

Korean Future Tense Marker *-keyss* as An Epistemic Modal*

(인식적 양상 표지로서의 “겠”)

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Abstract

I argue in this paper that *-keyss* which is traditionally treated as a future tense marker in Korean linguistics is an epistemic modal marker. The marker *-keyss* occurs with speech-time-oriented adverbials and the past tense marker *-ess*. Furthermore, the interpretation of *-keyss* involves the speaker's presumption, not anybody else'. These facts argue against the treatment of *-keyss* as a future tense marker. The speaker's presumption of an eventuality under the scope of *-keyss* seems to result from the nature of the conversational background, which is parallel to what Kratzer notes in English modal verbs. The incorporation of Kratzer's modal semantics into the analysis of *-keyss* may assist in allowing an improved understanding of its semantic nature more accurately than has previously been suggested.

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I. Introduction: Problem with the View of -keyss as a Future Tense Marker

This paper argues against the treatment of -keyss as a future tense marker and presents a proper semantic account of -keyss as an epistemic modal within Kratzer's (1977, 1991) framework. Scholars such as Martin (1954), Ramstedt (1939), Song (1967), and Kim (1992) among others argue that -keyss is treated as the future tense marker since it refers to a future event or state, as in (1):

- (1) John-i nayil ttena-**keyss**-ta
 NOM tomorrow leave-**FUT**-DEC
 'John will leave tomorrow'

According to Kim (1992), in a sentence like (1) the event time follows the utterance time, and thus (1) should be treated as conveying a future event of John's leaving tomorrow. Given that the semantics for the future tense can be defined in terms of the Priorian analysis, as in (2), (1) seems to be properly treated by (2).

- (2) $F\phi$ is true iff $\exists t'[t < t' \ \& \ \phi(t')]$, where F is a future tense operator, and ϕ a formula.

However, such a treatment runs into trouble as soon as it deals with sentences like (3a) and (3b).

- (3) a. *cikum* *pi-ka* *o-keyss-ta*
 now rain-NOM come-?-DEC
 'It must be raining now'
- b. *Mary-ka* *manhi* *apha-ss-keyss-ta*
 TOP many sick-PAST-?-DEC
 'Mary must have been very sick'

It is obvious that in sentences like (3a) and (3b), *-keyss* does not express any future eventualities. Instead, *-keyss* in (3a) and (3b) refers to a present and a past eventuality, respectively. That is, *-keyss* can combine with the temporal adverbial *cikum* 'now' which is speech-time oriented, as in (3a). It can also occur with the past tense marker *-ess*, as in (3b). The treatment of *-keyss* as a future tense marker has difficulty with accounting for the fact that it can occur with *cikum* 'now' and *-ess*. Given all this, (2) fails to give *-keyss* a proper treatment. This indicates that the treatment of *-keyss* as a future tense marker is not on the right track.

It is worth noting that sentences like (1) and (3a-b) are interpreted as expressing the presumption of the eventualities under the scope of *-keyss*. For example, (1) is interpreted to mean the presumption that John will leave tomorrow, instead of describing a future event. The same comments hold for (3a) and (3b). As mentioned earlier, in (3a) and (3b), *-keyss* is compatible with a speech-time oriented temporal adverbial like *cikum* 'now' and the past tense marker *-ess*, respectively. This suggests that *-keyss* in (3a) and (3b) expresses the conjecture about a present and a past eventuality.

The view that *-keyss* serves primarily to mark the presumption of an event has already been mentioned in the previous Korean linguistic literature. Choe (1937), Lee (1978), Park (1935), Seo (1977), Sohn (1975) among others are in favor of this view. Lee (1978) and Sohn (1975) are slightly different from the other scholars mentioned above in claiming that *-keyss* expresses the speaker's presumption. According to them, *-keyss* conveys the information of the speaker's presumption or conjecture. For example, (1) is interpreted to mean the speaker's presumption that John will leave tomorrow.

What I have discussed so far indicates that *-keyss* should be treated as a modal marker, rather than as a future tense marker. Scholars such as Sohn (1975), Han (1996), Yang (1972), and Chong (1990) among others argue in favor of the treatment of *-keyss* as a modal marker. One advantage of this approach is that it can account easily for the fact that *-keyss* is compatible with *cikum* 'now' and the past tense marker *-ess*, as in (3a-b).

In order to give a proper treatment of *-keyss*, I propose in this paper that *-keyss* is involved in epistemic modality¹⁾ which is based on the speaker's knowledge, not on anybody else's knowledge. Therefore, (1), (3a) and (3b) can be paraphrased as (4a), (4b), and (4c), respectively:

- (4) a. In the view of what is known to the speaker, John apparently leaves tomorrow

1) Sohn (1974) and Han (1996) do not use the terms "epistemic modality".

- b. In view of what is known to the speaker, it must be raining now.
- c. In view of what is known to the speaker, Mary must have been very sick.

As I mentioned earlier, some of the previous studies treat *-keyss* as a modal. One should, however, note that, to my knowledge, they don't provide an appropriate semantic account of how *-keyss* is interpreted as being involved in the speaker's presumption of the eventuality in question. Their arguments are only focused on how we can define *-keyss* without positing its semantic properties. My discussion in this paper will also focus on the pursue of the answer to the question.

I will conclude this section by mentioning the outline of this paper. Section 2 is devoted to discussing Kratzer's treatment of modals which will be adopted in this paper. Section 3 is composed of two sub-sections: in the first sub-section I will discuss the framework which will be employed in this paper, specifically focusing on type assignments and the derivation of logical forms (LF), and the second sub-section aims at providing the semantic analysis of *-keyss* as an epistemic modal.

