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The Syntax of Modal Auxiliaries in Northern Thai

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Abstract

This paper looks into the syntax of modal auxiliaries in Northern Thai, a language spoken in the six provinces of the Northern Thai region. The purpose of the present paper is to examine the syntactic properties of Northern Thai modal sentences from a transformational-generative point of view. Without a rich pile of linguistic literature for Northern Thai, the literature review has evaluated the relevant research of Standard Thai and other languages. The paper first categorizes the modals according to their modal bases and forces, and it describes their corresponding structural positions in hierarchies. The modals are then analyzed in terms of control and raising, in which the present study argues that epistemic modals are raising modals, whereas deontic and dynamic modals are control modals. In addition to the discussion of modals in affirmative sentences, this paper also considers negative modal sentences and discusses the scope interactions between modals and negation. The present analysis has claimed that epistemic modal scopes over negation, while deontic and dynamic modals scope under negation. Building on these analyses, this paper delineates the double modal construction in Northern Thai and validates the arguments in previous sections. In the end, this paper regards syntax-semantics correspondence as a focal point for further studies of Northern Thai modals.

Acknowledgment

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Table of Contents

Abbreviations

FUT   future tense

NEG   negation

PERF   perfective aspect

PRES   present tense

PROG   progressive aspect

1. Introduction

This paper studies the clausal architecture in Northern Thai focusing on modal auxiliaries in finite declaratives. The paper makes use of the data elicited from a multilingual language informant whose native language is Northern Thai. While the paper is primarily descriptive, which is attempting to delineate some syntactic aspects of Northern Thai modals, a number of analyses under the transformational-generative framework are offered with regards to the syntactic and semantic behaviors of modal auxiliaries in this language.

Due to the fact that Northern Thai does not receive much attention from the formal linguists, Section 2 presents previous research on modals in Standard Thai, which resembles Northern Thai in various linguistic levels, and related studies as the basis of discussion. As Northern Thai is unfamiliar to most, Section 3 describes the basic clause structure of finite declaratives and the distributions of tense and aspect markings that are necessary for positing the modal constructions in the following sections.

Section 4 discusses the syntactic aspects of Northern Thai modal auxiliaries, in which Section 4.1 first explores the syntactic distributions of various types of modals and further analyzes the modals in terms of the structural distinctions of control and raising. Section 4.2 examines how different modals interact with negation, and this section also takes scope interaction into consideration to justify the hierarchical relations between these functional elements. Section 4.3 then assesses the linguistic phenomenon of double modal constructions in Northern Thai and revisits the findings of previous sections through evaluating such a construction.

Section 5 concludes the findings from the perspective of syntax-semantics correspondence. In addition, the section reviews the unsettled issues and offers directions for further investigations.

2.   Literature Review

Northern Thai, a regional dialect in Northern Thailand, is known to have around six million speakers (Lewis, 2009). Although Northern Thai and Standard Thai both belong to the Tai-Kadai language family, they are not fully intelligible. Smalley (1994), an essential work on the linguistic landscape of Thailand, has discussed the unintelligibility of different varieties of Thai. In particular, Standard Thai, which takes the Central dialect as the base of standardization, is known to have a close relationship with Northern Thai due to language contact between these geographically-proximate languages. Therefore, it is essential to review relevant research in Standard Thai, in which they compensate for the limited studies of Northern Thai by laying the ground to compare and understand Northern Thai from a perspective as one of the Thai languages.

Davis (1970) is a pioneering study that solely concentrates on Northern Thai as the subject for linguistic description. Specifically for syntax, Warotamasikkhadit (1972) published a detailed description of Standard Thai syntax under the generative framework. Also, Diller (1988) revisited Thai syntax with a focus on how English influences the standardization process of Thai word order, in which many regional dialects, including Northern Thai, tend to converge into the structural order of SVO. Therefore, Section 3 will delineate the basic clausal structure of Northern Thai finite declaratives, and it will serve as a starting point to discuss the various functional categories of Northern Thai. Additionally, the aspectual markers in Thai are often considered as a complex issue that reflects the syntactic and semantic behavior of Thai. Koenig and Muansuwan (2005) have generalized the structural positions of Thai aspectual markers and discuss the incompatibility of Cinque's (1999) and Kayne's (1994) hypotheses on syntax-semantics correspondence with Thai data. Although Thai has captured the interest of syntacticians (Jiratatpasut, 1977; Koenig & Muansuwan, 2005), the tense-aspect system of Northern Thai have yet to be explored by linguists, and thus, Section 3.2 will describe the ways in which Northern Thai expresses time and events because such elements are closely related to the expression of modalities in Northern Thai.

The grammar of modal auxiliaries in Northern Thai has not been examined in the literature. However, it is possible to approach this issue by firstly examining the literature on modals in Standard Thai. A number of research has discussed Thai modals, focusing on their structural

positions and modal bases (Dellinger, 1975; Indrambarya, 1998; Jiratatpasut, 1997; Rangkupan, 2005; Sakkanayok, 2016). Jiratatpasut (1997) and Dellinger (1975) have examined the distributions of modals in Thai, and noted that Thai modals can be categorized according to their modal bases. These studies show that modal auxiliaries of Thai languages have the potential to be further analyzed with formal accounts.

Simpson (2001) has tried to explain the peculiarity of the postverbal dynamic modal in Thai. He defends the validity of Cinque's Universal Base Hypothesis by arguing the surface structure of the dynamic modal occupying the sentential-final position is actually the result of predicate raising from a position lower than the modal phrase in the deep structure. This paper will take Simpson's (2001) discussion into consideration in the analysis of Northern Thai dynamic modal(s). In addition, this paper will not only generalize the distributions of different types of Northern Thai modals but also try to correlate the relations between the different modal bases and the structures of the respective modal sentence. In view of the previous research of English, in particular, Zubizaretta (1982) and Picallo's (1990) argument of control and raising analysis of modals, Section 4.1.3 will discuss the possibility of differentiating Northern Thai modals by analyzing the compatibility of such an analysis with Northern Thai modal sentences. The control and raising analysis has been applied to other Asian languages, including Chinese (Lin & Tang, 1995), and evidently, it has the possibility for Northern Thai to yield generalizable results in this regard.

While most of the analyses on Thai modals are descriptive, Rungrojsuwan (2010) has discussed the interaction between modals and the functional elements in Northern Thai. In addition to the primary focus of the distributions of Northern Thai negative marker, Rungrojsuwan has discussed the ways of negating modal sentences. What is noted is the variations in the positionings of the negative marker in modal sentences, yet, Rungrojsuwan's discussion has not highlighted such a phenomenon in particular. In light of such an observation, Section 4.2 will extend the description and analysis of Northern Thai modals by considering the interaction between modal auxiliaries and negations. In this case, the focal point of discussion in the section involves the interaction between these functional categories; and through underlying the structural positions of these elements, the issue of scope interaction between modals will be addressed. In English, Coates (1983) has argued the

hierarchical projections of modal and negation in terms of scope interactions. It is hypothesized that the negation of modals with different modal bases has different scope interactions between the negation and modal in their syntactic structures. Hence, the study of such scope interactions in English provides the ground for Section 4.2.2 to analyze the scopes of negation and modals in Northern Thai to differentiate the constructions of modal sentences with different bases.

What is also intriguing about Thai modal is an observation that is highlighted briefly by Jiratatpasut (1977), from which serial modal constructions, i.e., double modal construction, is found to be possible in Thai. Multiple modals can co-occur in some other languages, in English, such expressions are only possible in certain regional varieties. It is evident that double modal constructions capture much attention for research, and there are proposed syntactic structures and semantic analyses (Battistella, 1995; Hasty, 2012). Since Northern Thai, as well as Thai, has not been discussed comprehensively in this regard, Section 4.3 will discuss the possible constructions of multiple modals in Northern Thai with the previously posited syntactic hypotheses in English. An additional purpose of this section is to provide analysis for the previously arrived preliminary conclusions in Section 4.1 and 4.2, in which the analysis may reaffirm or bring more worth noting discoveries of the syntax and semantics of Northern Thai modals.

On the whole, Northern Thai receives limited attention from formal linguists compared to Standard Thai. This paper will analyze the Northern Thai data with theories proposed in the prior studies of Standard Thai and relevant investigations in order to fill the void of the lack of linguistic study of Northern Thai modals.

3.   An Overview of Northern Thai Syntax

This section focuses on the structure of finite declarative clauses in Northern Thai. Section 3.1 presents the distributional facts of Northern Thai clausal elements and posits their possible syntactic structures. Section 3.2 illustrates the distributions of Northern Thai tense and aspectual markers based on the clausal architectures postulated in Section 3.1.

3.1.   Clause Structure of Finite Declaratives

Northern Thai shares the same linear word order of SVO with English. By the fact that Northern Thai expresses temporal events in different ways (to be discussed in 3.2), it is possible to consider Northern Thai declaratives headed by tense. The subject DP and the lexical verb are the two obligatory categories that fall in the projection of TP. In particular, Northern Thai verbs behave as either intransitive or transitive, in which they can take one or two arguments. Thus, based on these observations, sentences (1a) and (2b), which can be interpreted as either generic or habitual present event according to the contexts, will have the structures in (1b) and (2b) respectively.

(1) a. khao   non
        he   sleep
        'He sleeps.'

