

Interpretation of Korean Temporal Markers -ESS and -NUN in Interval Semantics

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Eun-Jung Yoo. 1999. Interpretation of Korean Temporal Markers -ESS and -NUN in Interval Semantics. *Language and Information* 3.2, 31–49. This paper deals with temporal markers *-ess* and *-(nu)n* in Korean, and provides formal interpretations of these markers within the framework of interval semantics. I propose that the truth-conditional interpretation of *-ess* and *-(nu)n* sentences is obtained by locating the involved eventuality within a ‘completive interval’ and ‘imcompletive interval’, respectively. Since characterization of these two intervals makes reference to the evaluation time, the basic distinction between the two lies on tense. Furthermore, I will argue that perfective/imperfective aspect meaning that usually arises in *-ess/-nun* sentences should be explained in terms of a conversational implicature. (Seoul National University)

1. Introduction

There have been various analyses of the temporal markers *-ess* and *-(nu)n/-φ* in Korean. Most of the previous studies on *-ess* and *-(nu)n/-φ* have been focused on their status in tense and aspect systems. Especially, the status and meaning of *-ess* have been controversial. There are three different positions for the analysis of *-ess*: to treat it as a past tense marker (Choe (1977), Chong (1990)), a perfective/completive aspect marker (Baek (1986), Lee (1988)) or a tense-aspect marker (Lee (1991), Choi (1993)). As for *-(nu)n/-φ*, it is generally recognized that it refers to present or nonpast time, thus making it a present tense marker (Choe (1977), Baek (1986)), but it is also sometimes taken to have an additional aspectual function, equivalent to progressive (Choe (1977)) or imperfective (Kim (1988), Lee (1991)).

The disagreement among various positions often arises from different employment of the conceptual or categorial classifications involved in tense and aspect systems. Moreover, even if there is a settled form of classification, it is very difficult to determine whether the marker *-ess* or *-(nu)n/-φ* has a particular category of tense or aspect meaning, given the complexity of the meaning that these markers have.

In this paper, I will approach the meaning of *-ess* and *-(nu)n/-φ* in a different way,

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by focusing on the formal interpretation of the sentences that contain these markers. Thus the main purpose of this paper is to provide proper interpretations of *-ess/- (nu)n* sentences. After examining various meanings that these markers have in a sentence, I will propose that the semantic function of *-ess* and *-(nu)n/-φ* is to locate the involved eventuality within a ‘completive interval’ and an ‘incompletive interval’, respectively. This analysis is based on the framework of interval semantics presented in Dowty (1979), in which interpretations are relativized to intervals of time rather than moments in time.¹

The meaning of a third marker *-keyss* will be discussed as well in the later part of this paper, and it will be argued that *-keyss* is a modal rather than a temporal marker taking wide scope with respect to the temporal markers *-ess* and *-(nu)n/-φ* in its interpretation. In the last part of this paper, I will examine some implications of my analysis for the Korean tense and aspect system. Based on the interpretation of *-ess* and *-(nu)n/-φ* sentences, I will claim that the *-ess/- (nu)n* opposition involves both tense and aspect.

2. Interpretation of *-ess* sentences

2.1 On the morpheme *-ess*

In order to derive an adequate interpretation of a sentence which involves *-ess*, we need to clarify the way in which *-ess* contributes to the meaning of the whole sentence. In many cases, Korean sentences with *-ess* (whose vowel is deleted in certain environments) describe events which happened in the past. (1) exemplifies this:²

- (1) Kim-i ecey Seoul-ul ttena-(e)ss-ta.
 Kim-Nom yesterday Seoul- Acc leave-T-S
 ‘Kim left Seoul yesterday.’

(1) would not cause any problem for the assumption that *-ess* refers to a past time so that its truth condition would require that there is a past time at which the event of Kim’s leaving happened. Thus the rough translation of (1) can be given as follows without any contradiction in interpretation:³⁴

- (2) $\exists t$ [yesterday’(t) & past(t) & AT (t, leave’(k,s))]

The same kind of interpretation can apply to all the *-ess* sentences, when there is a time adverbial which specifically denotes some past time as in (3):

1. Though I adopt the framework of interval semantics in this paper, the analysis that I will propose here can be also presented within other kinds of frameworks such as event-based semantics and location-based semantics. To the best of my knowledge, the choice between these doesn’t seem to be important for the present analysis. As for some advantages of location- or event-based theories over interval-based theories for other linguistic phenomena, see Roberts (to appear). Also see Yoon (1996) for derivation of *-ess* or *-(nu)n* sentences within the event-based semantics.

2. Some abbreviations used in this paper are as follows:

Nom - Nominative case marker; Acc - Accusative case marker; T - temporal marker; S- sentence type marker (This represents whether a sentence is declarative, interrogative or imperative. *-ta* is used for declarative sentences); Top -topic marker; Rel - relativizer; CF - contrastive focus marker.

3. “AT” is a two place operator representing the notion of a proposition being true at a time. Thus AT(t_1, φ) is true at any time t , iff φ is true at the time denoted by t_1 . (cf. Dowty, 1979:324)

“past(ζ)” is true at an interval i iff i ’precedes i , where i ’ is the denotation of ζ .

4. *today* translates as:

$\text{At}\exists t_1[\text{day}'(t_1) \ \& \ \text{NOW} \subseteq t_1 \ \& \ t \subseteq t_1]$

yesterday translates as:

$\text{At}\exists t_1[[\text{day}'(t_1) \ \& \ \forall t_2 [\text{today}'(t_2) \ \rightarrow [t_1 < t_2 \ \& \ \forall t_3 [(t_1 < t_3 \ \& \ t_3 < t_2) \ \rightarrow \text{today}'(t_3)]]]] \ \& \ t \subseteq t_1]$

Cf. the translation of *yesterday* and *today* in Stump (1985: 381)

- (3) Kim-i o-nyen cen-ey cwuk-ess-ta.
 Kim-Nom five-year ago-at die-T-S
 ‘Kim died five years ago.’

However, when we consider the possible cooccurrence of *-ess* with some other time adverbials, we find that *-ess* may occur with adverbials whose reference is not limited to past time.

- (4) a. Kim-i yethay chinkwu-lul kitali-ess-ta.
 Kim-Nom until now friend-Acc wait-T-S
 ‘Kim has waited for his/her friend until now.’
 b. Kim-i iceykses apeci-lul mos manna-(e)ss-ta.
 Kim-Nom as yet father-Acc not meet-T-S
 ‘Kim has not met his/her father as yet.’
 c. Kim-i cikum-kkaci kongpu-lul hay-(e)ss-ta.
 Kim-Nom now-up till study-Acc do-T-S
 ‘Kim has studied up till now.’

