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TEMPORAL ADVERBIALS AND AKTIONSARTEN
IN KOREAN

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By

Jae-Hak Yoon, M.A.

* * * * *

The Ohio State University

1996

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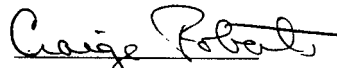
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TEMPORAL ADVERBIALS AND AKTIONSARTEN IN KOREAN

By

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The Ohio State University, 1996

Professor Craig Roberts, Adviser

This is a study of the semantics of temporal expressions in Korean. In particular, it is concerned with tense, temporal adverbials (TAs), and types of verb meanings, or *aktionsarten*, as to how they interact with one another. It aims to undertake explicit and falsifiable descriptions of tense, aktionsarten, and TAs in Korean by applying an event-based model-theoretic semantics, and it also purports to provide a theoretical account for those interactions among them.

The central thesis of this research is that temporal relations are in large part functions of aktionsarten: temporal relations in a sentence are inferred to a large extent from the types of denoted eventualities, as well as from TAs and tense.

Chapter 2 reviews the distributions of major tense and modal markers, and concludes that *-ess* and *-nun* can be adequately analyzed as tense markers. It also discusses relations between tense and TAs.

In Chapter 3, types of TAs and predicate meanings are discussed, along with truth conditional definitions for major TAs. It is demonstrated that a systematic non-presuppositional difference exists between a sentence with *longan/kkaci* 'for/until' and a sentence with *maney/kkaci* 'in/by'. Then, it is argued that they can be accounted only if some part of temporal relations is left to be specified by aktionsarten.

Chapter 4 is concerned with some constructions which apparently exhibit non-compositional modifications of TAs noncompositional in the sense that the involved TAs appear to modify only a semantic subpart of the main verb. It proposes an analysis according to which two eventuality variables are introduced in the semantics of verbs of these constructions and these constructions simultaneously describe two eventualities, i.e. the initiating event and its result state.

Finally, Chapter 5 discusses the relative nature of tense and tense neutralization in temporal adverbial clauses. It is demonstrated how tense neutralization is correlated with telicity of predicates and why it is expected in the general theory of relativity of tense and aktionsarten in Korean.

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To the memory of my father

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CHAPTER I

Introduction

Change and time are intimately related notions. Change is observable, but according to some philosophers (e.g. Russell, Wiener 1914, and Whitehead 1929) time is an abstract notion derivable from change. Or at least, time cannot be properly understood without the notion of change. Imagine what the passage of time would mean were there no change in the world.

One may have had an experience that after several days of busy travel filled with many events, one mistakenly thought more days had passed than the actual days spent. Conversely, when we are engaged so deeply in an event, be it a deep thought or an exciting chess match, we often miss the lunch hour. On the other hand, we sometimes find ourselves in a boring, or non-linguistics, class and realize that time goes painfully slowly. In this case, no event, or more precisely no involved event, means time does not pass. These experiences suggest that we define length of time by the number of events that occurred.

An event involves a change of some sort. Verbs denote functions from entities to event-types. In this way, change is usually represented by verbs in natural language, whereas time is mostly specified in the form of temporal adverbials or tense-aspect

markers. Natural language recognizes some differences among changes, or roughly eventualities.¹ This is reflected in the use of different types of temporal adverbials and tense-aspect markers for different kinds of verbs. While there are many cross-linguistic similarities in these relations, there are also a number of language-specific phenomena: one may expect languages with different systems of tense-aspect to exhibit different interactions between temporal adverbials and tense/aspect. Yet, we frequently observe that the interactions in different languages reveal general principles of language. The interactions among temporal expressions and aktionsarten in Korean seem to be no exception.

This is a study of the semantics of temporal expressions in Korean. More specifically, it is concerned with tense-aspect, temporal adverbials, and types of verb meanings, or *aktionsarten*², and how they interact with one another. It aims to posit explicit and falsifiable descriptions of tense, aktionsarten, and temporal adverbials in Korean by applying an event-based model-theoretic semantics. It also aims to give a theoretical account of newly-observed generalizations about interactions among tense, temporal adverbials, and aktionsarten.

1.1 Theoretical Topics

The central thesis of this research is that temporal relations are in large part functions of aktionsarten: temporal relations are inferred to a large extent from the types of

¹It is noted that states are not considered to be changes.

²Note that this equation is only an approximation as we will see in Chapter 3 that aktionsarten are defined on sentences and eventualities.

eventualities, as well as temporal adverbials and tenses which are commonly assumed to be solely responsible for those relations. Works such as Heinämäki (1974), Hinrichs (1981,1986), and Partee (1984) predate this research in explicitly taking into account types of verb meanings or eventualities in determining temporal relations: Heinämäki defines connectives with reference to the types of verb phrase meanings, and Hinrichs and Partee demonstrate that the progression of reference times in discourse is dependent upon the types of eventualities involved.³

Our conclusions about theoretical implications will be drawn mostly from the three different kinds of interactions among temporal adverbials, tense, and aktionsarten which are outlined below.

1.1.1 Asymmetry between Temporal Adverbials

Temporal adverbials with *longan* 'for' and *mancy* 'in' such as those in (1) and (2) both measure the duration of events; however, they differ in their behavior with respect to predicates. A *longan*-adverbial is compatible only with verbs like *ca* 'to sleep', whereas a *mancy*-adverbial occurs only with such predicates as *phynci-lul ssu* 'to write a letter'. These interactions are commonly accounted for by proposing that sentence meanings are categorized into several different groups in terms of their temporal structures and that temporal adverbials have different presuppositions about combinable types, e.g. a *longan*-adverbial presupposes certain conditions which can be satisfied by *ca* 'to sleep', but not by *ku phynci-lul ssu* 'to write the letter' (cf.

³Dowty (1986) argues that the relationship between aktionsarten and temporal relations in discourse is not as simple as Hinrichs and Partee assumed.

Verkuyl 1972, Dowty 1979, Hinrichs 1985).

- (1) a. Mary-ka han sikan tongan ca-ess-ta.
Mary-NOM one hour for sleep-PAST-DEC
'Mary slept for an hour.'
- b. #Mary-ka han sikan maney ca-ess-ta.
Mary-NOM one hour in sleep-PAST-DEC
'#Mary slept in an hour.'
- (2) a. #Mary-ka han sikan tongan ku phyenci-lul ssu-ess-ta.
Mary-NOM one hour for that letter-ACC write-PAST-DEC
'#Mary wrote the letter for an hour.'
- b. Mary-ka han sikan maney ku phyenci-lul ssu-ess-ta.
Mary-NOM one hour in that letter-ACC write-PAST-DEC
'Mary wrote the letter in an hour.'

Thus, one may well expect some languages with an adverbial just like a *tongan*-adverbial but without these presuppositions; therefore, in those languages the same adverbial would be used for both types of predicates. In fact, an adverbial of this type is found within Korean; the *kkaci*-adverbial in (3a) and (3b) does not have the presuppositions that English *until* and *by*-adverbials do, as *kkaci* translates to both English *until* and *by*:

- (3) a. Mary-ka cengo-kkaci ca-ess-ta.
Mary-NOM noon-POST sleep-PAST-DEC
'Mary slept until noon.'
- b. Mary-ka cengo-kkaci swukcey-lul kkuthnay-ess-ta.
Mary-NOM noon-POST homework-ACC finish-PAST-DEC
'Mary finished the homework by noon.'

Hence, a natural assumption will be that a *kkaci*-adverbial should be interpreted as the same regardless of what type of sentences it appears in. Likewise, we may predict that *tongan* and *maney*-adverbials should have the same meaning except for

the presuppositional differences. However, temporal relations are different depending on whether a *kkaci*-adverbial is used in a sentence of a type (3a) or in one of a type (3b). Likewise, *tongan* and *maney*-adverbials exhibit differences other than the presuppositions about eventuality types.

Demonstrating that the differences between *tongan* and *maney*-adverbials are the same kinds of differences between two uses of *kkaci*, we will argue that these differences can be accounted for adequately only if some aspects of temporal relations are left to be specified by aktionsarten.

1.1.2 Internal Adverbs

A construction like (4) poses a challenge to a compositional view of adverbial modification. It involves an adverbial modification which is apparently noncompositional in the sense that the temporal adverbial *cikum* 'now' appears to modify only a subpart of the denotation of the main verb, i.e. 'internally', rather than the denotation of the verb as a whole. It also seems to undermine the assumption that the suffix *-ess* marks the past tense. Even with the marker, the temporal adverbial *cikum* 'now' in (4) describes present states of affairs rather than a past event.

- (4) Mary-ka cikum ppalkau moca-lul ssu-ess-ta.
Mary-NOM now red hat-ACC put.on-PAST-DEC
'Mary is wearing a red hat now.'

For (4) to be true, for instance, it is only required that Mary is wearing a red hat at the utterance time; it is allowed - in fact entailed - that she put it on sometime earlier than the utterance time. In other words, this sentence describes a present state which a past event brought about. It will be seen that despite an example like this a theory

of *-ess* as aspect marker is inadequate and unmotivated. Instead we will propose an analysis based on the aktionsarten of the verbs involved in the above sentences: according to this analysis, two eventuality variables are introduced in the semantics of verbs like *ssu* 'to put on/wear' and sentences involving them can be understood as descriptions of two eventualities, i.e. the initiating event and its result state.

1.1.3 Tense Neutralization

Korean is a relative tense language in the sense that tense may be interpreted relative to a point other than the moment of speech. While tense in subordination observes relativity, there are some nontrivial points that distinguish temporal adverbial clauses from embedded complement clauses with respect to temporal interpretation. In particular, we observe that difference in tense is neutralized in pairs like (5) and (6), where they are understood to mean the same even though they have different tenses in the temporal adverbials, i.e. nonpast in (5) and past in (6).

(5) Mary-ka aphu- ϕ -ul ttay John-i ttena-ess-ta.
 Mary-NOM sick-NONPAST-REL time John-NOM leave-PAST-DEC
 'John left when Mary was sick.'

(6) Mary-ka aphu-ess-ul ttay John-i ttena-ess-ta.
 Mary-NOM arrive-PAST-REL time John-NOM leave-PAST-DEC
 'John left when Mary was sick.'

Demonstrating that this type of tense neutralization is correlated with telicity of the predicate, we will show why it is expected in the general theory of relativity of tense and aktionsarten in Korean.

1.2 Descriptive Topics

We intend this research to be as much a formally descriptive work as a theoretical contribution. The topics to discuss are divided into tense, aktionsarten, and temporal adverbials, though they are always discussed in connection with each other. Among the topics are those listed below:

A. Tense:

- To review the distributions of major tense and modal markers in Korean, and provide truth conditional definitions for tenses. (Chapter 2)
- To give an formal account of relative tense. (Chapter 5)

B. Aktionsarten:

- To review the verb classes. (Chapter 3)
- To argue for a class of result state verbs in Korean and two subclasses within this class. (Chapter 4)
- To claim that adjectival/description verbs are not identical to stative verbs but rather a subset of stative verbs. (Chapter 3)
- To argue that evidence does not support the existence of a semantic class of verbs of existence. (Chapter 3)

C. Temporal Adverbials:

- To propose precise semantics for major Korean temporal adverbials. (Chapter 3)
- To describe different classes of temporal adverbials in Korean and illustrate how they differ. (Chapter 3)
- To argue that there are two uses of *many/in*-adverbials and that only one use tests for telics. (Chapter 3)

1.3 Notational Conventions

There are a number of suffix allomorphs in Korean which are products of vowel harmony or morphophonemic rules. For ease of construal on the part of nonnative

Table 1: Allomorphs to be recognized

allomorphs to be recognized			
environments	TOP.	NOM.	ACC.
open syllable	- <i>nun</i> , e.g. <i>Mary-nun</i>	- <i>ka</i> , e.g. <i>Mary-ka</i>	- <i>lul</i> , e.g. <i>Mary-lul</i>
closed syllable	- <i>un</i> , e.g. <i>John-un</i>	- <i>i</i> , e.g. <i>John-i</i>	- <i>ul</i> , e.g. <i>John-ul</i>

speaker of Korean, we will ignore most of the alternations except for the three major case markers listed in the table 1. These markers alternate between the two forms depending on whether the stem ends with an open syllable or a close one.

