

# Semantics and Pragmatics of *-ess* in Korean\*

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Yeom, Jae-Il. (2010). Semantics and Pragmatics of *-ess* in Korean. *Language Research* 46.2, 199-236.

It is well-known that *-ess* is sometimes interpreted as past tense and sometimes as perfect aspect. But most analyses claim that one meaning can be derived from the other pragmatically. In this paper, I claim that *-ess* is ambiguous and takes two different syntactic positions depending on its meaning. To support this, I show that the two interpretations are independent and semantically different in several ways. The crucial differences can be traced back to the locations of reference times. They might be determined linguistically or pragmatically, but the differences in reference times come from semantic differences. And perfect interpretations vary with classes of predicates, while past interpretations do not show such variations. This also makes them distinctive.

**Keywords:** *-ess*, past, perfect, Korean, result state, continuity, result event

## 1. Introduction

It has been observed that *-ess* is used as a marker of the past tense or of the perfect, and that the actual meaning of a use of *-ess* is determined by a time adverbial or by other contextual factors.<sup>1</sup> Take the following three sentences for example:<sup>2</sup>

- (1) a. chelswu-nun hakkyo-ey ka-ss-ta. (Past/Perfect)  
Chelswu-Top school-to go-Pst-Dec

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\* This work was supported by 2008 Hongik University Research Fund. I thank J-S Yang for his detailed comments on the seminal draft of this paper, which helped me correct a lot of misunderstandings and misuses of some terms. I also thank the audience of 2010 Annual Conference of KSLI for their comments on an earlier version of this paper. Three anonymous reviewers helped me clarify my argumentations. All remaining errors are mine.

<sup>1</sup> *ess* has a couple of variations, depending on the linguistic context in which it occurs. After a vowel, *-e* is deleted. If an ending consonant is preceded by a front vowel, *ass* is used instead of *ess*.

<sup>2</sup> In this paper, the following abbreviations are used to specify grammatical morphemes: Acc(usative case), C(o)mp(lementizer), Dec(larative mood), H(o)rt(ative), Int(errogative mood), N(o)m(ina)l(izer), Nom(inative case), P(a)ss(ive), P(a)st, P(e)r(fect), Pl(ural), Pr(e)s(ent), Pr(o)g(ressive), Rel(ativizer), Top(ic).

‘Chelswu went/has gone to school.’

- b. chelswu-nun ecey hakkyo-ey ka-ss-ta. (Past)  
 Chelswu-Top yesterday school-to go-Pst-Dec  
 ‘Chelswu went to school yesterday.’
- c. chelswu-nun cikum hakkyo-ey ka-ss-ta. (Perfect)  
 Chelswu-Top now school-to go-Pst-Dec  
 ‘Chelswu has gone to school now.’

Sentence (1a) describes the situation in which there was an event of Chelswu going to school in the past. This can be understood as a past sentence, as in (1b), or as a present perfect, as in (1c). In the last two examples, the time adverbials like *ecey* and *cikum* play a crucial role.

There are mainly three groups of analyses which attempt to explain these observations. One group claims that *-ess* is basically a past tense marker, and that a perfect meaning is derived from the context: C-K Kim (1999), Y-K Ko (2004), C-S Suh (1976), S-H Kim (1992), D-W Han (1996, 1998), C H Woo (2003), etc. On the other hand, another group says that *-ess* is a perfect aspect marker and that the past tense meaning is derived contextually: K-S Nam (1972, 1978), Y-K Hong (2002), J-S Yang (2008).<sup>3</sup> Only a small group of analyses claim that *-ess* for the past tense and *-ess* for the perfect aspect must be distinguished: S-O Shin (1984), J-S Lee (2000), etc. The claim in this paper is in the same direction as the last.

If either of the first two positions is taken, there are some challenging examples to be accounted for. When *-ess* is assumed to be a past tense marker, a sentence like the following cannot be explained easily.

- (2) chelswu-nun cal sayngki-ess-ta.  
 Chelswu-Top well appear-ess-Dec  
 ‘Chelswu looks good.’

Despite the use of *-ess*, the sentence is about Chelswu’s current state of being handsome. On the other hand, when *-ess* is a perfect aspect marker, a sentence like the following is not easy to explain:

- (3) ne-nun chelswu-lul encey manna-ss-nya?  
 you-Top Chelswu-Acc when meet-ess-Int  
 ‘When did you meet Chelswu?’

<sup>3</sup> Some Korean linguists claim that *-ess* is a marker of modality: K-C Sung (1974), H-B Im and S-W Jang (1995), C-Y Oh (2004), etc. I do not discuss their analyses here.

Here *-ess* is definitely a past tense marker. By its use, the speaker asks when there was an event of the addressee meeting Chelswu in the past.

Finally, there are some examples which are challenging to both groups of analyses:

- (4) a. ne      nayil              cwuk-ess-ta.  
          you   tomorrow   die-*ess*-Dec  
          'You will die tomorrow.' (= You will be severely scolded tomorrow.)
- b. chelswu-ka      nayil              iltung      hay-ss-ney.  
          Chelswu-Nom   tomorrow   top      do-*ess*-Dec  
          'Chelswu will get the top score tomorrow.'
- c. na icey      yakwu-nun      ta      hay-ss-ta.  
          I   now   baseball-Top   all      do-*ess*-Dec  
          'I cannot play baseball any more.'

Unlike other uses of *-ess*, these sentences express some events or situations that will come in the future. In this respect, this use of *-ess* is different from the past or (present) perfect interpretation. In many cases, these statements are not accepted literally. They are used as a warning or as a sarcastic or exaggerated pessimistic statement.

Despite the diversity of meanings, most Korean linguists assume that there is only one *-ess* and that it has one core meaning. The reason seems to be that there is no formal distinction between the one used as a past tense marker and the one used as a perfect aspect marker. In this paper, however, I claim that *-ess* as a past tense marker is distinguished from *-ess* as a perfect aspect marker, based on various differences in meaning and distribution. To support this claim, the paper discusses some pieces of evidence that *-ess* is at least ambiguous and that one meaning is not derived pragmatically from the other. Next, I account for some apparently exceptional behaviors of the past tense by showing that Korean only has tenses that are relative to the local context. And I define the meanings of *-ess* for various interpretations, which provides indirect evidence that *-ess* is ambiguous between the past tense and a perfect aspect, and also ambiguous between different meanings as a perfect aspect. Finally, I show that the distinction between the past tense and a perfect aspect is always clear in a discourse because the tense is like a topic time in relation to the utterance time, and that, when a topic time changes, it must be indicated clearly by a time adverbial expression.

## 2. Ambiguity of *-ess*

Behind the claim that there is only one core meaning of *-ess* in Korean and that the other meanings are derived pragmatically from it is the assumption that it has only one form.<sup>4</sup> However, we have a lot of expressions that have more than one (semantic, not pragmatic) meaning. In many cases, even though their meanings are given in the language, the meaning of an actual use of an ambiguous expression is determined contextually. This does not mean they are not ambiguous.<sup>5</sup> And if one meaning is associated with one syntactic position and the other with another, they must be claimed to be separate morphemes.

Whether *-ess* is used as a past tense marker or a perfect aspect marker, it is associated with some past situation in most cases. Thus it might be quite natural to try to integrate the two meanings into one. Such an attempt, however, is inappropriate in various respects. More extensive discussion of this issue is made in J-I Yeom (2010). I will briefly summarize it here.

First, when *-ess* is used once in a sentence, the simple past interpretation has a different truth-condition than the (present) perfect interpretation. To express the truth-condition of an interpretation, we need some formal devindi. Rdi-chenbach (1947) uses the notions of reference time, event time, and utterance time. The meanings of a past tense and a perfect aspect se and expressed schematically as follows:<sup>6</sup>

$$\begin{array}{ll} \text{present perfect:} & e < r = u^7 \\ \text{simple past:} & e = r < u \end{array}$$

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<sup>4</sup> Before I make my own claims, it is necessary to set the boundaries of pragmatics. Pragmatics should not be a magic wand or a monster. Not all that is related to contexts is a pragmatic matter. Presuppositions can be projected or not depending on contexts, but presuppositions themselves come from the semantics of expressions or structures. If an expression has two or more meanings, you have to consider the context to decide which meaning the expression has in its actual use. So we have to define what pragmatics can, or cannot, do. Pragmatics adds something to the truth condition and strengthens it, but never changes it in other ways. If pragmatics were assumed to do more than that, there would be no sense in making distinctions between semantics and pragmatics. Only under the strict definition of pragmatics can we make valid argumentations.

<sup>5</sup> Specifically, a marker of an aspect has more than one meaning. In English, the progressive form of a verb is also used to express the future event. One meaning is derived from the other diachronically, but the two meanings are separate synchronically.

<sup>6</sup> More precise definitions of them will be given below. Until then, the schematic system will be adequate.

<sup>7</sup> Klein (1994) assumes the Extended Now Theory and expresses the meaning of the perfect aspect as the relation of  $e \subseteq r$ . This may be necessary to explain the English perfect. In Korean, the result state interpretation of the perfect aspect does not need the extended now. The representation of the present perfect here is given on the basis of the result state interpretation of the perfect aspect.

(r: reference time; e: event time; u: utterance time)

Here, the utterance time *u* is given by the context  $c = \langle a, u, w^* \rangle$ , where *a* is the speaker, *u* the utterance time, and  $w^*$  the actual world. In both cases, the event time precedes the utterance time. The difference is that the reference time is the same as the utterance time in the (present) perfect interpretation, while it is the same as the event time in the simple past interpretation.

The following two sentences can be interpreted either as a past or a present perfect sentence. If *-ess* is a past tense marker, a sentence with it always gets a past interpretation, regardless of what modifiers are involved, and a perfect meaning must add to, not change, the past interpretation. This is what pragmatics does. Their past interpretations are given below. Now let's see if perfective meanings can be derived pragmatically.

(5) a. *chelswu-nun kuttay hakkyo-ey ka-ss-ta.*  
       Chelswu-Top then school-to go-*ess*-Dec  
       'Chelswu went/ {has gone} to school then.'

b. *chelswu-nun cikum hakkyo-ey ka-ss-ta.*  
       Chelswu-Top now school-to go-*ess*-Dec  
       'Chelswu went/ {has gone} to school now.'

