meireisi-tai.
tomorrow withdraw-IMP-COMP order-want.NPST
'I want to give an order to withdraw, tomorrow.'

The imperative mood which has the illocutionary force of 'order' appears in (8), but communicative modals such as *yo* and *ne* cannot be included in the clause.

Verbs such as *shiru/wakaru* (know), *utagau* (doubt), and *omou/kangaeru* (think), whose arguments can be regarded as 'thoughts' cannot embed mood but can include topic and epistemic modals which should be tied to speakers'/thinkers' ideas.

(9) Kare-wa kuru-darō-to omot-ta.
he-TOP come-will-COMP think-PST
'I thought he would come.'

In (9), the complement clause includes the postposition *wa* of topic and the auxiliary *darō* (will/may) of epistemic modal, but no mood such as the imperative *koi*.

And verbs of perception such as *kiku* (listen) and *miru* (see), whose arguments with the complementizer *no* indicate an 'event,' exclude topic and modals but include NPs and locative and possibly relative tense specifying immediate precedence/following: thus, anything which

specifies the given event can appear.[5)]

(10) Kare-ga guraundo-de hashiri-dashi-ta-no-o mi-ta.
he-NOM ground-LOC run-start-PST-COMP-ACC see-PST
'(I) saw him start running on the ground.'

All the nominative, locative, and relative tense are included within the complement clause with *no* in (10), but the topic *wa* or modal *darō* cannot be included.

Consequently, it is assumed here that the meanings of verbs constrain the possible embeddings within a clause.[6)] The contents of the complement clauses seen above, which can be named as in (11), correspond to the scope order of modifiers in (2).[7)]

(11) correspondence between contents of clauses and the scope order

utterance:	vocative
	communicative modal
speech act:	mood
thought:	topic
	epistemic modal
event:	temporal, tense
	locative
	NPs
	main predicate

Here also, the hierarchical nesting structure of contents of clauses is seen, for the utterance includes the speech act, thought, and event, but the reverse inclusion is impossible.[8)]

3.2 Noun modifying clauses

Noun modifying clauses or relative clauses are classified into two categories in Japanese, i.e., clauses with an extracted nominal head ('uchi-no kankei,' Teramura 1975), and clauses which express the content of a nominal head ('soto-no kankei,' Teramura 1975).[9)] It is well known that the former cannot include topic; besides, it also excludes mood, communicative modals, vocative, but can include an epistemic modal, temporal/tense, locative and other NPs as below.

(12) itsuka owari-ga kuru-darō kono-sekai
someday end-NOM come-will this-world
'the world which will be ended in the future'

(13) kinō gakkō-de watashi-ga John-ni shōkaishi-ta Mary
yesterday school-LOC I-NOM John-DAT introduce-PST Mary
'Mary whom I introduced to John at school yesterday'

The noun modifying clauses in (12) and (13) include the epistemic modal *dearō* (will/may), the temporal *itsuka* (someday) / *kinō* (yesterday), the locative *gakkō-de* (at school), and other NPs, but cannot include the topic *wa*, mood, communicative modals, and vocative. And the head nouns, which have an argument relation to a verb within a clause, are extracted from the clause; accordingly, the noun modifying clauses cannot include the same case NPs as the head, i.e., a dative NP in (12) and an accusative NP in (13).

It can be regarded that the noun modifying clause with an extracted noun amounts to a 'thought' which lacks an extracted noun and topic; and the reason why topic is excluded may be explained by assuming that only the extracted noun can amount to a topic, as Kuno (1973) suggests. Thus, for instance, if an extracted nominal head is accusative as in (13), the clause has the internal scope order below.

(14) internal elements within a noun modifying clause with an extracted accusative head

thought: ~~topic~~
epistemic modal
temporal, tense
locative
nominative, dative, ~~accusative~~
predicate

The extracted elements, which cannot appear in the clause, are erased from the scope order above: the grammatical function of the noun modifying clause amends the scope order in (2) to a slightly different one by erasing; but it does not change the partial ordering.

In contrast, the internal elements in the content clauses, which express the content of a head/modified noun, can be classified into several different categories according to the meaning of a head noun, similar to the case of complement clauses; and the same correspondence between the contents and the scope order as in (11) is seen.[10)]

Nouns of 'utterance' such as *kotoba* (word), *koe* (voice), *serifu* (line), *īkata* (way of saying), etc. together with a conjunctive particle or complementizer *toiu* can include vocative and communicative modals.[11)]

(15) John make-nai-de-ne-toiu kotoba
John-VOC give up-NEG-please-MOD-COMP words

'the words "John, don't give up" '

In (15), the clause with the complementizer *toiu* includes the vocative *John* and the communicative modal *ne*.