The standard Yale romanizations are used for examples in Korean. We will use John and Mary for proper names, but not without some regret and hesitation. They are popular names for dogs, written as *Ccong* and *Meylek*; they are rarely used for humans in the Korean culture. We will take a big step to use these names for ‘humans’ and write them as in English to make it easier for nonnative speakers of Korean to follow the discussion, though this use may not be completely acceptable to some Koreans. For the same reason, we will write words of foreign origin the way they are written in the original language. Thus, *phathi* ‘party’ will be written as *party*.

We will follow the common practice of Montague-style semantics in translating natural language expressions into expressions of intensional logic. Since there is not likely to be any confusion between natural language and translated expressions, we will omit prime notation. Thus, as shown in (7), the Korean expression *ket* ‘to walk’ is not as (a) but rather (b).

(7) a. *ket* \Rightarrow *walk'*

b. *ket* \Rightarrow *walk*

When it is unnecessary to fully translate an expression, we will use an abbreviatory notation. For instance, if the internal structure is irrelevant for the discussion, an expression like *ku chayk* ‘the book’ will be abbreviated as in (8).

(8) *kuchayk* \Rightarrow *the.book*

Translated expressions will often be referred to as denotations or semantics for such and such natural language expressions, though technically they are neither denotations nor semantics of natural language expressions.

We will make a reasonable effort to distinguish between ungrammaticality and pragmatic infelicity: they are indicated by the symbols * and #, respectively. When we are not certain between the two, we will use # (so, # can mean either ungrammaticality or infelicity.) Also, we will use the term ‘unacceptable’ to mean pragmatically infelicitous, but also it will be used to cover these two notions.

1.4 Notes

This study has greatly benefited from the work of Davidson (1967), Vendler (1967), Taylor (1967), Verkuyl (1972), Bennett & Partee (1972), Montague (1974), Heinämäki (1974), Dowty (1979, 1984, 1987), Stump (1985), Hinrichs (1985), Bach (1986), Krifka (1988), and Kamp & Roßdeutscher (1992). These formal and descriptive works furnished me with formal tools with which I was able to look into the presented data in a concrete and precise way. They also provided me with a good model of formally descriptive research on tense and aspect.

Previous studies on tense and aspect of Korean have been invaluable for this research. They include H. Lee (1993), Yoo (1993), Chang (1973), K. Lee (1980), Yang (1977), Jeong (1981), C. Lee (1987), Kang (1988), Shin (1988), and Nam (1978).

CHAPTER II

Tense and Temporal Adverbials

In this chapter we will develop formal preliminaries for the remainder of the dissertation. We will be concerned with temporal adverbials in relation to Korean tense. In §2.1 we will lay out major tense phenomena in Korean and then adopt a simple theory of tense. It will be maintained that a past vs. nonpast distinction is adequate for Korean tense. Also the marker *-keyss* will be argued to be a modal, not a tense. In §2.2 we will discuss simple cases of interaction between tense and temporal adverbs and how they can be analyzed. In §2.3 a formal analysis of tense and temporal adverbs will be presented which will serve as basis of the analyses in the ensuing chapters.

2.1 A Simple Theory of Tense

There are many theories of tense and aspect in Korean. Some claim that there is no tense in Korean but only aspect. Some others contend that there is, indeed, tense. Moreover, once we get down to specific grammatical markers such as *-ess* and *-nun*, competing theories abound. This abundance of theories in a way reflects the lack of precise cross-linguistic definitions of tense and aspect. For instance, many definitions do not appear to distinguish between relative tense and aspect. Consider Lyons (1968:305):

"The essential characteristic of the category of tense is that it relates the time of action, event or state of affairs referred to in the sentence to the time of utterance. Tense is therefore a deictic category."

It is obvious that when Lyons describes tense as deictic, he means absolute tense.

The problem of distinguishing between relative tense and aspect is observed by Dahl (1985:25):

"The distinction between deictic and non-deictic categories can only be used to distinguish tenses and aspects if we do not, in addition to 'absolute', i.e. deictic tenses, admit the existence of 'relative' tenses, i.e. forms that may express temporal relations between any pair of time points, regardless of their deictic status."

We will follow Comrie (1976) for our working definitions of tense and aspect.

Consider Comrie (1976:2-3):¹

"Tense relates the time of the situation referred to to some other time, usually the moment of speaking ... aspects are different ways of viewing the internal temporal constituency of a situation"

Thus, we take tense as a grammatical device which relates the time of the described situation to some other time, i.e. utterance time in absolute tense and contextually given time in relative tense. As for aspects, we contrast 'durational' and 'nondurational', 'perfective' and 'imperfective'. These notions are independent of locating events in time; rather, they describe whether a given event involves some interval of

¹Note though that Comrie's definition of aspect is very vague and could be practically uninformative for a precise description for a given aspect marker. It is unclear what exactly *internal* or *temporal constituency* means. Several questions arise. What are the 'temporal constituents of a situation'? Does a situation have other kind of constituencies other than temporal ones? If aspect deals with the "internal temporal constituency", does that imply that there is an 'external' temporal constituency, too? If so, then what is the difference between the two?

time, 'durational' and 'nondurational', or whether it is completed or not, 'perfective' and 'imperfective'.

Let us take English aspects for example.

(1) John was building a house.

(2) John built a house.

The situations described by both sentences are located in the past, as indicated by the past tense inflection. The sentence (1) is understood as a description about a past event which was in progress. This is marked by the combination of the auxiliary *be* and the present participle *-ing*. On the other hand, (2) describes an event that has completed. The aspect marker *be -ing* in (1) does not locate the situation in time; what it does is to implicate that the situation was not completed at a certain time.

This is in fact a rare case of a clear tense vs. aspect distinction. Lyons asserts that "there is not, and cannot be, in universal grammar any sharp distinction between tense and aspect" (Lyons 1977:690). English perfect is a case in point. It is still controversial whether it has both (present) tense and (perfect) aspect or just one of them. As English perfect seems to involve tense and aspect, its status is often dependent on the theoretical definitions of tense and aspect one is employing.

Also we suspect that linguistic facts of Korean are frequently subject to a theoretical analysis designed for English. Sometimes this works, but in many occasions it leads to unnecessary complications. For example, we suspect the marker *-ess* is often analyzed as two homomorphic markers, one for past and the other for perfect, mostly

because it can be translated into English in those two ways, rather than because of any real syntactico-semantic motivation within Korean.

2.1.1 The Past Tense and *-ess*

It has been noted by many that the marker *-ess* is used as more than a standard past marker. In other words, it does not correspond directly to a 'typical' past marker like the English *-ed*. For instance, the marker *-ess* in (3) and (4) seems to have uses for which English would make use of two different expressions, *-ed* and *have -ed*, respectively.

- (3) Ecey pi-ka nayli-ess-ta.
yesterday rain-NOM come.down-TNS-DEC
'It rained yesterday.'
- (4) Ku yeca-ka caknyen-pwuthe an o-ess-ta.
that woman-NOM last.year-from not come-TNS-DEC
'The woman hasn't come since last year.'

As is indicated in the glosses, it is most appropriately translated as past in (3) and present perfect in (4).

Despite these and other examples of different uses to be given below, we will maintain the traditional view that *-ess* marks past (cf. Martin 1954, Au 1980, K. Lee 1980, and C. Lee 1987). We will not attempt to prove that a theory of *-ess* as an aspect marker is outright inadequate, mostly because it is unclear to us what predictions the proposed aspectual theories would make about the marker and all of its uses. Instead we will show that all the uses are accounted for within the theory of *-ess* as a simple past marker without any stipulation. We will discuss four kinds of uses which are considered to pose a problem for viewing *-ess* as a simple past marker.

Use of Perfect-One

Along the lines of the sentence (4), we now consider more examples to illustrate the perfect nature of *-ess*. One characteristic common to these examples is the cooccurrence of the marker *-ess* and temporal adverbs whose reference does not appear to be limited to past time (cf. Yoo (to appear)).

- (5) Kim-i yethay chinkwu-lul kitali-ess-ta.
Kim-NOM so far friend-ACC await-TNS-DEC
'Kim has been awaiting his/her friend so far.'
- (6) Kim-i icykkes chinkwu-lul mos mama-ess-ta.
Kim-NOM as yet friend-ACC unable to meet-TNS-DEC
'Kim hasn't been able to see his/her friend as yet.'
- (7) Kim-i cikum-kkaci kongpwuha-ess-ta.
Kim-NOM now-up.till study-TNS-DEC
'Kim has been studying up till now.'

Though these adverbs might appear to refer to a time including the speech time, we claim that their truth conditional meanings do not require this. Notice that though there may be no better way to translate them, the English glosses are quite misleading if we take them literally and try to match the words one to one between Korean and English. First of all, the sentence (4) does not always give a perfect reading. Depending on the context, it may have a simple past reading as in (8). It is only that it is typically understood as referring to a time including the utterance time when there is no adverb such as *ciky-kkaci* explicitly delimiting the final interval. In fact, when this adverb is present, the simple past reading is the only one available in any context.

- (8) Ku yeca-ka caknyen-pwuthe (ecey-kkaci) an o-ess-ta.
 that woman-NOM last.year-from yesterday-until not come-TNS-DEC
 'The woman didn't come from last year (until yesterday).'

Secondly, the adverbs in (5)–(7) above do not necessarily include the speech time, or the evaluation time, the time in a technical sense which serves as a reference point for past tense and which should be distinguished from speech time. When they appear in sentences like (9)–(11), these adverbs are understood as referring to times up to the recent past rather than up to the speech time.

- (9) Kim-i yethay chinkwu-lul kitali-taka ttena-ess-ta.
 Kim-NOM so far friend-ACC await-CONJ leave-TNS-DEC
 'Kim had been awaiting his/her friend up until (?) and then left.'
- (10) Kim-i iceykses chinkwu-lul mos manna-taka
 Kim-NOM as yet friend-ACC unable to meet-CONJ
 onul tutie manna-ess-ta.
 today finally meet-TNS-DEC
 'Kim hadn't been able to see his/her friend up until (?)
 but finally today saw him/her.'
- (11) Kim-i cikum-kkaci kongpwuha-taka cip-ey ka-ess-ta.
 Kim-NOM now-up.till study-CONJ home-to go-TNS-DEC
 'Kim had been studying up till (?) and then went home.'

Use with *cikum* 'now'

Closely related to the above adverb examples are cases where the adverb *cikum* 'now' appears with *-ess* in the same clause. An example like (12) may prove to be a challenge for a theory of simple past such as Suh (1976) and Yoo (to appear) claim.

- (12) Kim-i cikum ttena-ess-ta.
 Kim-NOM now leave-TNS-DEC
 'Kim has left now.'

But this argument is based on the common, but nevertheless questionable, assumption that *cikum* is identified with the speech time (cf. No 1979 and Suh 1976).

However, we agree with K. Lee (1976, 1980) and Jeong (1981) that *cikum* and the speech time should be distinguished and that *cikum* is a superinterval of speech time. In fact, Yoo (to appear) admits that in (12) the leaving is understood to have happened in the recent past and proposes that *cikum* should be able to refer to recent past or immediate future time. We definitely sense that (12) is about an event in the recent past, whereas (13) is about one in the very near future. Thus, (12) is compatible with *-ess* being a past marker.

- (13) Kim-i cikum ttena-nun-ta.
 Kim-NOM now leave-TNS-DEC
 'Kim leaves now.'

Use of Perfect–Two

The sentences in (14) and (15) provide a real challenge for our analysis: they describe present states of affairs even though they have an explicit marker *-ess*. Unlike the previous examples, the adverb in (15) in particular explicitly refers to an interval including the speech time.

- (14) Ney os-ey hulk-i mwut-ess-ta. [Nam (1978:9)]
 your clothes-on mud-NOM stick.to-TNS-DEC
 'Mud is (has been) stained on your clothes.'
- (15) Mary-ka onul ohwu-ey-nun ppalkan moca-lul ssu-ess-ta.
 Mary-NOM today afternoon-in-TOP red hat-ACC put.on-TNS-DEC
 'Mary is wearing a red hat this afternoon.'

For (15) to be true, it is only required that Mary is wearing a red hat this afternoon; it is allowed that she put it on this morning or sometime earlier than this afternoon.

Similarly, a sentence like (16) is taken as past perfect because the event time is prior to a given time of 12 o'clock, which is also past (cf. Choi 1993:542).

- (16) John-i 12 si-cy-nun (imi) cip-ul ttena-ess-ta.
 John-NOM 12 o'clock-at-TOP already home leave-TNS-DEC
 'At noon, John had (already) left his home.'