The adverbials *yethay*, *iceykses*, and *cikum-kkaci* in (4) have “extended now” meaning in the sense that they describe an interval that began in the past and extends up to the present moment. Therefore, if we assume that *-ess* is a past tense marker and that it is introduced by a past tense rule, it will cause a contradiction between the “extended now” meaning of the adverbials and the past tense predicate in the interpretation of the sentences in (4).

Another reason why I don’t want to assume that we need a Past Tense rule for *-ess* is that the *-ess* form of verbs can cooccur with adverbials whose denotations include the speech time as in (5):

- (5) a. Kim-i cikum ttena-(e)ss-ta.
 Kim-Nom now leave-T-S
 ‘Kim has left now.’
 b. Kim-i cikum i swunkan ku il-ul kkuthnay-(e)ss-ta.
 Kim-Nom now this moment the work-Acc finish-T-S
 ‘Kim has finished the work at this very moment.’

It can be argued that the time denoted by the adverb *cikum* in (5a) is actually a very recent past rather than the present, since (5a) can be uttered when Kim’s leaving occurred just before the speech time⁵. However, there are still many cases where *-ess* is used together with *cikum* whose denotation includes the utterance time. Consider (6):

- (6) Cikum nay-ka malhako-iss-nu-n i swunkan-ey ce ay-ka
 now I-Nom speaking-be-T-Rel this moment-at that child-Nom
 nemeci-ess-ney.
 fall-T-S
 ‘That child has fallen down at the moment of my speaking now.’

5. Nonetheless, it is questionable whether we should analyze *cikum* as being ambiguous between the very recent past and the present meaning. We would rather suggest that *cikum* denotes an extended interval that may include the very near past. (See footnote 17 for details.) The latter analysis is consistent with our view that *-(e)ss* in (5a) is not just a simple past tense marker.

In (6), the event of the child's falling down is cotemporaneous with the utterance of the sentence. Accordingly, if we try to interpret (5) and (6) using a past tense rule, it would lead to contradiction, since no interval can satisfy **past**(*t*) and the denotation of *cikum* at the same time.⁶

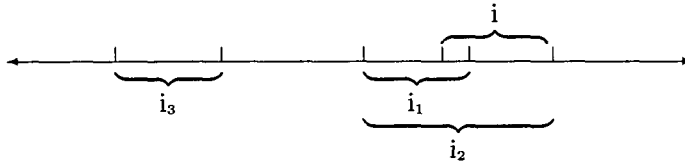
Based on the examples (1)–(6), we can conclude that the meaning of *-ess* should be described in a way that it allows for either a past or 'extended now' meaning. The same line of idea is proposed in Stump (1985) in his account of English perfect. Stump argues that it is wrong to assume that the function of the perfect is to locate an event within an extended now. Then he proposes the notion of a perfect interval which is defined in (7):⁷

(7) The denotation of **perf**(*t*) is

$$[\exists t_1 [t_1 \subseteq t \ \& \ t_1 \prec \mathbf{now}] \ \& \ \neg \exists t_1 [t_1 \subseteq t \ \& \ \mathbf{now} \prec t_1]]$$

Given (7), some perfect intervals (relative to *i*) are illustrated in (8):

(8) i_1, i_2, i_3 are perfect intervals relative to *i*. **now** denotes *i*.



Now, what I want to claim is that the interpretation of the Korean *-ess* can be captured best in terms of perfect intervals in Stump's sense. This view accounts for the fact that *-ess* can cooccur with either of *ecey* 'yesterday' or *yethay* 'so far'. Moreover, it explains why *-ess* is not used with adverbials of future reference such as *nayil* 'tomorrow'.⁸

(9) * Kim-un nayil Seoul-ul ttena-(e)ss-ta.⁹

Kim-Top tomorrow Seoul-Acc leave-T-S

'* Kim left / has left Seoul tomorrow.'

In the following section 3, the meaning of *-ess* will be discussed in comparison with *-(nu)n/-phi*, and I will use the term 'completive interval' instead of perfect interval in order

6. An anonymous reviewer points out that, although (6) can be uttered, the real time of the child's falling down precedes the utterance time of the sentence. While setting the interval of the utterance time may be subtle, the interval need not indicate a single point of time. I feel that the interval of the child's falling down can be overlapping with the interval of utterance in (6). As will be shown in what follows, in an *-(e)ss* sentence like (6), the described eventuality is interpreted as being completed by the evaluation time, due to the perfective aspect meaning arising from the conversational implicature associated with *-(e)ss*.

7. Stump (1985) introduces the new intensional logic predicate '**perf** (ζ)' where ζ denotes a time interval *i*', and assumes **perf** (ζ) to be true at index $\langle w, i \rangle$ iff *i*' begins before *i* and lasts no later than *i*.

8. It is not always true that *-ess* cannot be used with future adverbials such as *nayil*. It has been observed that the following sentence is fine, when *-ess* is used figuratively as in:

(i) Ne nayil cwuk-ess-e!
you tomorrow die-T-S
'You have died / died tomorrow'

In (i), the speaker describes the event as if it has already occurred to express his/her strong intention that *s/he* will defeat the hearer in the following day. I don't have any compositional way of deriving (i) with this figurative usage of *-ess*.

to contrast the meaning of *-ess* with that of *-(nu)n/-φ* and in order to avoid the possible confusion with English-type perfect.¹⁰ Therefore, in the subsequent discussion, it will be assumed that *-ess* introduces a ‘completive interval’ predicate, *compl*, whose denotation is the same as that of Stump’s perfect interval, as in (10):

- (10) The denotation of **compl**(*t*) is

$$[\exists t_1 [t_1 \subseteq t \ \& \ t_1 \prec \mathbf{now}] \ \& \ \neg \exists t_1 [t_1 \subseteq t \ \& \ \mathbf{now} \prec t_1]]$$

Given the assumption that *-ess* locates an event within a completive interval, it follows that (11b) is true at *i*, iff (11a) is true sometime during a completive interval relative to *i*:

- (11) a. Kim-i sakwa-lul hana meke-chiwu-ta.
 Kim-Nom apple-Acc one eat-up-S
 ‘Kim eats up an apple.’
 b. Kim-i sakwa-lul hana meke-chiwu-(e)ss-ta.
 Kim-Nom apple-Acc one eat-up-T-S
 ‘Kim ate up an apple.’

However, a problem arises, when we consider the aspectual class of the verb *meke-chiwu* ‘eat up’ in (11). Even though (11b) asserts that (11a) is true at a completive interval *i* which does not extend into some future time, it itself does not block the possibility that (11a) is also true at a superinterval of *i*. Accordingly, (11b) can be counted as true in a situation where Kim is in the middle of eating at the speech time and does not finish eating until some future time.¹¹ As telic predicates such as *chayk-ul hankwen ilke chiwu* ‘read off a book’, *sakwa-lul hana meke-chiwu/peli* ‘eat up an apple’, *tochakha* ‘arrive’ and *alachay-* ‘notice’ do not allow a sentence which is true at an interval *i* to be true at the superinterval of *i*, we need to impose a telicity condition as in (12), which is proposed in Dowty (1987:18):

- (12) If δ is a telic predicate, then the truth of $\delta(x_1, \dots, x_n)$ for interval *t* entails that $\delta(x_1, \dots, x_n)$ is false for all proper subintervals *t'* of *t*.