But nouns of 'speech act' such as *negai* (wish), *sengen* (declaration), *yakusoku* (promise), and *meirei* (order) exclude vocative and communicative modals when they do not denote an actual utterance act, but include mood as in (16).

(16) shiawase-ni natte-kure-toiu negai
happy-DAT become-IMP-COMP wish
'the wish to be happy'

Nouns of 'thought' such as *kangae* (thought), *suisoku* (estimation), *handan* (judgement), and *ninshiki* (understanding) exclude mood but include topic as in (17).

(17) zeikin-wa sageru-bekida-toiu kangae
tax-TOP reduce-should-COMP idea
'the idea that the tax should be reduced'

And nouns of 'perception' such as *nioi* (smell), *oto* (sound), *sugata* (way), and *shigusa* (behavior) exclude topic and epistemic modals, but include tense and NPs and locative as in (18) and (19).

(18) gohan-ga koge-ta nioi
rice-NOM burn-PST smell
'the smell of burned rice'

(19) kare-ga guraundo-de hashiru sugata
he-NOM ground-LOC run.NPST way
'his way of running on the ground'

If we regard that the nouns of perception require the bare 'events' as their contents, then the correspondence between the utterance, speech act, thought, event, and the scope order as presented in (12) is also seen here.

In addition, nouns of someone's action/state such as *dōsa/ugoki/shigusa* (action), *sainō/nōryoku* (ability), and *jyōtai* (state) which co-occur with a subject marked by the genitive case *no*, exclude subject NPs from the content clauses such as in (20) and (21).

(20) kanojo-no [te-o furu] shigusa
she-GEN hand-ACC wave.NPST gesture
'her gesture of waving a hand'

(21) kare-no [doko-de-demo ne-rareru] sainō
he-GEN anywhere-LOC-even sleep-can.NPST ability
'his ability to sleep anywhere'

The content clauses signaled by [ ] above express a (composed) property which contributes to the first argument individual, thus include other NPs, locative, and temporal; but this genitive construction prevents nominative subjects from occurring in the events as follows.[12)]

(22) internal elements in a content clause with a genitive subject noun

event: temporal, tense
locative
~~nominative~~, dative, accusative, oblique case
main predicate

Therefore, it can be said that the correspondence between the internal structure of clauses and the scope order in (11) is also seen among noun modifying clauses; but the meanings or grammatical functions of clauses impose restrictions by the extraction of elements.

3.3 Temporal / locative clauses

Other smaller constructions than events can be seen in temporal/locative adverbial clauses, which express the content of the locative/temporal of a matrix. A content clause with a head noun of place such as *basho/tokoro* (place) as in (13) shares the location with matrix, so that it cannot include independent locative but can include temporal and subjects; thus has a structure as in (24).

(23) Watashitachi-ga kinō at-ta-basho-de jiko-ga oki-ta.
we-NOM yesterday meet-PST-place-LOC accident-NOM occur-PST
'The accident happened at the place we met yesterday.'

(24) internal elements in a locative clause

event: temporal, tense
~~locative~~
nominative, dative, accusative, oblique case
predicate

Temporal clauses which indicate simultaneity or inclusions of events between a matrix and an adverbial clause are constructed either by content clauses with nouns such as *toki/sai/ori/jikan* (time), *tokoro* (location), and *aida* (time span), or clauses with conjunctive particles such as *ni-tsurete / saishite / tomonatte* (while/as) or *to-dōji-ni* (at the same time). They can

include independent locative and subjects, and tense in order to specify the temporal precedence/following, but no temporal since the temporal location must be shared by the two clauses, as in (25) and (26).

(25) Watashi-ga kaisha-de hataraite-i-ta-aida-ni dorobō-ga hait-ta.
I-NOM company-LOC work-PROG-PST-while-TEMP robber-NOM enter-PST
'A robber broke into my house while I was working at the office.'

(26) internal elements in a temporal clause
event: ~~temporal~~, tense
locative
nominative, dative, accusative, oblique case
predicate

In addition, temporal nouns/conjunctions of relativity such as *mae/ni-sakidatte* (before), *ato* (after), and *to-zengoshite* (immediately before or after) can include independent temporal as in (27), where the temporal clause with *mae-ni* (before) includes an independent temporal *Shigatsu-ni* (in April).