Our generalization about these sentences is that they describe states which past events brought about, i.e. result states. The only relevant difference between (14) & (15) and (16) is whether there is a temporal adverb present and whether it refers to present time or past time. In Chapter 4, we will motivate a subclass of verbs which provide result state readings independently of the tense marker *-ess* and moreover show that this class of verbs coincide with those which give perfect readings with *-ess*, thereby accounting for the perfect readings associated with these sentences.

Use of Perfective

Examples like those in (17) and (18) are frequently taken to show that *-ess* is not a tense marker but rather one of perfective aspect (cf. Nam 1978 and Park and Han 1993). (17) differs from (18) in that the event of going home is completed in (17) but not in (18). However, the only difference in form between the two is that (17), but not (18), has *-ess* in the first clause. Thus, an obvious implication is that presence of the marker brings about the sense of perfectivity.

- (17) Chelswu-nun cip-cy ka-ess-taka o-ess-ta.
 Chelswu-TOP home-to go-TNS-CONJ come-TNS-DEC
 'Chelswu went home and came back.'
- (18) Chelswu-nun cip-cy ka-taka o-ess-ta.
 Chelswu-TOP home-to go-CONJ come-TNS-DEC
 'Chelswu came back in the middle of going home.'

However, the difference in the above sentences, in fact, does not necessitate a claim that the marker is perfective. The difference is compatible with the marker being a tense marker, once we take into consideration the fact that tense is relative in Korean. As will be clearer with the formal analysis to be given for tense in subordinate clauses in Chapter 5, if we take *-laka* as a subordinating conjunction, it becomes obvious why the observed difference arises. Let us accept the hypothesis that tenses in a subordinate clause are relative to the event time of its superordinate clause. Then, in our approach the difference in (17) and (18) comes down to the difference of the subordinate tense between the two. Namely, *ka-ess-laka* in (17) is past tense, while *ka-laka* in (18) is nonpast tense.² Thus, the event of going home is prior to the event of coming back in (17) but it is not prior to the event of coming back in (18), i.e. they could be overlapping in (18). Since the main clause event, which is completed, is a reversal of the subordinate event³, the subordinate event is taken to be interrupted, i.e. imperfective, in (18), whereas it is taken to be completed, i.e. perfective, in (17).

Thus, we will maintain that *-ess* marks past tense whose truth conditional value is to locate the event time before the speech time.⁴

2.1.2 The Nonpast Tense and *-nun*

There are at least three possible analyses of the marker *-nun*; it can be considered as an imperfective aspect marker, a nonpast tense marker, or as a mood marker.

²As will be explained in the next section, the default is nonpast, even though there is no explicit marker.

³In the sense that *cip-cy ka* 'to go home' is opposite to *o* 'to come (back)'

⁴We are only concerned with simple clauses here. Relativity of tense will be dealt in Chapter 5.

A brief overview will be provided to show motivations for each analysis. It will be shown that the nonpast tense marker and the mood marker approaches are more plausible among these three analyses. Though these two analyses are competing and there is no knock-down argument for either of them, we will present our motivations for adopting the nonpast marker approach.

Distribution of *-nun*

First, the marker can only appear in a clause describing nonpast eventualities. In many cases it has to appear in nonpast sentences. Thus it contrasts with the past marker *-css*. Consider (19) and (20). It cannot appear together with the past marker as shown in (19a,b). Also, it is required in a sentence like (20a), thus an ungrammatical sentence (20b).

- (19) a. Ecey pi-ka nayli-ess-ta.
yesterday rain-NOM come.down-PAST-DEC
'It rained yesterday.'
- b. *Ecey pi-ka nayli-ess-nun-ta.
yesterday rain-NOM come.down-PAST-NUN-DEC
'(intended) It rained yesterday.'
- (20) a. Cikum pi-ka nayli-nun-ta.
now rain-NOM come.down-NUN-DEC
'It is raining now.'
- b. *Cikum pi-ka nayli-ta.
now rain-NOM come.down-DEC
'(intended) It is raining now.'

Second, there is an additional requirement for the marker to appear. It is limited to a class of verbs commonly called 'nonadjectival verbs' or 'description verbs'. Verbs of Korean are morphologically subdivided into adjectival verbs and nonadjectival

verbs, i.e. they have different inflectional paradigms, with *-nun* being one inflection which appears only with a nonadjectival verb. The examples in (21) illustrate this point. The verb *pwucilha* 'be diligent' is adjectival. Therefore it cannot appear with the marker, as the contrast in (21) illustrates. This pair of sentences contrasts with the pair in (20) with the nonadjectival verb *nayli* 'come down', which exhibits a pattern precisely the reverse of that in (21): the marker *-nun* has to appear with the nonadjectival verb.

- (21) a. *Mary-ka pwucilha-nun-ta.
Mary-NOM diligent-NUN-DEC
'(intended) Mary is diligent.'
- b. Mary-ka pwucilha-ta.
Mary-NOM diligent-DEC
'Mary is diligent.'

Third, there are further restrictions on the distribution of the marker. In fact, the declarative sentential ending *-ta* is a rare case in which it can appear.⁵ The sentences in (22) and (23) exemplify unacceptable cases of the marker: (i) conjunctions like *-ko* do not allow *-nun*, while they do allow the past tense marker *-css* as shown in (22b,c); (ii) the marker cannot appear with sentential endings like *-eyo*, an informal polite-style ending, as in (23b), or *-ni*, an interrogative ending, as in (24b).

- (22) a. Palam-i pwul-ko pi-ka nayli-nun-ta.
wind-NOM blow-CONJ rain-NOM come.down-NUN-DEC
'The wind is blowing and it is raining.'
- b. *Palam-i pwul-nun-ko pi-ka nayli-nun-ta.
wind-NOM blow-NUN-CONJ rain-NOM come.down-NUN-DEC
'(intended) The wind is blowing and it is raining.'

⁵The only other places the marker can appear are in the conjunction *untey* 'but', in the complementizer *un-ci* 'whether', and in a formal form of interrogative marker *un-ka*, as to be discussed in Chapter 3.

- c. Palam-i pwul-ess-ko pi-ka nayli-ess-ta.
wind-NOM blow-PAST-CONJ rain-NOM come.down-PAST-DEC
'Wind blew and it rained.'
- (23) a. Pi-ka nayli-eyo.
rain-NOM come.down-POL
'It is raining.'
- b. *Pi-ka nayli-nun-eyo.
rain-NOM come.down-NUN-DEC
'(intended) It is raining.'
- (24) a. Pi-ka nayli-ni?
rain-NOM come.down-Q
'Is it raining?'
- b. *Pi-ka nayli-nun-ni?
rain-NOM come.down-NUN-Q
'(intended) Is it raining?'

There are still other restrictions on the distribution of *-nun*. The past tense marker *-ess* must be present in a sentence like (25); (26) is ungrammatical. The pattern is exactly opposite with respect to *-nun*. The marker *-nun* must not appear with the modal *-keyss*, as the contrast in (27) and (28) illustrate:

- (25) Ecey Seoul-ey pi-ka o-ess-keyss-ta.
yesterday Seoul-in rain-NOM come-PAST-MOD-DEC
'Probably it rained in Seoul yesterday.'
- (26) *Ecey Seoul-ey pi-ka o-keyss-ta.
yesterday Seoul-in rain-NOM come-MOD-DEC
'Probably it rained in Seoul yesterday.'
- (27) *Cikum Seoul-ey pi-ka o-nun-keyss-ta.
now Seoul-in rain-NOM come-NUN-MOD-DEC
'Probably it is raining in Seoul now.'
- (28) Cikum Seoul-ey pi-ka o-keyss-ta.
now Seoul-in rain-NOM come-MOD-DEC
'Probably it is raining in Seoul now.'

This distribution is summarized as (29):

(29) Necessary Conditions for Presence of *-nun*:

1. It appears only with a nonadjectival verb.⁶
2. It appears only in a nonpast clause.
3. It appears only with a limited number of sentential endings and one form of a conjunction.
4. It appears only in a clause without the modal *-keyss*.

The first condition supports a claim that the marker indicates imperfectivity or incompleteness. This approach seems appealing to many (cf. H. Lee 1991), since a sentence with the marker often gives a progressive reading and adjectival verbs are incompatible with this reading. However, note that it is not necessarily because of the marker that nonpast sentences give a progressive reading; nonstative verbs are often interpreted as progressive, regardless of whether the marker *-nun* is present. For instance, (23a), (24a), and (28) above have progressive readings without the marker. Notice that this approach does not explain the third condition. Furthermore, it cannot account for the fact that the marker cannot appear in a past sentence, i.e. the second condition. For it is not unnatural to have an imperfective, or incomplete, past sentence. For example, there is a progressive form *-ko iss*, which can be considered as a form of imperfective. This form can appear with the past marker as shown in (30).

⁶It will be shown in Chapter III that there is no aktionsart class exclusively for nonadjectival verbs.

- (30) Pi-ka nayli-ko iss-ess-ta.
 rain-NOM come.down-PROG be-PAST-DEC
 'It was raining.'

We agree with the view, (cf. Yoo (1993)), that the first condition is not semantic but morphological in nature. This view would be supported by a pair of verbs that have the same meaning but behave differently with respect to the marker. *Iss* and *concauha* are such a pair.⁷ They both mean 'to exist'. However, it is illustrated in (31) and (32) that *concauha* requires *nun*, whereas *iss* cannot appear with it.

- (31) a. Mwul-ey-to sanso-ka iss-ta.
 water-in-also oxygen-NOM exist-DEC
 'Oxygen exists in the water too.'
 b. *Mwul-ey-to sanso-ka iss-nun-ta.
 water-in-also oxygen-NOM exist-NUN-DEC
- (32) a. *Mwul-ey-to sanso-ka concauha-ta.
 water-in-also oxygen-NOM exist-DEC
 b. Mwul-ey-to sanso-ka concauha-nun-ta.
 water-in-also oxygen-NOM exist-NUN-DEC
 'Oxygen exists in the water too.'

Given these examples the first condition is regarded best as morphological in nature: the ability to inflect with *-nun* is essentially an arbitrary property possessed by nonadjectival verbs but not by adjectival verbs. Consequently, we will decide against the aspect marker approach.

Then, we are left with two plausible analyses for the marker, outlined in (33):

(33) **Views on Nonpast and *-nun***

1. **the nonpast marker analysis:** nonpast has two phonetic representations, *-nun* and the null marker:

⁷*Paucokha* and *mocala* are another such pair meaning 'to lack': adjectival and nonadjectival, respectively.

- a. *-nun* occurs with a nonadjectival verb in a declarative mood.
 b. the null marker \emptyset occurs elsewhere.

2. **the mood marker analysis:** nonpast has just one representation the null marker. *-nunta* and *-ta* are simply two allomorphic sentential endings which mark the assertive mood and their distribution is morphologically conditioned.⁸

The second condition in (29) above suggests that *-nun* marks nonpastness of the clause it appears in; *-nun* never cooccurs with the past tense marker *-ess*. But the tense marker analysis can be regarded as reasonable only if we make two assumptions which will explain the other conditions, namely that (a) a tense marker can distinguish between subcategories of verbs, and (b) it can distinguish between sentential endings. Also, the nonpast marker analysis must explain the fourth condition: why *-nun* cannot cooccur with the modal *-kegss* if the past tense marker *-ess* can? Intuitively, however, it does not seem natural for a tense marker to appear with a certain class of verbs, but not with other classes of verbs. Moreover, it seems unnatural for a tense marker to distinguish between a question and an assertion. Likewise, it would be quite suspicious that a tense marker could not appear before a conjunction. It should be noted at this point that the past tense marker does not distinguish any of these environments. It seems highly unlikely for two contrasting tense markers to have strikingly different distributions.

⁸One may think of another mood marker analysis that views *-nun* as a nonpast modal with a stronger force than *-kegss*. This would explain the non-cooccurrence of *-nun* with the modal *-kegss* if we assume that there is a constraint against multiple modals. This analysis also explain why it cannot cooccur with the past tense marker *-ess*, since it would be incompatible to have the past tense with the nonpast modal.

However, this approach cannot explain why *-nun* cannot occur with an adjectival verb and why it has to occur with a nonadjectival verb for a nonpast reading, as one would expect a modal to be an optional element. Also, this approach cannot explain why *-nun* does not occur in a question and some other endings.