2. Kratzer's Theory of Modality

The strategy I will adopt to give the semantics to the epistemic modal *-keyss* is essentially along the lines of that proposed by Kratzer (1977, 1979, and 1991). Before going into the details of a

more formal account, I will briefly survey Kratzer's theory of modality.

Modals are usually ambiguous between a root and an epistemic modal (cf. Jackendoff (1972)²⁾ and Kratzer (1977)³⁾, depending on the context of use. The term "root modality", first introduced by Hofmann (1966), to my knowledge, refers to non-epistemic modals such as a deontic modal. The term "epistemic modal" expresses possibility or necessity relative to a state of knowledge. To illustrate modals are ambiguous, let us take the modal verb *must* for instance. Consider the following sentences:

- (5) a. Every American citizen who has income must pay a tax
- b. It must have rained for the land to be muddy
- c. If you must yawn, put your hand over your mouth
- d. Because this computer is better than that one, we must buy this one.

The modal verb *must* in (5a-d) has several different

2) Jackendoff (1977) observes that some English modals have a root and an epistemic meanings, as illustrated in the following (Jackendoff (1977: 100)):

(i)	Root	Epistemic
may	permission	possibility
can	ability	possibility
must	obligation	logical entailment
wont	refusal	future non-occurrence
should	obligation	supposition

3) Kratzer (1977) does not use the term "root modality". She provides examples which demonstrate the variability of the interpretation of modals such as *must* and *can*, as we will see later. Her examples are intended to show the interpretation of modals is context-dependent.

interpretations: it is interpreted to be deontic, as in (5a), epistemic, as in (5b), dispositional, as in (5c), and preferential, as in (5d), respectively. The variability of the modal verb *must* results from the context of use, as we will see below.⁴⁾ According to Kratzer, *must* in (5a-d) is not ambiguous. It only has a meaning which remains invariable across sentences like (5a-d) (i.e., a neutral meaning of *must*). The different interpretations of the modal verb *must* in sentences like (5a-d) are caused by the fact that its variance in meanings is purely dependent upon the variability of the context of use.

By introducing the context into modal semantics which plays a role in determining the interpretation of modals, Kratzer attempts to account for their variance in meanings semantically in a unified way. Kratzer (1991) regards modality as relative modality, namely, modals are relativized to contextually-supplied propositions. As we saw above, the different kinds of interpretations of (neutral) modals are derived from what she calls a conversational background, which is supplied by the context of use.

In possible worlds semantics, a proposition is a set of possible worlds in which it is true, i.e., a function from possible worlds to truth value. A conversational background for modals is a set of propositions that the law provides in a world *w*, or that are known

4) When I discuss Kratzer's theory of modality below, we will see that the variance of modals in meanings is due to the context of use. For the purpose of our discussion, let us accept for now that the meanings of modals are context-dependent, even though I haven't discussed this point here.

in a world w , etc.: it is a function which assigns sets of propositions to possible worlds.

In a modal sentence, the conversational background may be expressed explicitly or implicitly. The examples of the latter case are the sentences in (5a-d), and the former case is exemplified in (6a-d), which may be referred to as a paraphrased version of the sentences in (5a-d):

- (6) a. *In view of what the law provides*, every American citizen who has income must pay a tax
- b. *In view of what is known*, it must have rained for the land to be muddy
- c. *If-in view of what your dispositions are*-you must yawn, put your hand over your mouth
- d. Because this computer is better than that one, *in view of what our preferences are*, we must buy this one.

A conversational background is explicitly denoted in sentences like (6a-d) by phrases like *what the law provides*, and *what is known in w* , etc., whereas in sentences like (5a-d), their conversational background is not. In case of the sentences in (5a-d), the conversational background is implicit in the context of their use.

The conversational background for a sentence like (6a) is, for example, a function which assigns to any possible world in W the set of propositions expressing what the law provides in w . This is called a deontic conversational background. Similarly, the conversational background for a sentence like (6b) is a function which assigns to any possible world in W the set of propositions which are known in w . This is referred to as an epistemic

conversational background. The other sorts of conversational backgrounds are defined in the same way. The meaning of *must* in (5a-d) is neutral. Its variance in meanings is relativized to the context of use, i.e., the deontic meaning of *must* in (5a) is derived from deontic conversational backgrounds, and the epistemic meaning of *must* in (5b) epistemic conversational backgrounds, and so forth.

Another important notion in Kratzer's theory is a modal base which is formed on the basis of a conversational background. The modal base is defined as the conversational background which determines the set of accessible worlds. An accessible world is one which is compatible with all the propositions that are known in w or that the law provides in w , etc. The former case is referred to as an epistemic accessibility relation, while the latter a deontic accessibility relation. In general, an accessibility relation is defined as follows:

(7) Accessibility Relation

A world w' is accessible from w iff $w' \in \cap f(w)$, where f is a conversational background (or a modal base).

In prose, a world w' is accessible from w iff w' is a member of the set of possible worlds in which every proposition in $f(w)$ is true. For illustration, let f be an epistemic conversational background, i.e., a function from possible worlds into the set of propositions that are known in w . Then, $\cap f(w)$ is the set of possible worlds where all the propositions that are known in w are true. This is the set of worlds epistemically accessible from w .