The condition (12) guarantees that when a sentence with a telic predicate is true for *i*, it is false for a superinterval of *i* as well as a subinterval of *i*, because otherwise the superinterval of *i* would violate (12). Accordingly, for a sentence with a telic predicate, there is always a ‘unique interval’ *i* for which the sentence is true.

Interestingly enough, *-ess* sentences with atelic predicates may also have a similar problem in that they are often not true in a situation where the described state or activity extends to some future time. However, I will put the discussion of this phenomena aside until we can compare the meaning of *-ess* with that of *-(nu)n/-φ* in the section 3.

2.2 Translations of *-ess* sentences

In this section, I will show how we can derive a desirable interpretation of sentences with *-ess* by using completive intervals. Most of Stump’s system is assumed, that is, the use of

10. It should be pointed out that the use of the term ‘completive’ itself does not mean that *-ess* is an aspect marker rather than a tense marker. The relation between this term and Korean tense and aspect system will be discussed in the section 5.

11. This problem was pointed out to me by David Dowty, and I owe him the subsequent discussion.

temporal abstracts (TAB) and the way in which temporal adverbials are introduced. TAB is the basic category of temporal abstracts, and though expressions of this category may have the superficial form of sentences, they have different denotations from sentences: they denote sets of time intervals.

Let us consider (1), which is repeated below:

- (1) Kim-i ecey Seoul-ul ttena-(e)ss-ta.
 Kim-Nom yesterday Seoul-Acc leave-T-S
 ‘Kim left Seoul yesterday.’

First, we need a temporal abstract rule to convert type *t* (sentential) constituents into abstracts over intervals as follows, where I use the feature [Temporal] which subsumes both tense and aspect marking:

- (13) **S 11.** If $\phi \in P_t$, [-Temporal], then $F_{11}(\phi) \in P_{TAB}[-\text{Temporal}]$, where $F_{11}(\phi)$ is ϕ .
T 11. If $\phi \in P_t$ and ϕ translates as ϕ' , then $F_{11}(\phi)$ translates as $\lambda t[\text{AT}(t, \phi')]$.

Next, time adverbs are added to temporal abstracts by the following rule:^{12 13}

- (14) **S 21.** If $\alpha \in P_{MTA}$ and $\beta \in P_{TAB}[\gamma\text{Temporal}]$, then $F_{21}(\alpha, \beta) \in P_{TAB}[\gamma\text{Temporal}]$, where $F_{21}(\alpha, \beta)$ is the result of placing α after the subject of β .
T 21. If $\alpha \in P_{MTA}$, $\beta \in P_{TAB}$, and α, β translate as α', β' , then $F_{21}(\alpha, \beta)$ translates as $\alpha'(\wedge \beta')$.

Then, *-ess* is introduced to the temporal abstracts by the following rule:

- (15) **S 12.** If $\alpha \in P_{TAB}[-\text{Temporal}]$, then $F_{12}(\alpha) \in P_{TAB}[\text{+Temporal}]$, where $F_{12}(\alpha)$ is the result of placing *-(e)ss* after the root of the verb or adjective of α .
T 12. If $\alpha \in P_{TAB}$ and α translates as α' , then $F_{12}(\alpha)$ translates as $\lambda t[\text{compl}(t) \ \& \ \alpha'(t)]$.

Finally, the temporal abstract with the feature [+Temporal] is converted to a sentence by the following rule:

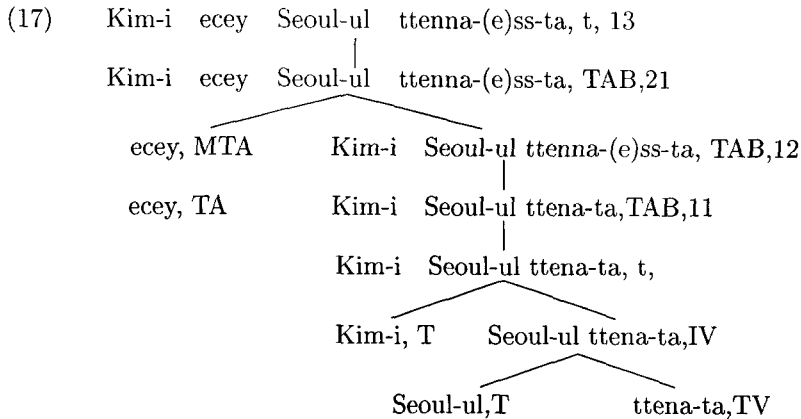
- (16) **S 13.** If $\alpha \in P_{TAB}[\text{+Temporal}]$, then $F_{13}(\alpha) \in P_t[\text{+Temporal}]$, where $F_{13}(\alpha)$ is α .
T 13. If $\alpha \in P_{TAB}$ and α translates as α' , then $F_{13}(\alpha)$ translates as $\exists t[\alpha'(t)]$.

Now, given the above rules, we can assign an analysis tree for (1) as in (17) and get the interpretation in (18).¹⁴

12. MTA is the category TAB/TAB of main tense adverbs.

13. Here I assume that the canonical position of adverbials in Korean is right after a subject (and before an object, if any). The relatively free order of adverbials as well as arguments (such as objects and subjects) in Korean can be captured by an independent syntactic rule or mechanism (i.e., scrambling).

14. In (17), I assume the rule creating main tense adverbs of Stump (1985), by which set-level time adverbs (TA) become main tense adverbs (MTA). Thus, if $\alpha \in P_{TA}$ and α translates as α' , then the result of this rule α ($\in P_{MTA}$) translates as $\lambda P^t[\alpha'(t) \ \& \ P^t\{t\}]$. (Cf. The variable P^t is of the type $\langle s, \langle i, t \rangle \rangle$.)



(18) $\exists t[\text{yesterday}'(t) \ \& \ [\text{compl}(t) \ \& \ \text{AT}(t, \text{leave}'(k,s))]]$

3. Interpretation of *-(nu)n* sentences

3.1 On the morpheme *-(nu)n*

When it is assumed that there is a distinction between present tense (or nonpast tense) and past tense, the morpheme *-(nu)n/- ϕ* is usually identified as present (or nonpast) morpheme.¹⁵ In fact, in many cases *-(nu)n/- ϕ* is used in a present situation as follows:

(19) Kim-i cikum cemsim-ul mek-nun-ta.
 Kim-Nom now lunch-Acc eat-T-S
 'Kim eats lunch now.'