(6) a.  $\exists e \exists r [e=r < u \ \& \ \text{go-to-school}(\text{Chelswu})(e)(w^*) \ \& \ r \sqsubseteq \text{then}]$  (past)  
       b.  $\exists e \exists r [e=r < u \ \& \ \text{go-to-school}(\text{Chelswu})(e)(w^*) \ \& \ r \sqsubseteq \text{now}]$

Here (6a) is the normal past interpretation and it is not motivated to be reinterpreted as the present perfect. On the other hand, (6b) is not a normal past interpretation and needs to be reinterpreted as the present perfect. In its past interpretation, Chelswu left for school now and is not at home now, but oddly enough now is before the utterance time. A normal situation for the present perfect is that Chelswu went to school before now and is not at home now. For the proper present perfect interpretation, the event of Chelswu going to school now must be moved to the past before now.

Pragmatic inferences do not change the truth-condition of a sentence, but strengthen it by adding more conditions. On the other hand, if a present perfect interpretation is to be derived from the past interpretation, the event time must be moved. This means a different event is involved in the truth condition: an event at time *t* is different from an event at *t'* ( $t \neq t'$ ). You have to change the truth condition that there is a certain event at a certain time in this world into the truth condition that there is a different event of the same property at a different time in this world. This is not the strengthening of the original proposition, but the changing of the truth condition. This shows that the present per-

fect interpretation is not derived pragmatically from the past interpretation.

Now (7a) is the normal present perfect interpretation.<sup>8</sup> Let's see if the past interpretation is pragmatically derived from the perfect interpretation.

(7) a.  $\exists e \exists r [e < r = u \ \& \ \text{go-to-school}(\text{Chelswu})(e)(w^*) \ \& \ r \subseteq \text{now}]$   
(present perfect)

b.  $\exists e \exists r [e < r = u \ \& \ \text{go-to-school}(\text{Chelswu})(e)(w^*) \ \& \ r \subseteq \text{then}]$

(7b), however, is not quite natural. Yesterday is the utterance time, and Chelswu went to school before yesterday. A first attempt to remedy this wrong interpretation is to interpret the sentence as a past perfect, because *-ess* must be rigorously a perfect aspect marker.

(7b')  $\exists e \exists e' \exists r [e < e' = r < u \ \& \ \text{go-to-school}(\text{Chelswu})(e)(w^*) \ \& \ r \subseteq \text{then}]$

This is about what the situation is like at the time of *r*, and asserts that there is a situation *e'* at that time. In the example above, the sentence means that at the time of  $r \subseteq \text{then}$ , Chelswu was not there since he had gone to school before. This is not a normal past tense meaning. If the sentence is to get the ordinary past tense meaning pragmatically, we have to *add* the meaning that the sentence is about the time of the event *e*. However, this cannot be added to the past perfect interpretation because the same sentence can be about the time of *r* and about the time before that simultaneously. The only way to get the normal past tense meaning is to *change* the reference time *r* to the time of event *e*. This is not what pragmatics does. The idea that a past interpretation is derived from a perfect interpretation is a pre-theoretical way of thinking which is misguided by something that is apparently shared by the two interpretations.

Additionally, a reference time is a topic time, and it is not arbitrarily moved:

(8) ?? chelswu-nun ecey nemeci-ese tali-ka pwuleci-ess-ta.  
Chelswu-Top yesterday fall-and leg-Nom break-ess-Dec  
  
kulenty cikum ttena-ss-e.  
nevertheless now leave-ess-Dec

'Chelswu fell down and broke his leg yesterday. Nevertheless he has left.'

The first sentence is about yesterday's event. The topic time is the past. The

<sup>8</sup> (5a) is not usually interpreted as a perfect, but it is observed that a past time adverbial can be used in a present perfect, as pointed out in Giorgi and Pianesi (1998). (5a) can be uttered to explain why Chelswu is not at home now, supposing that there is an occasion in which Chelswu has to spend three days and nights at the school and the addressee forgets it.

second sentence is also expected to be about the past. The second sentence is apparently about now, but it is implied (actually presupposed, which will be clear soon), that there was an event in the past of leaving despite his injury. Pragmatically the sentence could be reinterpreted as talking about the time of the event. But the whole discourse is odd.<sup>9</sup> This shows that we need a statement about the past, not a statement about the present which implies a past event. This shows that the reference time is not moved arbitrarily.<sup>10</sup> That is, a past meaning is generally not derived pragmatically from a perfect meaning.

Second, in the result state interpretation of *-ess*, the past event is just a presupposition, not part of the assertion.

- (9) A: chelswu-nun cikum hakkyo-ey ka-ss-e.  
 Chelswu-Top now school-to go-*ess*-Dec  
 'Chelswu has gone to school.'
- B: anya, tolao-ass-e./??kulay, haciman tolao-ass-e.  
 no return-*ess*-Dec/yes but return-*ess*-Dec  
 'No, he has come back./Yes, but he has come back.'

In (9), B's *anya* 'no' negates the present state of being at school, not the existence of the event of going to school in the past. If B says "yes" and that Chelswu has come back, there arises a contradiction. As will be discussed below, the presupposition entails the existence of a state like the one in the assertion in the perfect interpretation. There are cases when the negation of an assertion leads to the negation of the presupposition, unlike ordinary presuppositions.

- (10) A: chelswu-nun cikum sangca 10 kay mantul-ess-e.  
 Chelswu-Top now box 10 pieces make-*ess*-Dec  
 'Chelswu has made 10 boxes.'
- B: anya, 9 kay mantul-ess-e.  
 no 9 pieces make-*ess*-Dec  
 'No, he has made 9.'
- B': anya, hana-ka mangkaci-ess-e.  
 no one-Nom break-*ess*-Dec  
 'No, one has broken down.'

<sup>9</sup> If the sentence sounds fine, it is with the interpretation that the event of leaving occurred in the time interval denoted by *cikum* 'now.' This is not the meaning intended here.

<sup>10</sup> It might be thought that determination of a reference time is just a pragmatic matter, but this is not the case. Rather it determines the assertion of a sentence with respect to what event holds at what time.

When the assertion is negated by *anya* in B's statement, the presupposition which entails the assertion is also negated.<sup>11</sup> What is more important is that only the assertion can be negated, as in B's statement, despite the use of *anya* 'no.' This only negates the current state of having 10 boxes, maintaining the presupposition that there was an event of making 10 boxes.

When it is not overtly mentioned in a sentence, the presupposition is not referred to in a later statement. In a perfect interpretation, the past event cannot be referred to by a pronoun.

- (11) A: chelswu-nun cikum hakkyo-ey ka-ss-e.  
 Chelswu-Top now school-to go-ess-Dec  
 'Chelswu has gone to school.'

B: ??kuke(s)-i encey-(i-n)ya?  
 it-Nom when-be-Int  
 'When was it?' (it = the event of going to school)

In (11), the pronoun *kukes* 'it' is intended to refer to the event of going to school in the past, but its use is odd.

The fact that in a perfect interpretation the existence of the past event is a presupposition is a problem for those who claim that *-ess* has only one meaning and the other meaning is derived pragmatically. It is a problem with analyses that take *-ess* as a past tense marker. The past event should be asserted and referred to by a pronoun, which is not the case. This is also a problem with analyses that take *-ess* as a perfect aspect marker. Pragmatic considerations do not change a presupposition into an assertion. Presuppositions and assertions are grammatically/semantically different.

Third, the past interpretation of *-ess* is observed in almost all verbs, but a perfect interpretation may, or may not, be allowed, depending on what aspectual type the interpretation is. Even when a perfect interpretation is allowed, a verb of a different aspectual type shows a different interpretation. Here three verbs are illustrated: *ttena*, *kongpwuha*, and *phikonha* are achievement, activity, and state verbs respectively.

- (12) a. chelswu-nun ku-ttay ttena/kongpwhay/phikonhay-ss-ta.  
 Chelswu-Top it-time leave/study/tired-ess-Dec  
 'Chelswu left/studied/ {was tired} then.'

<sup>11</sup> One reviewer says that it is weird that a presupposition entails the assertion. I am saying that it is one peculiarity of *-ess* in a perfect interpretation (more specifically, a result state interpretation).



- b. chelswu-nun cikum ttena/kongpwuhay/??phikonhay-ss-ta.  
 Chelswu-Top now leave/study/tired-*ess*-Dec  
 'Chelswu {has left} / {has studied} / {is tired} (now).'
- c. chelswu-nun cikum-kkaci ??ttena/kongpwuhay/phikonhay-ss-ta.  
 Chelswu-Topnow-until leave/study/tired-*ess*-Dec  
 'Chelswu {has left} / {has been studying} / {has been tired} so far.'

In (12a), *-ess* gets a past interpretation. Note that all the three verbs are allowed in this interpretation. In (12b) and (12c), *-ess* gives rise to a result state and continuity interpretation respectively. Here, however, a state verb and an achievement verb do not get a result state and a continuity interpretation respectively. This shows that the past interpretation is not constrained by any aspectual factor, while the other interpretations are. This is exactly what is expected when past interpretations and perfect interpretations are independent. As will be shown below, telic predicates and atelic predicates give rise to different perfect interpretations, and regardless of what perfect interpretation a predicate has, it always has the past interpretation. It provides another reason for distinguishing the past interpretation from the other interpretations.<sup>12</sup> This can be a more serious problem for those who take *-ess* to be a perfect aspect marker, because sometimes past interpretations should be derived from perfect interpretations which are not acceptable.

Fourth, when some predicates get result state interpretations as perfect interpretations, they become individual-level predicates. This is a fundamental difference. Perfect predicates are, in general, not allowed to be used in generic sentences, but these predicates become inherent generic predicates.

- (13) a. chelswu-nun halapeci-lul talm-ass-ta.  
 Chelswu-Top grandfather-*Acc* resemble-*ess*-Dec  
 'Chelswu resembles his grandfather.'
- b. kay-tul-un kho-ka paltalhay-ss-ta.  
 dog-Pl-Top nose-Nom develop-*ess*-Dec  
 'Dogs have good senses of smell.'