(27) Shigatsu-ni ryūgakusuru-mae-ni ichido furusato-ni kaeri-ta-kat-ta.
April-TEMP study_abroad-before-TEMP once hometown-DAT visit-want-PST
'I wanted to visit my hometown before I go abroad to study in April.'

These clauses can specify independent temporal locations according to their relative meanings, i.e., temporal precedence/following between the clause and a matrix; thus, here also the meanings of heads determine the possible internal elements.

3.4 Other adverbial clauses

A combination of someone's actions such as in '*John-ga tabe-te non-da* (John ate and drank)' or events such as in '*John-ga it-te Mary-ga ki-ta* (John left and Mary came)' can be seen as a coordination of the same two constructions which has the meaning of logical multiplication (∧). It combines at least two main predicates, so that the scope order of main predicate modifiers can also be observed here and the meanings of heads or conjunctive particles affect the elements in the order too.

There seems to be no conjunction (conjunctive particle) which exclusively combines two utterances or speech acts, but copulative/adversative conjunctions such as *shi* (and) or *ga/keredo/kedo* (though), and causals such as *kara/node* (because) combine 'thoughts' as below.

(28) John, soto-wa attakai-darō-kedo watashi-wa dekake-taku-nai-yo.
John.VOC outside-TOP warm-may-ADV I-TOP go_out-want-NEG-MOD
'It seems warm outside, but I don't want to go out, John.'

In (28), both the adverbial clause with the conjunction *kedo* and the matrix can specify an independent topic and epistemic modal; since they can include different thoughts. But the vocative and communicative modal must be shared by the same utterance, so that they cannot be embedded only in the adverbial clauses or the matrix.

Conditional conjunctions such as *to/tara/ba/nara* and the adversative conditional *temo* connect 'events' whose truth are not guaranteed by speakers; accordingly, temporal, locative, and NPs can appear in both clauses, but topic and speakers' modals are to be shared and occur only in a matrix as seen in (29).

(29) Yoru yama-de yuki-ga fut-tara ashita konohen-wa kirei-darō-ne.
night mountain-LOC snow-NOM fall-COND tomorrow here-TOP beautiful-must-MOD
'If snow falls on mountains tonight, the scenery around here will be beautiful tomorrow, don't you think?'

Conjunctions which connect some individual's simultaneous actions/states such as *nagara/tsutsu/te* combine events without temporal, locative, and subjects.

(30) John-ga cōra-o yukkuri nomi-nagara arui-ta.
John-NOM Coke-ACC slowly drink-SIML walk-PST
'John drank Coke slowly while walking.'

The conjunction *nagara* combines 'simultaneous actions of the same individual (s)'; accordingly the subject, temporal, and locative are to be shared by two clauses, while the accusative and adverbial are independent. The internal structure of this clause, which amounts to what Takubo (1987) calls 'action,' is shown as below.

(31) internal elements in a clause of a simultaneous action/state of an individual

event: ~~temporal~~, ~~tense~~
~~locative~~
~~nominative~~, dative, accusative, oblique case
main predicate

Above observation corresponds to Minami (1974)'s classification of adverbial subordinate clauses: the thoughts connectors are Minami's level C conjunctions, the events connectors are level B, and the simultaneous actions/states connectors are level A.

In addition, conjunctions such as the adversative *nagara* and the purpose *(y)ō-to/tameni*

as in (32) and (33) also indicate 'events caused by the same individual,' but the events are not necessarily simultaneous.

(32) Kare-wa kyonen daigaku-o sotsugyoshitei-nagara bunsū-mo deki-nai.
he-TOP last_year college-ACC graduate-ADVST fraction-even can-NEG.NPST
'Though having graduated from a college last year, he can't even solve the fraction.'

(33) Ashita gakkō-de tabe-yō-to bentō-o tsukut-ta.
tomorrow school-LOC eat-PURPS lunch-ACC make-PST
'I made a lunch to eat at school tomorrow,'

The embedded clauses above cannot have independent nominatives, but can include an independent temporal and locative, such as *kyonen* (last year) and *gakko-de* (at school); thus the internal structures of these clauses are the same as in (22) in 3.2, i.e., an event without a nominative subject.[13)]

(34) internal elements in a clause which combines events caused by the same individual
event: temporal, tense
locative
~~nominative~~, dative, accusative, oblique case
main predicate

Moreover, another purpose conjunction *yōni*, which can specify 'other individuals' events as purposes,' has no restriction on the subject and can include any modifiers in events as in (35).