The morpheme *-(nu)n/- ϕ* is also used to express habitual events or eternal truth, like the English present tense:

(20) a. Cikwu-nun to-n-ta.
 earth-Top turn-round-T-S
 'The earth turns round.'

b. Kim-un mayil san-ul olu-n-ta.
 Kim-Top everyday mountain-Acc climb-T-S
 'Kim climbs the mountain everyday.'

Moreover, *-(nu)n/- ϕ* can be used with future adverbs, when the speaker is sure that the involved eventuality will occur:

(21) Kim-un nayil hakkyo-ey ka-n-ta.a
 Kim-Top tomorrow school-to go-T-S
 'Kim goes to school tomorrow.'

The sentences (19) - (21) would be accounted for if we assume a present (or nonpast) interval that does not include any past time.¹⁶ However, what is peculiar about the morpheme *-(nu)n/- ϕ* is that it can cooccur with an adverbial whose denotation contains a time which is earlier than the speech time as in (22):

15. *-nu* is deleted from *-(nu)n* when the root of a verb ends with a vowel.
 16. Stump defines NONPAST intervals as follows:

- (22) Kim-i ecey-puthe ca-n-ta.
 Kim-Nom yesterday-from sleep-T-S
 'Kim has slept since yesterday. (He is not awake yet, and will sleep for a while.)'

One might want to regard $-(nu)n/-\phi$ in (22) as a present tense marker and interpret (22) in terms of an extended now interval which began on the previous day and lasts up to the present. However, this view fails to account for the following example:

- (23) I namu-nun cinan-tal-puthe naytal-kkaci kkoch-ul phiwu-n-ta.
 this tree-Top last-month-from next-month-until flower-Acc blossom-T-S
 'This tree came into blossom last month, and will blossom until next month.'

In (23), the interval which begins in the past and extends up to a certain future time cannot be captured by an extended now interval. Therefore, we can conclude that a present tense rule is not appropriate for the interpretation of (22) and (23).

Then, what would be a denotation of $-(nu)n/-\phi$? To get a clearer sense, we can compare (19) with (24):

- (24) Kim-i cikum cemsim-ul mek-ess-ta.
 Kim-Nom now lunch-Acc eat-T-S
 'Kim has eaten lunch now.'

In (19), Kim's eating still continues at the evaluation time, i.e., it is not completed. On the other hand, in (24) Kim's eating is completed before or at the evaluation time.¹⁷ The same contrast holds between (25) and (26):

- (25) Kim-i yethay ca-n-ta.
 Kim-Nom until now sleep-T-S
 'Kim has slept until now. (He is not awake yet.)'
- (26) Kim-i yethay ca-(e)ss-ta.
 Kim-Nom until now sleep-T-S
 'Kim has slept until now. (He is awake now.)'

The difference between these two lies in whether the described state is terminated by the evaluation time. Thus, a contrast arises from the addition of a conjunct as in the following examples:

- (27) a. Kim-i yethay ca-(e)ss-ta, kulena icey-nun ilena-n-ta.
 Kim-Nom until now sleep-T-S but now-Top get up-T-S
 'Kim has until now, but now s/he is getting up.'

(i) Given that NOW denotes i' ,
 PRES(ζ) is true iff $i'' \subseteq i'$, where i'' is the denotation of ζ ;
 NONPAST(ζ) is true iff there is no subinterval i'' of the denotation of ζ such that $i'' < i'$.

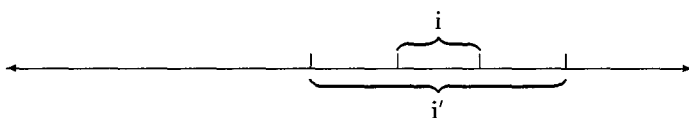
17. It seems that Korean *cikum* has a somewhat broader range of meaning so that its denotation may include the very near past and future. Accordingly the translation of *cikum* may tentatively be given as in (i), assuming that the present time span represented by *cikum* can be expressed via a predicate such as **current-event**(ζ) :

(i) *cikum* translates as
 $\lambda P^t \lambda t [\exists t_1 [\text{now} \subset t_1 \ \& \ \text{current-event}(t_1) \ \& \ t \subset t_1] \ \& \ P^t\{t\}]$

- b. ‡ Kim-i yethay ca-n-ta, kulena icyey-nun ilena-n-ta.
 Kim-Nom until now sleep-T-S but now-Top get up-T-S
 ‘Kim has slept until now, but now s/he is getting up.’

Therefore, the interval *i* for which (22), (23) or (25) is true can be shown as follows, where *i* is the interval of evaluation:

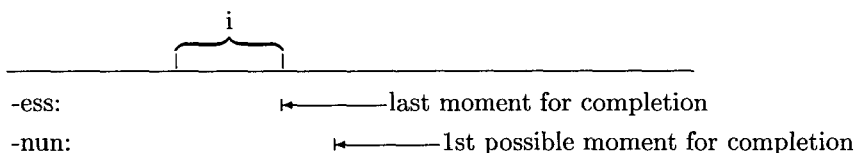
(28)



Accordingly, the interval *i*' in (28) cannot be captured by either a present or a nonpast interval.

Instead, I want to propose an analysis of *-(nu)n/-φ* in terms of an 'incomplete interval', since all the sentences with *-(nu)n/-φ* entail that the described eventuality is not completed yet. As *-(nu)n/-φ* is used for an ongoing eventuality or for an eventuality which is certain to occur, the possible moment of the completion of the eventuality comes after the evaluation time. This can be represented as in (29) in contrast with the meaning of *-ess*:

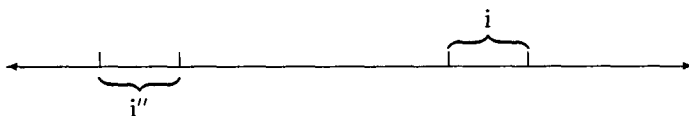
(29)



A similar argument is found in Kim (1988), where it is argued that *-(nu)n/-φ* represents unfinishedness or incompleteness. According to that analysis, sentences such as (20) involve incompleteness in the sense that the same event will occur continuously or repeatedly. (21) also involves incompleteness, since the described event (i.e., Kim's going to school) has not happened or is not yet completed at the interval of evaluation.