<sup>12</sup> One reviewer says that previous analyses can explain that perfect interpretations are pragmatically affected while past interpretations are not. What I am saying is that the pragmatics such analyses assume is not what pragmatics is defined to be in linguistic literature. This is what I am showing in this paper. If anyone assumes just one *-ess* and gets two interpretations which have different truth-conditions, then the assumption is wrong. Another reviewer claims that seeing that perfect interpretations are restricted in this way, perfect interpretations are not real. However, it is quite natural and expected that they are restricted in this way, when *-ess* is an aspect marker. There must be some interaction between the semantic property of the perfect aspect and aspectual features of the verbs it comes with. This is really the evidence for claiming that the perfect interpretation of *-ess* is real in Korean. The same restrictions are observed in other languages which have overt established forms of the perfect aspect.

One important fact is that these predicates do not presuppose past events. Since there are no past events, these readings do not come from, or change into, past interpretations pragmatically. These individual-level predicate interpretations are independent of past interpretations. If any analysis claims that one interpretation is derived from the other pragmatically, such pragmatics is just impossible.

So far, I have shown that the past tense interpretation of *-ess* is not pragmatically derived from a perfect aspect interpretation or vice versa. This may not be simple ambiguity. In Korean, *-ess* can be used twice continuously. In many cases, it is necessary to express a past result state when a perfect meaning is also expressed by one *-ess*.

- (14) a. eli-ess-ul        ttay    chelswu-nun    emma-lul    talm-ass-ess-ta.  
          young-ess-Rel   time   Chelswu-Top   mom-Acc   resemble-ess-ess-Dec  
          ‘When he was young, Chelswu resembled his mom.’
- b. kuttay-nun    kenmwul-i    maywu    nalk-ass-ess-ta.  
          then-Top    building-Nom   very    old-ess-ess-Dec  
          ‘At that time the building was very old.’

In these two examples, the first *-ess* definitely yields a result state interpretation. Otherwise, the predicate would not become an individual-level predicate. Then the past tense interpretation comes from the second *-ess*.<sup>13</sup>

These examples clearly show which one is the perfect aspect marker and which one the past tense marker. It is not the case that the one morpheme *-ess-ess* makes the VP an individual-level predicate and the past event property at the same time.

If the two morphemes have the same meaning, we have no reason for using the same morpheme twice. And why do we not find an example in which it is used more than twice?<sup>14</sup> In this paper, I claim that there are at most two *-ess*’s in

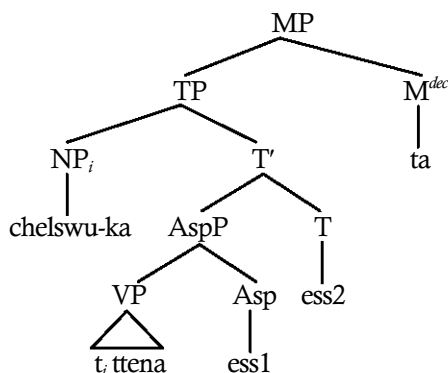
<sup>13</sup> There are some analyses where “*-ess-ess*” is just one morpheme which expresses the aspect of discontinuity. However, this is not the case:

(i) chelswu-nun    kuttay-to    nulk-ess-ess-ta.  
      Chelswu-Top   then-also   old-ess-ess-Dec  
      ‘Chelswu was old then too(, as he is now).’

ku-ttay-to ‘... then too’ implicates that Chelswu is old now. The state of Chelswu being old continues to hold till now.

<sup>14</sup> One reviewer says that it is possible to repeat *ess* more than twice, because when we want to emphasize an event occurred long time ago, we do so. However, this should be taken as playing with words. A verb with six *-ess*’s does not express twice as remote past as with three *-ess*’s. Korean has a word *cemcem*, which expresses continuous increasing or decreasing change of degree. We can also say *cemcemcem* or more than three *cem*’s. It does not have to be an even number of *cem*’s, even though we do not have one *cem* as a word in this meaning. Other examples are *ha-tetel.... ma* ‘Don’t do ...!’, *cwukwucanhangchang...* ‘steadfastly,’ *(ko)kolkol...* ‘de-

a row, because they are structurally constrained. In a main clause, there are only two positions for *-ess*, as shown below. And in section 3 I will explain why *-ess* can be used at most twice even in embedded contexts. Thus, it is reasonable to take the first *ess1* of *-ess-ess* to be a perfect aspect marker and the second *ess2* to be the past tense marker. I assume that they occur at different syntactic positions:



I assume that a subject starts from within the VP. The structure seems general enough to be considered universal. Von Stechow (2002) and Portner (2003) also assume the same structures for English and other languages. Since *ess1* and *ess2* are separate morphemes and take two different syntactic positions, their meanings must be different. A more precise definition of their meanings will be given below, and I will give their rough meanings here. These meaning relations and meaning compositions are also the motivation for assuming the structure above. A VP denotes a property of events. A verb takes ordinary participants as its arguments within VP. But it only denotes a property of an event. A VP like *John leave* is the property of the events of John's leaving. John's leaving a year ago has this property, but John's marrying a girl six months ago does not have this property. If *John left yesterday* is true, it means that there is an event yesterday in the actual world which has the property of John's leaving. We know that if a specific event is determined, the time is also determined. This relation is captured by the aspect. An aspect takes a property of events from the VP and yields a property of times: an aspect takes the meaning of a VP and yields a function *f* from a set of times to a set of functions which take a possible world to yield a truth-value. If the aspect is imperfective, it determines a time which is in the middle of each event time which has the property of the VP. If the aspect is the perfect which expresses a result state, it determines a

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bilitated,' *simsimsim...hay* 'bored,' etc. Someone might not like the last one, but you can find uses of it on the Internet.

time in which the result state of each event has the property of the VP. TP is the structure which provides the time and MP the structure which provides the possible world. The denotation of an AspP takes these two as arguments, so MP gets a truth-value. That is, the tense simply refers to a reference time which is the input into the function *f*. Thus, we get a function from a set of possible worlds to a set of truth-values. Finally, the head of a MP provides a possible world and yields a truth-value.<sup>15</sup>

When an overt tense marker or an overt aspect marker is missing, we assume that there is an empty tense marker  $\phi_2$  or an empty aspect marker  $\phi_1$ . This is necessary once we assume the structure above: technically, if any one element in the structure is missing, no truth-value comes out. An empty aspect maps events to times of whole events. An empty tense places the time designated at the contextually given time. In the discussions below, I sometimes point out the empty aspect or the empty tense just for convenience, but this does not mean that they are optional: they are always required.<sup>16</sup>

### 3. Tense in Korean and Meaning of *ess2*

In Korean, there is seemingly a piece of evidence against the claim that Korean has the past tense.<sup>17</sup> Suppose that the following statement is uttered as a reason for thinking that Chelswu will be tired tomorrow afternoon:

- (15) chelswu-nun achim-ey inchen-ey ka-ss1-ess2-{ul kes}-i-ta.  
 Chelswu-Top morning-at Inchen-to go-Prf-Pst-will-be-Dec  
 'Chelswu will have been to Inchen tomorrow morning.'

In this example, *ul kes* expresses futurity or epistemic modality. The question is how *-ess2* occurs with the marker of the future when it is a past tense marker. To explain how *-ess2* can occur with *ul kes*, I need to show that Korean has only relative tenses. First, look at English tenses:

- (16) a. He was the winner.  
 b. John thought he was the winner.

<sup>15</sup> Actual interpretations are illustrated in the Appendix.

<sup>16</sup> I have claimed that (5b) is ambiguous depending on whether *-ess* is a past tense marker or a perfect aspect marker. If *-ess* is one of the two, then the other is empty. The two interpretations are given in the Appendix.

<sup>17</sup> K-S Nam (1972) claims on the basis of a similar example that *-ess* is a perfect aspect marker, but this can be no evidence for claiming the grammatical status of *-ess*.

In (16b) the past time of being the winner is the same as that of John's thinking. Note that the verb form is the same as the form used in the matrix clause. In English, a past event or state can be expressed by a past tense, regardless of whether it is embedded in a past tense matrix clause or not.

In Korean, on the other hand, a past event or state is expressed by a past tense in the matrix clause, while it is expressed by a present or empty tense in a clause embedded in a past tense clause:

- (17) a. chelswu-nun pang-i tep- $\emptyset$ 2-ta-ko sayngkakhay-ss2-ta.  
Chelswu-Top room-Nom hot-Prs-Dec-Cmp think-Pst-Dec  
'Chelswu thought the room was hot.'
- b. chelswu-nun pang-i tep-ess2-ta-ko sayngkakhay-ss2-ta.  
Chelswu-Top room-Nom hot-Pst-Dec-Cmp think-Pst-Dec  
'Chelswu thought the room was hot.'

The matrix verb *sayngkakhay* is used with the past tense marker *-ess2*. In this case, the embedded verb *tep* is used without the past tense marker to express the state at the same time as the time of thinking. When the embedded verb is used with *-ess2*, it expresses a state before the time of Chelswu's thinking. The time of an event or a state in an embedded clause is interpreted with respect to the time of the event/state in the matrix clause. If the embedded clauses are used as matrix clauses, they are interpreted with respect to the utterance context, which includes the utterance time. This shows that in Korean, a tense is interpreted with respect to the local context. It is necessary to show how this works.

Before we do this, I need to give the meaning of *ess2*.<sup>18</sup> Suppose that a sentence is interpreted in a local context  $c = \langle a, t, w \rangle$  and an assignment  $g$ . Partee (1984), Heim (1994) and Kratzer (1998) assume that a tense is like a pronoun: its value is given by an assignment with the presupposition that its value precedes the time given by the local context:

- (18)  $[[\text{ess}_i]]^g_{\langle a, t, w \rangle} = g(i)$  if  $g(i) < t$ ; otherwise undefined.

Since the reference of a tense is given by an assignment  $g$ , a tense shows

<sup>18</sup> According to Lewis (1980), an utterance context can be expressed as a triple  $\langle a, u, w^* \rangle$ , where  $a$  is the speaker,  $u$  the utterance time and  $w^*$  the actual world. Here the addressee can be determined from the utterance context. In a sentence more than one context may be involved and one context may be embedded in another. In an embedded context  $\langle a, t, w \rangle$ ,  $a$  is the person who the agent involved thinks is himself or herself, and  $t$  the time with respect to which the embedded verb is interpreted, and  $w$  the world with respect to which the embedded clause is interpreted. The interpretation of a tense is primarily interpreted with respect to a local context, but is indirectly affected by the embedding context.

anaphora and the assignment gives the same time to a variable with the same index. Moreover, the tense of an embedded clause can be bound by that of an embedding clause.