Following Lewis (1981), Kratzer (1991) also introduces an “ordering relation” on possible worlds in her analysis of modality.⁵⁾ The ordering relation states how the set of accessible worlds are ordered according to the normal course of events, and is established on the basis of what she calls an ordering source. The ordering source is a (stereotypical) conversational background which is supplied by what the normal course of events are.⁶⁾ It determines how the set of accessible worlds is ordered according to how close they are to the normal course of events in a world w . In other words, it determines which world is ideal with respect to the ordering source. Kratzer represents an (partial) ordering relation on W by the notation “ \leq_A ”, where W is a set of possible worlds, A a set of propositions, and ξ a function from W into a set of sets of propositions. The ordering can be defined as follows:

- (8) For all $w, w' \in W$, for any $A \subseteq \xi(W)$:
 $w \leq_A w'$ iff $\{p: p \in A \text{ and } w' \in p\} \subseteq \{p: p \in A \text{ and } w \in p\}$

(8) means that a world w is as close to the ideal represented by A as a world w' iff every proposition in A which is true in w' is

5) Kratzer (1991) discusses several arguments in favor of the ordering relation. One of her arguments is that the modal semantics into which the ordering relation is incorporated is in a better position than the classical modal semantics in dealing with graded modals such as *good possibility*, *better possibility* and *weak necessity*, etc. which have been hard to account for in the classical modal semantics. I will not go into the detail of her arguments here. The reader can refer to Kratzer (1981, 1991).

6) Kratzer (1991) also names the stereotypical conversational background as a secondary conversational background (Kratzer (1991: 644)).

also true in w . What I have discussed so far can be summarized by saying that the modal base determines accessible worlds, while the ordering source an ordering relation on those accessible worlds, namely, the ideal world.

Now we are in a position to discuss the truth conditions for modal sentences proposed by Krazter (1991). She gives a variety of truth definitions for modals, but I will only discuss the truth definitions for necessity for illustration. I will not go into the detail of other truth definitions.⁷⁾ The truth conditions for necessity are defined as in (9) (Krazter (1991: 644)):

(9) Necessity

A proposition p is a necessity in a world w w.r.t. a modal base f and an ordering source γ iff the following condition is satisfied:

- (i) For all $u \in \cap f(w)$, there is a $v \in \cap f(w)$ such that $v \leq_{\gamma(w)} u$
and
- (ii) for all $z \in \cap f(w)$: if $z \leq_{\gamma(w)} v$, then $z \in p$

(9) roughly says that a proposition is a necessity in a word w iff it is true in every accessible world which is closest to the best world. Let us take the following sentences for illustration:

(10) John must have been sick

A sentence like (10) is interpreted to have an epistemic modal. In this case, $f(w)$ is the set of propositions that are known in w :

7) The reader can refer to Krazter (1991: 644-645) for the truth definitions for modals which I haven't discussed here.

$f(w) = \{p: p \text{ is known in } w\}$. This establishes an epistemic modal base for a sentence like (10). $\cap f(w)$ is the set of possible worlds where every proposition in $f(w)$ is true: $\cap f(w) = \{w: \forall p[p \text{ is known in } w \rightarrow w \in p]\}$. This is the set of worlds epistemically accessible from w . Given this, the truth conditions for (10) can be stated as follows:

- (11) $\| \text{John must have been sick} \|^{f, \gamma} = 1$ iff for every word $u \in f(w)$, there is a world $v \in \cap f(w)$ such that $v \leq_{\gamma(w)} u$ and for every world $z \in \cap f(w)$, if $z \leq_{\gamma(w)} v$, then John is sick in z .

To sum up, two important parameters are introduced in Kratzer's treatment of modal sentences: a modal base and an ordering source. The modal base determines the set of accessible worlds and the ordering source an ordering on those accessible worlds. Both of them are supplied by the context of use, and therefore, we get a variety of meanings of modal sentences, depending on the nature of conversational backgrounds. Following Kratzer, I will provide the semantics of the epistemic modal *-keyss*, which will be elaborated upon in what follows.

3. Analysis

3.1. Preliminaries

This sub-section is devoted to presenting a brief discussion of type assignment of major syntactic categories which I will employ

in this paper, including the discussion of how we can derive logical forms (LF) which is an input for the semantic interpretation. The inflection (INFL), the head of IP, is of type $\langle\langle s, \langle i, t \rangle \rangle, t \rangle$ with the denotation of sets of properties of intervals. It (i.e., I) applies the intension of VP which is of type $\langle i, t \rangle$ and gives the type t . I' which is the result of the combination of I and VP which is of type $\langle i, t \rangle$ is of type t .

Names like *John* and *Mary* etc. are basically taken to be type of e . When they move out from their original position for some reason, they undergo type raising (cf. Partee and Rooth (1983)) which lifts their original type e to the type of generalized quantifiers, i.e., $\langle\langle s, \langle e, t \rangle \rangle, t \rangle$ with the denotation of sets of properties of individuals.⁸⁾ NP traces are type of e .

Unlike the traditional Montagovian semantics, this paper adopts the system in which verbs take an interval as an additional argument. For instance, in Montagovian semantics, the intransitive verb whose category is IV is of type $\langle e, t \rangle$ with the denotation of sets of individuals. The intransitive verb (IV) in this paper is of type $\langle e, \langle i, t \rangle \rangle$, which denotes a function from individuals to sets of intervals, indicating IV has two arguments: one is an individual and the other an interval, as in $\lambda x \lambda t [IV' (x, t)]$, where IV' is the IL translation of IV. The transitive verb (TV) is of type $\langle e, \langle e, \langle i, t \rangle \rangle \rangle$ which denotes a function from individuals to a function from individuals to sets of intervals, i.e., relations between

8) I will give an example for this later in this section to show how this works. For the time being, let us take such a brief explanation to be sufficient.

individuals.