(2) a. khao   kin   sai ua
        he   eat   Northern Thai sausage
        'He eats Northern Thai sausage.'

b.
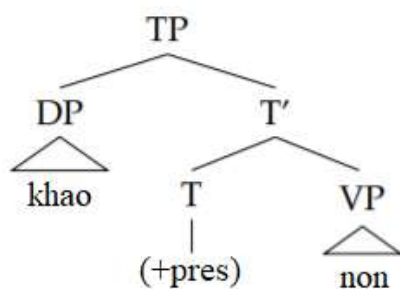
b.
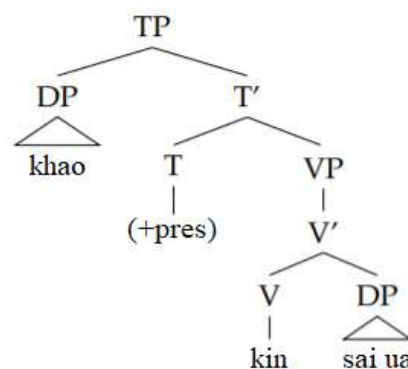
From the derived structures in (1b) and (2b), the hierarchical projections of Northern Thai declaratives resemble the ones in English. At this point, the indication of tense is assumed to be found in T, and further discussions will be made in the subsequent section.

3.2. Tense and Aspect

This section deals with the syntactic and semantic behavior of tense and aspectual markers in Northern Thai. As noted from the examples in 3.1, Northern Thai does not mark present tense overtly. Yet, it is found that explicit markers exist for denoting time and events. In the case of future events, a future tense morpheme *ja* always appears before the lexical verb, as in (3).

(3) a. khao   ja   kin   sai ua

        he   FUT   eat   Northern Thai sausage

        'He will eat Northern Thai sausage.'

    b. * khao kin   ja   sai ua

        he   eat   FUT   Northern Thai sausage

Based on the linear order in (3), *ja* can only take a preverbal position, and it marks tense semantically. Thus, the position is assumed to be T, as in (4).

(4)
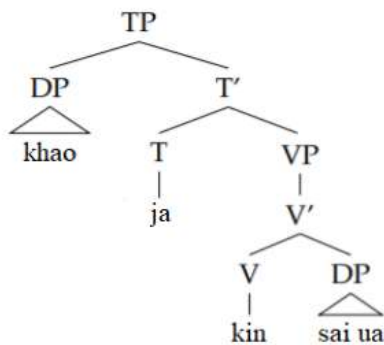
Following the same reasoning, it is possible to assume that the present tense is generated in T but it is not realized in the surface structure. Before attempting to account for this observation, it is worth noting that Northern Thai does not have a past tense marker in this position, but instead, a postverbal clausal element *laeo* is used whenever the sentence denotes a past and completed event. (5a) has a structure in which *laeo* occupies the sentential-final position, and it is treated as an adverb that modifies the action of the declarative. Without *laeo*, the sentence conventionally refers to present event, as in (5b).

(5) a. khao   kin   sai ua   laeo

      he   eat   Northern Thai sausage   already

      'He ate Northern Thai sausage. / He has eaten Northern Thai sausage.'

   b. khao   kin   sai ua

      he   eat   Northern Thai sausage

      'He eats Northern Thai sausage.'

   c.

```
                    TP
                   /  \
                 DP    T'
                 /\   / \
               khao  T   AspP
                        /  \
                      Asp'
                      /  \
                    VP    Asp
                    /\     |
              kin sai ua  laeo
```
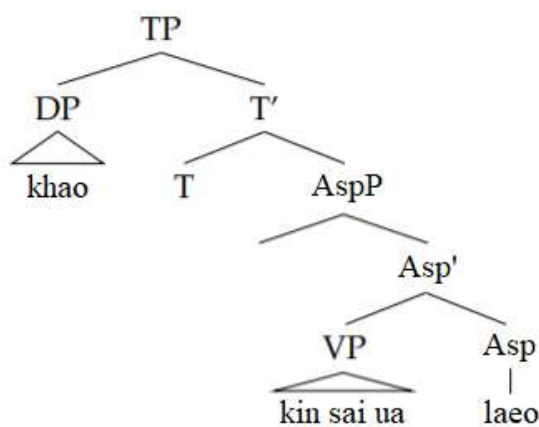
Although *laeo* structurally corresponds to an English adverb that takes the postverbal position, its status as an adverb is challenged by the fact that the sentence does not refer to past and completed event without *laeo*, as in (5b). Since an adverb is usually a non-obligatory element, *laeo* serves more than the function of an adverbial as it is also required for marking tense and aspect. In this sense, (5c) assumes *laeo* is a perfective aspect, and for the sake of word order, *laeo* is assumed to be a head final element. As this is an issue that requires further investigation and it falls out of the focus of this paper, the syntactic status of *laeo* will not be discussed in detail.

At this point, the ways in which Northern Thai expresses present, past, and future tense, as well as the perfective eventuality are covered. Additionally, Northern Thai indicates progressive aspect with the preverbal *kamlang*, as in (6).

(6) a. khao   kamlang   kin   sai ua

        he   PROG   eat   Northern Thai sausage

        'He is eating Northern Thai sausage.'

   b. * khao kin   kamlang   sai ua

       he   eat   PROG   Northern Thai sausage

   c.
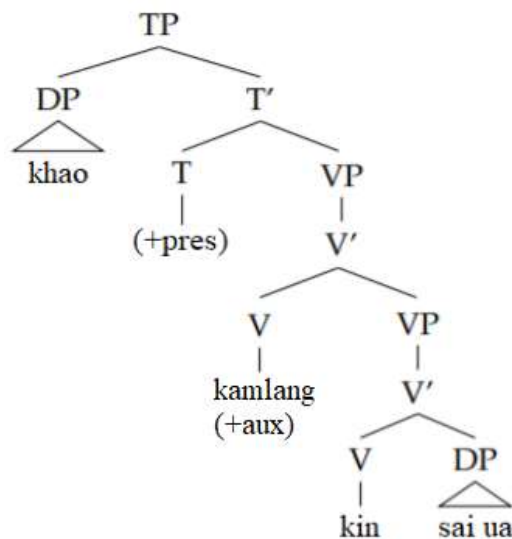
The motivation for postulating the structure in (6b) is based on the assumption of Pollock (1989), in which an auxiliary verb is generated in VP. Also, because *kamlang* immediately precedes the main verb in the surface linear order, *kamlang* takes the lexical VP as its complement to convey progressiveness.

The syntax of Northern Thai aspects concerning progressive and perfective markers appear to follow the order of PROG > V > PERF. Disregarding the unsettled issues of *laeo*, it is noted that the aspectual markers in Northern Thai do not have a fixed syntactic position.

In summary, most of the tense and aspectual markers in Northern Thai constitute the preverbal clausal elements in finite declaratives. The sole postverbal element is the *laeo* which conveys past and perfective eventualities. This section is of critical importance for the following discussion because it suggests the necessary structures as prerequisites to analyze the syntactic distribution of modals in Northern Thai.

4. Syntactic Aspects of Modal Auxiliaries in Northern Thai Finite Declaratives

The entire Section 4 examines the syntax of Northern Thai modal auxiliaries with various interrelated focuses. The section describes the distributional facts of Northern Thai modals and derives possible syntactic structures from such observations. Also, the descriptions are accompanied by the analyses that offer suggested explanatory account for the syntactic and semantic behavior of Northern Thai modals.

4.1. Syntactic Distributions of Modal Auxiliaries

4.1.1 identifies different Northern Thai modals, and 4.1.2 categorizes the modals according to their structural positions. Based on the observation, 4.1.3 tries to capture the categorical distinction of modals with control and raising analysis.

4.1.1. Types of Modal Auxiliaries

This paper identifies 22 different modal auxiliaries in Northern Thai. The modals can be categorized according to their modal bases and quantificational forces. Table 1 compiles the epistemic possibility and necessity modals.

Epistemic Possibility	at ja 'may/might'	Epistemic Necessity	tong ja 'must'
	na ja 'may/might'		tong kan ja 'must'
	khong ja 'will/would'		au hai dai ja 'must'
	yom ja 'likely to'		cham pen tong ja 'must'
	han ja 'seems that'		khuan ja 'should'
	mak ja 'tends to'		na ja 'should'

Table 1 Epistemic modals in Northern Thai

The epistemic possibility modals denote possibility and/or inference. Whereas *at ja* and *na ja* are interchangeable, the rest are different subtly. In contrast, the epistemic necessity modals denote the necessity based on the knowledge of speakers. They differ in the degree of necessity, in which *cham pen tong ja* and *au hai dai ja* are perceived to express the highest degree. In particular, *khuan ja* and *na ja* denotes obligation, and they are interchangeable.

It is shown that the most salient syntactic feature is that the future tense marker *ja* always follows the epistemic modal expressions, in which the modals and the future tense marker constitute a complete epistemic modality in Northern Thai. (7), (8), and (9) are some examples of epistemic sentences in Northern Thai.

(7)   khao   khong   ja   mai   ma

        he   will   FUT   NEG   come

        'He probably will not come.'   (deduction)

(8)   khao   at   ja   tai

        he   may/might   FUT   die

        'He may die.'   (inference)

(9)   khao   tong   ja   uan

        he   must   FUT   fat

        'He must be fat.'   (assumption)

While *ja* is obligatory in epistemic modals, Table 2 demonstrates a different picture in deontic modals.