Although *-(nu)n/-φ* may include times earlier than the speaker's interval, it cannot solely consist of an interval earlier than the interval of evaluation. That is, in (30), the interval *i''* which is relative to *i* cannot be the time of the eventuality described in *-(nu)n/-φ* sentences:

(30)



This is shown in the unacceptability of the following strings:

- (31) a. * Kim-i ecey kongpuha-n-ta
 Kim-Nom yesterday study-T-S
 ‘*Kim studies yesterday’
 b. * Kim-i cokum cen-ey ttena-n-ta
 Kim-Nom minute ago-at leave-T-S
 ‘*Kim leaves a minute ago’

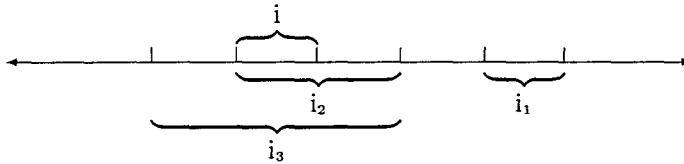
Based on these characteristics of $-(nu)n/-\phi$, I propose that $-(nu)n/-\phi$ locates an eventuality within an incomplete interval which can be defined as follows:

(32) The denotation of **incompl**(t) is

$$[\exists t_1 [t_1 \subseteq t \ \& \ \mathbf{now} \prec t_1]]$$

According to (32), i_1, i_2, i_3 in the following diagram (33) are incomplete intervals relative to i :

(33)



As (32) does not say that **incompl**(t) cannot include an interval which precedes i , i_3 can be an incomplete interval relative to i . (20) and (22) can be taken care of by i_3 . The incomplete interval in (21) corresponds to i_1 in (33).¹⁸ The specific syntactic rule and translation rule by which $-(nu)n/-\phi$ sentences are interpreted will be discussed in the following section, and those rules are based on the assumption that $-(nu)n/-\phi$ locates an involved eventuality within an incomplete interval.¹⁹

Now, given the denotation of an incomplete interval in (32) and that of a complete interval in (10), it would be useful to consider the logical relationship between these two. Complete intervals and incomplete intervals are complementary, since any incomplete interval should include a subinterval which is preceded by **now** in (32), whereas a complete interval cannot include a subinterval which is preceded by **now** in (10). Thus given any interval i , either **compl**(i) is true or **incompl**(i) is true, and **compl**(i) and **incompl**(i) are never both true at the same time.

In the discussion of *-ess* in section 2.1 of this paper, it was argued that for telic predicates we need the condition (12) to guarantee that a sentence involving a telic predicate is true only for a single interval. This condition is useful for $-(nu)n/-\phi$ sentences with telics such as (34) as well:

(34) Kim-i sakwa-lul hana ta mek-nun-ta.
 Kim-Nom apple-Acc one all eat-T-S
 'Kim eats a whole apple.'

18. Likewise, i_2 is an incomplete interval in an example like (i):

(i) Na cikum-puthe chwumchwu-n-ta.
 I now-from dance-T-S
 'I will dance from now.'

19. The foregoing analysis of $-(nu)n/\phi$ in terms of **incompl**(t) does not rule out the following kind of examples containing a stative predicate:

(i) † Kim-i nayil aphu- ϕ -ta.
 Kim-Nom tomorrow aphu
 '(Lit.) Kim is sick tomorrow.'

As Yoon (1996) argues, we assume that the deviance of such examples comes from pragmatic reasons, and can be made acceptable in an appropriate context.

The proposition in (34) is not true in a situation in which Kim's eating a whole apple is finished by the speech time. However, without (12), the sentence (34) could also be true for an interval which does not extend beyond the speech time, since when a sentence *f* is true for an interval *i*, it can also be true in a subinterval of *i*. Therefore, (12) is necessary to block this possibility.

At the end of section 2.1, it was mentioned that *-ess* sentences with atelic predicates (as well as telic predicates) seem to have a 'unique' interval interpretation in the sense that they are usually not true in a situation where the described state or activity extends to some future time beyond the speech time. This is shown in (26), which is repeated here:

- (26) Kim-i yethay ca-(e)ss-ta
 Kim-Nom until now sleep-T-S
 'Kim has slept until now. (He is awake now.)'

This is surprising given the 'homogeneity' of atelic predicates. One way of explaining this is to assume that the meaning of *-ess* itself imposes a 'unique' interval condition so that a *-ess* sentence is true only for a single interval (which is a completive interval).

However, this approach is problematic, because some *-ess* sentences may be true even when the described state or activity extends into the present. (35) exemplifies this:

- (35) Kim-i ecey-puthe aphu-ess-ta.
 Kim-Nom yesterday-from sick-T-S
 'Kim was sick from yesterday.'

The fact that (35) may be true when the state is persistent beyond the speech time is clearly shown in (36):

- (36) Kim-i ecey-puthe aphu-ess-ta, kulentey acikto aphu- ϕ -ta.
 Kim-Nom yesterday-from sick-T-S yet still sick-T-S
 'Kim was sick from yesterday, and yet he is still sick.'

Given (36), we can explain the 'telicity' of *-ess* sentences by means of conversational implicature rather than by entailment. Since the eventualities described by *-ess* sentences are usually interpreted as being terminated before or at the speech time as in (26) whereas those described by *-(nu)n/- ϕ* sentences are usually interpreted as not being terminated by the speech time as in (25), we can assume that this arises from a conversational implicature. That is, given two equally brief forms *-ess* and *-(nu)n*, it would be more informative to make the stronger assertion (25) rather than (26) in a situation where Kim's sleeping extends into the present.

One of the supporting argument for the conversational implicature approach is that this implicature is cancelable or defeasible as shown in (36), which is a fundamental characteristic of conversational implicatures. Another kind of example that shows cancelability is found in question-answer contexts.

- (37) a. A: Kim-i twu-si-kkaci mues hay-(e)ss-ni?
 Kim-Nom two-o'clock-until what do-T-S(question marker)
 'What did Kim do until 2 o'clock?'
 b. B: Kim-i twu-si-kkaci kongpuhay-(e)ss-e.
 Kim-Nom two-o'clock-until study-T-S(informal)
 Sasil cikum-kkaci kyeyso kongpuha- ϕ -e.
 in-fact now-up-till continuously study-T-S(informal)
 'Kim studied until 2 o'clock. In fact, he has studied until now.'

More evidence in support of the conversational implicature approach comes from the fact that this implicature is calculable based on the maxim of quantity. Consider the examples (25) and (26) again:

(25) Kim-i yethay ca-n-ta.
Kim-Nom until now sleep-T-S
'Kim has slept until now. (He is not awake yet.)'

(26) Kim-i yethay ca-(e)ss-ta
Kim-Nom until now sleep-T-S
'Kim has slept until now. (He is awake now.)'