Let us now discuss the derivation of LF by giving concrete examples. Consider the following sentence

- (12) John-i ttochakhay-ss-ta
 NOM arrive-PAST-DEC
 'John arrived'

The LF for (12) that I have in my mind looks like (13):

- (13) [_{IP} John-i₁ [_{VP} e₁ tochakha] [_I -ess₂]]

In the course of the derivation of LF, I adopt the VP-internal hypothesis (Sportiche (1988) and others) that subjects of verbs are base-generated in the Specifier (SPEC) of VP and move to the SPEC of IP at S-Structure, leaving a trace behind. In (18a-b), the NP₁ in [SPEC, IP] position has moved out from [SPEC, VP] position. When it moves out, it leaves a trace behind, which in turn becomes a variable for interpretation. In some sense, this movement has the same effect as Quantifying Raising (QR). Recall that the NP *John* which has moved out is a name, namely it is of type e. Given this, the desirable IL translation of (12) cannot be derived from the LF (13) because of type mismatch. In (13), VP is of type <i, t>. The node I which is of type <<s, <i, t>>, t> takes the intension of VP as its argument and yields I' which is of type t. The NP₁ *John* cannot combine with its sister node I' since the former is of type e and the latter is, on the other hand, of type t. The way out is to lift the semantic type of names to a

higher-order type (i.e., $\langle\langle s, \langle e, t \rangle \rangle, t \rangle$) (cf. Partee and Rooth (1983)).⁹⁾ Names which move out from their base-generated position, leaving a trace behind, are to undergo the type raising, yet their traces are translated as variables of type *e*.

Given all this, we are now in a position to give the IL translation to the sentence in (12). I will adopt the type-driven IL translation proposed by Klein and Sag (1985). Along the lines of Enç (1987) and Abusch (1997), I assume that every tense bears a temporal index whose role denotes the most salient reference time.¹⁰⁾ For example, the past tense marker *-ess* is translated as follows:

- (14) Translation of the past tense marker *-ess*_{*j*}, where *j* is a temporal index
 $\lambda P \exists t [\text{past}(t) \ \& \ t \in R(j) \ \& \ P(t)]$, where *P* is a variable of type $\langle\langle s, \langle i, t \rangle \rangle$ and *R* is a set of relevant intervals which denotes a function from indices to intervals

9) Groenendijk and Stokhof (1989) also discuss the type raising about names in a similar fashion. Notice that every term phrase which is claimed to be originally of type *e* undergoes the type raising in Partee and Rooth's system. Unlike their system, however, I assume that only names undergo the type lifting when a certain conditions are met. In other words, quantified NPs does not undergo the type raising. They have the constant type $\langle\langle s, \langle e, t \rangle \rangle, t \rangle$ throughout the derivation.

10) Abusch (1977) and Enç (1987) adopt the referential theory of tense in their treatments of tense on the basis of Partee's (1973) observation that temporal expressions are parallel to nominal ones. The referential theory is characterized by the use of indexing mechanism as a means of referring to determinate tense. The fact that I will employ the indexing mechanism here does not mean that my analysis is in the lines of the referential theory. Instead, I'd like to incorporate the indexing mechanism into the object-language-style translation, as we will see below in this section.

In (14), the use of indices may suggest that tense is taken to be determinate in our framework, but this is not what I pursue in this paper. The more satisfactory semantic analysis of tense would be one which can provide a semantic representation handling the determinacy and the indeterminacy of tense. In order to achieve this, I'd like to incorporate the notion of determinacy into our object-language style of translation although this treatment is not an ultimate way to give a semantic treatment of tense.

The free variable R is introduced in the IL translation in (14). When a free variable occurs in a formula, its value is determined not by semantics but by pragmatics or the context of use. R denotes a set of most salient reference times which are given by the context of use. R is a function from indices to a set of intervals.¹¹⁾ In other words, R takes indices as its argument and provides a set of intervals as its value, as indicated in $R(i)$, where i is an index. In our LF (13), the past tense bears the index 2. This index is translated as $R(2)$, as in (14). Given what I have discussed in this paragraph, (13) can be translated as (15):

(15) Translation of (13) into Intensional Logic (IL)

1. V' : $\text{tochakha}(\text{arrive}) \Rightarrow \text{arrive}'$
2. NP_1' : $e_1 \Rightarrow x_1$
3. $VP' = NP_1' (V\text{-bar}')$ $\Rightarrow \text{arrive}'(x_1)$
4. $I' \Rightarrow \lambda P \exists t [\text{past}(t) \ \& \ t \in R(2) \ \& \ P(t)]$
5. $I\text{-bar}' = I' (^{\wedge}VP') \Rightarrow \lambda P \exists t [\text{past}(t) \ \& \ t \in R(2) \ \& \ P(t)]$
 $(^{\wedge}\text{arrive}'(x_1)) \Rightarrow \exists t [\text{past}(t) \ \& \ \text{arrive}'(x_1, t)]$
6. NP_1' : $\text{John-i (John-NOM)} \Rightarrow \lambda PP(j)$
7. $IP' = NP_1' (^{\wedge}\lambda x_1[I\text{-bar}'])$

11) This is due to Kuhn and Portner (1997).

$$\begin{aligned}
&=> \lambda PP(j)(\lambda x_1[\exists t[\text{past}(t) \ \& \ t \in R(2) \ \& \ \text{arrive}'(x_1, t)]]) \\
&=> \exists t[\text{past}(t) \ \& \ t \in R(2) \ \& \ \text{arrive}'(j, t)]
\end{aligned}$$

The final line of the translation says that there is a past time interval t which is an element of the set of contextually most salient times $R(2)$ such that John arrived at t .