Deontic Possibility	dai 'can' (permission)	**Deontic Necessity**	tong 'must'
			tong kan 'must'
			au hai dai 'must'
			cham pen tong 'must'
			khuan 'should'
			na 'should'

Table 2 Deontic modals in Northern Thai

Similar to English, Northern Thai deontic modals are also ambiguous in the sense that they carry both deontic and epistemic readings. But as contrasted between Tables 1 and 2, *ja*

seems to be an element that disambiguate between the two interpretations, that is, deontic necessity modals are not followed by *ja*. Disregarding the absence of *ja*, deontic necessity modals are identical to epistemic necessity modals. Apart from deontic necessity, there is only one deontic possibility modal *dai* which has a permission reading. (10), (11), and (12) demonstrate different sentences of Northern Thai deontic modality.

(10) khun   tham   chennan   mai   dai
      you   do   that   NEG   can
      'You cannot do that.'   (permission)

(11) rao   tong   mai   luem
      we   must   NEG   forget
      'We must not forget.'   (directive/advice)

(12) khun   khuan   trongtowela
      you   should puntual
      'You should be puntual.'   (obligation)

Following the same logic in which Northern Thai modals can overlap in the categorization of modal bases, *dai*, which means 'can', is expected to be ambiguous, and thus, grouped in another category, as in Table 3.

Dynamic Modals	dai 'can' (ability)
	pen 'can' (the ability to perform a certain skill)
	wai 'can' (the ability to physically perform a certain action)

Table 3 Dynamic modals in Northern Thai

There are three dynamic modals, and they all refer to the ability of various kinds. They are not always interchangeable. *dai* is most generally used to refer to ability, while *pen* and *wai* are less common and are associated with more specific meanings. Such differentiations will be illustrated in 4.1.2.

In summary, the observation of epistemic modals always being followed by the future tense markers has left a possibility that the syntactic structures of epistemic and deontic modal sentences in Northern Thai are different. The next subsection will tackle this issue.

4.1.2. Structural Positions of Modal Auxiliaries

This section puts isolated examples of Northern Thai modal auxiliaries into their syntactic and semantic environments, in which it aims to identify the positions of different modals in Northern Thai.

Firstly, consider the epistemic possibility modal sentence in (13), *at ja* appears before the main verb in (13a). (13b) indicates that *ja* is mandatory as the sentence is ungrammatical in its absence. (13c) illustrates the fixed position of *ja* as a post-modal element because it is impossible to have *ja* occupying before the modal. What's more, the ill-formed structure in (13d) proves that *at* is a preverbal modal rather than a postverbal one.

(13) a. khao   at   ja   kin   sai ua

   he   may/might   FUT   eat   Northern Thai sausage

   'He may eat Northern Thai sausage.'

   b. * khao at   kin   sai ua

      he   may/might   eat   Northern Thai sausage

   c. * khao ja   at   kin   sai ua

      he   FUT   may/might   eat   Northern Thai sausage

   d. * khao ja   kin   sai ua   at

   he   FUT   eat   Northern Thai sausage   may/might

In the case of epistemic necessity modal sentence (14), it behaves almost identically with the example in (13).

(14) a. khao   tong kan   ja   laaw

    he   must   FUT   handsome

    'He must be handsome.'

    b. khao   tong kan   laaw

    he   must   handsome

    'He must be handsome.'   (deontic reading)

    c. * khao ja   tong kan   laaw

    he   FUT   must   handsome

    d. * khao ja   laaw   tong kan

    he   FUT   handsome   must

In particular, (14b) is grammatical without the *ja* that follows the modal *tong kan*. This is because, as mentioned in Table 2, an epistemic necessity modal without *ja* becomes a deontic necessity modal. Except for this case, it is found that epistemic modal situates in the preverbal position, in which the future tense marker must immediately follow the modal.

Based on the linear order, it appears that an epistemic modal takes a higher position than the tense marker in a hierarchy as the modal always precedes the tense marker. According to Cinque's (1999) findings, he has reported the possibility for an epistemic modal to stay above TP in some languages. In this sense, it is plausible to derive the hierarchical structure in (15). The motivation for (15) is that it generates the surface structure by placing the modal phrase above the tense phrase, thus, it produces the word order in which the modal is followed by the tense marker. Moreover, (15) is argued to be the result of DP movement. The subject DP is originally situated in the specifier of TP for the sake of EPP, and following the standard assumption, it has moved to MP to generate the correct word order. Building on the minimalist approaches, it is reasonable to assume MP also has EPP features in this regard (Chomsky, 1995; Lasnik, 1995). Therefore, the MP projects the TP in the structure of (15).

(15)
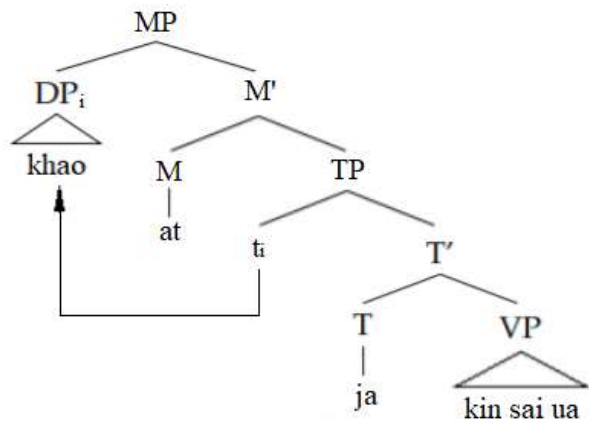
Secondly, considering the deontic possibility modal sentence in (16), *dai* 'can' is found in the sentential final position, which is on a par with the Standard Thai data in Simpson (2001). The ungrammaticality of (16b) states the nature of *dai* as a postverbal modal.

(16) a. khao   kin   sai ua   dai

      he   eat   Northern Thai sausage   can

      'He can eat Northern Thai sausage.' (permission reading)

   b. * khao dai   kin   sai ua

      he   can   eat   Northern Thai sausage

Following Simpson (2001), this paper postulates the structure in (17) as a modification of what is proposed in Simpson's research.

(17)
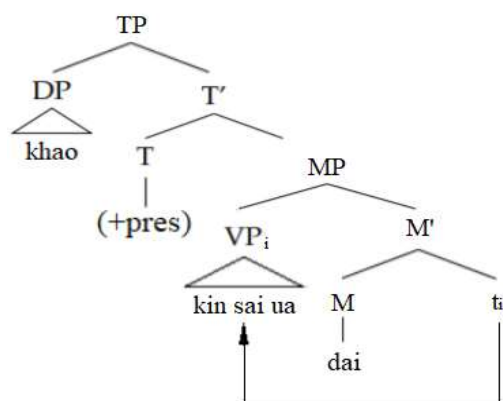
To satisfy the surface order of (16a), and at the same time to obey Cinque's Universal Base Hypothesis, the VP predicate undergoes movement and lands in the specifier position of MP.

Nevertheless, the deontic necessity modal sentence is rather similar to an epistemic modal sentence in the sense that both modals are preverbal, as in (18). Note that no future tense marker follows the modal *tong*, so it affirms the distinction between epistemic and deontic modal sentences.

(18) a. khao   tong   non
        he   must   sleep
        'He must sleep.'

     b. * khao non   tong
          he   sleep   must

By following the assumption of clausal structure of Northern Thai, (18a) will have a structure in (19).

(19)
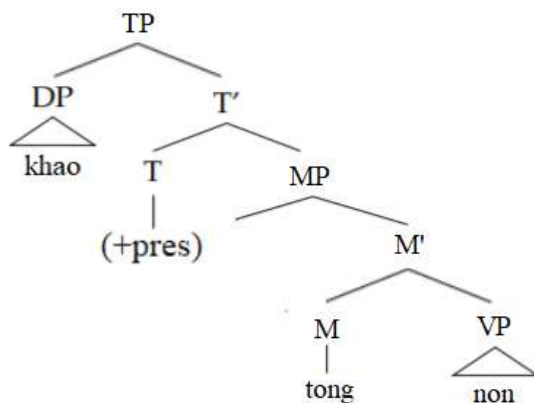
In short, the deontic modal sentence in Northern Thai has a modal phrase under a TP.

Thirdly, consider the third kind of modal in Northern Thai, i.e., dynamic modals, they are found in the predicate-final positions, as in (20), (21), and (22).

(20) a. khao   kin   ahanrotphet   dai

        he   eat   spicy food   can

        'He can eat spicy food.'   (ability reading)

    b. * khao dai   kin   ahanrotphet

        he   can   eat   spicy food

(21) a. ?? khao   kin   ahanrotphet   pen

           he   eat   spicy food   can

           'He knows the way to eat spicy food.'

    b. khao   len   piano pen

        he   play   piano can

        'He knows how to (can) play the piano'

    c. * khao pen   len   piano

        he   can   play   piano

(22) a. ?? khao   kin   ahanrotphet   wai

           he   eat   spicy food   can

           'He is physically capable to eat Northern Thai sausage.'

    b. khao   din   wai

        he   walk   can

        'He is physically capable (can) to walk'

    c. * khao wai   din

        he   can   walk

What is worth noted in (21) and (22) is the incompatibility of *pen* and *wai* with the eventuality exemplified in (20). Despite the syntactic distributions for *pen*, *wai*, and *dai* remain the same, i.e., postverbal, their usages are restricted by pragmatic and semantic conventions. Apart from this, the structures for these examples are arguably the same as in (17), in which the postverbal modal is preverbal in the deep structure.