On the other hand, the mood marker approach does not explain (a) why *-nun* cannot cooccur with the past tense marker, since we would expect to make an assertion about the past, (b) why the alternation between *-nunta* and *-ta* is morphologically conditioned, and (c) why 'accidentally' there are some other endings and one conjunction with the same morphologically based alternations.

Without a knock-down argument for one way or the other, the two approaches are competing. Noting that choosing one over the other is not really a semantic decision but rather a morphological one, we will adopt the nonpast marker approach.

Interpretation of Nonpast

In descriptive terms, there are many uses of a nonpast-tensed sentence. We will consider these uses and attempt to see what semantic contributions nonpast tense in Korean makes. The major uses can be classified according to what kind of temporal interpretation they are compatible with, as listed in (34):

(34) Uses of a Nonpast Sentence⁹

1. Events in progress at the time of utterance
2. States holding at the time of utterance
3. Events occurring at a time later than the time of utterance
4. Generic or habitual events and states, or eternal truth
5. Events or states holding, or occurring, at a time encompassing the time
of utterance

⁹We may consider (1) and (2) as subcases of (5).

First of all, a nonpast sentence may describe an event in progress at the time of utterance.¹⁰ This is the use in (35). Notice that being in progress, the event is understood not to be completed at the time of speech.

- (35) Cikum Mary-ka nommwun-ul ssu-nun-ta.
now Mary-NOM paper-ACC write-NONPAST-DEC
'Mary is writing a paper now.'

A second type of use, i.e. describing a state holding at the time of utterance, is exemplified in (36).

- (36) Onul nalssi-ka cham col- ϕ -ta.
today weather-NOM very good-NONPAST-DEC
'The weather is very good today.'

A third type of use is shown in (37), where the described event is understood to occur at some time later than the time of utterance.

- (37) Nayil Mary-ka o-nun-ta.
tomorrow Mary-NOM come-NONPAST-DEC
'Mary comes tomorrow.'

A fourth and a fifth type of use are given in (38) and (39), respectively. These uses are similar to each other in the sense that they both describe situations that hold not just at the time of utterance but also at a time before and/or after it. For the generic sentence in (38) is construed as a statement not about the specific time of utterance, but rather about the general time frame surrounding it.

- (38) Kay-nun cic-nun-ta.
dog-TOP bark-NONPAST-DEC
'Dogs bark.'

¹⁰Strictly speaking, this is only true in a matrix sentence, since again tenses are relative and not deictic in Korean, as we will see later in Chapter 5. In other words, a nonpast clause which is embedded does not have to describe an event occurring at the time of utterance.

- (39) Mary-ka (eccc-pwuthe) (nayil-kkaci) Seoul-ey memwul-nun-ta.
 Mary-NOM yesterday-from tomorrow-until Seoul-in stay-NONPAST-DEC
 'Mary stays in Seoul from yesterday until tomorrow.'

As Yoo (1993, to appear) contends, all of these can be generalized in such a way that the nonpast tense is used to describe eventualities that have not yet been completed at the time of utterance. To represent it in an informal way, a 'simple' nonpast sentence describes eventualities which hold at a time specified as in (40).¹¹

- (40) If a simple sentence is nonpast-tensed, that sentence describes an eventuality which occurs later than the time of utterance or holds at a superinterval of the time of utterance.

In other words, nonpast tense indicates that eventuality hold in the future or in a superinterval of the speech time. However, if we take a closer look at the proposed generalization of the nonpast, we immediately realize that it appears to make a wrong prediction with respect to statives. For according to (40), a sentence like (41), as well as (37) repeated here, should be possible, which we find unacceptable. Thus, a question arises as to why (41) cannot have a future reference and how we can explain it without changing our position about the nonpast marker.

- (37) Nayil Mary-ka o-nun-ta.
 tomorrow Mary-NOM come-NONPAST-DEC
 'Mary comes tomorrow.'
- (41) #John-i nayil hayngpokha- ϕ -ta.
 John-NOM tomorrow happy-NONPAST-DEC
 (intended) 'John is happy tomorrow.'

¹¹Notice that we put scare quotes around the word *simple* above, because this description is meant to be true only in a simple clause. As mentioned in the above, Korean tenses are relative, thus reference to the utterance time should be relativized in an embedded clause.

We suspect that this is not a problem stemming from a flaw in the truth conditional definition of the nonpast tense. Instead, we conjecture that a stative predicate like *hayngpokha* is not compatible with a definite assertion about future, as a nonstative verb like *o* 'to come' can. Normally we seem to conceive of the world in such a way that somebody's happiness in a future time cannot be determined by some concrete measure at the speech time, while someone's arrival can be. For instance, one can plan to arrive at a certain place at a certain time; but, it is not as natural to plan to be happy at a certain time. Likewise, we as listeners may take someone's assertion about a future event of arrival as being supported by some physical evidence, e.g. the flight schedule on a computer screen, to be accessible to the speaker. Therefore, this type of assertion is acceptable for nonstative verbs. However, we may not usually be ready to accept an assertion about happiness in some future time; therefore, it would require a special context for a stative verb to be acceptable in this construction.

This view seems to be supported by the fact that with a modal *-keyss*, which weakens the assertive force, it becomes acceptable as in (42). Note that the modal does not provide futurity but it adds presumptive modal force, as will be shown in the next section.

- (42) John-i nayil hayngpokha- ϕ -keyss-ta.
 John-NOM tomorrow happy-NONPAST-MOD-DEC
 'John will be happy tomorrow.'

In other words, the sentence (41) is unacceptable for pragmatic reasons. If a plausible reason is given for asserting about a future time, nonpast statives can indeed refer to a future time. For instance, when (43) is asserted by a meteorologist, it is a

perfectly acceptable sentence, whereas this sentence would be unacceptable if spoken by a nonprofessional.

- (13) Nayil nalssi-ka cham coh- ϕ -ta.
tomorrow weather-NOM very good-NONPAST-DEC
'The weather is very good tomorrow.'

For our convenience we will often omit the specification of the implicit nonpast marker from here on, if specific needs do not arise.

2.1.3 *-keyss* as a modal

The marker *-keyss* had frequently been regarded as a future tense marker by most traditional grammarians before the era of generative grammar (cf. Choi 1935). Though it can be found to be treated as such in some of the current linguistic literature as well, the majority of current literature views it as a modal of presumption or volition (see Yang 1972, C. Lee 1973, Suh 1977, Nam 1978, Au 1980, Song 1988, Chong 1990, H. Lee 1991, Yoo 1993). We agree with the latter position that it is a modal. Several arguments for this position will be presented below. Refer to Au (1980) for a more detailed discussion.

Notice that there seems to be reason to treat the marker as pertaining to futurity, especially when we consider a sentence like (14).

- (14) Nayil pi-ka o-keyss-ta.
tomorrow rain-NOM come-KEYSS-DEC
'It will rain tomorrow.'

However, it becomes immediately clear that the above use is only one special case of more general sense of the marker. First, notice that the past marker can, and must,

appear with *-keyss* in a sentence like (15) where the relevant event is located in the past, as the absence of the past marker leads to an ungrammatical sentence in (16).

- (15) Ecey pi-ka o-~~css~~-keyss-ta.
yesterday rain-NOM come-PAST-KEYSS-DEC
'Probably it rained yesterday.'
- (16) *Ecey pi-ka o-keyss-ta.
yesterday rain-NOM come-KEYSS-DEC

Also, the marker can appear with a sentence involving present events as in (17).

- (17) Pakkey pi-ka o-ko iss-keyss-ta.
outside rain-NOM come-PROG exist-KEYSS-DEC
'Probably it is raining outside.'

Thus, generalizing the facts in (14)–(17), we can conclude that locating events within the past, present, or future is not the function of *-keyss* but rather that of the past and the nonpast markers. Though there appears to be no tense marker in (14) and (17), recall that it was concluded in the previous section that the nonpast marker is null in this case. Therefore, the present and the future events are compatible with the nonpast tense.

Furthermore, note that *-keyss* differs from the tense markers syntactically. While tense markers are obligatory as shown in (15) and (16), *-keyss* is optional. Of course, it restricts the meaning of the sentence in which it appears. Thus, when we remove the marker from (14), as in (18), it becomes a stronger assertion. As a result, if the weather turns out to be dry tomorrow, a speaker of (18) would be more liable to a charge of misinformation than one of (15) would be. Observe that this difference in degree of certainty is one typical kind of information which modals convey.

- (48) Nayil pi-ka o-nun-ta.
 tomorrow rain-NOM come-NONPAST-DEC
 'It rains tomorrow.'

In conclusion, the marker *-kcyss* and the tense markers are independent of each other.

2.2 Temporal Locating Adverbials

This section will focus on the interaction between tenses and temporal adverbials. Though there are other kinds of temporal adverbials whose behaviors are different from the kind discussed here, we will limit our discussion to adverbs like *yesterday*, which are called 'frame adverbs' by Bennett and Partee (1972) or 'locating adverbials' by Kamp and Reyle (1993). In the discussion, we will use English as well as Korean examples, as historically these discussions started with English. Adverbials other than locating adverbs will be discussed in Chapter 3.

2.2.1 Interactions between Tense and Temporal Adverbials

With regard to tenses and temporal adverbs, we consider particularly important those issues discussed below in this subsection. Thus, we will attempt to account for as many of them as possible in our approach.

Interpretation of Tense

Traditional Priorian tense logic takes standard predicate logic and enriches it in two respects. First, truth is defined not just relative to a model and an assignment function but also relative to a time, i.e. evaluation time. And second, tense operators such as P and F are introduced, and defined as existential quantification over times.

Thus, in Priorian tense logic a simple past sentence has a schematic truth clause like (49), where $t' < t$ means that t' precedes t .

- (49) $P\phi$ is true in a model \mathcal{M} , with respect to an assignment function g at time t
 iff $\exists t'(t' < t \ \& \ \phi$ is true in \mathcal{M} , g at time $t')$

Among the limitations of traditional tense logic, Partee (1973) points out that tense cannot be regarded as a simple existential quantification over times (p. 602):

The deictic use of the Past tense morpheme appears in a sentence like (3):

- (3) I didn't turn off the stove.

When uttered, for instance, halfway down the turnpike, such a sentence clearly does not mean either that there exists some time in the past at which I did not turn off the stove or that there exists no time in the past at which I turned off the stove. The sentence clearly refers to a particular time – not a particular instant, most likely, but a definite interval whose identity is generally clear from the extralinguistic context.

To make it more explicit, the meaning of the sentence cannot be captured correctly by either of the likely Priorian formulae in (50).

- (50) a. $\neg P[I \text{ turn off the stove}]$
 b. $P\neg[I \text{ turn off the stove}]$

On the one hand, (50a) is too strong. Namely, it would be true only if the speaker has never turned off the stove. On the other, (50b) is much too weak. It asserts that the speaker didn't turn off the stove in the past one time or another. As a result, it would be able to be false only in a highly unlikely situation in which the speaker continuously and iteratively turned off the stove.

Interactions

Dowty (1979:323) pointed out that purely Priorian tense logic is not well-equipped to handle a sentence like (51) compositionally. Subsequently many others, including Bacuerle (1980), Stump (1981,1985), Hinrichs (1981,1985), and Ogihara (1992), have discussed this problem for classical tense logic.

(51) John left yesterday.

John-i ecey ttena-ess-la
 John-NOM yesterday leave-PAST-DEC
 'John left yesterday.'

The sentence (51) seems to make reference to time in two different ways. The tense inflection on the verb indicates that John's leaving occurred in the past, and the time adverb *yesterday* specifies further that the event happened during the time period one day before the time of utterance. Moreover, these temporal elements appear to be syntactically independent – the tense is a suffix realized on the verb, while *yesterday* is an adverb. If we tried a Priorian approach for both the temporal elements in (51), we would adopt two operators P and Y as in (52) corresponding to the temporal elements in (51).

(52) a. $[[P\varphi]]^i = 1$ iff $[[\varphi]]^{i'} = 1$ for some $i' \prec i$.

b. $[[Y\varphi]]^i = 1$ iff $[[\varphi]]^{i'} = 1$ for some i' within the day preceding i .

With these operators, the only obvious ways to represent (51) are (53). However, neither (53a) nor (53b) is a correct description of the understood reading of (51).

(53) a. $P[Y[\text{John leaves}]]$

b. $Y[P[\text{John leaves}]]$

The formula (53a) directs us first to some time in the past, and then to some time on the day before that time. On the other hand, (53b) first directs us to the day before the utterance time, then to some time in the past of that time. Both (53a) and (53b) allow the time of John's leaving to be too far in the past. For example, they allow the interpretation that John left a year ago. Dowty (1979) thus concludes that tenses and temporal adverbs in this case do not have scope over each other.