3.2. Semantics of *-keyss* as an Epistemic Modal

In this sub-section, I will discuss the semantic interpretation of the marker *-keyss*. Recall that the marker *-keyss* is related not to a future eventuality, but to modality. I think of *-keyss* as an epistemic modal marker based upon what is known to the speaker in a world w , rather than a future tense marker. The strategy I will adopt to give the semantics to the modal *-keyss* is essentially along the lines of that proposed by Kratzer (1977, 1978, and 1991). Having already discussed Kratzer's theory of modality in section 2, I will go through the semantics of the epistemic modal marker *-keyss*.

Let us begin with the following sentences in (1), (3a), and (3b), which are repeated below as (16a-c), respectively:

- (16) a. John-i nayil ttena-**keyss**-ta
 NOM tomorrow leave-**modal**-DEC
 'John will leave tomorrow'
- b. cikum pi-ka o-**keyss**-ta
 now rain-NOM come-**modal**-DEC
 'It must be raining now'

- c. Mary-ka manhi apha-ss-**keyss**-ta
 TOP many sick-PAST-**modal**-DEC
 'Mary must have been very sick'

Instead of describing a future eventuality, the modal marker *-keyss* in (16a-c) indicates the speaker's presumption concerning an event or state under the scope of the modal marker. Each of the sentences in (16a-c) can be paraphrased as (17a-c), respectively, in which each of their conversational backgrounds is explicitly addressed:

- (17) a. In view of what is known to the speaker, John apparently leaves tomorrow
 b. In view of what is known to the speaker, it must be raining now
 c. In view of what is known to the speaker, Mary must have been sick

A sentence like (16a) conveys the speaker's presumption about a future event of John's leaving tomorrow. A sentence like (16b) conveys the speaker's presumption of a present event of its raining. A sentence like (16c) conveys the speaker's presumption of a past state of Mary's being sick.

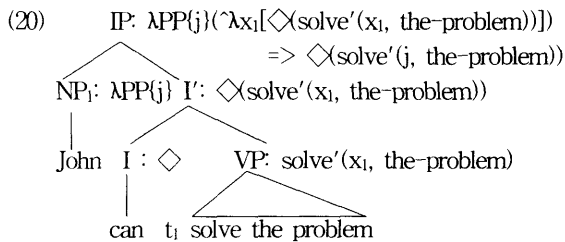
In languages like English, modal verbs are tensed. In other words, the following sentences are grammatical in English:

- (18) a. John can solve the problem
 b. John could solve the problem

Syntactically or semantically, however, tense either is usually ignored for the sake of convenient discussion, or is hardly discussed for some reason in the formal semantics literature on modals.¹²⁾ On the assumption that the modal verb is a sentence operator, for example, sentences like (18a-b) can be roughly represented as (19a) and (19b), respectively, where the modal verb is applied to the tenseless sentences:

- (19) a. can(John solves the problem)
 b. could(John solves the problem)

Semantic representations like (19a-b) carry no information of tense. In other words, if we think of the following structure as the LF for the sentence in (18a), it is just assumed that the modal verb occupies the position immediately dominated by the head of IP without any indication of verb movements, as illustrated in (20):



12) I am not saying that any approach to modal verbs in which tense is ignored is wrong. Rather, the Korean data which we will see later on seems to require us to incorporate tense into the semantic analysis of a modal marker like *-keyss* in order to derive a desired interpretation in our framework, as we will see below.

The LF representation in (20) indicates no syntactic configuration whatsoever that shows the modal verb *can* is derived from the form *Present can*. As a result of it, no tense is incorporated into the IL translation in (20). The same comments hold for a sentence like (19b). In formal semantics, syntax determines how semantics is derived. In this respect, such a kind of the LF representation in (20) would miss the point. Therefore, we need a set of syntactic rules for the language under consideration that spells out various syntactic structures for the combination of tense and modal verbs in a systematic way. This set of syntactic rules lays a foundation of the semantic interpretation of modal verbs.¹³⁾ My purpose here is not to argue that in languages like English, the account of modals in which tense is not dealt with is inappropriate, but simply to point out that in languages like Korean and Japanese, the semantics of modals cannot be well accounted without mentioning tense syntactically at LF, as we will see below in (21). This is because tense and modal markers are morphologically independent of each other. In what follows, I will discuss this point.

Morphosyntactically speaking, in English the auxiliary verb which is syntactically combined with a certain tense is converted

13) I will not go into the detail of developing syntactic configurations for English modals and tense (e.g., configurations like *would have won*, *will have won*, and *must have won* etc.) because it is beyond the present study. Ladusaw (1977) proposes syntactic and semantic rules for the English auxiliary (or modal) and tense. The reader can refer to Ladusaw (1977) for the discussion of such configuration for English auxiliary verbs and tense.

to a certain form which is best suited for that tense (e.g., *PRES will* is converted to its present form *will*). However, Korean modals behave differently from English ones. Korean is a language in which tense markers and modal markers behaves independently. In other words, English modals are tensed, as in (18a-b), while Korean modals are not, as in (21).¹⁴

- (21) a. John-i cip-ey honca isskey toy-ess-kwun
 NOM home-at alone exist become-PAST-modal
 ‘Apparently, John must be at home alone’
 b. Mary-ka ku mwunce-lul pwul-ess-keyss-ta
 NOM the problem-ACC solve-PAST-modal-DEC
 ‘Mary must have solved the problem’

Sentences like (21a-b) show that Korean modals occur with tense morphemes, indicating that modals are not tensed. This contrasts with English modals which are tensed, as we saw above in (18).

Let us consider the sentences in (16a-c) once again, repeated below:

- (16) a. John-i nayil ttena-keyss-ta
 NOM tomorrow leave-modal-DEC
 ‘John apparently leaves tomorrow’
 b. cikum pi-ka o-keyss-ta
 now rain-NOM come-modal-DEC
 ‘It must be raining now’

14) This is also true of Japanese modals. See Whitman (1989).