In summary, the structures of various kinds of modal are evidently different. Although three different hierarchical structures are posited for epistemic, deontic, and dynamic modal auxiliaries in Northern Thai, these structural representations do not adequately account for the disparities of modals in terms of semantics. Hence, the subsequent section will further refine the postulations, and the relative heights of modals will be discussed with more related tests including negation, which is the focus of 4.2.

4.1.3.   Control and Raising Modal Auxiliaries

At this point, it is found that the structures of Northern Thai modal sentences tend to correspond to their differentiation in modal bases. Epistemic modals appear to have a structure headed by M, whereas deontic and dynamic modals seem to be headed by T. Nonetheless, such a generalization does not provide a neat findings for the tendency in which the modal bases determine the structures of modal sentences. For this reason, this section discusses Northern Thai modals under the analyses of control and raising.

The control and raising analysis of modal auxiliaries is extensively examined in Zubizaretta (1982) and Picallo (1990). They have proposed that English modals, and possibly, modals of other languages can be distinguished by their syntactic positions, and notably, by the structures they constitute as a whole. What they have argued is that the disparities in the interpretations of modal sentences are attributed to the contrasting structures. Owing to their arguments, this section suggests the potential to yield constructive findings if Northern Thai modal sentences are analyzed as control and raising structures.

Consider the deontic modal sentences in (23), it is observed that only an animate subject is compatible with a deontic modal. For this, it is evident that deontic modals in Northern Thai impose selectional restriction on the subject it takes.

(23) a. khao   tong   ma

      he   must   come

      'He must come.'   (deontic reading)

   b. * chot mai   tong   ma

      letter   must   come

   'The letters must come.'   (deontic reading)

On the contrary, the epistemic modal sentences in (24) demonstrate the fact that epistemic modal is compatible with both animate and inanimate subjects. No explicit semantic restriction is imposed by epistemic modals.

(24) a. khao   at   ja   ma

      he   may/might   FUT   come

      'He may come.'

   b. chot mai   at   ja   ma

      letter   may/might   FUT   come

      'The letters may come.'

The ways in which epistemic and deontic modals interact with the subject reveals their structural differences. Zubizaretta (1982) reports that English deontic modals also impose selectional restriction on the subject they take, and so English modals behave correspondingly to Northern Thai modals in the above cases. Also, Zubizarreta (1982) suggests that such an observation can be explained by analyzing deontic and epistemic modal sentences as control and raising structures respectively. Thus, (25) revisits the postulated structure of the deontic modal sentence in 4.1.2.

(25)
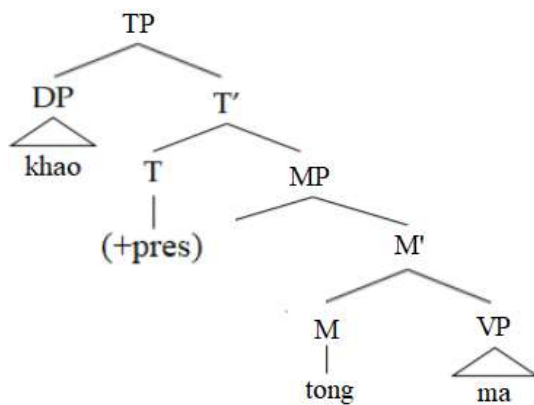
If (25) is to be analyzed as a control structure, (25) is refined as in (26). Together with the consideration of the deontic modal *tong* taking a verb complement, the control structure in (26) can adequately capture the incompatibility of deontic modal with an inanimate subject by delineating the theta-role assignment in (26). In this case, the modal *tong* assigns the agent role to the subject, whereas the theta-role that has yet to be assigned in the VP is assigned to the empty PRO.

(26)
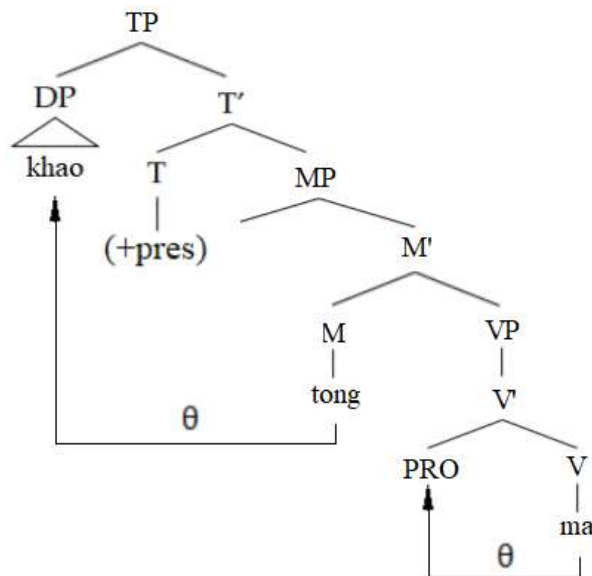
This analysis sufficiently accounts for the fact that the deontic modal, which denotes sentient, is impossible to co-occur with the subject of inanimacy. From this point of view, a deontic modal sentence in Northern Thai has a control structure.

Conversely, epistemic modal sentences will have raising structures. It is assumed that the subject DP is generated in VP, and it is where it receives an agent role, as in (27). It moves out from the specifier of VP to the specifier of TP for the sake of EPP. And the DP moves for the second time and lands on the specifier of the MP to generate the S-structure in (28). The raising of DP is able to account for the compatibility of epistemic modal with both animate and inanimate subject by virtue of the theta-criterion that forbids the moved DP with an agent role to receive the theta-role to be assigned by the modal. This explains the syntactic and semantic behavior of epistemic modal in theta-assignment terms.
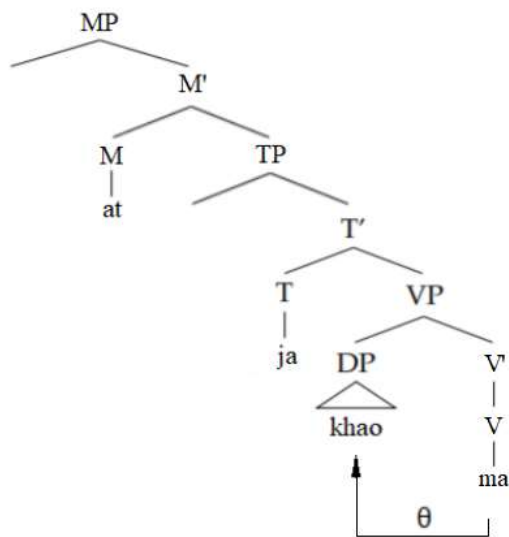
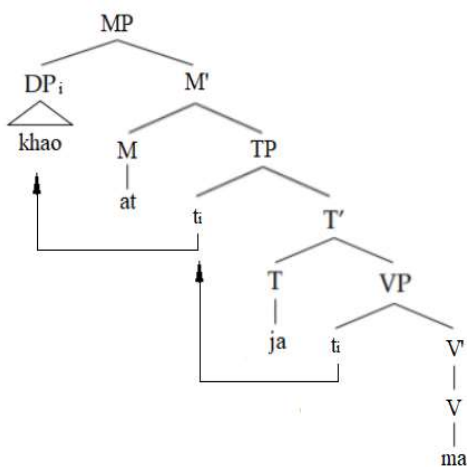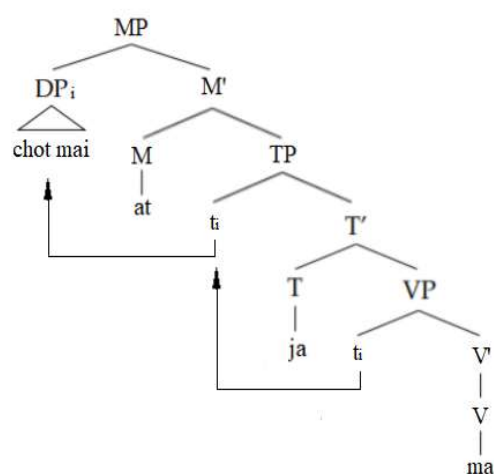(27) a.   b.
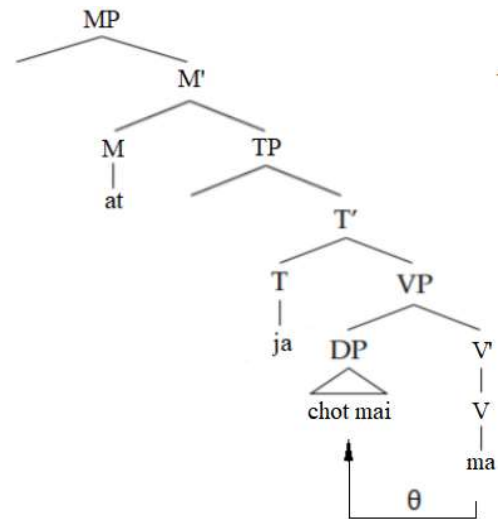
(28) a.   b.

Building on the argument that deontic and epistemic modal sentences are control and raising structures respectively, Northern Thai dynamic modal *dai* 'can', which has both the deontic and ability readings, is believed to project different structures in different interpretations. (23) exemplifies the deontic reading (permission) of *dai*.