Now take a look at how a complement clause is interpreted with respect to a propositional attitude verb in past tense. The following is the interpretation of (17a) with the contexts of interpretation added.

$$(17a') \llbracket \text{chelswu-nun } \lambda \langle x, t, w \rangle [\text{pang-i tep-}\phi_i\text{-ta-ko}]^{\langle x, t, w \rangle} \text{sayngkakhay-ss2-ta} \rrbracket^{\text{gc}, \langle A, u, w^* \rangle}$$

Here *sayngkakhay-ss2* ‘thought’ is interpreted with respect to the utterance context  $\langle A, u, w^* \rangle$  and an assignment  $g_c$ . The past tense *ss2<sub>j</sub>* is interpreted with respect to the utterance time  $u$ . That is,  $\llbracket \text{ss2}_j \rrbracket = g_{\langle u \rangle} = t'$  if  $t' < u$ ; otherwise undefined. The propositional attitude verb *sayngkakhay* is a universal quantifier over contexts with respect to which the embedded clause is interpreted. ed rwiss of the set theory, the mitning of *chelswu-nun sayngkakhay* is that the set of contexts  $\langle x, t', w \rangle$  which are compatible with what Chelswu thought at  $t'$  is a subset of the set of contexts with respect to which the complement clause is true. And the interpretation of the complement clause is a set of contexts with respect to which the complement clause is true. ed interpreting the complement clause,  $\phi_{2_i}$  is assigned the same time as  $t$  in the local context, and *-ta* in the embedded clause refers to the world  $w$  given by the local context  $\langle x, t, w \rangle$ .

$$\begin{aligned} & \llbracket \text{chelswu-nun } \Phi \text{ sayngkakhay-ss2-ta} \rrbracket^{\text{gc}, \langle A, u, w^* \rangle} \\ &= \{ \langle x, t', w \rangle \mid w \text{ is compatible with what Chelswu thought at } t' (< u) \text{ in } w^*, \\ & \text{believing } x \text{ to be himself} \} \subseteq \llbracket [\Phi] \rrbracket \\ & \llbracket [\text{pang-i tep-}\phi_i\text{-ta-ko}] \rrbracket = \{ \langle x, t, w \rangle \mid \text{Chelswu believes } x \text{ to be himself, the} \\ & \text{room is hot at } t \text{ in } w \} \end{aligned}$$

The whole sentence is true iff the set of contexts which are compatible with what Chelswu believes is a subset of the set of contexts w.r.t. which the complement clause is true. This has the effect of  $t'$  binding  $t$ : that is, the room is hot at  $t'$ . In sum, the utterance context  $\langle A, u, w^* \rangle$  determines that the event time of Chelswu’s thinking is  $t'$  ( $< u$ ). *tep- $\phi_i$*  is interpreted with respect to  $t'$  and the event time of being hot becomes the same as  $t'$ . This is how the main context affects the interpretation of a tense in an embedded clause.

This can be compared with the following example, where the main clause has an empty tense.

$$(19) \begin{array}{lll} \text{chelswu-nun} & \text{cikum pang-i} & \text{tep-}\phi_1\text{-}\phi_2\text{-ta-}\{\text{nun kes}\}\text{-ul} \\ \text{Chelswu-Top} & \text{cikum room-Nom} & \text{hot-}\phi_1\text{-}\phi_2\text{-Dec-Cmp-Acc} \end{array}$$

kkaytal-ass1- $\phi$ 2<sub>j</sub>-ta.  
realize-Prf- $\phi$ 2<sub>j</sub>-Dec

‘Chelswu has realized that the room is hot.’

The time of realizing (and as a result, knowing) that the room is hot is the same as the utterance time because of the empty tense. Then the complement clause is also interpreted with respect to the utterance time. It also has the empty tense and the time of being hot becomes the same as the time of (realizing and) knowing the fact. Notice that aspect does not play a role in determining a local context.

I have shown that a tense is interpreted with respect to a local context. Let’s go back to example (15):

- (15) [[chelswu-nun  $\lambda$ <t,w>[achim-ey inchen-ey ka-ss1-ess2<sub>i</sub>]<sup><t,w></sup>-{ul kes}-i-ta]]<sub>GC, <A,u,w\*>19</sub>

*ul kes ul kes-i-ta* itself is interpreted with respect to the utterance context, but it is also a universal quantifier over a set of pairs of a time and a possible world each of which provides a local context <t,w> for the interpretation of *achim-ey inchen-ey ka-ss1-ess2*. In the local context the person is omitted because the modal operator *ul-kes* is like a raising verb. Note that -ess2<sub>i</sub> is interpreted with respect to the local context introduced by *ul kes*. The local context is the future with respect to the utterance context. The situation is quite similar to the following:

- (20) chelswu-nun      yenghi-ka      phikonhay-ss2-ta-ko  
Chelswu-Top      yenghi-Nom      tired-Pst-Dec-Cmp  
sayngkakha-{ul kes}-i-ta.  
think-will-be-Dec  
‘Chelswu will think Yenghi was tired.’

The modal marker *ul kes* moves the reference time to the future, which provides the time in the local context for the interpretation of the embedded clause. So the past tense in the embedded clause is interpreted w.r.t. the future time. The state of being tired may be in the future with respect to the utterance time, despite the use of (*e*)ss2.

<sup>19</sup> In the representation, *ul kes* is embedded in the utterance context. Then it is expected to have another tense after *i* ‘be.’ However, when *ul kes* is used a modal marker, it does not occur with the past marker -ess2 in general. It needs some explanation, but I will leave it for another paper.

The explanation here predicts that a tense can occur in an embedded clause only when there is an operator which introduces a local context. In the main context, the utterance context is introduced for the interpretation of the tense and mood of the whole sentence. A tense in an embedded clause can be interpreted with respect to a local context, which is introduced by a modal operator like the futurity expressed by *ul kes* or a propositional attitude verb. Therefore, the sequence of *-ess-ess-ul kes* is quite natural, even though *-ul kes* has the effect of shifting the time referred to by a tense. Proper interpretation of a tense requires a context, not another tense. Therefore no more than two *-ess*'s can occur in Korean.

#### 4. Meaning of *-essI*

When we divide the meanings of *-ess* into the past interpretation and the other interpretations, the meanings other than the past interpretation are not congruent. There seem to be several interpretations of *-essI* in Korean. But we have to have some criteria for deciding whether an interpretation belongs to one of the perfect interpretations. The past involves an event or a situation which occurs before **now**. Then a natural criterion is whether an event or a situation expressed with *-essI* involves some time within the time span of **now**. Therefore we need to discuss what **now** denotes.

A progressive sentence is about the utterance time **now**, but it does not necessarily refer to the time when an utterance is made:

- (21) na cikum etten sosel-ul ssu-ko iss-e.  
 I now some novel-Acc write-and be-Dec  
 'I am writing a novel now.'

At the moment of uttering the sentence, the speaker is just talking, but the speaker has some longer time as the referent of **now** in mind, during which he or she is writing a novel. Even when a sentence is not progressive, the speaker has a specific time in mind as the time referred to by **now**:

- (22) A: i il-ul kkuthnay-n-ta-ko hay-ss-ci?  
 this job-Acc finish-Prg-Dec-Cmp do-Pst-Int  
 'You said you would finish the job, didn't you?'  
 B: kkuthnay-ss-e.  
 finish-ess-Dec  
 'I have finished it.'



- A: *cikum hay-ss-ci anh-a.*  
       now do-Prf-Nml not-Dec  
       ‘You have done it now.’

Here speaker A thinks that the job should have been done in the past, not **now**. This implicates that the speaker has some length of time including the moment of utterance in mind. If a sentence uses *-ess* and the event involves the time interval **now**, it can be taken to express a perfect aspect.

The time **now** can vary with the sentences it occurs in. When a situation expressed is in the future, **now** seems to be a time yet to come.

- (23) *na cikum ka-lke-ya.*  
       I now go-will-Dec  
       ‘I am going now.’

Despite the use of *cikum* ‘now’, the sentence is about the future. This shows that the time **now** may extend to the future. Even if *cikum* can refer to different ranges of time, the meaning of *cikum* should be the same all the time. So I assume that it always includes the moment of uttering the sentence. If the event or state in a sentence is before the utterance time, the moment of utterance is the ending point of **now**. If the event or state is after the utterance time, it becomes the starting point. The time beyond the beginning or ending point is not relevant. In any case I assume that the utterance time is included in it. So there are three possible references of **now**:

- (---u)--->  
 ---(-u-)--->  
 ---(u---)--->

The second understanding of **now** is taken when it is asserted that an event or a state is in progress at the utterance time.

We are concerned with past or perfect sentences. They are related to the time before the utterance time, rather than the time after. So *cikum* ‘now’ is assumed to refer to some time which ends with the utterance time. In this section, I discuss three typical interpretations of the perfect in Korean.

#### 4.1. Perfect in Result State Interpretation

When *ess* is used to refer to the result state of an event, it is difficult to explain in terms of time. To explain this use of a perfect, Portner (2003), assuming McCoard’s (1978) Extended Now Theory, extends **now** to the extent that **now** covers the entire time in which the relevant event happened and in which

the result state holds.<sup>20</sup> However, this idea is not appropriate for the result state interpretation of the perfect in Korean. Let's take a concrete example. When a predicate is telic, it is natural for its perfect use to denote the result state of the relevant event.

- (24) chelswu-nun cikum hakkyo-ey ka-ss1- $\phi$ 2-ta.  
Chelswu-*Top* now school-to go-*Prf*- $\phi$ 2-*Dec*  
'Chelswu has gone to school now.'

---==++(+++u)--->

(u: utterance time, ( ): now, ==: event of going to school,  
++: result state)

More precisely, the sentence is about the time in which the result state holds. The moment of the utterance is included in the time of the result state. If we accepted the Extended Now Theory, **now** would have to be extended as follows:

---==++(+++u)--->  $\Rightarrow$  ---(==+++++u)--->

That is, **now** would include the event time of going to school. This must not be the case. Consider the following example in which B is making some boxes:

- (25) A: cikum myech kay mantul-ess1- $\phi$ 2-nya?  
now how+many piece make-*Prf*- $\phi$ 2-*Int*  
'How many boxes have you made?'