- c. Mary-ka manhi apha-ss-keyss-ta
 TOP many sick-PAST-modal-DEC
 'Mary must have been very sick'

Recall that the sentences in (16a-c) each refer to a future event, a present event, and a past state, respectively. One should notice that it is not the modal marker *-keyss* that locates an eventuality within a future, a present, and a past interval since modals are not tensed in Korean, as has been noted by Whitman (1989). (16a) and (16b) are tenseless: I refer to (16a) and (16b) as a tenseless futurate modal sentence and a tenseless present modal sentence, respectively. In contrast to (16a-b), in (16c) tense occurs with the modal marker *-keyss* explicitly, hence the tense marker *-ess* locates the eventuality being described before the utterance time. In a tenseless sentence like (16a), the temporal adverbial *nayil* 'tomorrow' forces (16a) to locate the event picked out by the verb into some future interval which is included in the interval denoted by *nayil* 'tomorrow' through conventional implicature.¹⁵⁾ The implicature is involved in the course of the interpretation of (16a). Suppose the speaker saw John packing his belongings and John showed him or her his airplane ticket for his tomorrow's flight. Given this context, it follows from such direct evidence¹⁶⁾ available to the speaker that he or she presumes that John will apparently leave tomorrow. Notice that the speaker utters (16a) on the basis of the evidence which is available to him or her before or at the

15) I'd like to thank Portner for pointing out this to me.

16) I mean to say that in the context under consideration, the evidence is direct. Evidence can be indirect in some contexts.

same time as the time of the utterance of (16a). That is, in uttering (16a), the speaker implicates (or presupposes) that he or she has evidence that supports his or her presumption that John will leave tomorrow. The implicature of the tenseless future¹⁷⁾ under the scope of the epistemic modal marker *-keyss* in (16a) can be stated as follows:

- (22) $\| \text{tomorrow}(\text{John leaves}) \|^{M, w, g, u}$ is defined iff the truth of *John leaves* at some interval t included in the day following the day that includes u follows from direct or indirect evidence which is available to the speaker at an interval preceding or overlapping u . (N.B. u is an utterance time)

A sentence like (16a) is taken to be felicitous only if it has well-defined implicature like (22) in the given context. Otherwise, it would be infelicitous. If (22) is felicitous, we can go on to give the semantic interpretation of the whole sentence in (16a), as in (23).

- (23) Where (22) is defined,
 $\| \text{keyss}[\text{tomorrow}(\text{John leaves})] \|^{M, w, g, u}$ is true iff for every accessible world w' from w , *John leaves* is true in w' at t which is a subinterval of the day following the day that includes u .¹⁸⁾

17) The tenseless future refers to sentences where the present tense is used to describe a future event, as in *John leaves here tomorrow*. This terminology is due to Dowty (1977).

18) In this truth definition, I follow the classical truth definition for the modal for simplicity because the purpose of this part is to show how the implicature works in a tenseless future sentence. However, I will not

The implicature (22), along with the temporal adverbial *mayil* 'tomorrow' which locates the eventuality within the future, plays a role in interpreting the tenseless futurate modal sentence (16a). The same explanation is applicable to the tenseless present modal sentence (16b).

Whitman (1989) argues that the fact that Korean/Japanese modals are not tensed suggests that modal phrases (MP) appear outside the position of tense (i.e., outside of IP in our LF framework). This contrasts with languages like Germanic and Romance where MP's appear within tense.¹⁹⁾ Koizumi (1993) also makes the same point about Korean/Japanese MP's. I will adopt Koizumi (1993)'s and Whitman (1989)'s proposal in which MP appears between CP and IP in languages like Korean and Japanese. Given this, the LF representation for a sentence in which the modal marker *-keyss* occurs is something like this:

(24) [_{CP} ... [_{MP} [_{M'} [_{IP} ...] -keyss]]]

Let us consider the following sentence for illustration.

(25) Mary-ka apha-ss-keyss-ta
 TOP sick-PAST-modal-DEC
 'Mary must have been sick'

pursue this kind of truth definition here, as we will see below.

19) Whitman (1989) provides several arguments which support his claim. I will not go into the detail of his discussion here since syntactic discussions are beyond the present study. I will simply adopt his proposal on which our LF representation for *-keyss* is based.

The sentence in (25) has a LF representation like (25a):

(25a) $[_{CP}[_{MP}[_{M'}[_{IP}[_{NP}Mary-ka_1] [I'[_{VP} x_1 aphwu] [_{-ess_2}]]]-keyss}]]]$

The modal marker *-keyss* translates into $\lambda p[\Box^V p]$, where p is a variable of type $\langle s, t \rangle$. It combines with IP of type t to make M' which is of type t , hence it is of type $\langle \langle s, t \rangle, t \rangle$ which denotes sets of propositions. The sentence in (25) translates as follows:

(26) IL Translation

1. VP' : $sick'(x_1)$
2. I' : $\neg ess_2 \Rightarrow \lambda p \exists t[PAST(t) \ \& \ t \in R(2) \ \& \ P(t)]$
3. $I\text{-bar}'$: $\lambda p \exists t[PAST(t) \ \& \ t \in R(2) \ \& \ P(t)] \ (\wedge sick'(x_1))$
 $\Rightarrow \exists t[PAST(t) \ \& \ t \in R \ \& \ sick'(x_1, t)]$
4. NP_1' : $Mary-ka \Rightarrow \lambda PP\{m\}$
5. IP' : $\lambda PP\{m\}(\wedge \lambda x_1 \exists t[PAST(t) \ \& \ t \in R(2) \ \& \ sick'(x_1, t)])$
 $(Quantifying-In) \Rightarrow \exists t[PAST(t) \ \& \ t \in R(2) \ \& \ sick'(m, t)]$
6. M : $\neg keyss \Rightarrow \lambda p[\Box^V p]$
7. $M\text{-bar}'$: $\lambda p[\Box^V p(\wedge \exists t[PAST(t) \ \& \ t \in R(2) \ \& \ sick'(m, t)])]$
 $\Rightarrow \Box \exists t[PAST(t) \ \& \ t \in R(2) \ \& \ sick'(m, t)]$