(29) a. khao   kin   sai ua   dai

       he   eat   Northern Thai sausage   can

       'He can eat Northern Thai sausage.'   (deontic reading)

     b. * kradat chamra   sue   dai

         toilet paper   buy   can

         'The toilet papers are purchasable.'

Since (29) reports the ungrammaticality of the deontic *dai* having an inanimate subject, it is plausible that it has a control structure by the same mentioned rationale. Specifically, it is proposed that the theta-role assignment occurs first, as in (30a). In this respect, *dai* assigns the agent role to the subject, before the movement of VP in (30b).

(30) a.   b.
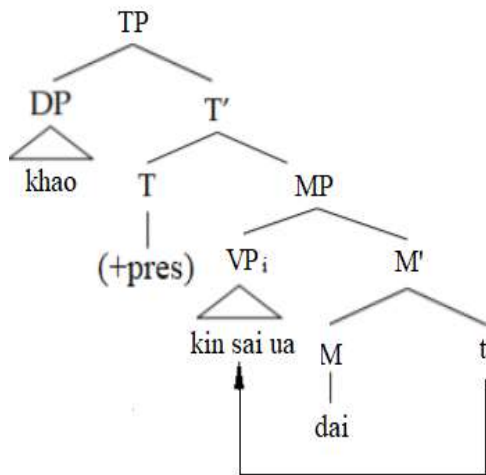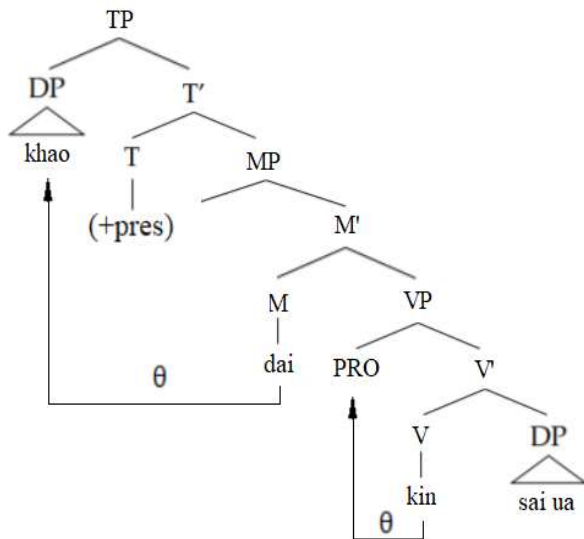
While deontic *dai* seems to have a control structure, ability *dai* is a case that have yet to be considered. Although dynamic modal falls out of the distinction of epistemic and deontic, dynamic modal is found to be incompatible with inanimate subject, as in (31).

(31) a. khao   klapma   dai

        he   come back   can

        'He can come back.' (ability reading)

    b. * khrueang bin   klapma   dai

        airplane   come back   can

        'The airplane can come back.'   (ability reading)

This suggests that dynamic modal also has a control structure, in which the modal assigns the theta-role to the subject and selects only the animate subject. It yields a structure that resembles (30).

In summary, the syntactic structures of epistemic, deontic and dynamic modal sentences are refined with the analysis of control and raising structures. The classification of modals according to their modal bases is a manifestation of interaction between syntax and semantics, and it has shed light on how the modals in Northern Thai distinct from each other.

4.2. Negative Modal Sentence

This section continues the discussion of Northern Thai modal sentences with an additional focus of how different modal auxiliaries interact with negation. In particular, this section addresses such a focus with the previously proposed structures for further refinement.

4.2.1. Syntactic Distributions of negative marker in modal sentences

Despite the fact that Northern Thai has more than one morpheme to mark the negations that correspond to English negative markers: *not* and *no*, the only possible Northern Thai maker that negates a modal is *mai*. In the following, the structural positions of *mai* will be illustrated.

(32) demonstrates the possible syntactic position of *mai* in an epistemic modal sentence. It is noted that *mai* occurs preverbally, and it immediately follows the epistemic possibility modal *at ja*, as in (32a). As (32b) suggested, *mai* cannot occur before the modal, or else it is ungrammatical.

(32) a. khao   at   ja   mai   kin   sai ua

        he   may/might   FUT   NEG   eat   Northern Thai sausage

        'He may not eat Northern Thai sausage.'

   b. * khao mai   at   ja   kin   sai ua

        he   NEG   may/might   FUT   eat   Northern Thai sausage

Not only for epistemic possibility, (33a) confirms that *mai* can only occur before an epistemic necessity modal but not after this particular modal, as in (33b). What's more, *mai* cannot go after the progressive marker *kamlang*, as in (33c).
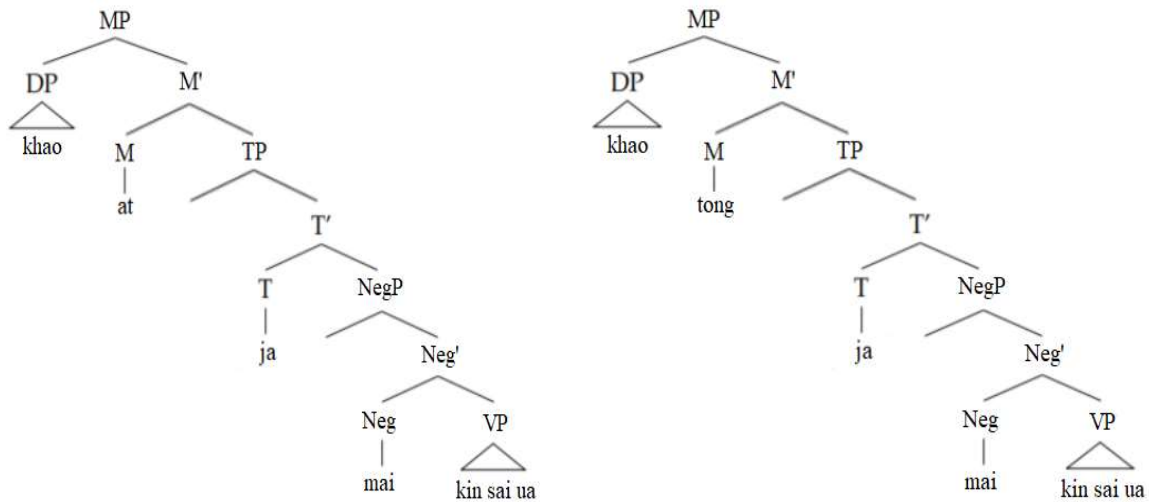

(33) a. khao   tong   ja   mai   kamlang   kin   sai ua

        he   must   FUT   NEG   PROG   eat   Northern Thai sausage

        'He must not be eating Northern Thai sausage.'   (epistemic reading)

   b. * khao mai   tong   ja   kamlang   kin   sai ua

        he   not   must   FUT   PROG   eat   Northern Thai sausage

   c. * khao tong   ja   kamlang   mai   kin   sai ua

        he   must   FUT   PROG   not   eat   Northern Thai sausage

By considering the linear order in (32) and (33), together with the posited structures for Northern Thai modals in the previous sections, (34) demonstrates a plausible structure for negative epistemic modal sentences.

(34) a.   b.

MP
DP — M'
khao
M — TP
at
T'
T — NegP
ja
Neg'
Neg — VP
mai — kin sai ua

MP
DP — M'
khao
M — TP
tong
T'
T — NegP
ja
Neg'
Neg — VP
mai — kin sai ua

In (34), the NegP projects the negative marker and the VP, in which the structures generate the surface linear word order of negative epistemic modal sentences.

For deontic necessity modal sentence, it is shown that *mai* precedes the deontic modal *tong*, as in (35a). (35b) follows the order of negating an epistemic modal, and it is not possible to produce such a structure grammatically.

(35) a. khao   mai   tong   non
       he   NEG   must   sleep
       'He must not sleep.'

   b. * khao tong   mai   non
       he   must   NEG   sleep

Following the assumed structures and the linear order in (35), a deontic necessity modal sentence will have the structure in (36).

(36)
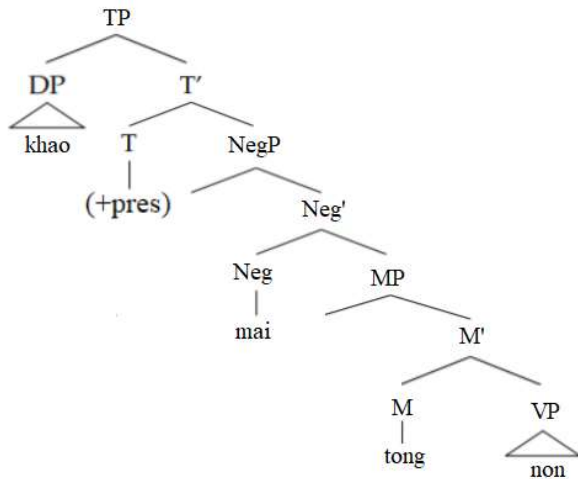
In (36), the NegP projects the MP and then the VP. It is clear that the structures for epistemic and deontic modal sentences contrast in the relative positions to NegP.
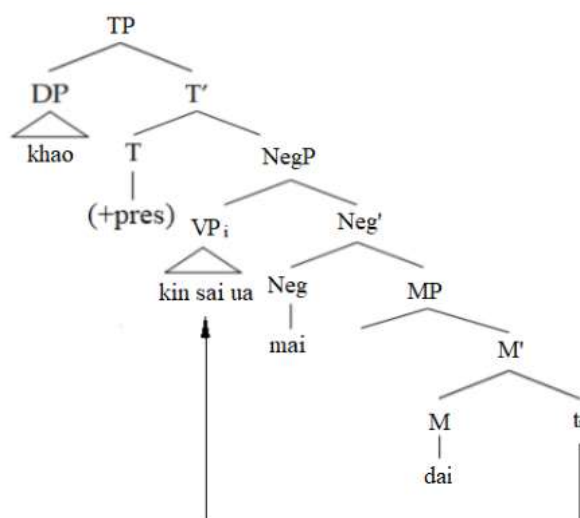
Nevertheless, the deontic possibility modal *dai* is expected to have a different structure compared to (36) because it is a postverbal modal, as in (37).