Multiple Temporal Adverbs

Natural languages seem to allow more than one temporal adverb in a clause. For instance, sentences like (54), where there are five adverbial phrases, are commonly used (with this example taken from Dowty (1982:38)).

(54) I first met John Smith at two o'clock in the afternoon on Thursday in the first week of June in 1942.

Though the string *at two o'clock ... in 1942* could be taken as one constituent, we prefer a theory capable of treating multiple temporal adverbs not as a single syntactic unit, in particular when there are sentences like (55).

(55) On Thursday John left in the afternoon.

Mokyoil-ey John-i ohwu-cy ttena-ess-la
 Thursday-on John-NOM afternoon-in leave-PAST-DEC
 'On Thursday John left in the afternoon.'

The null hypothesis would be that the two adverbs in (55) do not constitute a single syntactic unit, since *on Thursday* and *in the afternoon* are separated, though we acknowledge that they could be viewed as one discontinuous constituent.

The Onion Effect

It has been observed about multiple temporal adverbial clauses that the orders of adverbials affect readings involving them. For example, Roberts (1994) maintains that (56), with non-parenthetical intonation of the second temporal adverbial clause, is not synonymous with (57), though the only difference between the two sentences is the orders of the adverbial clauses. Note that Korean examples show the same effect; but both adverbials have to appear before the main verb, due to a syntactic constraint requiring the main verb to appear in the sentence final position.

(56) When Joan was in Kansas City, she took a walk after she gave her talk.

Joan-i Kansas-ey iss-ulttay, palphyo-lul ha-unhwu,
 Joan-NOM Kansas-in exist-when presentation-ACC do-after
 sa chaykha-ess-ta
 take.a.walk-PAST-DEC
 'When Joan was in Kansas City, she took a walk after she gave her talk.'

(57) After Joan gave her talk, she took a walk when she was in Kansas City.

Joan-i palphyo-lul ha-unhwu, Kansas-ey iss-ulttay,
 Joan-NOM presentation-ACC do-after Kansas-in exist-when
 sa chaykha-ess-ta
 take.a.walk-PAST-DEC
 'After Joan gave her talk, she took a walk when she was in Kansas City.'

According to her, (56) implicates that Joan gave her talk, and took her walk, while in Kansas City, whereas we assume that if Joan gave her talk in some city other than Kansas City, the situation can be described correctly by (57), but not by (56). This is a case where linear precedence affects scope relations between temporal adverbial clauses in such a way that a preceding clause has a wider scope than a following one,

what Roberts calls 'an onion effect', a metaphor of layers of embedded modifications by temporal adverbials.

2.2.2 Temporal Adverbials and Reference Time

The idea of viewing temporal adverbs like *yesterday* and *now* in English as restrictions on reference points, or reference times as they are more commonly called, has been popular since Reichenbach (1947) introduced the notion of reference point, where the reference point is the temporal perspective from which an event is viewed. He claimed that every locating adverbial refers to the reference point of the sentence, as is clear from the following passage (p. 294).

When a time determination is added, such as is given by words like 'now' or 'yesterday', or by a nonreflexive symbol like 'November 7, 1944', it is referred, not to the event, but to the reference point of the sentence. We say, 'I met him yesterday'; that the word 'yesterday' refers here to the event obtains only because the points of reference and the event coincide. When we say, 'I had met him yesterday', what was yesterday is the reference point, and the meeting may have occurred the day before yesterday.

However, we find the notion of reference time unnecessary in Korean on two grounds.

First, notice that Reichenbach is silent about the possibility of these adverbs referring to the event times. In this regard, Bertinetto (1986) argues that temporal adverbials refer to two distinct kinds of times. According to him, (58) may have two readings paraphrasable as in (59).

(58) John had left at 2 p.m.

(59) a. John had left (exactly) at 2 p.m.

b. By 2 p.m. John had (already) left.

The time adverb *at 2 p.m.* in (59a) apparently refers to the event time¹², while the one in (59b) refers to the reference time, which is later than the event time. Thus, Reichenbach's assertion about temporal adverbials appears to be too strong to explain the two uses pointed out in (59).

Secondly, Reichenbach's only motivation for introducing the notion of reference point was to account for complex tenses in English. As shown in (60), where commas indicate simultaneity and dashes indicate that the time on the left is temporally prior to the one on the right, event time and reference point are distinguished only for complex tenses like past perfect and present perfect, (where E,R, and S stand for event time, reference point, and speech time respectively):

(60)	Structure of Tense (Reichenbach 1917:297)
	Structure Traditional Name
	E -R, S Past perfect
	E,R, S Simple past
	E, S,R Present perfect
	S,R,E Present
	S -R,E Simple future
	S -E -R Future perfect

Naturally then, the lack of complex tense in Korean seems to undermine any reference to reference time. Once we assume that Korean does not have complex tenses, then adopting Reichenbach's three parameters of time would not hurt, but it would not help much either, for event time and reference time would always coincide in the

¹²To be more general, it refers to a time containing the event time, for there are examples like (i), where *yesterday* is not understood to refer to the reference time, but the period of *yesterday* is obviously not identical to the event time; it is a temporal frame for the event.

(i) I had met him yesterday.

Korean tense system. In other words, reference time is unnecessary for us, at least for the purposes of this study.

However, one might find it convenient to nevertheless use a notion like reference time even for Korean. For instance, as Hinrichs (1985) suggests, the deictic nature of the Partee example in the above, repeated here, can be accounted for by introducing some notion of contextually given time, which is close in spirit to Reichenbach's reference point. Notice that a Korean version of the sentence (61) exists that needs context for its intended reading just like the English sentence.

I didn't turn off the stove.

(61) Stove-lul an kku-ess-ta.
 stove-ACC not turn.off-PAST-DEC
 'I didn't turn off the stove.'

With the help of this notion, the sentence can be understood as pertaining to the contextually salient time, i.e. the reference time: to mean that the speaker didn't turn off the stove during the reference time, but not necessarily during the whole past time as a pure Priorian tense logic requires.

Attractive as this use of reference time appears to be as a way of capturing deictic nature of tense, we recognize with Roberts (1994) that the Partee example is a species of general domain restriction in natural language. Thus, we will leave this phenomenon to be explained by a more general theory of domain restriction rather than attributing this case of domain restriction as part of lexical meaning of tense involving reference time. Instead, we will allow the existential closure of event vari-

ables over a discourse to undergo domain restriction: thus, the deictic nature of tense can be captured by domain restriction on the events described.

2.3 Formal Descriptions

We aim at a semantic description that is precise enough to be falsifiable. Also, we take compositionality as our guiding methodology. We consider model-theoretic semantics to be most fitting to our purposes. The particular version of model-theoretic semantics that we adopt and revise for our purposes is that of Montague Semantics (cf. Montague 1973). This is because it affords us the most explicit intra-sentential analysis in a compositional way.

2.3.1 Preliminaries

We will adopt the Davidsonian event semantics which regards action sentences as having implicit event arguments (cf. Davidson 1967b). Accordingly we analyze a sentence such as (62) as asserting that there occurred an event in the past that is a leaving of John, as represented in the logical form in (63).

(62) John left.

(63) $\exists e[\text{leave}(j,e) \ \& \ \text{past}(e)]$

Notice in (63) that the intransitive verb *leave*, classically considered as one-place, is treated as two-place. Likewise, transitive verbs will be treated as three-place in our semantics. We find one of the arguments for the Davidsonian approach appealing, when we consider a sentence such as (64), where the pronoun *it* seems to refer to the

event of buttering. The Davidsonian approach makes it possible to represent this in a simple way, as in (65).

(64) Jones buttered the toast and he did it in the bathroom.

(65) $\exists e[\text{butter}(j,\text{the-toast},e) \ \& \ \text{past}(e) \ \& \ \text{do-in-the-bathroom}(j,e)]$

We will go one step further than Davidson and follow Parsons (1990) and many others in assuming that not just action sentences but every sentence makes implicit reference to an event.¹³ Frequently we will use Bach's (1986) *eventualities*, or *events*, as a cover term for events, states, and activities. When a need arises to distinguish between them, we will make it clear. We will view eventualities as special kinds of entities that entities are sorted into individuals and eventualities. Accordingly, we will introduce a subtype *e* for eventuality, in addition to the type of truth value *t* and the type of entity *c*. Thus, a verb phrase is represented as the type $\langle c, \langle e, t \rangle \rangle$.

Moreover, we will adopt Kamp (1979) and van Benthem's (1983) lines of approach in taking events as primitives and viewing intervals and instants as derived from events. Alternatively, one might take intervals as primitives and derive events from intervals: events as properties of times as Montague does. According to the latter method, if two occurrences occupy the same temporal location, they are defined to be the same event. This is unintuitive. Thus, we adopt the first method. Notice

¹³We recognize that we will be hardpressed to explain the sentences in (i) as implicit descriptions about events if we maintain the intuitive notion of event.

- (i) a. This event occurred in the past.
 b. It is irrational.
 c. Donkeys are mammals.

that there is another possibility that posits both events and intervals as primitives. Our choice is made simply because deriving one from the other makes the ontology of the model simpler. However, our analysis does not crucially hinge on this choice in any way. Below we list some definitions of event relations, taken from Landman (1991:196).

- (66) An *event structure* Υ is a tuple $\langle E, \leq, \prec, \subseteq, \circ \rangle$ (of which \subseteq and \circ are derived relations), where:
1. E is a non-empty set of events.
 2. \leq is a partial order, the relation of part-of, i.e. subevent relation.
 3. \prec is a strict partial order, i.e. temporal precedence on events.
 4. $\subseteq := \lambda e_1 \lambda e_2. \forall c [e_2 \prec e \rightarrow e_1 \prec c] \ \& \ \forall c [c \prec e_2 \rightarrow c \prec e_1]$, i.e. temporal inclusion on events.
 5. $e \subseteq e' \rightarrow e \subseteq e'$
 6. $\circ := \lambda e \lambda e'. \exists c_1 [c_1 \subseteq e \ \& \ c_1 \subseteq e']$, i.e. temporal overlapping relation on events.

We will also adopt an interval structure I , a substructure of Υ , generated by the above event structure $\langle E, \prec, \subseteq \rangle$. Accordingly, the binary relations \prec, \subseteq, \circ are also defined between an event and an interval, or between intervals:

- (67) The *interval structure* I generated by $\langle E, \prec, \subseteq \rangle$ is a tuple $\langle [E]_{\equiv}, \prec, \subseteq, \circ \rangle$, where t, t_1 , and t_2 are elements of $[E]_{\equiv}$:
1. $\equiv = \lambda e_1 \lambda e_2. e_1 \subseteq e_2 \ \& \ e_2 \subseteq e_1$
 2. $t_1 \prec t_2$ iff $\exists c \in t_1 \exists c' \in t_2 : c \prec c'$
 3. $t_1 \subseteq t_2$ iff $\exists c \in t_1 \exists c' \in t_2 : c \subseteq c'$
 4. $t_1 \circ t_2$ iff $\exists c [c \in t_1 \ \& \ c \in t_2]$
 5. $e \prec t$ iff $\forall e' \in t : e \prec e'$, and
 $t \prec e$ iff $\forall e' \in t : e' \prec e$
 6. $e \subseteq t$ iff $e \in t$, and
 $t \subseteq e$ iff $\forall e' \in t : e' \subseteq e$
 7. $e \circ t$ iff $\exists c' [c' \subseteq e \ \& \ e' \in t]$

2.3.2 Derivations

In this section, we will concentrate on the derivations of the sentences (68) (70) below, with an assumption that they share structures and therefore undergo the same derivational steps.

- (68) John-i ttena-ess-ta.
John-NOM leave-PAST-DEC
'John left.'
- (69) Ecey John-i ttena-ess-ta.
yesterday John-NOM leave-PAST-DEC
'John left yesterday.'
- (70) Nayil John-i achim-cy ttena-nun-ta.
tomorrow John-NOM morning-in leave-NONPAST-DEC
'Tomorrow John leaves in the morning.'