As I said before, I will pursue the interpretation of the modal marker *-keyss* on the basis of Kratzer's (1977, 1991) theory of modality, which was outlined in section 2. Recall that her theory is a theory of relativized modality in the sense that the nature of conversational backgrounds determines what kinds of interpretations are available in modal sentences. Also recall that *-keyss* is always related to the speaker's knowledge, not to anybody else's, leading to the speaker's oriented deictic center. This suggests that

the conversational background f for the epistemic modal $\neg keyss$ is the set of propositions that are known to the speaker in a world w at a time t , i.e., $f(w)(t) = \{p: p \text{ is known to the speaker at } t \text{ in } w\}$. Given this, we can obtain the set of worlds epistemically accessible from $\langle w, t \rangle$, i.e., $\cap f(w)(t)$. $\cap f(w)(t)$ is the set of possible worlds in which every proposition in $f(w)(t)$ is true, i.e., $\cap f(w)(t) = \{\langle w, t \rangle: \forall p[\text{is-known-to-the-speaker}(p)(w)(t) \rightarrow \langle w, t \rangle \in p]\}$. Given this, the sentence in (25) can be interpreted as follows:²⁰⁾

- (27) $\| \Box \exists t[\text{PAST}(t) \ \& \ t \in R(2) \ \& \ \text{sick}'(m, t)] \|^{M, w, g, u, f} = 1$ iff for every world $k \in \cap f(w)(t)$, there is a world $v \in \cap f(w)(t)$ such that $v \leq_{\gamma(w)(t)} k$ and for every world $z \in \cap f(w)(t)$, if $z \leq_{\gamma(w)(t)} v$, then for some $g \langle t_1/t \rangle g'$ such that $g'(t_1) < u$ and $g'(t_1) \in R(2)$ and Mary is sick in z at $g'(t_1)$. (N. B. u is the utterance time, f a conversational background, γ an ordering source, and $g \langle t_1/t \rangle g'$ refers to a value assignment exactly like g except that it possibly assigns t_1 to t)

In prose, (27) roughly says that the sentence in (25) is true w.r.t M, w, g, C, u, f , and γ ²¹⁾ iff for every accessible world w' which is closest to the ideal established by what is known to the speaker in w at t , there is a past interval t which is a member of $R(2)$ such that Mary is sick in w' at t . Remember that the contextually supplied conversational background f in question is the set of

20) The truth definition in (22) is based upon that for *a necessity* provided by Kratzer (1991). Recall that it is given as follows: $\| \Box p \|^{f, v} = \{w \in W: \forall u[u \in \cap f(w) \rightarrow \exists v[v \in \cap f(w) \ \& \ v \leq_{\gamma(w)} u \ \& \ \forall z[z \in \cap f(w) \ \& \ z \leq_{\gamma(w)} v \rightarrow z \in p]]\}$ (see Kratzer (1991: 644)).

21) Recall that f is a conversational background and γ an ordering source.

propositions that are known to the speaker in w at t . Thus, the nature of this kind of conversational background indeed provides the interpretation of the modal marker *-keyss* as conveying the speaker's conjecture or presumption about a given eventuality. This explains how *-keyss* obtains such a kind of meaning.

4. Conclusion

In this paper, I have argued in favor of the view of the marker *-keyss* not as a future tense marker but as a modal marker by observing that the interpretation of *-keyss* is parallel to that of an epistemic modal. The eventuality described under the scope of the epistemic modal *-keyss* expresses the speaker's presumption about that eventuality. The interpretation of *-keyss*, whose treatment is based on Kratzer's analysis of modality, is determined by the conversational background, a function which assigns to possible worlds the set of propositions that are known to the speaker in a world w . This approach provides an appropriate account of how and why *-keyss* produces the speaker's conjecture, not anybody else's.

I will conclude this section by mentioning what is the difference between my analysis and the previous treatment of *-keyss* as a modal. Most of the previous studies (cf. Han (1996), Kim (1981), Seo (1977), and Sohn (1975) among others) which are in favor of the modal approach attempt to account for *-keyss* in undefined descriptive terms without presenting an analysis of what is

responsible for the available interpretation of *-keyss* as the speaker's presumption, not anybody else'. The descriptive explanation is not sufficient to present an analysis of the linguistic data in question. It only provides a clue as to what the data we are considering suggest, and in what direction we should analyze them. In order for an analysis to be included in a grammatical theory, rules and constraints should be stated in rigorous linguistic terms. In this respect, the previous treatments of *-keyss* leave something to be desired. In contrast, the analysis of *-keyss* I have presented in this paper by incorporating Kratzer's theory accounts for how we semantically capture its interpretation for the speaker's presumption of an eventuality under the scope of *-keyss*.