(37) a. khao   kin   sai ua   mai   dai

       he   eat   Northern Thai sausage   NEG   can

       'He cannot eat Northern Thai sausage.'   (permission reading)

    b. khao   kin   sai ua   dai   mai

       he   eat   Northern Thai sausage   can   NEG

       'Can't he eat Northern Thai sausage?'

Notably, *dai* is negated when it is preceded by the negative marker *mai*, in which such a negation follows the negation pattern in deontic necessity modal sentence. Interestingly, if *mai* follows *dai*, it becomes a grammatical interrogative sentence. Disregarding (37b), a negative precedes a deontic possibility modal. Thus, it is necessary to take the Simpson's (2001) proposed structure for accommodating the NegP in this regard, as in (38). The NegP projects MP and the VP, which is the same as (36). What is followed is the movement of VP that generates the surface order.

(38)

TP
DP   T'
khao   T   NegP
      (+pres) VP_i   Neg'
            kin sai ua   Neg   MP
                        mai   M'
                                    M   t_i
                                   dai

At this point, it is also anticipated that the dynamic modal sentences in Northern Thai, featuring the postverbal *dai*, *pen*, *wai*, will be negated in the way shown in (38), simply because the negative marker must precede the postverbal modal in order to generate a declarative rather than an interrogative. Following this reasoning, the negative dynamic modal sentence will have a hierarchical structure that resembles the deontic possibility modal sentence in (38).

In summary, the ways in which epistemic and deontic modal sentences are negated emphasized their contrasting syntactic and semantic behavior. Due to the syntactic realization of deontic possibility modal and dynamic modal sentences, they once again resemble in the interaction with negation and their respective negated structures. Nonetheless, the subsequent section will consider these constructions in terms of their scope relations to further analyze the modals from both syntactic and semantic aspects.

4.2.2.   Modal Auxiliaries, Negation, and Scope

A generalization of Northern Thai negative modal sentences is that the modals receiving an epistemic reading syntactically situate above negation, while the modals receiving a deontic and dynamic interpretation always go below negation. Such a generalized observation reports the notable difference in the syntactic scope interaction between two sets of modals with respect to negation.

Likewise, Coates (1983) has argued over the distinction between the English epistemic and deontic modals in terms of their scope relations with negations. When the interpretation of the negative modal sentence is considered, it is said that the negation scopes over the main predicate, i.e., the main lexical verb, in the case of English epistemic modals, as in (39)

(39)　He may not eat the cake.　　(epistemic reading)

　　　Reading: 'It is possible that he will not eat the cake.'　　(possibility > negation)

(39) exemplifies the semantic reading of an English negative epistemic sentence, in which *not* affects the main predicate *eat the cake*. On the contrary, Coates has discussed the opposite behavior of such an operation in English negative deontic sentences, as in (40).

(40)　He may not eat the cake.　　(deontic reading)

　　　Reading: 'He is not allowed to eat the cake.'　　(negation > permission)

The sentence in (40) is best paraphrased into the reading in which the negation includes modality, as well as the main predication that follows. In light of Coates (1983), this section will examine the scope interactions between Northern Thai modals and in semantic terms.

First, the negative epistemic modal sentence is considered in (41). As expected, the literal interpretations are in line with the English ones, in which an epistemic modal scopes over the negation.

(41)　khao　at　　　　ja　　mai　kin　　sai ua
　　　he　　may/might　FUT　NEG　eat　　Northern Thai sausage
　　　'He may not eat Northern Thai sausage.'
　　　Reading: 'It is possible that he will not eat Northern Thai sausage.'

The continuation test is used to further justify the fact that an epistemic modal scopes over negation, as in (42).

(42)	penpai dai	wa	khao	ja	mai	kin	sai ua		lae
	It is can	that	he	FUT	NEG	eat	Northern Thai sausage		and
	penpai dai	wa	khao	ja	kin	sai ua			
	it is can	that	he	FUT	eat	Northern Thai sausage			

'It is possible that he will not eat Northern Thai sausage, and it is possible that he will eat Northern Thai sausage.'

(42) extends the interpretation of the Northern Thai negative epistemic modal sentence in (41), and it is noted that the overall meaning in (42) is still coherent and reasonable despite the affirmative sentence that follows the original negative sentence. Now consider (43), featuring reversed scope relations between the epistemic modal and negation.

(43)	* manpenpai	mai	daithi	khao	ja	kin	sai ua		lae
	It is	NEG	that	he	FUT	eat	Northern Thai sausage		and
	penpai	dai	wa	khao	ja	kin	sai ua		
	It is	can	that	he	FUT	eat	Northern Thai sausage		

* 'It is not possible that he will eat Northern Thai sausage, and it is possible that he will eat Northern Thai sausage.'

The extended sentence has a contradictory meaning because the sentence initially states the impossibility for the event to happen, and then it follows with an affirmative sentence that is incompatible with the previously negated eventuality. In terms of the possible world semantics of modals (Kratzer, 1981, 1991), there is not a possible world where the concerned proposition is true, in other words, such a sentence only has the negation > possibility scope reading, in contrast to (42).

At this point, it is expected that deontic modals will operate in another way with respect to negation. (44) considers a deontic modal sentence, and (45) and (46) puts the sentence in (44) into the continuation test.

(44)   khao   mai   tong   non

he   Neg   must   sleep

'He must not sleep.'

Reading: 'He is not allowed to sleep.'

(45)   * khao mai   dai   rap   anuyat hai   non   lae   khao   yangkhong

         he   NEG   can   accept allow let   sleep and   he   still

         samarot   lueak thi   ja   non   rap

         capable   choose that   FUT   sleep   accept

         * 'He is not allowed to sleep, and he can still choose to sleep.'

(46)   khao   dai   rap   anuyat hai   mai   non   lae   khao   yangkhong

         he   can   accept allow let   NEG   sleep and   he   still

         samarot   lueak thi   ja   non   rap

         capable   choose that   FUT   sleep   accept

         'He is allowed not to sleep, and he can still choose to sleep.'

It is shown that only (46) is felicitous and it is impossible to say that the concerned person in (44) has the choice to sleep as in (45). On the contrary, (46) makes sense as the scope relation is reversed, i.e., deontic modal > negation, together with the ill-formed test result of (46), it is justified that negation must scope over the deontic modal because such a scope relation entails that there is no deontic possible world where the proposition is true.

The continuation tests have revealed the available scopes of epistemic and deontic modals with respect to negation. It is also worth noting that dynamic modals always scope below negation, as in (47).

(47)   khao   len   piano mai   dai

         he   play   piano not   can

         'He cannot play the piano.'   (ability reading)

         Reading: 'He is not capable to play the piano.'

So if a dynamic modal sentence is put into the continuation test, the results are demonstrated in (48) and (49).

(48) khao   non   mai   dai   wela   sam   wan   tonni khao

he   sleep NEG   can   for   three day   now   he

du   nueay mak   tae   kaho   yangkhong   kangwon   kiao kap

look   tired very   but   he   still   worry   about

ngan

work

'He is not able to sleep for 3 days. He looks very tired right now but is still worried about the work.'

(49) * khao mai   non   pen   wela   sam   wan   tonni khao   yangkhong

he   NEG   sleep can   for   three day   now   he   still

mai   nueay khao   khaengraeng

NEG   tired he   strong

* 'He is able to not sleep for 3 days. He is still not tired right now. He is strong.'

In Northern Thai, it is impossible to have the reading in (49), in which it has the scope reading of dynamic modal > negation. Conversely, the only felicitous reading is (48). These test results indicate that a dynamic modal must scope below negation in Northern Thai since the scope of negation > dynamic modal does not yield a pragmatically and grammatically possible modal sentence.

In summary, this section has described the scope interactions between various modals and negation in Northern Thai. The semantic analyses have shown that epistemic modals always scope above negation, while deontic modals always scope below negation. Notably, dynamic modal scopes below negation in a way that resembles the deontic modals. These give weight to the argument that Northern Thai modals with different modal bases have different structural positions that lead to different interpretations.

4.3. Double Modal Constructions

This section aims to provide descriptions for the linguistic phenomenon of serial modal constructions in Northern Thai. Further, the discussion will revisit the analyses employed in the previous sections for the purpose to examine the syntactic and semantic behavior of this particular type of modal construction.

4.3.1. Syntax of Double Modal Constructions

This section focuses on the syntactic structure of Northern Thai double modal constructions, and it will derive possible hierarchical structures of double modal sentences based on the

proposed structures in 4.1, as well as the previous findings of double modal constructions in English.