B: 5 kay mantul-ess1- $\phi$ 2-e.  
5 piece make-*Prf*- $\phi$ 2-*Dec*  
'I have made 5.'  
(after a while)

A: cikum-un myech kay mantul-ess1- $\phi$ 2-nya?  
now-*Top* how+many piece make-*Prf*- $\phi$ 2-*Int*  
'How many have you made?'

<sup>20</sup> The Extended Now Theory is discussed in Bennett and Partee (1978), Dowty (1979), Vlach (1993), Spejewski (1996), Anagnostopoulou et al. (1997), Iatridou et al. (2001). Stump (1985) proposed the notion of perfect interval, as defined below:

(i)  $\text{perf}(t) =: \exists t' [t' \subseteq t \ \& \ t' \prec \text{now}] \ \& \ \neg \exists t'' [t'' \subseteq t \ \& \ \text{now} \prec t'']$

The notion of perfect interval is not adequate for result state interpretations, but it is a useful notion for continuity interpretations, which will be discussed next.

- B: cikum-un 10 kay mantul-ess1- $\phi$ 2-e.  
 now-Top 10 piece make-Prf- $\phi$ 2-Dec  
 'I have made 10.'

Speaker A asks twice how many boxes B has made. In asking the second question, *cikum* 'now' must not include the time it takes to make the first five boxes. The use of *un*, which is a contrastive topic marker here, attached to **now**, indicates that the two periods of time referred to by *cikum* in A's two questions must be disjoint. On the other hand, the number of the boxes B made is cumulative. This implies that *cikum* in the second question does not refer to any time during which any of the 10 boxes are made, but to some time after B made 10 pieces. That is, *cikum* refers to some time in which the result state holds. This shows that **now** does not include the event time in the past. This observation is related to the fact that in the result state use of a perfect, the past event is just a presupposition, not part of the assertion.

A more extreme case is where a predicate becomes an individual-level predicate together with *-ess1*. In such cases, there are no previous events which give rise to the result states:

- (26) a. chelswu-nun halapeci-lul talm-ass1- $\phi$ 2-ta.  
 Chelswu-Top grandfather-Acc resemble-Prf- $\phi$ -Dec  
 'Chelswu resembles his grandfather.'  
 b. chelswu-nun chengkak-i paltalhay-ss1- $\phi$ -ta.  
 Chelswu-Top hearing-Nom develop-Prf- $\phi$ -Dec  
 'Chelswu has good auditory sense.'  
 c. +++(+++u)+++--> (+++: result state)

In these examples, there are no previous events which give rise to the resulting states. Therefore, it is not reasonable to extend **now** so that it can cover the time of previous events.

Now we can give the meaning of *ess1* as a perfect marker in a result state interpretation:

the meaning of *ess1* in a result state interpretation:

$[[ess1]] = \lambda P \lambda t \lambda w \exists Q \exists e' [\{ \exists e [\tau(e) < t \ \& \ P(e)(w)] \} \ \& \ \tau(e') = (t) \ \& \ Q(e')(w)]$ , where

- i.  $t = (t' : t'')$  iff  $t$  begins with  $t'$  and ends with  $t''$ ; if  $t'$  (or  $t''$ ) is missing,  $t$  begins (or ends) with an arbitrary time.
- ii.  $P$  entails  $Q$ .

Here the term of entailment is used with predicates, not with propositions. There is a reason for that. It can be understood as follows: P entails Q iff for any time  $e$  and possible world  $w$ , if  $P(e)(w)$  at  $\tau(e)$ , then for some  $e'$  such that  $\tau(e) < \tau(e')$ ,  $Q(e')(w)$ . One additional condition above is that the state must hold at the utterance time as well. Q is a predicate entailed by P, but when there is an event of the property P before the utterance time, a result state of the property Q follows, but it does not necessarily hold at the utterance time. This is additionally necessary in the perfect interpretation. We have seen cases where a perfect in a result state interpretation may not presuppose a previous event. This may be due to the relation between P and Q. If P entails Q and an actual event of P exists, then an actual state of Q exists. But if P entails Q and a actual state of Q exists, it is not necessarily the case that an actual event P exists. This reasoning opens the possibility that the presupposition that  $P(e)(w)$  is not satisfied.<sup>21</sup>

In the meaning of *ess1* in a result state interpretation, it might be suggested that the notion of *cause* be used, instead of entailment.<sup>22</sup> The following example shows that a more strict notion is necessary:

- (27) chelswu-nun cikum phikonha- $\phi$ 1- $\phi$ 2-ta. achim-ey  
 Chelswu-Top now tired- $\phi$ 1- $\phi$ 2-Dec morning-at  
 inchen-ey ka-ss1-ess2-e.  
 Inchen-to go-Prg-Pst-Dec

‘Chelswu is now tired. He went to Inchen this morning.’

It is taken to be the cause for Chelswu being tired that he went to Inchen in the morning, but it does not entail his tiredness. An entailment from Chelswu going to Inchen is just that he was in Inchen (and was not here). The direct result state ended when he came back. This requires the use of *ess2*.<sup>23</sup>

We are assuming that an aspect marker is attached to a VP and makes the predicate a stative predicate. This implies that a perfect in a result state inter-

<sup>21</sup> There may be more than one state entailed by one event. The meaning of *-ess1* itself does not determine which state Q is. It only provides a set of result states, and the context determines which state is relevant. This should not be part of the meaning. It is just a general principle in language use.

<sup>22</sup> The definition of *cause* is discussed in Lewis (1973) and Dowty (1979).

<sup>23</sup> There are some discussions about what result states are, but there seems to be no attempt to account for the relation between a previous event and the result state on the basis of entailment. Inoue (1979) tried to capture it as relatedness to the present topic. Smith (1992) tried to capture a result state as the subject having a certain property. Moens and Steedman (1988) took a result state to be a certain contingent state related to the present situation. It seems that different types of result states are involved in the use of a perfect in result state interpretation across languages.

pretation is used only to describe the state of the subject. This is corroborated by the following examples:

- (28) a. ku ywulichang-un chelswu-ka kkay-ss-e.  
           the window-Top Chelswu-Nom break-Pst-Dec  
           ‘Chelswu broke the window.’  
       b. ku ywulichang-un kkay-ci-ess-e.  
           the window-Nom break-Pss-Prf-Dec  
           ‘The window is broken.’

The active does not describe the state of the object even if it is marked with a topic marker. In contrast, the passive describes the state of the logical object, which now occurs at the position of the subject. This is not related to the distinction between actives and passives. When an agent is missing and the object becomes the topic, the sentence can describe the state of the object:

- (29) a. ku kakey-nun cikum mwun-ul yel-ess-e.  
           the store-Top now door-Acc open-Prf-Dec  
           ‘The store is open now.’  
       b. ku yelsoy-nun cikum ilh-e peli-ess-e.  
           the key-Top now lose-and throw-Prf-Dec  
           ‘The key is lost now.’

The two verbs in these examples are not passive, but the logical subjects are not overtly expressed and the objects become topics. In these cases, the sentences can express the states of the logical objects. Assuming the logical subjects stay in the VPs if they are empty, this can be explained by the analysis here.

Predicates can be classified into four groups: accomplishment, achievement, activity, and state. A perfect in a result state interpretation can be observed with accomplishment and achievement predicates. It is because they give rise to result states after the events are finished. Activity and state predicates are not telic, so result states are not defined naturally. This explains why the following does not have a natural result state interpretation:

- (30) ??chelswu-nun cikum kicha-lul kitali-ess-ta.  
           Chelswu-Top now train-Acc wait-Prf-Dec  
           ‘Chelswu has waited for a train.’

*kitali* is an activity verb. It does not have any characteristic result state, so it is not used to describe a result state of the event. We can say the same thing

about verbs like *kongpwuha* ‘study,’ *talli* ‘run,’ etc.<sup>24</sup>

#### 4.2. Perfect in Continuity Interpretation

A perfect in a continuity interpretation cannot be characterized by the situation it denotes, but it is more appropriately characterized by the time a situation holds. In this respect, Stump’s (1985) notion of a perfect interval, whose definition is given in fn. 20, seems to be a necessary notion for this interpretation. But we cannot say that **now** itself is extended: **now** is not used with this interpretation:

- (31) na-nun cikum hayngpokha- $\{\phi/*ess\}$ -ta.  
 I-Top cikum happy- $\{\phi/ess\}$ -Dec  
 ‘I am happy now.’

The state of being happy holds all the time during the time denoted by *cikum*. For this reason, a state predicate with *-ess* cannot come with *cikum*.<sup>25</sup> And even if the same state holds before **now**, it is not relevant to the statement. Any additional state of being happy can be relevant only if the time span is extended to cover the state. For this reason, state predicates can be used with *-ess1* only when the time span is extended into the past:

- (32) a. chelswu-nun ??cikum/cikum-kkaci hayngpokhay-ss-ta.  
 Chelswu-Top now/now-until happy-Prf-Dec  
 ‘Chelswu has been happy now/ {so far}.’  
 b. chelswu-nun cikum/cikum-kkaci hayngpokha- $\phi1-\phi2$ -ta.  
 Chelswu-Top now/now-until happy- $\phi1-\phi2$ -Dec  
 ‘Chelswu has been happy now/ {so far}.’

The expression *cikum-kkaci* implies that the time in question extends to the past. Thus the use of *-ess1* is licensed by the state in the past. In the second example, however, *cikum-kkaci* does not require *-ess1*. Then we have to check if the state can hold during the time referred to by *cikum* ‘now.’

<sup>24</sup> When something like *sey sikan-ul* ‘for three hours’ is added, the sentence becomes fine because the aspect of the VP becomes telic.

<sup>25</sup> This is characteristic of *cikum*. Other time adverbials are different in that a state holds during some parts of the times they denote:

(i) na-nun onul hayngpokha- $\{\phi/ess\}$ -ta.  
 I-Top today happy- $\{\phi/ess\}$ -Dec  
 ‘I am/was happy today.’