We can say that (25) is stronger than (26), because in (25) the incompleteness of Kim's sleeping is asserted by $-(nu)n/-\phi$, whereas in (26) the incompleteness of Kim's sleeping at the speech time is just possible due to the characteristic of the atelic predicate. Given such a relation of relative strength, and the maxim of quantity that tells speakers to be as informative as is required, the fact that the speaker states only (26) suggests that the speaker lacks evidence for (25) and s/he is not in the position to claim (25). Therefore, the use of *-ess* in (26) implicates that Kim's sleeping does not extend to the present in ordinary circumstances.^{20 21}

20. It seems that the conversational implicature associated with *-ess/-nun* may not arise when a sentence has an adverbial with *-puthe* 'from' as in (35). That is, (35) can be used even when the speaker knows that Kim's illness extends into the present. However, this kind of usage arises when information about Kim's illness is already salient in the context, or when Kim's present state does not matter. This seems to be because *-puthe* adverbials usually force the involved eventuality to be focused on the inceptive time of the eventuality. In another kind of situation where Kim's illness is new information in the context and his/her present state can be a matter of concern, a sentence with $-(nu)n/-\phi$ is used when Kim's illness extends into the present, as it is predicted by our conversational implicature. Thus if the speaker informs a doctor of his/her child's present illness by telephone, then a $-(nu)n/-\phi$ form is used as in (i), and the use of a *-ess* form is very awkward:

(i) Sensayngnim, wuli ai-ka ecey-puthe aphu- ϕ -ayo.
doctor my child-Nom yesterday-from sick-T-S (informal, polite)
'Doctor, my child has been sick since yesterday.'

21. An anonymous reviewer suggests that the following (i) may be problematic, since the event described in (i) has not been completed:

(i) Yenghi-nun emma-lul talm-ess-ta.
Yenghi-Top mother-Acc resemble-T-S
'Yenghi resembles her mother.'

As discussed earlier, our analysis does not prohibit an example like (i) from being uttered in a situation where the described state extends into the present. Thus (i) does not pose a problem in terms of truth-conditional semantics. However, it remains to be explained why (i) lacks the interpretation in which the state has been completed by the evaluation time: it should be available via the conversational implicature discussed above. One might conjecture that this is because (i) involves a resultative state, rather than an ordinary state. As shown in (ii), when a result state verb is used, the state is interpreted as being continuous, not completed.

(ii) Ney kwutwu-ey hulk-i mut-ess-ta.
your shoes-on med-Nom stick-to-T-S
'Mud is (has been) stained on your shoes.'

There is one thing to be noted about *-(nu)n*. In Korean, adjectives alone are used as predicates just like verbs, however, in that case *-(nu)n* is never attached to them:

- (38) a. * Kim-i pucilenha-n-ta.
 Kim-Nom diligent-T-S
 ‘Kim is diligent.’
 b. Kim-i pucilenha- ϕ -ta.
 Kim-Nom diligent-T-S
 ‘Kim is diligent’

On the other hand, this distinction does not hold for *-ess*:

- (39) Kim-i celm-ul-ttay pucilenhay-(e)ss-ta.
 Kim-Nom young-Rel-time diligent-T-S
 ‘Kim was diligent when young.’

Kim (1988) argues that *-(nu)n* has a dual semantic function, one which distinguishes verbs from adjectives, and the other as a temporal marker. According to this view, what makes *-(nu)n* compatible with verbs is the semantic function of *-(nu)n* that expresses “change”. However, I think that this is too broad a generalization, since stative verbs such as *salangha-* ‘love’ and *al-* ‘know’ do not involve a meaning component of change, though they can be affixed with *-(nu)n*.²² Moreover, this suggests that compatibility of *-(nu)n* with verbs may not be relevant to the semantics of *-(nu)n*. It might be simply because of the syntactic function of *-(nu)n* which distinguishes verbs from adjectives.

Moreover, the occurrence of *-(nu)n* seems to be restricted by other affixes in a verb form. For example, *-(nu)n* is not used even with verbs, if the declarative sentence ending is *-e*, which is used in informal register:

- (40) Kim-i mayil swul-ul masi- ϕ -e.
 Kim-Nom everyday liquor drink-T-S(very informal)
 ‘Kim drinks everyday.’

However, the use of *-(nu)n* is not determined by the choice of register, either, since other sentence endings such as *-kwuna*, which is also used in informal register, distinguish verbs from adjectives via *-(nu)n*:

- (41) a. Ney-ka yocum pule-lul paywu-nun-kwuna.
 you-Nom nowadays French-Acc learn-T-S(informal, colloquial style)
 ‘You learn French nowadays.’
 b. Ney-ka yocum pappu- ϕ -kwuna.
 you-Nom nowadays busy-T-S(informal, colloquial style)
 ‘You are busy nowadays.’

Therefore, at this point, I cannot find any convincing semantic or pragmatic account for why *-(nu)n* is not used with certain sentence endings, and why it attaches to verbs but not adjectives when it is employed.

22. Though verbs such as *salangha-* and *al-* are usually classified as stative verbs, they are different from (stative) adjectives in the respect that they can be used in progressive forms. It might be the case that *-ko-iss*, which is usually assumed to be progressive marking in Korean, has a different meaning from English progressive tense.

3.2 Translations of *-(nu)n* sentences

To derive the desired interpretation of sentences with *-(nu)n/-φ*, we need the following rule:

(42) **S 14.** If $\alpha \in P_{\text{TAB}}[-\text{Temporal}]$, then $F_{14}(\alpha) \in P_{\text{TAB}}[+\text{Temporal}]$, where $F_{14a}(\alpha)$ is the result of placing *-(nu)n* in the predicate of α when it is a verb, and $F_{14b}(\alpha)$ is α when the predicate is an adjective.

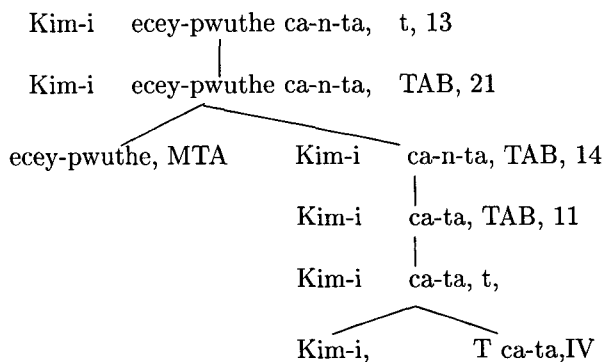
T 14. If $\alpha \in P_{\text{TAB}}$ and α translates α' , then $F_{14}(\alpha)$ translates as λt [**incompl**(t) & $\alpha'(t)$].

Now, (22) is interpreted as in (44), given the translation of *ecey-puthe* in (43):²³

(22) Kim-i ecey-puthe ca-n-ta.
 Kim-Nom yesterday-from sleep-T-S
 ‘Kim has slept since yesterday (He is not awake yet, and will sleep for a while.)’