We will draw on Stump (1981, 1985) and follow some of his rules for English in our treatment of Korean. But we will depart from his PTQ-style (Montague 1973) syntax in handling case markers and verb inflections. Noun phrases will appear in the list of basic expressions with case markers attached. Likewise, verbs will be listed in fully inflected forms, including tense and mood markers. Thus, there will not be a tense rule in our syntax. Though this may be viewed as a mostly stylistic departure from the orthodox PTQ-style, there is at least one advantage for our syntax. Recall that there are two types of verbs in Korean, viz. adjectival and non-adjectival and that each type has different inflections for the declarative mood with the nonpast tense. Thus, if we followed PTQ and introduced a tense rule at the sentence level, we would have to adopt a feature percolation mechanism of the sort used in Generalized Phrase Structure Grammar (Gazdar et al. 1985), so that features of adjectivalness would be

transmitted up to the sentence level. Though this would be one way of achieving the right inflections for verbs, our way is less complex and more intuitive.

A category *temporal abstract* is used in Stump's interval-based system, in part to account for iterated temporal adverbials as independent constituents. An expression of the category of temporal abstract has the same phonological form as a sentence; but it is treated as denoting the set of times at which the corresponding proposition is true. As a first step we will adopt this category and accommodate it to reflect our event-based system and we will call it an 'event abstract', (hence EAb), i.e. an expression of category EAb denotes a set of events.

The main tense adverb rule in (71) modifies a given event abstract, yielding yet another event abstract, thus making it possible for the rule to be applied recursively. Then, the existential closure rule in (72) provides existential quantification over events, yielding the final translation of a sentence, a proposition.

(71) Main Tense Adverb Rule:

S12. If $\alpha \in P_{MTA}$ and $\beta \in P_{EAb}$, then $F_{12}(\alpha, \beta) \in P_{EAb}$, where $F_{12}(\alpha, \beta)$ is $\alpha\beta$.

T12. Functional application.

(72) Existential Closure:

S13. If $\alpha \in P_{EAb}$, then $F_{13}(\alpha) \in P_t$, where $F_{13}(\alpha)$ is α .

T13. If $\alpha \in P_{EAb}$ and α translates as α' , then $F_{13}(\alpha)$ translates as $\exists e[\alpha'(e)]$.

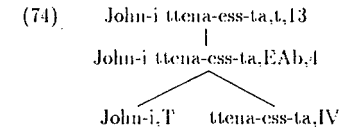
With an additional but fairly obvious rule in (73) all of the sentences in (68)–(70) in the above can be derived. Note that in our formalism, an expression of the category

IV has a semantic type $\langle e, \langle e, t \rangle \rangle$, a function from individuals to sets of events; an expression of the category T, e.g. NP, is of type $\langle \langle \alpha \langle e, t \rangle \rangle, \langle e, t \rangle \rangle$.

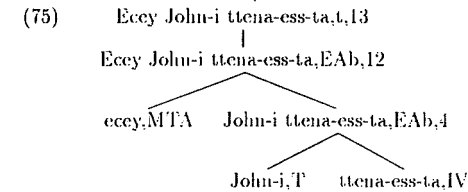
(73) S4. If $\alpha \in P_T[nom]$ and $\beta \in P_{IV}$, then $F_4(\alpha, \beta) \in P_{EAb}$, where $F_4(\alpha, \beta)$ is $\alpha\beta$.

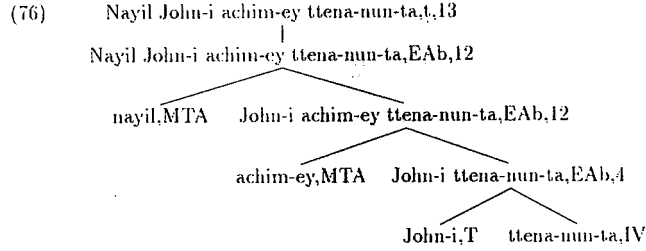
T4. Functional application.

Now let us first take (68). We need two rules for this sentence, S4 and S13. The term phrase *John-i* takes the IV phrase as argument and results in an event abstract, which in turn undergoes the existential closure rule in the discourse. The analysis tree for it is given in (74):



As shown in the derivation (75), the sentence (69) undergoes basically the same steps as (74), with an addition of the Main Tense Adverb rule before the existential closure. Likewise, in (76) the Main Tense Adverb rule is applied twice for the sentence (70) with the two temporal adverbs.





The semantic derivational steps corresponding to (75) are illustrated in (79) below, along with the translations of lexical items and some abbreviatory notations in (77) and (78):¹⁴

- (77)
1. John-i,T $\Rightarrow \lambda \text{PP}(j)$
 2. ttena-ess-ta,IV $\Rightarrow \lambda x \lambda e [tcavc(x, c) \ \& \ c \prec s]$
 3. ecey,MTA $\Rightarrow \lambda P \lambda c [P(c) \ \& \ c \subseteq yest]$

- (78)
1. $past(c) \equiv [c \prec s]$
 2. $nonpast(c) \equiv [s \prec c \vee s \subseteq c]$
 3. $yest(c) \equiv [c \subseteq yest]$ ¹⁵
 4. $tomor(c) \equiv [c \subseteq tomor]$

- (79) 1. John-i ttena-ess-ta,EAb $\Rightarrow \lambda c [tcavc(j, c) \ \& \ c \prec s]$, by T1

¹⁴Tenses are relative in Korean. Thus, the suggested semantics for tense is technically not correct. However, since there is no empirical difference in a simple clause between relative and absolute tenses and also the suggested semantics is simpler, tense will be treated as if being absolute in this chapter; we will return to this matter and modify the system to accommodate this point in Chapter 5.

¹⁵Note that *yest* and *tomor* are deictically fixed to the speech time.

2. Ecey John-i ttena-ess-ta,EAb
 $\Rightarrow \lambda c [tcavc(j, c) \ \& \ c \prec s \ \& \ c \subseteq yest]$, T12
 $\Rightarrow \lambda c [tcave(j, c) \ \& \ past(c) \ \& \ yest(c)]$, by abbreviations
3. Ecey John-i ttena-ess-ta,t $\Rightarrow \exists e [tcavc(j, c) \ \& \ past(e) \ \& \ yest(e)]$, by T13,
 the existential closure rule

With similar steps we will get (80) as the final translation for the derivation (76) above:

- (80) Nayil John-i achim-ey ttena-nun-ta,t
 $\Rightarrow \exists c [tcavc(j, c) \ \& \ nonpast(c) \ \& \ tomor(c) \ \& \ morning(c)]$

2.3.3 Summary

Our formal system in the present form addresses most of the issues raised in §2.2.1 above. First, we adopted an intersective analysis and factored out tenses and temporal adverbs, avoiding scope dependency between them. Secondly, our system takes temporal adverbs as functions from event abstracts to event abstracts. As a result, it allows multiple adverbial modification with adequate semantics, as shown in the example in (80) above. Moreover, we simplified the system considerably by not specifying reference time as part of the lexical meaning of temporal adverbials or tenses. Instead, we leave the context-dependent, anaphoric nature of tense as something to be handled by general domain restriction on the existential quantification over events in the final translation of a sentence.

The onion effect has not been addressed in this chapter, because it usually involves temporal adverbial clauses. This issue will be discussed in Chapter 5.

CHAPTER III

Temporal Adverbials and Aktionsarten

It has been observed crosslinguistically that certain temporal adverbials are compatible only with certain types of sentences and that the same temporal adverbials are used in different ways depending on the type of sentence in which they appear. These interactions are commonly accounted for by proposing that sentence meanings are categorized into different groups according to their temporal structures.

In this chapter we will discuss temporal adverbials and different types of sentential meanings, or *aktionsarten*, in Korean. In §3.1 we will examine different types of temporal adverbials and try to see exactly how they differ from each other. In §3.2 we discuss different types of sentential meanings and verb meanings in Korean. Then in §3.3, we will propose lexical semantics for major temporal adverbials which reflects the observed interactions between temporal adverbials and different sentential meanings.

3.1 Types of Temporal Adverbials

Though we are not particularly concerned with a taxonomy of temporal adverbials *per se*, it will be instructive to see how they behave and in what ways they differ from each other. This is particularly so because one of our goals is to find the best way

to represent the meanings of temporal adverbials. Though there are numerous differences among temporal adverbials, we will focus our study on how they are different from each other with respect to the issues listed below:

1. Whether a given adverbial locates events or describes the internal temporal structures of events.
2. Whether a given adverbial contributes to an existential or universal quantification over time.
3. Whether a given adverbial refers to a specific interval.
4. Whether a given adverbial demonstrates different behaviors depending on the type of sentence it appears in.

Thus, this section will serve as an empirical preliminary to the discussions to follow; in the ensuing sections and chapters, we will attempt to develop a semantics of adverbials which captures the differences to be mentioned below.

3.1.1 Locating vs. Measuring

Certain adverbials specify a temporal boundary or location for an eventuality; others, the length of event times. Let us call the former locating adverbials and the latter, measure adverbials, following Kamp and Reyle (1993). The adverbial *cccy* 'yesterday' in (1) is a locating adverbial; *yel sikan tongan* 'for ten hours' in (2), a measure adverbial. For example, Mary's leaving in (1) is understood to occur at some point during

the time denoted by *cccy* 'yesterday', whereas John's crying in (2) is understood to last for ten hours.

- (1) Mary-ka ecey ttena-ess-ta.
Mary-NOM yesterday leave-PAST-DEC
'Mary left yesterday.'
- (2) John-i yel sikan tongan wul-ess-ta.
John-NOM ten hour for cry-PAST-DEC
'John cried for ten hours.'

Some examples of each type are given below:

- (3)
 - Locating Adverbials:
cikum 'now', caknyen-ey 'last year', 1995 nyen-ey 'in 1995', yelum-ey 'in summer', panghak tongan-ey 'during a vacation', cengo-ey 'at noon', sey sikan hwu-ey 'after three hours', nayil kkaci 'by/until tomorrow', ecey pwuthe 'since yesterday', Mary-ka ttena-ess-ul tlay 'when Mary left', Mary-ka ttena-un hwu 'after Mary left'.
 - Measure Adverbials:
twu sikan maney 'in two hours', twu sikan-ey 'in two hours', twu sikan tongan 'for two hours'.

Locating adverbials often involve indexicals; indexical adverbials are fitting for the function of providing a temporal location for an event. Note that there are nonindexical locating adverbials like *panghak tongan-ey* 'during a vacation'. However, there are some constraints on locating adverbials. For instance, *twu sikan* 'two hours' is not allowed to appear with postpositions used only for locating adverbials such as *tongan-ey* 'during', *pwuthe* 'from', or *kkaci* 'until/by', as demonstrated in (4):

- (4)
 - a. #twu sikan tongan-ey 'during two hours'
 - b. #twu sikan pwuthe 'from two hours'
 - c. #twu sikan kkaci 'until/by two hours'

On the other hand, note that indexicals are not allowed to appear with a postposition for a measure adverbial.

- (5) a. #*caknyen tongan* 'for last year'
 b. #*nayil tongan* 'for tomorrow'
 c. #*ceey maney* 'in yesterday'
 d. #*caknyen maney* 'in last year'

Also notice that a measure adverbial cannot include a nonindexical temporal expression which is allowed in locating adverbials:

- (6) a. #*panghak maney* 'in a vacation'
 b. #*ychum maney* 'in a summer'
 c. #*owel-ey* 'in a May'

It is not difficult to see why locating adverbials are in complementary distribution with measure adverbials. For an event to be located with respect to a time, be it a precisely specified interval or a rough orientation, the locating time must have a clearly identified location. As mentioned above, indexicals are the canonical examples which are considered to be fixed in the time line. Being definite, they are understood to be in only one position on the time line in a given situation. For example, at any given utterance time there is only one position on a time line which is denoted by the adverb *ceey* 'yesterday'. Thus, an indexical adverbial can be used to locate an event in the most effective way. Nonindexicals such as *owel* 'a May' and *panghak*

'a vacation' are not as effective for this purpose as indexicals. Being indefinite, a nonindexical might refer to more than one location. It is not that everyone has only one vacation, all at the same time. Nevertheless, those indexicals single out some intervals from the rest. Namely, some intervals belong to a vacation time but other intervals do not. Therefore, specifying a vacation time restricts the possible location of a given event time.

On the other hand, items like *tuw sikan* 'two hours' cannot locate an event for the opposite reason; every interval belongs to a certain two hour duration as long as it is smaller than two hours. Hence, this type of item is useless for locating events. The only restriction it can bring is whether a given event time is smaller than, equal to, or larger than the interval denoted. This seems to be precisely the reason why only this type of item is used in a measure adverbial. Consider the temporal nouns in (7), which can be contained in a measure adverbial:

(7) **Prototypical Measure Adverbials:**

i nyen maney/tongan 'in/for two years':

kaywel 'month', *cwu* 'week', *il* 'day', *sikan* 'hour', *pwun* 'minute', *cho* 'second'

These nouns can also appear in a construction such as (8).