First of all, it is found that only two double modal constructions are pragmatically and grammatically possible in Northern Thai, as shown in (50)

(50) a. khao   at   ja   kin   sai ua   dai

    he   may/might   FUT   eat   Northern Thai sausage   could

    'He might could eat Northern Thai sausage.'

    Reading 1: 'It is possible that he is allowed to eat Northern Thai sausage.'

    Reading 2: 'It is possible that he is physically suitable to eat Northern Thai sausage.'

    b. khao   kong   at   ja   kin   sai ua

    he   will/would   may/might   FUT   eat   Northern Thai sausage

    'He would might eat Northern Thai sausage'

   Reading: 'It is possible that he is likely to eat Northern Thai sausage.'

(50a) exemplifies the double modal *at ja*-VP-*dai* 'might could' and (50b) shows the usage of *khong at ja*. From (50a), it is found that *at ja* and *dai* can co-occur within the same sentence disregarding their difference in modal bases, in which *at ja* is epistemic, while *dai* is either deontic or dynamic. According to the postulated structures for epistemic, deontic, and dynamic modal sentences, (51) indicates a possible way to construct the architecture of such a sentence.
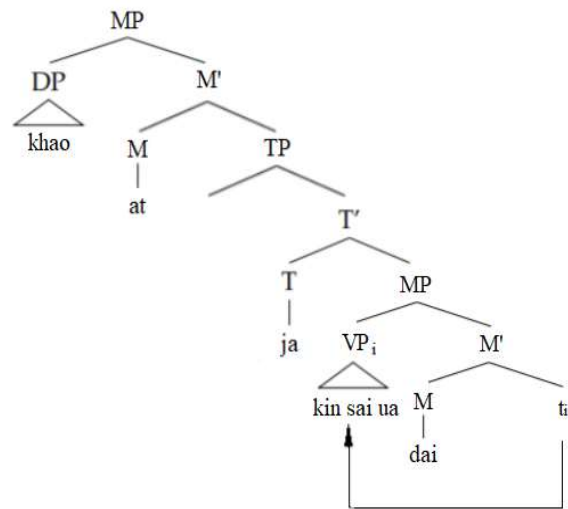
(51)
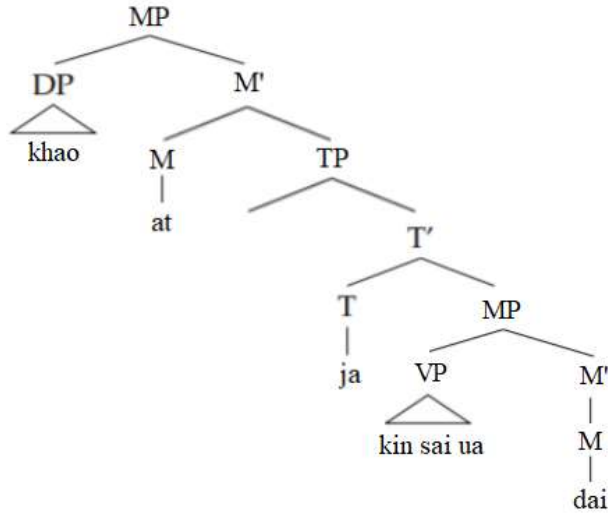
(51) combines the structure for epistemic modal sentence and the structure for deontic possibility and dynamic modal sentence. The preverbal MP projects the first modal *at ja*, and the postverbal MP projects the second modal *dai*. As discussed in 4.1.2, the subject DP is moved and landed in the specifier of MP for EPP, as shown in (52a) below.
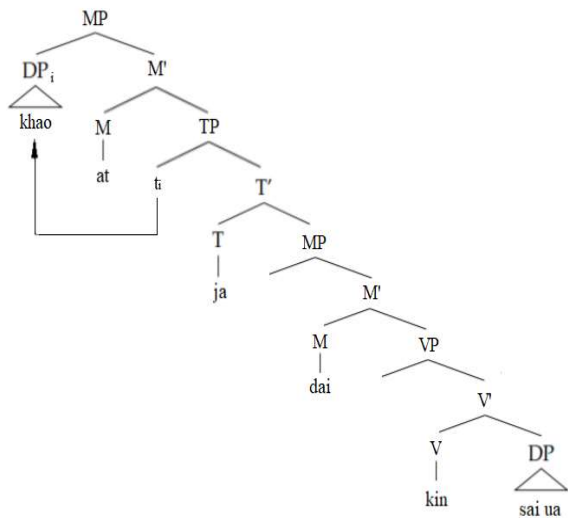
(52) a.   b.

(52b) illustrates the VP that moves from the complement position to the specifier of MP in order to generate the surface order. The motivations for these movements and the resulted structure are based on the discussion in 4.1.2. What's more, it will offer a more comprehensive account if the proposed structure in (51) is analyzed under the notion of control and raising structures.

Following the same approach in 4.1.3, (53) checks whether there are any restrictions on the subject to be taken by the double modal.

(53)   chot mai   at   ja   ma   dai
       letter   may/might   FUT   come   can
       'The letters might could come.'

(53), and together with (50a), exemplify that 'might could' in Northern Thai can take both inanimate and animate subjects. This particular finding corresponds to that in an epistemic modal sentence, in which it imposes no selectional restriction on the subject. Notably, one problem to consider is that the *dai*, which constitutes the second modal, can be interpreted as either deontic or dynamic. Nonetheless, as discussed in 4.1.3, both the deontic and dynamic modal sentences take only an animate subject. This means the double modal construction that involves two contrasting structures is expected to be an issue of the analysis in 4.1.3.

In spite of the potential conflict, (53) has shed light and made sense in theta-role terms. (54) illustrates the way in which the subject of such a double modal sentence receives a theta-role. Again, the subject DP is assumed to be generated in VP, and it is where it receives the theta-role. With multiple movements, the DP lands in the specifier position of the highest MP. As the theta-role is not assigned by the modal, such a modal construction is compatible with any subject. In fact, the subsequent movement, as in (52b), is a predicate movement of the VP that generates the postverbal position of *dai* that involves the movement of a constituent from which a certain material has already been extracted out. In this case, the VP accompanied by a subject trace is moved, and thus, it is a remnant movement. Therefore, the structure postulated in (51) is derived from, first the DP movement as a matter of raising, and then the remnant movement that follows.

(54)
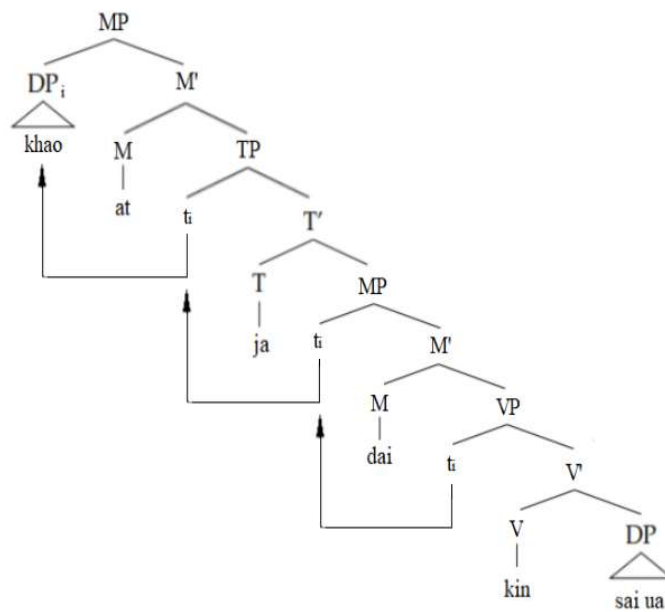
On the other hand, (50b) has a serial modal construction composed of two epistemic modals. It is much more straightforward than (50a) as the modal basis of the two modals are identical, which has prompted the ground to consider it as a raising structure. But first, it is important to see if (50b) has any selectional restrictions on the subject, thus, as shown in (55).

(55)   chot mai   kong   at   ja   ma
        letter   would might   FUT   come
        'The letters would might come.'

From (55), it is confirmed that *kong at ja* behaves like any other single epistemic modal construction in that they are compatible with both inanimate and animate subjects. For this reason, it is plausible to have (56) as a raising structure that accounts for such an observation. The subject is raised from the VP where it receives the theta-role, then eventually it is landed in the specifier of the highest MP.

(56)
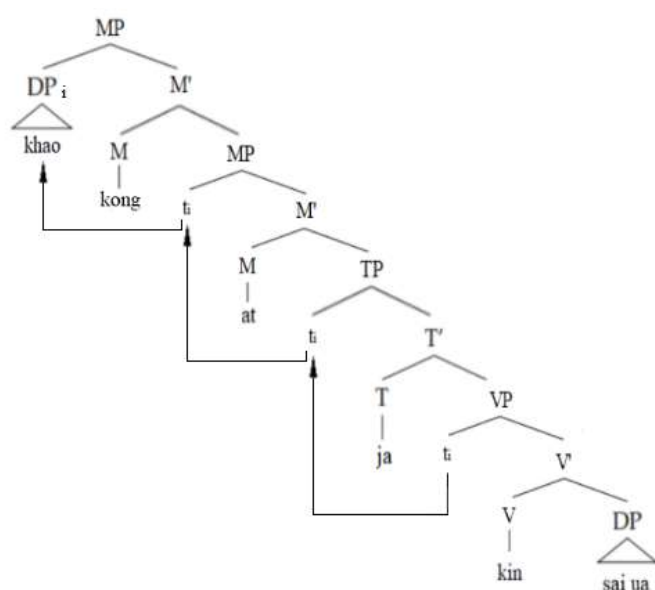
In summary, the two possible double modal sentences are arguably raising structures because they do not impose selectional restriction on the subjects they take. The findings in this part resemble those in Section 4.1.3., and this section reaffirms and gives weight to the validity of the argument on the differentiation of modals based on the syntactic structures. Further, the subsequent section will examine the interaction between double modal and negation.