References

- Abusch. 1997. "Sequence of Tense and Temporal De Re", in *Linguistics and Philosophy*. 20. 1-50.
- Choe, H-B. 1935. *uri malbon* (Our Grammar). Seoul: Jeongum Publisher.
- Chong, H-J. 1990. "Reconsideration on Tense in Korean", in *Linguistic Journal of Korea*. 15 389-407.
- Dowty, D. 1977. "Toward a Semantic Analysis of Verb Aspect and the English Imperfective Progressive", in *Linguistics and Philosophy*. 1. 45-77.
- Dowty, D. 1979. *Word Meaning and Montague Grammar*. Dordrecht, D. Reidel Publishing Co.
- Enç. 1987. "Anchoring Conditions for Tense", in *Linguistics Inquiry*. 18. 633-657
- Groenendijk, J. and M. Stokhof. 1989. "Type-Shifting Rules and the Semantics of Interrogatives", in G. Chierchia et al. (eds.), *Properties, Types, and Meaning*. Dordrecht, Kluwer Academic Publishers
- Han, D-W. 1996. *kwueuy sice yenkwu* (A Study on Korean Tense). Seoul, Tae Hak Publishing Co.
- Heim, I. and A. Kratzer. 1998. *Semantics in Generative Grammar*. Oxford, Blackwell Publishers.
- Hofmann, T. R. 1966. "Past Tense Replacement and the Modal System", in James McCawley (ed.), *Syntax and Semantics* 7. New York, New York, Academic Press. 85-100.
- Jackendoff, R. 1972. *Semantic Interpretation in Generative Grammar*. Cambridge, MA. MIT Press.
- Kim, C-K. 1981. "*ul kwa keyss uy uymi* (The meaning of 'ul' and 'keyss')", in *Hangul* 173. 65-114.
- Kim, S-W. 1992. *kwueuy sang yeonkwu* (A Study on the Korean Aspect). Seoul, Hanshin Publishing Co.
- Klein, E. and I. Sag. 1985. "Type-Driven Translation", in *Linguistics and Philosophy*. 8, 163-201.
- Koizumi, M. 1993. "Modal Phrase and Adjuncts", in Patricia Clancy (ed.), *Japanese / Korean Linguistics II*. CSLI. Stanford University. 409-428.
- Kratzer, A. 1977. "What 'Must' and 'Can' Must and Can Mean?", in *Linguistics and Philosophy*. 1. 337-355.

- Kratzer, A. 1979. "Conditional Necessity and Possibility", in Baeuerle, Egli, and von Stechow (eds.), *Semantics From Different Points of View*. Berlin, Springer-Verlag.
- Kratzer, A. 1991. "Modality", in von Stechow and D. Wunderlich (eds.), *Semantics: An International Handbook of Contemporary Research*. Walter de Gruyter, Berlin. 639-650.
- Kuhn, S. and P. Portner. 1997. "Tense and Time". To appear in Gabby and Guenther (eds.), *The Handbook of Philosophical Logic*. Vol IV. D. Reidel Publishing Co.
- Ladusaw, W. 1977. "Some Problems with Tense in PTQ", in *Texas Linguistics Forum* 6. Austin, University of Texas.
- Lee, K. 1978. "*eoneo wa chuwavung* (Language and Presumption)", in kwueohak (The Study of the Korean Language).
- Lewis, D. 1981. "Ordering Semantics and Premise Semantics for Counterfactuals", in *Philosophical Logic*. 10. 217-234.
- Martin, S. 1954. Korean Morphophonemics, in *Linguistic Society of America*.
- Montague, R. 1973. "The Proper Treatment of Quantification in Ordinary English", in Hintikka, Moravcsik, and Suppes (eds.), *Approaches to Natural Language: Proceedings of the 1970 Stanford Workshop on Grammar and Semantics*. Dordrecht, D. Reidel Publishing Co. 221-42, reprinted in Montague (1974).
- Nam, K. 1978. *kwukeomunpeop-uy sicemun-ey kwanhan yeonkwu* (A Study on Korean Tense). Seoul: Tower Press.
- Partee, B. 1973. "Some Structural Analogies Between Tenses and Pronouns in English", in *The Journal of Philosophy*. 70. 601-609.
- Partee, B. 1984. "Nominal and Temporal Anaphora", in *Linguistics and Philosophy*. 7. 243-286.
- Partee, B. and Mats Rooth. 1983. "Generalized Conjunction and Type Ambiguity", in R. Baeuerle and Schwarze, and von Stechow (eds.), *Meaning, Use, and Interpretation of Language*. Walter de Gruyter, Berlin, Germany. 290-301.
- Prior, A. 1967. *Past, Present and Future*. Oxford University Press.
- Ramstedt, G. J. 1939. *A Korean Grammar*. Suomalais Ugrilainen Seura, Helsinki.
- Seo, J-S. 1977. "-keyss-ey kwanhayeo (On -keyss)", in *mal* (Language). 2, 63-88.
- Sohn, H-M. 1975. "Tense in Korean", in Sohn (ed.) *The Korean Language*:

- Its Structure and Social Projection*. Occasional Paper 6. University of Hawaii. 47-61.
- Song, M-Y. 1997. "Tense and Opacity in Propositional Attitudes in Korean", To appear in *the Proceedings of SCIL 9, MIT Occasional Working Paper*.
- Song, M-Y. 1999. *The Semantics of Tense and Propositional Attitudes*. Ph. D. Dissertation, Georgetown University.
- Song, S-C. 1967. *Some Transformational Rules in Korean*. P. D. Dissertation, Indiana University.
- Sportiche, D. 1988. "A Theory of Floating Quantifiers and its Corollaries for Constituent Structure", in *Linguistic Inquiry*. 19. 425-49.
- Whitman, J. 1989. "Topic, Modality, and IP Structure", in Kuno et al (eds.) *Harvard Studies In Korean Linguistics III*. Seoul, Hanshin Publishing Co. 341-356.

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