(43) $\lambda P^t \lambda t$ [$\exists t_1$ [yesterday'(t₁) & t₁ C t & $\neg \exists t_2$ [t₂ C t & t₂ < t₁]]] & P^t{t}

(44) a.



b. $\exists t$ [$\exists t_1$ [yesterday'(t₁) & t₁ C t & $\neg \exists t_2$ [t₂ C t & t₂ < t₁]]] & **incompl**(t) & AT (t, sleep'(k))

The infelicity of (31a) is predicted, since (31a) will have the following contradictory translation:

(45) $\exists t$ [yesterday'(t) & [**incompl**(t) & AT(t, study'(k))]]

There is no interval t such that both *ecey'*(t) and **incompl**(t) are true at the same time. On the other hand, we can get the desired translation of (21) as follows without any contradiction:

23. The translation of *ecey-puthe* can be obtained compositionally from *ecey* (of the category TA) and *puthe* (of the category MTA/TA), if we assume (i) and (ii):

(i) *puthe* translates as $\lambda P^t \lambda Q^t \lambda t$ [$\exists t_1$ [$\alpha'(t_1)$ & t₁ C t & $\neg \exists t_2$ [t₂ C t & t₂ < t₁]]] & P^t{t}

(ii) If $\alpha \in P_{\text{MTA/TA}}$, $\beta \in P_{\text{TA}}$, and α, β translates as α', β' , then $F(\alpha, \beta)$ translates as $\alpha'(\wedge \beta')$.

- (21) Kim-un nayil hakkyo-ey ka-n-ta.
Kim-Top tomorrow school-to go-T-S
'Kim goes to school tomorrow.'

(46) $\exists t$ [tomorrow'(t) & [incompl (t) & AT(t, go-to-school'(k))]]

4. On the morpheme *-keyss*

The morpheme *-keyss* has been treated as a future tense marker in earlier literature. In fact, in many cases *-keyss* seems to represent futurity as in the following sentence:

- (47) Nay-ka nayil hakkyo-ey ka-keyss-ta.
I-Nom tomorrow school-to go-will /Volitional-S
'I will go to school tomorrow.'

However, recent studies such as Chong (1990) argue against the view that analyzes *-keyss* as a future tense marker. Chong observes that the sentence (48) does not describe a future state:

- (48) Ne-uy tali-ka aphu-keyss-ta.
you-Possessive leg-Nom be-hurt-Presumptive-S
'I presume that your legs are hurt (or hurting) / your legs must be hurt.'

According to her, *-keyss* is a modal marker which represents the speaker's presumption as in (48) or the speaker's volition as in (47) at the time of utterance. I know of no reason to disagree with Chong's conclusion that *-keyss* is not a future tense marker. This view is supported by the following example where we have both *-ess* and *-keyss*:

- (49) Kim-i ecey phikonhay-(e)ss-keyss-ta.
Kim-Nom yesterday be-tired-T- Presumptive-S
'I presume Kim was tired yesterday / Probably Kim was tired yesterday'.

It is very difficult to see how an account for the above sentence can be given that relies on distinctions among present, past, and future tense.

Another reason that we need to treat *-keyss* as a modal comes from the truth conditional characteristics that sentences with *-keyss* have. In section 3, we saw that *-(nu)n* can be used in describing a future eventuality when it is somehow predetermined and assured by the speaker. Therefore, the following (50) would turn out to be false, if the asserted event did not happen after all:

- (50) Kim-i naynyen-ey tayhak-ey ka-n-ta.
Kim-Nom next year college-to enter-T-S
'Kim enters a college next year.'

On the other hand, (51) is not false, even if Kim could not enter a college for some reason:

- (51) Kim-i naynyen-ey tayhak-ey ka-keyss-ta.
Kim-Nom next year college-to enter-Presumptive-S
'I presume that Kim will enter a college next year.'

This is because Kim's entering a college is judged to happen based on the epistemic evidence available to the speaker, but not asserted by the speaker as a fact.

There is another possible future expression in Korean, *-ul-kes-i*. Though I will not discuss the difference between *-keyss* and *-ul-kes-i* in detail, it can be described roughly as follows. The use of *-keyss* is subjective in the sense that the epistemic judgment comes from the speaker, given the common ground shared between the speaker and the hearer. On the other hand, *-ul-kes-i* is objective in the sense that the epistemic judgment comes from the speaker's authoritative or objective knowledge which is often not shared with the hearer.²⁴ In spite of this difference, *-ul-kes-i* should be treated as a modal marker as well, since it can be used with *-ess* as in (52), and the sentence containing it is true even if the described eventuality has not occurred after all:

- (52) Ku-ka ecey phikhonhay-(e)ss-ul-kes-i-ta.
 he-Nom yesterday tired-T-Presumptive-S
 'I presume that he was tired yesterday./ Probably he was tired yesterday.'

In the preceding sections, I argued that temporal interpretation of Korean is assigned in terms of either **compl**(t) or **incompl**(t). As for incomplete intervals, we saw that only verbs are marked with *-(nu)n* whereas adjectives are not marked (or marked with a zero morpheme). There is one thing to note about the sentences with *-keyss* with respect to incomplete marking. As we saw in (51), the verb is not marked with *-(nu)n* when *-keyss* is attached to it. The same thing happens even when *-keyss* is used as a volitional marker as in (47). In these cases, we can assume that there is a morphological cooccurrence restriction between *-keyss* and *-(nu)n*, so a zero form is employed for the incomplete marker. This explains why (53) is a presumption about an event which would happen at an incomplete interval.

- (53) Ne yocum cip-cis- ϕ -keyss-ta.
 you these days house-build-T-Presumptive-S
 'I presume that you build houses these days.'

Sohn (1974) observes that the use of volitional *-keyss* is more restricted than that of presumptive *-keyss* in the sense that i) the volitional *-keyss* cannot be used with a verb which is affixed with *-ess*; ii) the volitional *-keyss* cannot be used with stative verbs; and iii) the subject of a sentence with the volitional *-keyss* should be first person. On the other hand, presumptive *-keyss* does not show this kind of restriction in its usage. Therefore, in the following discussion, I will focus on the usage of presumptive *-keyss*.

Let us consider (49) first. (49) is a present presumption about an event which occurred earlier than the utterance time. Therefore, when both complete *-ess* and modal *-keyss* are used together, the modal *-keyss* should have wider scope. Otherwise, (49) would be interpreted as a presumption made at a complete interval. For this reason, I will assume that the modal *-keyss* is introduced after a sentence is marked as either complete or incomplete. This is shown in the rule (54), where *-keyss* is assumed to belong to the category MOD:

- (54) **S 31.** If $\alpha \in P_{MOD}$ and $\phi \in P_t[+Temporal]$, then $F_{31}(\alpha, \phi) \in P_t[+Temporal]$,
 where $F_{31a}(\alpha, \phi)$ is the result of placing α in the predicate of ϕ .²⁵
T 31. If $\alpha \in P_{MOD}$, $\phi \in P_t$, and α, ϕ translate as α', ϕ' , then $F_{31}(\alpha, \phi)$
 translates as $\alpha'(\wedge \phi')$.

24. There are other views on the difference between *-keyss* and *-ul-kes-i* as well. As for the distinction from an interactional perspective, see Suh and Kyu-hyun Kim (1991).