4.3.2.   Negative Double Modal Sentence

This section utilizes the proposed structures in 4.2.1, as well as the syntactic scope relations of Northern Thai modals with respect to negation to examine the clausal architecture of a negative double modal sentence.

First, a question to consider when negating a negative double modal sentence in Northern Thai is which modal should be negated so it yields the intended meaning of the speaker. (57) compiles the two possible distributions of the negative marker for the sentence in (51a).

(57) a. khao   at   ja   kin   sai ua   mai   dai

he   may/might   FUT   eat   Northern Thai sausage   NEG   can

'He might could not eat Northern Thai sausage.'

Reading 1: 'It is possible that he is not allowed to eat Northern Thai sausage.'

Reading 2: 'It is possible that he is not able to eat Northern Thai sausage.'

b. khao   at   ja   mai   kin   sai ua   dai

he   may/might   FUT   NEG   eat   Northern Thai sausage   can

'He might not could eat Northern Thai sausage.'

Reading 1: 'It is not possible that he is allowed to eat Northern Thai sausage.'

Reading 2: 'It is not possible that he is able to eat Northern Thai sausage.'

As shown in (57), both of the modals can be negated and convey different meanings accordingly. Therefore, it is possible to assume that a NegP can be inserted after the higher modal, i.e., *at ja*, as in (58a), and before the predicate-final modal *dai*, i.e., *dai*, as in (58b). The predicate raising of VP is illustrated in both hierarchical structures as it is noted that the landing sites of such a VP are different in (58a) and (58b). The VP in (58a) follows the previously argued structure, in which it moves to the specifier of MP. However, the negation of *dai* occupies a pre-modal position in (58b). So in order to generate the correct word order, the VP cannot move to the specifier of MP. Instead, it is assumed to land in the specifier of the NegP that projects the MP for realizing the surface structure, as in (58b).
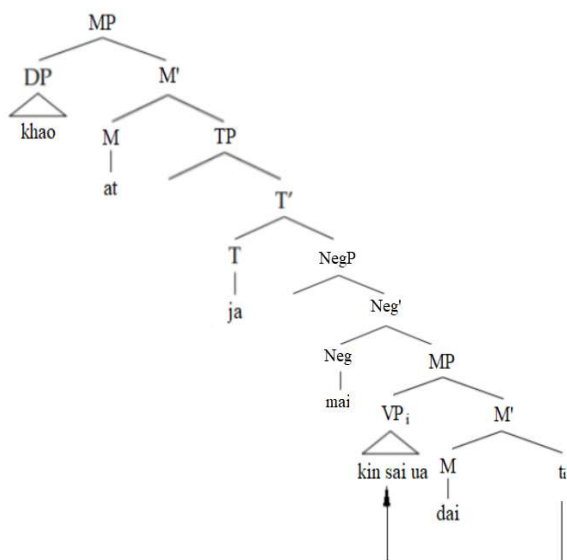
(58) a.   b.
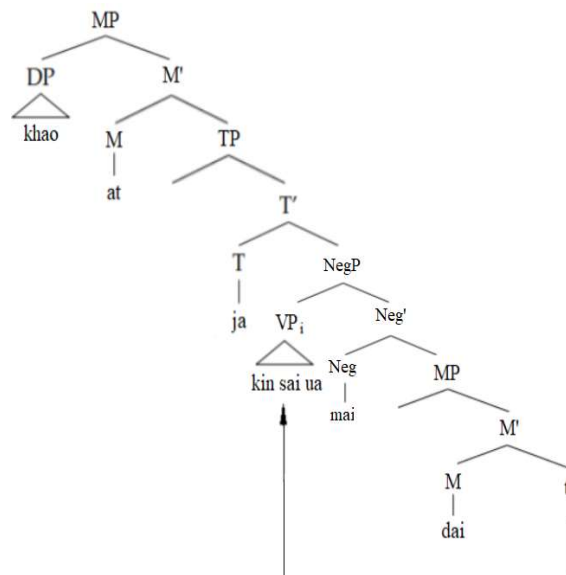
Apart from this particular discrepancy, it is found that both structures, disregarding their meaning differences, *at ja* always take a higher position than the NegP, whereas *dai* always goes under the NegP. To account for this structure, it is important to consider the arguments of scope relations. An epistemic modal in Northern Thai always syntactically scope above

negation, whereas deontic and dynamic modal never scope over negation. The available scopes between negation and different modals in Northern Thai give rise to different interpretations. In (58a) and (58b), the epistemic modal *at ja* scopes above negation, while the dynamic or deontic modal *dai* scopes under negation. Thus, the meaning of (58a) has the reading of the impossibility for performing an act, and (58b) means inability, as well as the possibility of the proposition. In short, the data of double modal constructions again acknowledges the previous findings because the syntactic positions of modal are likely to be determined by their modal bases.

For (50b), which has two epistemic modals serially constructed, will have the structure in (59) by following the structures proposed earlier. Similar to English double modal construction, it can be assumed that two modal phrases join together consecutively to produce the correct word order (Hasty, 2012). The rest of the architecture resembles the negative epistemic sentence with one modal. What is noted is both of the epistemic modals scope over the negation, which is in line with the previous generalization in this paper.

(59)
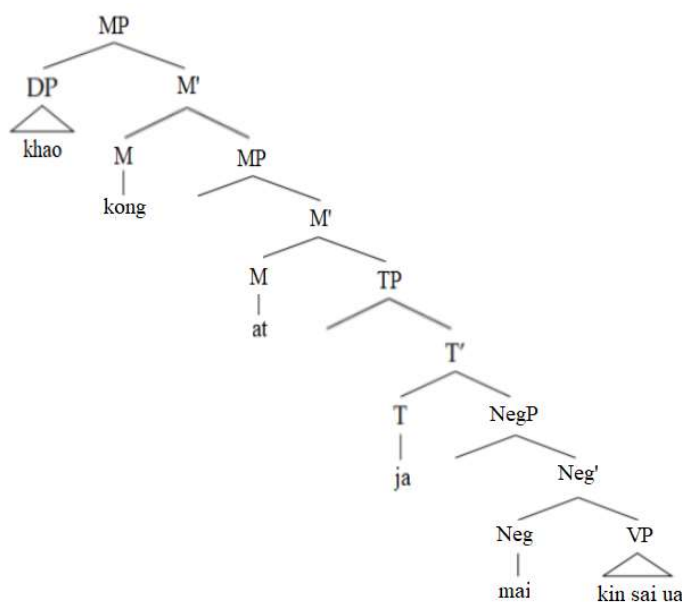
Notably, it is impossible to have a sentence in (60), in which the negative marker immediately follows the first modal *kong*. Such a ill-formed structure can be explained by the syntactic behavior in which an epistemic modal must syntactically scope over the negation, and in the case of (60), *at ja* is under the scope of negation, thus it is a violation.

(60) *khao kong   mai   at   ja   kin sai ua

      he   will/would   NEG   may/might   FUT   eat Northern Thai sausage

In summary, this section presents some descriptions of the distributions of negative double modal constructions in Northern Thai. At the same time, the observations of how double modal construction interacts with negation appear to correspond to the previous arguments in Section 4.2.

5.   Conclusion

This paper has presented multiple analyses on the syntax of modal auxiliaries in Northern Thai. First, Section 4.1 has outlined various modals, in which it has presented their syntactic distributions and structural positions in the clausal architecture. It is argued that Northern Thai epistemic modals are raising modals, while deontic and dynamic modals are control modals by virtue of their contrasting compatibilities with animate and inanimate subjects, which can be accounted structurally in theta-assignment terms. Second, Section 4.2 has examined the ways in which Northern Thai models are negated. It is claimed that the negation can be placed between different modals with a structural order of $MP_{epi} > NegP > MP_{deo/dyn}$ due to the observed syntactic positions and scope relations of modals with regard to negation. Third, Section 4.3 has described the syntax of the two double modal constructions in Northern Thai. It is found that such double modal sentences behave correspondingly to their single modal counterparts, that is, the arguments built in 4.1 and 4.2 are further justified.

Although the analyses of Northern Thai modals and their respective structures have shed light on the tendency in which a particular modal basis corresponds to a particular structure, i.e., an instantiation of syntax-semantics correspondence, this paper does not come to a neat differentiation of various modals as deontic and dynamic modals appear to share some syntactic properties in terms of the selectional restrictions they impose on the subjects and their plausible structures. Moreover, the discussion in 4.3 only presents the syntactic facts and analyses on Northern Thai double modals, for which such a construction worths a more thorough examination in semantic aspects that can further delineate the restrictions of double modal constructions. Therefore, an avenue for future studies is the semantics of Northern Thai modals because it can definitely aid in the understanding of modals under the notion of syntax-semantics correspondence.

6.   References

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