- (33) A: pay-ka                  kophu- $\phi$ 1- $\phi$ 2-ta.      mwue                  com      mek-ca.  
    stomach-Nom hungry- $\phi$ 1- $\phi$ 2-Dec      something      little      eat-Hrt  
    'I am hungry. Let's eat something.'
- B: na-nun      han sikan      cen-pwuthe      paykoph- $\{??a/ss-e\}$ .  
    I-Top      one hour      ago-from      hungry- $\{Dec/Prf-Dec\}$   
    'I have been hungry for an hour.'

Here B is saying that he has been hungry for an hour and he is hungry now too. The following is another example:

- (34) nalssi-ka                  cikum-kkaci-nun      tep-ess-ciman      aphulo  
    weather-Nom now-until-Top      hot-Prf-but      forth  
    chwup-eci-lke-ya.  
    cold-become-will-Dec  
    'It has been hot so far, but it will become cold in the future.'

The sentence implies that it is also hot now. But why isn't *ess* necessary to express the continuity of a state until the utterance time? This can be explained because *cikum-kkaci* has two meanings and one of them is the same as that of **now** with some additional meaning that *cikum* is somewhat of an extreme time. That is, *cikum-kkaci* means 'even now (in addition to some time in the past).' In this meaning the state in the past is just a presupposition and the sentence asserts the current state, which licenses the verb with no *-ess*. If the beginning time is mentioned, *-ess* seems necessary:

- (35) chelswu-nun      cinan      yelum-pwuthe      cikum-kkaci  
    Chelswu-Top      last      summer-from      now-until  
    hayngpokhay-ss-ta/ ??hayngpokha-ta.  
    happy-Prf-Dec/happy-Dec  
    'Chelswu has been happy from last summer until now.'

This shows that a state from the past until now requires *ess*.

If a continuity interpretation as a perfect is established, it is expected that a past perfect reading is possible too. This seems to be supported empirically. If the whole state for a present perfect in a continuity interpretation is shifted to the past, we need the past tense marker *-ess* too:

- (36) a. kuttay      na-nun      han sikan      cen-pwuthe pay-ka  
    then      I-Top      one hour      before-from

??koph-ass-ta/koph-ass-ess-ta.

stomach-Nom hungry-ess-Dec/hungry-Prf-Pst-Dec

'At that time I had been hungry for an hour.'

- b. nalssi-ka ku cen-pwuthe tep-ess-ess-ciman,  
weather-Nom the before-from hot-Prf-Pst-but

kuttay-eyse-ya kkaytal-ass-ta.  
then-at-only realize-Pst-Dec

'It had been hot from some time before, but only then did I realize it.'

This shows that the first *-ess* is devoted to the meaning of perfect and the second to that of past.

So far I have shown that a state which continues from some time in the past until now is expressed with *-essI*. Such a use of *essI* is taken to have the continuity interpretation of a perfect aspect. Its meaning can be defined as follows:

Meaning of *essI* in the continuity interpretation:

$[[ess1]] = \lambda P \lambda t \lambda w \exists e [\tau(e)=(:t) \ \& \ P(e)(w)]$

Here *t* is the reference time, which will be provided at TP by the tense of the sentence. If the sentence is a present perfect, *t* is **now**.  $\tau(e)$  is the time during which a state *e* of *P* holds.

I have discussed state predicates, but we can say the same thing about activity predicates:

- (37) a. chelswu-nun cikum-kkaci kongpwu-lul hay-ss-ta.  
Chelswu-Top now-until study-Acc do-Prf-Dec  
'Chelswu has been studying so far.'
- b. chelswu-nun il nyen cen-pwuthe kongpwu-lul hay-ss-ta.  
Chelswu-Top one year before-from study-Acc do-Prf-Dec  
'Chelswu has been studying for a year.'
- c. chelswu-nun ku cen-pwuthe kongpwu-lul hay-ss-ess-ciman,  
Chelswu-Top the before-from study-Acc do-Prf-Pst-but
- kuttay-eyse-ya wenli-lul kkaytal-ass-ta.  
then-at-only principle-Acc realize-Pst-Dec
- 'Chelswu had been studying from an earlier time, but only then did he realize the basic principle.'



Just like state predicates, activity predicates with *ess1* can express the continuity of an activity. And the continuity of an activity until some time in the past is expressed with *-ess1-ess2*. What is common between both types of predicates is that a situation starts from some time before ‘now’ and continues until now. Whether it will continue to the future is a pragmatic problem, as shown in (34).<sup>26</sup>

There are some examples which D J Choi (1995) took to be exceptional as uses of the perfect:

- (38) a. (kkuthnaylye-myen) acik mel-ess-ta.  
           (finish-if)                    yet    far-Prf-Dec  
           ‘It is far from being finished yet.’  
       b. wuli-nun acik celm-ess-e.  
           we-Top    yet    young-Prf-Dec  
           ‘We are still young.’

*mel* ‘far’ and *celm* ‘young’ are state verbs, and their result states are not defined naturally. It sounds like they express current states. One characteristic of the predicates here is that, if the states hold now, they must hold in the past too. If you are young, you must be younger before now. If something is far now, it must be far (ther) before now. In this respect, they can be taken to be examples of a perfect in the continuity interpretation. This explains why they are used with *-ess* even though they talk about **now**.

#### 4.3. Perfect in Result Event Interpretation

One exceptional use of *-ess1* is to express a future event. It is surprising because *-ess* is generally associated with a past event or situation. In this use, the sentence can contain a time adverbial denoting a future time:

- (39) ne        nayil            cwuk-ess-ta.  
       you    tomorrow    die-Prf-Dec  
       ‘You will be scolded severely.’

What this sentence means is that you will be scolded badly tomorrow because of something you did in the past. The latter event is not asserted but presupposed because the statement can be made when both the speaker and the

<sup>26</sup> E-J Yoo (1999) attempts to explain the continuity interpretation of a perfect with the notion of completeness, but it is more likely to be used to talk about an event. For states, the notion of terminating, in Smith’s (1992: 45) terms, more appropriate in that it does not have any natural ending point.

hearer share the same information about the past event. This use of a perfect has something in common with the perfect in its result state interpretation in that a previous event gives rise to a later situation. However, they are different in two respects. In the result state interpretation, the actually mentioned property of events is the previous one and the result state is asserted with no explicit mentioning. This is reasonable because the existence of the resulting state is entailed from the previous event, so no actual mentioning is necessary. In the result event interpretation, on the other hand, the event mentioned is the result event, not the previous one. The existence of the result event is not entailed from the previous event. In most cases, there is some logical jump to a rather exaggerated situation. If the result event were not actually mentioned, it would never be predicted. Therefore the result event must be explicitly mentioned. On the other hand, since the previous event is already shared by conversational participants, it does not have to be mentioned. And because of the logical jump and exaggeration, these sentences do not have literal meanings. The sentence above does not literally say that the addressee will be killed. Even if a good thing is mentioned, as in (4b), it tends not to be literally interpreted but taken to be a cynical joke.

There is an example which shows this kind of reasoning. The following example is in between the result state and result event interpretations:

- (40) ne icey yenghwa ta po-ass-ta.  
 you now movie all see-Prf-Dec  
 'You cannot see movies any more (since you have already see all movies).'

The actually mentioned situation is one in which the addressee has seen all movies and there is an intermediate step as in result state interpretations: the result state for **now** is that there is no more movie to see. Again this is not the meaning intended. The intended meaning is that the addressee has done something bad related to seeing movies and will not be allowed to see a movie any more. This is clearly implied because of the use of *icey* 'now.' *icey* refers to some time which ranges from now to some time in the future. It is not used in ordinary statements with *essI*:

- (41) ??chelswu-nun icey hakkyo-ey ka-ss-ta.  
 Chelswu-Top now school-to go-essI-Dec  
 'Chelswu has gone to school now.'

This shows that *ass* in (40) is used to express a future situation resulting from having seen all movies. This example is more like a perfect in a result state interpretation in that the mentioned situation is not the final result situation.

The predicate in (40) cannot be used in a future form:

- (42) ??ne icye yenghwa ta po-lke-ya.  
 you now movie all see-will-Dec  
 'You will have seen all movies.'

Note that having seen all movies is also a result situation from having done something wrong about seeing movies. Sentence (39) is slightly different in that the mentioned situation is the final situation, but the basic reasoning is the same: dying is the result situation which will hold in the future, but the prediction is already determined in the past.

As pointed out, the existence of a previous event does not entail a result event. It is more like a necessity relation. To a given context, if an event occurs, it leads to a certain situation. And since the event actually has happened, we predict the result situation will happen:

Meaning of *ess1* as a necessity relation:

$[[ess1]] = \lambda Q \lambda t \lambda w \{ \{ \exists P \exists e [P(e)(w') \ \& \ \tau(e) < t] \} \ \& \ \forall w' \in HA(<w, \tau(e)>) [\exists e' [t < \tau(e') \ \& \ Q(e')(w')]] \}$ , where  
 $HA(<w, \tau(e)>) = \{w' \in W \mid w' \text{ has the same history as } w \text{ until } \tau(e)\}$

At a time  $\tau(e)$ , if there is an event  $e$  of  $P$ , then there is necessarily a situation  $e'$  of  $Q$  after  $\tau(e)$ . Since  $t$  is after  $\tau(e)$ , a situation of  $Q$  will hold at  $t$ . If  $t$  were before now, then it would be settled as a fact, and the notion of modality would disappear. The only way to ensure a necessity relation between a situation at a time and a situation at a later time is to make a statement about the future, so  $t$  is the future. In actuality, however, there is something more involved: some logical  $\tau$  and tergeration come on and the hearer does not take the statement literally.

This use is not observed in the past tense:

- (43) a. chelswu-nun icye yenghwa-nun ta po-ass1-ta.  
 Chelswu-Top now movie-Top all see-Prf-Dec  
 'Chelswu cannot see movies any more.'
- b. \*kuttay chelswu-nun yenghwa-nun ta po-ass1-ess2-ta.  
 then chelswu-Top movie-Top all see-Prf-Pst-Dec  
 'Then Chelswu could not see movies any more.'

The reason is simple. The reasoning behind the statement is illogical, so the result situation cannot become a fact in the past.