- (8) *Ku kikan-i i nyen-i-ess-ta.*
 the duration-NOM two year-be-PAST-DEC
 'The duration was two years (it was two years long.)'

Notice in (9) below that if a temporal noun cannot appear in a measure adverbial in (7), it cannot appear in the construction in (8), and vice versa:

- (9) a. #*twu ecey maney/tongan* 'in/for two yesterdays', #*twu owel maney/tongan*
'in/for two Mays'
- b. #*Ku kikan-i twu owel-i-ess-ta.*
the duration-NOM two May-be-PAST-DEC
(intended)'The duration was two Mays (it was two Mays long.)'
- c. #*Ku kikan-i twu ecey-i-ess-ta.*
the duration-NOM two yesterday-be-PAST-DEC
(intended)'The duration was two yesterdays (it was two yesterdays long.)'

Thus, measure adverbials must contain nouns which are units of time. Thus, the expressions listed in (7) are appropriate for measuring times, but items such as *owel* 'a May' and *ecey* 'yesterday' are not.

Some nonprototypical measure adverbials involve common nouns denoting times such as *pam* 'night', shown in (10):

(10) **Nonprototypical Measure Adverbials:**

- sahul pam maney/tongan* 'in/for three nights':
pam 'night', *achiim* 'morning', *kyewul* 'winter', *keyecel* 'season', *hoycen* 'round',
hoy 'inning'

Measure adverbials involving these nouns are nonprototypical in the sense that these nouns are not a proper measuring unit of time. In (11) below, which contains a measure adverbial *sahul pam-tongan* 'for three nights', note that the nouns in (10) are different from the ones listed in (7): e.g. (i) the duration of night is not consistent over time; (ii) not all times can be measured by it. Thus, several differences are exhibited between prototypical measure adverbials and nonprototypical ones. For instance, the sentence (12) below, with a prototypical measure adverbial *yel sikan-*

tongan 'for ten hours', can be truthfully uttered, as long as the speaker was in front of the phone for a full ten hours in the understood temporal frame. It does not matter whether the time spent in front of the phone was at any particular time of the day or whether she was there on twenty noncontiguous occasions, each time for 30 minutes. However, this kind of flexibility is not obtained for nonprototypical measure adverbials like *sahul pam-tongan* 'for three nights'. They cannot be used to measure just any event: *pam* 'night' can measure events only if they occur at 'night'. Let us take, for example, a situation in which the speaker was in front of the phone from midnight till midnight. Further, let us assume that a night is 8 hours long. In this situation (11) cannot be uttered truthfully. It is false because the adverbial *sahul pam-tongan* 'for three nights' is being used to measure an eventuality which obtained during daytime as well as nighttime. Thus, these adverbials restrict an event in question within the time denoted by the base noun; e.g. *sahul pam-tongan* 'for three nights' restricts an event to the period 'night', the time denoted by *pam*. In other words, these measure adverbials function as locating adverbials as well.

- (11) *Sahul pam-tongan cenhwathong aphey iss-ess-ta.*
three night-for telephone in front of exist-PAST-DEC
'I was in front of the telephone for three nights.'
- (12) *Yel sikan-tongan cenhwathong aphey iss-ess-ta.*
ten hour-for telephone in front of exist-PAST-DEC
'I was in front of the telephone for ten hours.'

There is another restriction on nonprototypical measure adverbials; they are not additive in the sense that *sahul pam* 'three nights', for instance, does not include times that consist of six half-nights. Thus, while (12) can be true when the ten

hours consist of 20 separate half hours, (11) cannot be uttered truthfully when the speaker waited for half a night for six days. Incidentally, measure adverbials like (13) are possible. However, note that (13) can only mean 'three full nights and one half night'.¹

- (13) *sahul pam-hako pan tongan*
 three night-and half for
 'for three and half nights'

3.1.2 Existential vs. Universal Quantifications

Most locating adverbials provide an eventuality with a temporal boundary, and the eventuality is meant to take place at some interval within the boundary. For instance, Mary's leaving in (1), repeated here, is asserted to occur at some point of yesterday as an interval. In other words, the adverbial *ecy* 'yesterday' presents the event in a temporal frame (cf. Bennett and Partee 1972:25).²

¹A literal interpretation of *sahul* is 'three days' rather than 'three'. Accordingly, *sahul pam-tongan* is glossed literally as 'for three days' nights'. Though *sey pam-tongan*, a literal counterpart of English *for three nights*, is possible, the former is more natural than the latter in Korean. Likewise, there is the same difference in naturalness in each pair in (i):

- (i) a. *sahul pam-tongan* 'for three days' nights' vs ?*sey pam-tongan* 'for three nights'
 b. *sahul achim-tongan* 'for three days' mornings' vs ?*sey achim-tongan* 'for three mornings'
 c. *sey hay kyewul-tongan* 'for three years' winters' vs ?*sey kyewul-tongan* 'for three winters'

Note that the relations between day and night, day and morning, or year and winter are functional. Thus, pairmates are equivalent in truth conditions: three days' nights are equivalent to three nights. For obvious reasons, *sey hoyca-tongan* 'for three rounds' and *sey inung-tongan* 'for three innings' do not have the nonliteral counterparts: there are no pairmates for them whose relations would be functional. For instance, *sey kyengki inung-tongan* 'for three games' innings' is not equivalent to *sey inung-tongan* 'for three innings'; they are not functional because one game has more than one inning.

²A locating adverbial such as *cenyo-ey* 'at noon' may not be considered as giving a boundary or a frame for an event: it is an instant which cannot serve as a frame. Such adverbials seem to identify event times. However, English adverbial *at noon* seems to have a sense that is more like that of *noon time*, i.e. the interval (up to an hour or so long) centered on noon. Thus, a sentence like (i) is

- (1) *Mary-ka ecey ttena-ess-ta.*
 Mary-NOM yesterday leave-PAST-DEC
 'Mary left yesterday.'

On the other hand, some locating adverbials such as *twu si pwuthe ney si kkaci* 'from two to four o'clock' and measure adverbials such as *yel sikan tongan* 'for ten hours' specify an interval throughout which some eventuality holds continuously. For instance, in (2), repeated below, it is asserted that John cried for the entire ten hours; not that he cried at some time during the ten hour duration.

- (2) *John-i yel sikan tongan wul-ess-ta.*
 John-NOM ten hour for leave-PAST-DEC
 'John cried for ten hours.'

Some examples of each type are given below. The two headings are given to reflect the fact that in formal semantics, the above-mentioned difference is captured commonly as two different types of quantification over intervals: the former is analyzed as existential quantification, the latter, universal quantification (cf. Taylor 1967, Verkuyl 1972, Dowty 1979).

- (14) • Existential Quantification:
nayil 'tomorrow', *ecy* 'yesterday', *caknyen-ey* 'last year', 1995 *nyen-ey* 'in 1995', *yelum-ey* 'in summer', *paughak tongan-ey* 'during a vacation', *sey sikan hwu-ey* 'after three hours', *nayil kkaci* 'by tomorrow', *Mary-ka ttena-ess-ul ttay* 'when Mary left', *Mary-ka ttena-un hwu* 'after Mary left'
- Universal Quantification:
yel sikan tongan 'for ten hours', *nayil kkaci* 'until tomorrow', *ecy pwuthe* 'from yesterday'

often found:

- (i) John had lunch at noon.

Note that while all the adverbials of existential quantification are locating adverbials, adverbials of universal quantification include both locating and measure adverbials. Furthermore, the membership of an adverbial is fixed in this respect; e.g., *eccy* 'yesterday' always involves existential quantification, regardless of what type of sentence it appears in. Likewise, *ycl sikan tongan* 'for ten hours' invariably relates an eventuality with a time for whose entire duration the eventuality obtains. Accordingly, these adverbials can be given semantics which reflects the distinction in quantification.

However, some seeming exceptions such as (15) and (16) are found. As a matter of fact, it is strongly implied that the eventuality in (15) holds the entire time denoted by the adverb. Moreover, it is inferred from (16) that it was true during the entire year.³

(15) John-i eccey sulphu-ess-ta.
John-NOM yesterday sad-PAST-DEC
'John was sad yesterday.'

(16) John-i caknyen-cy sumwu sal-i-ess-ta.
John-NOM last.year-in twenty age-be-PAST-DEC
'John was twenty last year.'

Despite these, note well that they do not necessarily refute the generalization about the quantificational difference. These examples are consistent with the conclusion that *eccy* 'yesterday' involves existential quantification. This is because being true at some point within the interval does not exclude the possibility being true throughout the interval. But adverbials of universal quantification such as *leu sikan*

³According to the Korean system of counting ages, everyone becomes one year older on New Year's Day, not on one's birthday. Therefore, in this society, someone's age does not change on a given day.

tongan 'for two hours' are different in requiring a sentence to be true at all times during the two hours.

3.1.3 Aspectual Adverbials

Temporal adverbials can be grouped together depending on whether and how their distributions are restricted with respect to certain aktionsarten. Terms such as *telic*, *atelic*, and *accomplishment* have not been defined so far in this dissertation. These concepts will be examined in more detail later in §3.2.⁴

(17) • Telics Only: *nayil kkaci* 'by tomorrow'

• Atelics Only: *yelsikan tongan* 'for ten hours', *eccey pwuthe* 'from yesterday',
nayil kkaci 'until tomorrow'

• Accomplishments Only: *yelsikan cy* 'in ten hours'

It is illustrated in (18) and (19) that *yclsikan cy* 'in ten hours' is compatible with predicates like *ku pyenci-lul ssu* 'to write the letter', but not with ones like *wul* 'to cry':

(18) John-i yelsikan ey ku pyenci-lul ssu-ess-ta.
John-NOM ten hour in the letter-ACC write-PAST-DEC
'John wrote the letter in ten hours.'

(19) #John-i yelsikan ey wul-ess-ta.
John-NOM ten hour in cry-PAST-DEC
(intended) 'John completed crying in ten hours.'

On the other hand, (20) and (21) show that *eccey pwuthe* 'from yesterday' is a mirror image of *ycl sikan cy* 'in ten hours' with respect to compatibility with predicates:

⁴*Nayil kkaci* can appear in both telics and atelics. It is listed in both categories because it yields a different interpretation for each category. See §3.2 below.

Table 2: Locating vs. Measuring

	Locating	Measuring
telic only	<i>nayil kkaci</i> 'by tomorrow'	<i>yelsikan cy</i> 'in ten hours'
atelic only	<i>eccy pwuthe</i> 'from yesterday'	<i>yelsikan tongan</i> 'for ten hours'

- (20) John-i ecey pwuthe wul-ess-ta.
 John-NOM yesterday from leave-PAST-DEC
 'John cried from yesterday.'
- (21) #John-i ecey pwuthe ku pyenci-lul ssu-ess-ta.
 John-NOM yesterday from the letter-ACC write-PAST-DEC
 (intended) 'John wrote the letter from yesterday.'

Refer to §3.2 where it is shown that predicates like *ku pyenci-lul ssu* categorically differ from ones like *wul*.

Note again that this distinction cannot be derived from the locating vs. measuring distinction. Some locating adverbials are compatible only with telics, e.g. *nayil kkaci* 'by tomorrow'; some others, only with atelics, e.g. *eccy pwuthe* 'from yesterday'. Similarly, some measure adverbials are compatible only with telics, e.g. *yelsikan mancy* 'in ten hours'; some others, only with atelics, e.g. *yelsikan tongan* 'for ten hours'. This is shown in Table 2:

3.1.4 Temporal vs. Event-based Adverbials

Most simple adverbials are based on a temporal noun. For instance, *caknyu.n-cy* 'during last year' consists of the temporal noun *caknyu.n* 'last year' and the postposition *cy*. Some adverbials such as *eccy* 'yesterday' and *nayil* 'tomorrow' have the same phonetic forms as a temporal noun. In any case, they all relate eventualities to the time denoted by the temporal noun on which they are based.

On the other hand, there are certain temporal adverbials based on an event-denoting noun. *Panghak tongancy* 'during a vacation' is such an example: it is based on the noun *panghak* which denotes an event of vacation. Thus, these adverbials can be regarded as relating eventualities to the event denoted by the complement noun.