(35) Kodomo-ga ashita gakkō-de taberu-yōni bentō-o tsukut-ta.
children-NOM tomorrow school-LOC eat-PURPS lunch-ACC make-PST
'I made a lunch for the children to eat at school tomorrow.'

The purpose clause *yōni* above includes an independent nominative *kodomo-ga* (children-NOM) and temporal *ashita* (tomorrow) and locative *gakko-de* (at school), since it specifies other individuals' events, different from the matrix. Here again, the meaning of the conjunction *yōni* determines the possible embedding.

Thus, it can be concluded that the internal structures of adverbial clauses including Minami (1974)'s subordinate clauses and his counterexamples are explained in terms of the scope order and the meanings/functions of conjunctions. Also, the four primitives in the order presented in (11), i.e., utterance, speech act, thought, and event, are crucial in adverbial clauses, too.

4. Conclusion

This paper presented the scope order of predicate modifiers, whose logical properties result in the hierarchical structure. Through the examination of embedded constructions such as complements, noun modifying clauses, temporal/locative clauses, and other adverbial clauses, it was shown that several primitives in the order, i.e., utterance, speech act, thought, event, play crucial roles among embeddings. Although the grammatical functions and meanings of heads constrain the possible embeddings within primitives, the scope order was maintained in all constructions.

Note

1) The conjunction *node* (because) is considered to be C in this paper as in Noda (1986), as well as *kara* (because); since its syntactic constraint on a noun-modifying conjugation form explains the exclusion of *darō* (may).
2) The 'epistemic modal' in (2) stands only for speaker's modals which express likelihood of events and in addition, are connected to a speaker and speech time such as *tabun/osoraku/darō* (perhaps) etc. Other epistemic/deontic modals such as *yōda/rashī/mitaida* (seem), *nichigainai* (must), and *nakerebanaranai* (have to) are not necessarily tied to a speaker and speech time, thus can either include or be included in tense as in '*amega futteiru-rashikat -ta* (It seemed to be raining)'. Similar to logical modal operators, they have no single position in the order.
3) Syntactic arrangements of words and phrases such as the word order also can vary among languages. The correspondence between the semantic scope order and the syntactic word order in Japanese, which is not of concern here, is to be clarified in future studies.
4) If *meireisuru (order)* denotes an actual uttering act such as in '*koiyo to meireishita* (ordered to come),' it amounts to a verb of utterance, thus the communicative modal *yo* appears.
5) The difference between the complementizer *no* and *koto* is not considered in detail here; but Okuda(1960) and Kudō (1985) indicate that the verbs of perception take *no*, while the verbs of utterance, thought, or intention tend to take *koto*, and the verbs of cognition, findings, or feelings take either of them. Kuno (1973) claims that *koto* is used for the abstract concept, *no* for the direct action/state/event.
6) It does not mean the content of a clause is uniquely determined by the meaning of each verb: verbs such as *hakkensuru* (find) can take either an event such as in '*Hito-ga taoreteiru-no-o hakkenshita* (I found a person who fell down)' for indicating a perceptional finding, or a thought such as in '*Mizu-wa hyakudode kikasuru-koto-o hakkenshita* ((Someone) found that water evaporates at a hundred degrees centigrade),' for expressing the finding of a doctrine.
7) It is intended here to show the significant constructions among complements: thus, (11) may not be an exhaustive list of complements.
8) 'Utterance' and 'thought' and 'event' here roughly correspond to Minami's layers: utterance is D,

thought C, and event B; and also Takubo (1987)'s names, i.e., communication, judgment, event. But there is no hierarchical layer like Minami's A or Takubo's 'action' in (11). It is shown that constructions which amount to A are created by some constraints on embeddings in 3.4.

9) Some content clauses which modify nouns of relativity ('sōtaisei no meishi,' Teramura1975) such as *yokujitsu* (next day), *riyū* (reason) do not directly indicate the content of a head noun.

10) Ōshima (1989) classifies nouns such as *meirei* (order) into Minami's subordinators' level D, *kangae* (thought) into C, *jijitsu* (fact) into B, and *sainō* (ability) into A; his classification is slightly different from the one here, but the idea that the noun modifying clauses reflect the hierarchical structure is the same.