One implication from this observation is that Korean has only a past tense and no other tense. When no overt tense marker occurs in a sentence, we have to assume an empty tense in order to interpret the sentence properly. The past

tense *-ess2* refers to a past time and presupposes that the time it refers to precedes the time given by the local context. From this it is predicted that the empty tense refers to the time given by the local context or the time that follows it:

$$[[\phi 2]]^{g,c} = g(i) \text{ if } t_c < g(i); \text{ undefined otherwise.}^{27}$$

When the overt past tense is missing, the empty tense with a state predicate refers to the time given by the local context, while the empty tense with a non-state predicate can also refer to a time that follows the locally given time:

- (44) a. chelswu-nun cikum hayngpokha- $\phi 1$ - $\phi 2$ -ta.  
 Chelswu-Top now happy- $\phi 1$ - $\phi 2$ -Dec  
 'Chelswu is happy now.'
- b. ??chelswu-nun nayil hayngpokha- $\phi 1$ - $\phi 2$ -ta.  
 Chelswu-Top tomorrow happy- $\phi 1$ - $\phi 2$ -Dec  
 'Chelswu will be happy tomorrow.'
- (45) a. chelswu-nun cikum sophwungka-n- $\phi 2$ -ta.<sup>28</sup>  
 Chelswu-Top now field-trip-Prg- $\phi 2$ -Dec  
 'Chelswu is going for a field-trip.'
- b. chelswu-nun nayil sophwungka-n- $\phi 2$ -ta.  
 Chelswu-Top tomorrow field-trip-Prg- $\phi 2$ -Dec  
 'Chelswu is going for a field-trip tomorrow.'

This is, however, allowed only when it is interpreted with respect to the utterance time. It cannot refer to a future time with respect to a past time.

- (46) chelswu-nun ku taum nal sophwung-ka-ss-ta.  
 Chelswu-Top the next day field-trip-go-Pst-Dec  
 'Chelswu went on a field trip the next day.'

This sentence is simply understood as a past fact, not as a future relative to a past time. The latter meaning is expressed as follows:

<sup>27</sup> The presupposition might not be necessary. Instead we could think that it is implicated in comparison with the past tense. But if the empty tense refers to some time that precedes the time given by the local context, the sentence becomes odd. So it is reasonable to specify the condition overtly as a presupposition.

<sup>28</sup> Here *-(u)n* is treated as a progressive aspect marker because it occurs only with non-statives. I do not prefer any particular term for this: it could be *imperfective* too.

- (47) chelswu-nun ku taum nal sophwung-ka-l yeyceng-i-ess-ta.  
 Chelswu-Top the next day field-trip-go-will plan-be-Pst-Dec  
 'Chelswu would go on a field trip the next day.'

We can see a similar pattern in perfect interpretations. At an utterance time, a perfect in the result state interpretation describes a state at a time given by the context, and a perfect in the result event interpretation describes a non-state situation about a future time with respect to the given time. This is what is observed only with respect to the utterance time. With respect to a past time, on the other hand, the use of a perfect in a result event interpretation is not allowed to describe a future event with respect to a past time. For this reason, *-ess-ess* is not allowed in a perfect sentence in this interpretation either, as shown in (43b).

So far I have discussed three interpretations of the perfect in Korean. What they have in common is that there is a previous situation which is connected to a non-past situation somehow. The ways of being connected are different. In the result state interpretation, a past event leads to a result state. This state continues to hold until now. In the continuity interpretation, the past situation is a state from the beginning, and it continues to hold up to now. In the result event interpretation, there is an event in the past that causes a result event which has yet to occur. I have shown that this is also a result of following the general pattern. Therefore, connectedness between a past event and a situation later is the core meaning of the perfect aspect marker *-ess*, and the ways they differ vary with aspectual types of predicates and other pragmatic factors. The three connected relations can be summarized as follows:

Meaning of *ess*/( $\Phi$ ):

$\lambda w \exists e[Q(e)(w) \ \& \ t_c \prec \tau(e)] \{ \exists e[P(e')(w) \ \& \ \tau(e') \prec t_c \ \& \ \text{connected}(e', e)(w)] \}$ ,

where  $\{\alpha\}$  means that  $\alpha$  is a presupposition.

$\text{connected}(e', e)(w)$  iff in  $w$ , (i)  $e$  is a continuity of  $e'$ , or

(ii)  $e$  is a necessary consequence of  $e'$  in a context.

Here  $\phi$  may express  $P$  or  $Q$ , depending on which interpretation *-ess* gets.<sup>29</sup>

<sup>29</sup> There is a use of *-ess* which is quite similar to the past tense in that the event expressed occurs before the utterance time:

- (i) chelswu-nun cikum swukcey hay-ss-e.  
 Chelswu-Top now homework do-ess-Dec  
 'Chelswu has done his homework.'

One aspect of the sentence is that the event of doing his homework starts and ends within the time referred to by *cikum* 'now.' The time referred to by *cikum* 'now' could be adjusted to exclude the time at which the event occurs so that it could be interpreted as the past tense. But this is not appropriate because in an utterance the time *cikum* is not determined arbitrarily. A speaker de-

I have discussed three uses of a perfect *-ess1*, separately from the past tense marker *-ess2*. As I mentioned, the past tense meaning of *-ess2* can occur with any type of predicates, but *-ess1* can have different interpretations depending on what types of predicates they are. This is summarized as follows:<sup>30</sup>

interpretations	accomplishment	achievement	activity	state
result state	√	√		
continuity			√	√
result event	√	√	√	

Here activity predicates can have continuity interpretations or result event interpretations. So we could claim that a perfect aspect marker also shows ambiguity. However, the result event interpretation is exceptional in two respects. Ignoring this interpretation, we can conclude that different predicates show different interpretations due to their semantic properties. This indirectly shows that the two interpretations belong to one semantic category, which is distinctive from the past tense. One word of caution is that there could be an additional interpretation of *-ess* which is not dealt with in this paper.

## 5. Determination of Reference Time

*-ess* is used as a (relative) past tense marker or a perfect aspect marker. In this paper, the two uses are claimed to be different morphemes. The crucial distinction lies in the reference time: it is the time given by the local context when *-ess* is used as an aspect marker, while it is a certain time before the time given by the local context when *-ess* is used as a tense marker. The question is how the reference time is determined. Take a situation like the following:

---===+++((+++u) ---> (==: event time; ++: result state; ( ): now)

There is an event in the past, which is represented with “==.” The event is simply described as a past event by taking the event time to be the reference

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termines a certain time by the use of *cikum* and this is shown in (21-23). One problem with taking this sentence to be a perfect is that there is no past situation connected to the event. There does not seem to be any independent criterion for making such a decision.

<sup>30</sup> One reviewer says that if Korean has four meanings with one form *-ess* in relation to the tense and aspect system, it would be too complicated and difficult to learn. But Koreans know the meanings and recognize the differences. The four meanings have different truth-conditions. In English the perfect has at least four meanings with one form, but native speakers of English do not have difficulty learning them. Pragmatic processing is automated and is not associated with specific expressions or structures, so people usually do not recognize it even when they apply it.

time, like the following:

---|===|+++((+++u)---> (| ... |: reference time)

In this reading, *-ess* is taken to be a past tense marker. But it is also possible to take **now** to be the reference time:

(48) ---===+++|(+++u)|--->

*-ess* in this reading is taken to be a perfect aspect marker.

A reference time is also called a topic time. Even if we have the same situation, we can talk about the event itself or the result state. The topic is determined in the utterance context as the discourse proceeds. In the following discourse, the topic time is simply the past:

(49) chelswu-nun ecey ku il-ul ta kkuthnay-ss-ta.  
Chelswu-Top yesterday the job-Acc all finish-Pst-Dec

kuliko ku-nun ecey ttena-ss-ta.  
and he-Top yesterday leave-Pst-Dec

ku-lul ttala yenghi-to ttena-ss-ta.  
he-Acc follow yenghi-also leave-Pst-Dec

‘Chelswu finished the job yesterday. Then he left yesterday.  
Yenghi also left with him.’

The discourse is about what happened in the past. It is not about the utterance time or **now**. With the same sentence, we can talk about the present situation:

(50) chelswu-nun cip-ey eps-ta.  
Chelswu-Top home-at absent-Dec

ku-nun ecey ttena-ss-ta.  
he-Top yesterday leave-Prf-Dec

kulayse manna-lye-myen tasi wa-ya ha-n-ta.  
so meet-try-if again come-must do-Prg-Dec

‘Chelswu is not at home. He has left (yesterday).  
You have to come back later if you want to see him.’

In this case the existence of the past event becomes a presupposition, as discussed above. The change in the *ge* in the *ge* inleads to a change in the semantic status of an event from an assertion to a presupposition or vice versa. We

might think that the reference time is determined contextually, but this does not seem to be the case.

Notice that *ecey* is used within a VP in both interpretations. This implies that a time adverbial in a VP can restrict the event time or reference time. To explain this, we can assume that a time adverbial optionally moves out of a VP to restrict the reference time. But if a time adverbial occurs before the subject, it invariably restricts the topic time. In this case, it is predicted that the perfect interpretation is odd. This is supported as follows:

- (51) ??chelswu-nun      cip-ey      eps-ta.  
          Chelswu-Top    home-at    absent-Dec
- ecey              ku-nun      ttena-ss-ta.  
          yesterday    he-Top      leave-Prf-Dec
- kulayse manna-lye-myen    tasi      wa-ya      ha-n-ta.  
          so      meet-try-if              again    come-must    do-Prg-Dec
- ‘Chelswu is not at home. Yesterday he left.  
   You have to come back later if you want to see him.’

A change in the word order affects the acceptability of the discourse. This phenomena needs a linguistic explanation, not a pragmatic one. I assume that a time adverbial in VP at LF is just a modifier, while a time adverbial adjoined to a TP or a TopP is interpreted as an existential quantifier over times which has the effect of introducing a new time to the context.<sup>31</sup> This shows that the reference time is determined structurally. In many cases, time adverbials do not occur, and a reference time is provided contextually. Even if it is the case, the resulting interpretation is not pragmatic but semantic: recall that presuppositions and assertions are semantically, not pragmatically, different.