25. Here we need to assume a morphological process by which *-(nu)n* is deleted when *-keyss* is attached to a verb.

As the meaning of presumptive *-keyss* seems to be close to the ‘weak necessity’ of Kratzer (1991), I will use the operator ‘ \Box_{presum} ’ to express this.²⁶ The denotation of presumptive *-keyss* can be given as follows²⁷ (where, p is a variable of type $\langle s, t \rangle$):

$$(55) \text{-keyss}' (\text{presumptive}) : \lambda p [\Box_{\text{presum}} p]$$

Now, based on (54) and (55), (49) can be derived and translated as follows:

(44) Kim-i ecey phikonhay-(e)ss-keyss-ta.
 Kim-Nom yesterday be-tired-T- Presumptive-S
 ‘I presume Kim was tired yesterday. / Probably Kim was tired yesterday.’

(45) a. Kim-i ecey phikonha(y)-(e)ss-keyss-ta, 31
 |
 Kim-i ecey phikonha(y)-(e)ss-tat, 13
 |
 Kim-i ecey phikonha(y)-(e)ss-ta, TAB, 21
 / \
 ecey, MTA Kim-i phikonha(y)-(e)ss-ta, TAB, 12
 ecey, TA Kim-i phikonha-ta, TAB, 11
 |
 Kim-i phikonha-tat,
 / \
 Kim-i, T phikonha-ta, IV

b. $\Box_{\text{presum}} \exists t [\text{yesterday}'(t) \ \& \ \text{compl}(t) \ \& \ \text{AT}(t, \text{be-tired}'(k))]$

5. Implications on tense-aspect system

In the previous sections, I presented truth-conditional interpretations (along with pragmatic conditions) of *-ess* and *-(nu)n/-\phi* sentences, in terms of completive intervals and incomplete intervals. The reason that I employed the terminology ‘completive’ and ‘incomplete’ was to convey the distinction in (18), i.e., the distinction based on whether a described eventuality is completed (or terminated) by the speech time. This terminology may be misleading, however, since the terms are traditionally used for aspectual categories.

26. Kratzer defined six modal notions, which depend on conversational backgrounds. I will omit the definitions here, but each modal notion is related to a modal expression in English in the following way:

necessity	<i>must</i>
weak necessity	<i>probably</i>
good possibility	<i>there is a good possibility that</i>
possibility	<i>might</i>
slight possibility	<i>there is slight possibility that</i>
better possibility	<i>is more likely than</i>

27. Though I will not discuss the volitional *-keyss* in detail, I conjecture that the interpretation of sentences with volitional *-keyss* could be derived by applying the same rule (S 31) and by assuming another modal operator ‘ \Box_{volit} ’ which represents the speaker’s volition about the sentence.

Now, given the analysis of *-ess* and *-(nu)n/-φ* sentences it would be worth considering what this analysis implies about the tense/aspect system in Korean. As background for this discussion, I need to mention the commonly assumed distinction between tense and aspect.

Tense establishes the temporal location of eventuality with respect to some time. Thus according to Comrie (1976:1-2) 'tense relates the time of the situation referred to some other time, usually to the moment of speaking'. On the other hand, aspect does not involve a relation to the speech time, and Comrie explains that 'aspects are different ways of viewing the internal temporal constituency of a situation'. The most common categories of tense are, of course, past, present, and future (or past and nonpast), and the most common aspectual categories are perfective and imperfective.

The terms 'completive' and 'incompletive' themselves are aspectual, since they represent the perfective/imperfective distinction with respect to the temporal dimension in Lee's (1991) terms. Lee (1991) summarizes three views of perfectivity: (i) the temporal view, (ii) the totality view, and (iii) the view of boundedness. The temporal view of perfectivity considers a situation in terms of its completion. Perfectivity in terms of completion is concerned with the temporal dimension of a situation, because it has to do with which temporal juncture - e.g. beginning, middle, or end - of the situation is focused on. (Lee, 1991:43). The totality view, on the other hand, looks at situation in terms of its entirety. Thus perfectivity is determined by whether the situation is viewed internally (imperfective) or the whole situation is viewed in its entirety as an unanalyzable unit (perfective). Comrie's (1976) distinction between perfective and imperfective makes reference to totality, since Comrie argues that perfective denotes a complete situation, with beginning, middle, and end, whereas imperfective describes internal temporal structure.

The third view, the view of boundedness is concerned with whether a situation is limited in some ways: e.g. by initial or terminal juncture, by being wrapped up as a whole, or having an inherent end-point (Lee: 58).²⁸

Now, if we consider the terms 'completive' and 'incompletive' employed in this paper, in terms of Lee's distinction, this approach can be categorized as the temporal view of perfectivity, since the completion of a situation is considered as in (18).

However, despite the aspectual connotation that the terms 'completive' and 'incompletive' carry, it should be noted that the interpretation of *-ess* and *-(nu)n/-φ* in terms of completive and incompletive intervals do not argue that *-ess* and *-(nu)n/-φ* are a completive and incompletive aspect marker, respectively. Rather, the truth-conditional meanings that are assigned to *-ess* and *-(nu)n/-φ* sentences in section 2 and section 3 do not reflect such an aspectual distinction directly. (-1), (21) along with the rules (4), and (31) indicate that the basic distinction between *-ess* and *-(nu)n/-φ* lies on tense rather than on aspect, because *-ess* or *-(nu)n/-φ* locates a situation with respect to a completive or incompletive interval which makes reference to some other interval (usually speech time).

On the other hand, the aspectual meaning generally associated with *-ess/- (nu)n* is explained as well, though not truth-conditionally. The 'completive' (or 'perfective') meaning of *-ess* sentences is achieved by the conversational implicature discussed in section 3.1, together with the notion of completive interval in (-1), and the rule (4). As *-ess* sentences are located in a completive interval *i* by (4), and it is conversationally implicated that the situation does not extend beyond *i*, *-ess* sentences will have 'completive' (or

28. Despite the conceptual difference among these three views of perfectivity, however, Lee notes that they are also related to each other, and that some authors such as Dahl (1985) consider perfective as having all of the three features.

'perfective') meaning in ordinary contexts. As for the *-ess* sentences with telic predicates, the telicity condition in (1) as well plays a role in assigning 'completive' (or perfective) meaning, since a telic situation which is located in a completive interval cannot extend to some future time, due to the condition that telic sentences have a unique interval for which they are true. In the same way, the 'incompletive' (or 'imperfective') meaning of *-(nu)n/-φ* sentences arises from a conversational implicature along with the concept of incompletive interval in (21) and the rule (31). That is, by employing *-(nu)n/-φ* rather than *-ess*, it is implicated that the situation involved is not completed yet.

To sum up, in the present analysis, *-ess* and *-(nu)n/-φ* are viewed as conveying both tense and aspect meaning, though only the former is truth-conditional.

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