11) The syntactic status and semantic constraints on *toiu* is not considered here; but at least, it tends to appear with nouns which can be modified by thoughts or bigger constructions. Even if a noun can be modified by both thoughts and events, the appearances of *toiu* can be explained by the difference between thoughts and events, such as in '*chikyū-wa jitenshiteiru- toiu-jijitsu*' and '*chikyū-ga jitenshiteiru-jijitsu*',both of which mean 'the fact that the earth rotates on its axis,' since only the former with *toiu* can include topic.

12) It does not mean that these nouns uniquely take genitive constructions; for some can also take nominative subjects easily as in '*[Kanojo-ga te-o furu]-shigusa-o omoidashi-ta* (I remenbered her gesture of waving a hand)'; thus, embed a whole event including nominatives.

13) Minami classifies the adversative *nagara* clause into level B, but it hardly contains independent subjects. Takubo regards *-tameni* as level A, whose semantic type is also 'action'; but it seems to create a subject control construction (Bekki 2007), for locative/temporal can appear. Takubo classifies *-tameni* and *-yōni*, into A, following Minami's embeddability between subordinate clauses, as they can be easily embedded in another A clause such as *-nagara*. But this paper does not take this embeddability as a criterion: the hierarchical embeddings are assured only in the scope order by its logical properties, thus if the meanings/functions of conjunctions, head nouns, etc. permit, bigger constructions can be embedded in smaller ones.

References

Austin, John. L. (1962) *How to Do Things with Words*. Oxford: Clarendon Press.

Bekki, Daisuke (2007) Minami no jūzokusetsu bunrui saikō (Re-examination of Minami's classification of subordinate clauses). *Nihon Gengo Gakkai Yokōsyū* 134. pp.306-311.

Kitahara, Yasuo (1970) Jodōshi no sōgoshōnin ni tsuite no kōbunronteki kōsatsu (Constructional analysis of auxiliary concatenation). *Kokugogaku*. pp.32-59.

Kudō, Mayumi (1985) *No koto* no tsukaiwake to dōshi no shurui (The usage difference between *no* and *koto*, and verb kinds). *Kokubungaku kaishaku to kanshō*. pp.45-52.

Kuno, Susumu (1973) *Nihonbunpō Kenkyū (Studies on Japanese Grammar)*. Tokyo: Taishukan.

Minami, Fujio (1974) *Gendai Nihongo no Kōzō (The Structure of Modern Japanese)*. Tokyo: Taishukan.

Minami, Fujio (1993) *Gendai Nihongo Bunpō no Rinkaku (The Contour of Modern Japanese Grammar)*. Tokyo: Taishukan.

Noda, Hisashi (1986) Fukubun ni okeru *wa* to *ga* no kakarikata (The scope of *wa* and *ga* in complex sentences). *Nihongogaku* 5-2. pp.31-43.

Okuda, Yasuo (1960) Okaku no katachi o toru meishi to dōshi no kumiawase (Combinations of verbs and nouns which take the *o*-case marking). In Gengogaku Kenkyukai (ed.), *Nihongo Bunpō*

Rengoron, Tokyo: Mugi Shoboo.

Onoe, Keisuke (1999a) Minami moderu no naibu kōzō (Internal structure of the Minami model). *Gekkan Gengo* 28-11. pp.95-102.

Onoe, Keisuke(1999b) Minami moderu no gakushiteki igi (Significance of the Minami model in the history of Japanese linguistics). *Gekkan Gengo* 28-12. pp.78-83.

Oshima, Motoo (1989) Meidaihojū no rentai shūshoku kōzō ni tsuite (On the noun-modifying constructions which supply propositions). *Nihongokenkyu* 11. pp.61-76.

Searle, John. R. (1969) *Speech Acts: An Essay in the Philosophy of Language*. Cambridge: Cambridge University Press.

Takubo, Yukinori (1987) Tōgokōzō to bunmyaku jōhō (Syntactic structure and discourse information). *Nihongogaku* 6-5. pp.37-48.

Teramura, Hideo (1975) Rentaishūshoku no shintakusu to imi (1) (Syntax and meanings of noun-modifying). *Nihongo Nihonbunka* 4.

Tokieda, motoki (1941) *Kokugogaku genron (Principles of Japanese Linguistics)*, Tokyo: Iwanami Shoten.

Yoshimoto, Kei (1998) *Tense and Aspect in Japanese and English*. Frankfurt am Main: Peter Lang.