I have discussed an example of a perfect in a result state interpretation. We can say a similar thing about a perfect in a continuity interpretation. Suppose the situation is like the following:

---++++++(+++u)---> (+++: state; ( ): now)

The state continues until now, but even in this case, the reference time can be

<sup>31</sup> An actual interpretation is illustrated in the Appendix. The reason for treating time adverbials at the two syntactic positions differently is that a time adverbial in a VP does not introduce a new time. On the other hand, a time adverbial adjoined to a TP or a TopP introduces a new time just like an indefinite NP introduces a new individual by a new discourse referent. I do not explain this in detail because it seems that there is no unanimous way of dealing with time adverbials adjoined to a TP/TopP. And this paper is more focused on the interpretation of a minimal phrase with a tense and an aspect.



one of the following three:

- (52) a. ---|+++|+++(+++u) ----> (past)  
 b. ---++++++|(+++u)| ----> (present)  
 c. ---|++++++(+++u)| ----> (present perfect)

*-ess* is taken to be the past tense marker in the interpretation of (52a), while it is taken to be the perfect aspect marker in the (52c) interpretation. They are different in truth conditions because the asserted situations (and, as a result, reference times) are different. This is illustrated in the following:

- (53) *yenghi-nun kuttay chelswu-wa kyelhonhay-ss-e.*  
 Yenghi-Top then Chelswu-with marry-Pst-Dec  
*maywu hayngpokhay-ss-e.*  
 very happy-Pst-Dec  
*kulayse kunye-eykey pissa-n senmwul-to sa cwu-ess-e.*  
 so she-to expensive-Rel present-also buy give-Pst-Dec  
*cikum-kkaci-to hayngpokhay-hay.*  
 now-until-also happy-do.  
 ‘Yenghi married Chelswu at that time. She was very happy. So she bought him an expensive present. She has been looking happy so far.’
- (54) *yenghi-wa 3 nyen cen-ey kyelhonhay-se cikum-kkaci*  
 Yenghi-with 3 year before-at happy-and now-until  
*hayngpokhay-ss-e.*  
 happy-Prf-Dec  
 ‘Yenghi got married three years ago and has been happy so far.’

Regardless of what the actual situation is like, the crucial thing is what time the speaker is talking about. In the first example, the speaker is talking about what happened at a past time because it was the happiness at the time she got married that made her buy Chelswu an expensive present. In the second example, the speaker is talking about Yenghi’s happiness as a whole situation because there is no reason to separate some past time at which her happiness began.

## 6. Conclusion

There have been analyses that *-ess* in Korean has one semantics, and that various interpretations are derived from the one semantics considering some pragmatic factors. In this paper, I have shown that this is not the case. The crucial difference between the past meaning and a perfect meaning is not pragmatic. They have different truth-conditions. A past situation is regarded as an assertion in one interpretation and as a presupposition in the other interpretation. There is a structural factor that affects the interpretation: whether some expression like a time adverbial is within a VP or not. These are linguistic factors, not pragmatic factors. Furthermore, the two meanings are not just ambiguity of the same morpheme. *-ess* can be assumed to take two different syntactic positions. This analysis is required for two reasons. One is that Korean has the *-ess-ess* sequence. Why do we not have *-ess-ess-ess* if the same morpheme is repeated? Our analysis can explain why *-ess-ess* is the maximal form and why it can occur in a structure which involves a modality. The same morpheme does not have to be used twice to express a third meaning. The other reason is that a tense is necessary for a sentence to get a truth-value. Even an empty tense is necessary when no overt tense is used. *-ess2* plays the role of a tense. So we have no reason not to take it as a tense marker. Nevertheless, what interpretation an actual use of *-ess* has depends on the context. The context tells us what the reference time is. If *-ess* moves a reference time, it is a past morpheme. If it does not, it is a perfect aspect marker.

## Appendix

Here I will show briefly how a couple of sentences are actually interpreted together with a time adverbial. A time adverbial restricts the event or reference time in a slightly different way. We could assume that a time adverbial is always an existential quantifier, but for simplicity a time adverbial in a VP is a modifier and one in a TP/TopP is an existential quantifier.

### A. A time adverbial adjoined to a VP

A time adverbial adjoined to a VP is a modifier which restricts the event time.

chelswu-ka      ecey      ttena-ss-ta.  
 Chelswu-Nom   yesterday   leave-ssI}- $\phi$ 2<sub>i</sub>-Dec  
 'Chelswu has left (yesterday).'

- (a)  $[_{MP} [_{TP} \text{chelswu-ka}_k [_{T} [_{AspP} [_{VP} \text{ecey}_j [_{VP} \text{t}_k \text{ttena}]] \text{ss1}]-\phi 2_i]]\text{-ta}]$   
 (VP-adjoined)  
 $[[\text{ecey}]]^{g^c} = \lambda P \lambda e \lambda w [P(e)(w) \ \& \ \tau(e) \subseteq \text{yesterday}]$   
 $[[\text{t}_k \text{ttena}]]^{g^c} = \lambda e \lambda w [\text{leave}(g(k))(e)(w)]$   
 $[[[_{VP} \text{ecey} [_{VP} \text{t}_k \text{ttena}]]]]^{g^c}$   
 $= \lambda e \lambda w \exists t [\text{leave}(g(k))(e)(w) \ \& \ \tau(e) \subseteq \text{yesterday}]$

A VP denotes a property of events. A modifier of a VP does not change this. Now an aspect changes the property of an event into a property of a time. The meaning of sentence (a) is derived as follows:

$$\begin{aligned}
 & [[[_{AspP} [_{VP} \text{ecey} [_{VP} \text{t}_k \text{ttena}]] \text{ss1}]]]^{g^c} = \lambda t \lambda w \exists Q \exists e' [\{ \exists e [\tau(e) < t \ \& \ \text{leave}(g(k))(e)(w) \ \& \ \tau(e) \subseteq \text{yesterday}] \} \ \& \ Q(e')(w) \ \& \ t \subseteq \tau(e')] \\
 & [[[_{T} \dots]]]^{g^c} = \lambda w \exists Q \exists e' [\{ \exists e [\tau(e) < g(i) \ \& \ \text{leave}(g(k))(e)(w) \ \& \ \tau(e) \subseteq \text{yesterday}] \} \ \& \ Q(e')(w) \ \& \ g(i) \subseteq \tau(e')] \\
 & [[[_{TP} \text{chelswu-ka}_k \dots \phi 2_i]]] = \lambda x [[[_{T} \dots]]]^{g[x/k], c}(\text{chelswu}) \\
 & = \lambda w \exists Q \exists e' [\{ \exists e [\tau(e) < g(i) \ \& \ \text{leave}(\text{chelswu})(e)(w) \ \& \ \tau(e) \subseteq \text{yesterday}] \} \ \& \ Q(e')(w) \ \& \ g(i) \subseteq \tau(e')] \\
 & [[(a)]]^{g^c} = \exists Q \exists e' [\{ \exists e [\tau(e) < g(i) \ \& \ \text{leave}(\text{chelswu})(e)(w) \ \& \ \tau(e) \subseteq \text{yesterday}] \} \ \& \ Q(e')(w) \ \& \ g(i) \subseteq \tau(e')] \text{ (if not}(g(i) < t_e); \text{undefined otherwise.)}
 \end{aligned}$$

#### B. A time adverbial adjoined to a TP

A time adverbial adjoined to a TP is an existential quantifier over times.

- (b)  $[_{MP} [_{TP} \text{ecey}_j \text{ i } [_{TP} \text{chelswu-ka}_k [_{T} [_{AspP} [_{VP} \text{t}_k \text{ttena}] \phi] \text{ss2}_i]]] \text{ ta}]$   
 (TP-adjoined)  
 $[[\text{ecey}]] = \lambda P \lambda w \exists t [P(t)(w) \ \& \ t \subseteq \text{yesterday}]$   
 $[[\phi 1]]^{g^c} = \lambda P \lambda t \lambda w \exists e [\tau(e) \subseteq t \ \& \ P(e)(w)]$   
 $[[[_{AspP} [_{VP} \text{t}_k \text{ttena}] \phi]]]^{g^c}$   
 $= \lambda t \lambda w \exists e [\tau(e) \subseteq t \ \& \ \text{leave}(g(k))(e)(w)]$   
 $[[[_{TP} \text{chelswu-ka}_k [_{T} [_{AspP} [_{VP} \text{t}_k \text{ttena}] \phi] \text{ss}_i]]]^{g^c}$   
 $= \lambda w \exists e [\tau(e) \subseteq g(i) \ \& \ \text{leave}(\text{chelswu})(e)(w)] \text{ (if } g(i) < t_e; \text{undefined otherwise.)}$

When it is assumed that *ecey* is a quantifier, it must be combined with a function the domain of which is a set of times. To meet this condition, we assume

that when a time adverbial is adjoined to a TP, an index node is generated, as assumed in Heim and Kratzer (1998). Even if this is not assumed, *ecey* is somehow coindexed with the tense. One way is to assume that the index of the tense is projected to TP, which is quite natural. This index is exploited in interpreting *ecey*, which quantifies over the times given to the index. The meaning of sentence (b) is derived as follows:

$$\begin{aligned}
 & [[i \text{ } [_{TP} [_{VP} \text{ chelswu-ka ttena}] \text{ ss2}_i]]]^{g,c} \\
 & = \lambda t . [\lambda w . [[[_{TP} [_{VP} \text{ chelswu-ka ttena}] \text{ ss2}_i]]]^{g,t/i,c} \\
 & = \lambda t \lambda w [\tau(e) \subseteq t \ \& \ \text{leave}(\text{chelswu})(e)(w)] \text{ (if } t < t_c; \text{ undefined otherwise.)} \\
 & [[[_{TP} \text{ ecey}_j i \text{ } [_{TP} [_{AspP} [_{VP} \text{ chelswu-ka ttena}] \phi 1] \text{ ss2}_i]]]^{g,c} \\
 & = \lambda w \exists t [\tau(e) \subseteq t \ \& \ \text{leave}(\text{chelswu})(e)(w) \ \& \ t \subseteq \text{yesterday}] \text{ (if } t < t_c; \\
 & \quad \text{undefined otherwise.)} \\
 & [[(b)]]^{g,c} = \exists t [\tau(e) \subseteq t \ \& \ \text{leave}(\text{chelswu})(e)(w^*) \ \& \ t \subseteq \text{yesterday}] \\
 & \quad \text{(if } t < t_c; \text{ undefined otherwise; } w^* = \text{the actual world})
 \end{aligned}$$

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Received: July 5, 2010

Revised version received: November 6, 2010

Accepted: November 12, 2010