Needless to say, all the temporal adverbial clauses are based on sentences. Once we assume that an event, or an eventuality, is what a sentence describes, a temporal adverbial clause basically relates an eventuality to the eventuality described by the sentence it contains.

3.1.5 Frequency Adverbials

Certain temporal adverbials indicate the number of times, or the frequency, that a type of event occurs. Some examples of frequency adverbials are given in (22):

- (22) • Frequency Adverbials:
hangsang 'always', *cenhye* 'never', *mayil* 'daily', *kakkum* 'sometimes', *cacwu* 'frequently', *hanpen* 'once', *yelpen* 'ten times'

Frequency adverbials are often concerned with event types rather than event tokens. Thus, they usually involve generic sentences.⁵ In this respect, they are distinguished from the other types of temporal adverbials.

⁵Note that *hanpen* 'once' or *yelpen* 'ten times' do not necessarily involve a generic sentence. Normally, a sentence like (i) is not considered to be generic:

- (i) John-i hanpen cenhwaha-ess-ta.
 John-NOM once call-PAST-DEC
 'John once called me.'

Therefore, frequency adverbials do not always involve generic sentences.

3.1.6 Summary of Section 3.1

We have distinguished temporal adverbials in terms of different parameters. Thus, it should be noted that one adverbial token is usually identified in terms of a combination of these parameters. For instance, in (2), repeated here, the adverbial *yel sikan tongan* 'for ten hours' is regarded as a measure adverbial, an adverbial of universal quantification, an aspectual adverbial, and a temporal based adverbial at the same time.

- (2) John-i yel sikan tongan wul-ess-ta.
 John-NOM ten hour for leave-PAST-DEC
 'John cried for ten hours.'

There are, of course, some correlations between parameters. For example, all adverbials of existential quantification over time are locating adverbials.

Notice also that though the notions are contrastive in each classification, this does not necessarily exclude the possibility that one adverbial belongs to both categories. The adverbial *cinan samil tongan* 'for the last three days' in (23) is a case in point. It is a locating adverbial because it specifies some particular time for the event. It is also a measure adverbial because it asserts that the duration is for three days.

- (23) John-i cinan samil tongan wul-ess-ta.
 John-NOM last 3 days for leave-PAST-DEC
 'John has been crying for the last three days.'

We will discuss locating, measure, and aspectual adverbials in §3.3 in connection with different aktionsarten. Temporal adverbial clauses, the major type of event-based adverbials, will be discussed in Chapter 5. Though they are an interesting semantic topic, frequency adverbials will not be discussed in this dissertation.

3.2 Aktionsarten in Korean

Jeong (1981) is considered to be the first comprehensive study of the aspectual classes of Korean predicates. For the most part, we find it descriptively adequate when we need to make reference to aktionsarten in Korean. Consequently, we review its classification in this section. Then, we will discuss one of its distinctions that we do not adopt: the proposed distinction between statives and nonstatives. Finally, we examine a group of verbs often called 'verbs of existence'. It will be concluded that they do not form a class distinct from adjectival verbs and that the name is not theoretically motivated.

3.2.1 On the Nature of Aktionsarten

Vendler (1967) distinguishes four categories of verbs, *states*, *activities*, *accomplishments*, and *achievements*, based on two exclusive temporal properties: *continuity* vs. *punctuality*, *homogeneity* vs. *heterogeneity*. A list of verbs and verb phrases is presented in (24) as examples.

(24)	states	activities	accomplishments	achievements
	know	run	awaken	recognize
	think	breathe	write a letter	arrive
	believe	push a cart	eat a cake	die

He uses a progressive form to test whether or not a verb is *continuous*. According to Vendler, if a verb appears naturally in a progressive form, it is either an accomplishment or an activity. For instance, in (26) as an answer for (25), (b) and (c) are natural but (a) and (d) are not. Hence, *run* and *write the letter* are continuous, i.e. either an

accomplishment or an activity, whereas *know* and *recognize* are noncontinuous, i.e. either a state or an achievement.

- (25) What is Mary doing?
- (26) a. #She is knowing the answer.
 b. She is running.
 c. She is writing the letter.
 d. #She is recognizing the trace.

Another test is the opposition between temporal homogeneity and heterogeneity. If a verb involves a homogenous eventuality— if any part of that eventuality is of the same nature as the whole: it is either a state or an activity. If a verb involves a heterogenous eventuality, it is either an accomplishment or an achievement. In this way, the two tests combined classify verbs into the four categories.

Discussion of the nature of *aktionsarten* is in order at this point, as it is crucial for a proper understanding of the terms as used in this chapter. We will distinguish between *aktionsarten* and *aspect*. Also, we recognize that *aktionsarten* cannot be adequately understood as pertaining to classes of verbs but that they should be analyzed as involving whole sentences. Moreover, *aktionsarten* are not taken to refer to different classes of sentences *per se*; rather, they refer to different eventualities described by different types of sentences.

First, we follow the common practice of distinguishing *Aktionsart* and *Aspect*. While *aspect* refers to different forms of verbs, *aktionsart* has been traditionally used to refer to different semantic classes of verbs. Thus, we frequently refer to perfective and imperfective aspects with respect to certain inflectional or derivational

morphemes bound to verbs. For instance, the aspectual difference between perfective and imperfective in Russian can be marked by the prefix *pro-*, as shown in (27); i.e. *čital* is imperfective, *pročital* is perfective.

- (27) a. Ivan čit-al.
 Ivan read-PAST
 'Ivan was reading/Ivan used to read.'
 b. Ivan pro-čit-al.
 Ivan PERF-read-PAST
 'Ivan read.'

On the other hand, different categories of verbs, or verb meanings, were recognized and identified as correlated with different *aktionsarten* in early work such as Vendler (1967): e.g. in English *believe* is a stative verb, but *run* is an activity verb.

Second, it has been recognized since Verkuyl (1972) and Dowty (1972) that lexical verbs do not determine the *aktionsart* of the sentence in which they appear as the main verb. Rather, the *aktionsart* of a given sentence depends not only on its verb but also on the arguments of the verb and the adverbial phrases in the sentence. For example, even though they have the same verbs, the sentences in (28) differ from those in (29) with respect to their *aktionsarten*, as suggested by the compatibility tests with *in/for an hour*: *for an hour* is compatible with *Mary ran*, but not with *Mary ran to the bar*; likewise, it is compatible with *Mary drank beer*, but not with *Mary drank a glass of beer*.

- (28) a. Mary ran (for an hour/#in an hour).
 b. Mary drank beer (for an hour/#in an hour).
 c. Mary wrote letters (for an hour/#in an hour).

- (29) a. Mary ran to the bar (in an hour/#for an hour).
 b. Mary drank a glass of beer (in an hour/#for an hour).
 c. Mary wrote a letter (in an hour/#for an hour).

Thus, aktionsarten should be regarded first and foremost as pertaining to entire sentences.

Third, we want to make it clear once again that in our use *aktionsarten* refer neither to classes of verbs nor to those of sentences; they are taken to refer to different eventualities which are described by different types of sentences. We are in line with Bach (1986) in this regard, but slightly differ from Dowty (1987) in the sense that he takes aktionsarten as categories of propositions. Our discussions will be independent of whether aktionsarten are defined on eventualities or propositions. Notice that our position is equivalent to Dowty's if we assume that propositions are categorized according to what kind of eventuality they describe.

Thus, as Dowty (1987:4) suggests, since aktionsarten are primarily defined as categories of propositions, or eventualities described by propositions, any classifications of verb meanings should be understood as secondary definitions via a default case. Once a sentence is taken as a default sentence when it does not have any category-changing adverbials or arguments such as measure phrases, bare plurals, or mass terms, then a verb is defined as being of aktionsart α if and only if such a default sentence formed with this verb is interpreted as correlated with eventualities of aktionsart α according to the primary definitions of aktionsarten.

Granted that aktionsarten are properly defined on the level of complete sentences, verb classifications are nonetheless of significant empirical importance when we consider the compositional nature of aktionsart. The aktionsart of a sentence depends in part on the presence or absence of certain phrases such as telic adverbials, measure phrases, bare plurals, and mass terms; however, lexical verbs also contribute to the aktionsart of the sentences in which they appear. For example, the contrast between (30) and (31) must be explained in terms of the difference between the verbs *kongpwuha* 'to study' and *cwuk* 'to die':

- (30) Mary-ka samnyeun tongan kongpwuha-ess-ta.
 Mary-NOM three.year for study-PAST-DEC
 'Mary studied for three years.'
 (31) #Mary-ka samnyeun tongan cwuk-ess-ta.
 Mary-NOM three.year for die-PAST-DEC
 (intended) 'Mary died for three years.'

In the discussions below, we will employ the following way of referring terms for ease of reference, with a caveat that the reader should be careful not to be confused between verb classes and aktionsarten:

- (32) a. A verb is called an α or an α verb if and only if a default sentence formed with this verb describes an eventuality of aktionsart α .
 b. A verb phrase is called an α or an α predicate if and only if a default sentence formed with this phrase describes an eventuality aktionsart α .
 c. A sentence is called an α or an α sentence if and only if it describes an eventuality of aktionsart α .

3.2.2 Jeong (1981)

Subscribing to Vendler's (1967) idea of classifying aktionsart with a limited set of properties and adopting Dowty's (1979) methodological tools, Jeong (1981) presents an aspectual study of Korean predicates. He also follows Vendler and Dowty in regarding aktionsarten as being different from each other essentially in temporal structure, as can be inferred from the criteria used in classifying predicates. They all, with one exception, involve temporal structures only.

Nine criteria are used to categorize *statives*, *punctuals*, *accomplishments*, and *non-accomplishments*. Jeong acknowledges a subcategory of *resultatives*, whose members belong either to *punctuals* or *accomplishments*. The four major categories are very similar to Vendler's *states*, *achievements*, *accomplishments*, and *activities*. Thus, let us refer to them as such, for Vendler's terms will be familiar to the reader. We will use *statives* and *states* interchangeably, as this use will eliminate a potential confusion or implication with *state* as a notion opposite from *event*. Predicates exemplifying each category are presented in (33).

- (33) a. states (Jeong's *statives*): aphu 'be sick', kophu 'be hungry', kil 'be long', iss 'exist', yeppu 'to be pretty'
 b. activities (Jeong's *non-accomplishments*): wus 'laugh', nol 'play', mil 'push', salangha 'love', coaha 'like'
 c. accomplishments: mantul 'make', cis 'build', piwu 'empty', nayli 'get off (a plane)', kuli 'draw (a picture)'
 d. achievements (Jeong's *punctuals*): kkuthna 'end', cwuk 'die', kichimha 'cough', ilh 'lose', pwuth 'pass (an exam)'
 e. result states (Jeong's *resultatives*): ip 'put on/wear', nup 'lie down', el 'freeze', cwi 'get a hold/grasp', tol '(head) turn/get mad'

States and activities together will be called *atelic*; accomplishments and achievements, *telic* (cf. Garcy 1957). Note that Jeong (1981) considers result states as a subcategory within accomplishments or achievements, as each result state verb either passes all the tests for accomplishments or all the tests for achievements. Thus according to him, accomplishments are divided into result state accomplishments and nonresult state accomplishments; likewise, achievements are divided into result state achievements and nonresult state achievements. However, we will take result state verbs as being distinct from accomplishments or achievements since there is a crucial difference between result state verbs and the other categories above. While the default sentence formed with a verb in the other categories has a corresponding aktionsart, a default sentence with a result state verb does not correspond to an independent aktionsart. Rather, this type of sentence describes a telic event as well as an atelic event, making reference to two aktionsarten, either an accomplishment event and a state, or an achievement event and a state. Therefore, we will try to understand result state verbs as a category of predicate without a corresponding category in the domain of aktionsarten.

Now, let us summarize the criteria used to distinguish between the different categories.

1. Testing for Statives

Three tests are listed to distinguish *statives* from the other aktionsarten.

- a. *Statives* do not occur with the *nunta* form of the declarative marker; they only appear with the *ta* form.

- (34) a. *Hanul-i phwulu-nunta.
sky-NOM blue-DEC
(intended) 'The sky is blue.'
b. *Nay-ka aphu-nunta.
I-NOM sick-DEC
(intended) 'I'm sick.'
c. Mary-ka ttena-nunta.
Mary-NOM leave-DEC
'Mary leaves.'

- (35) a. Hanul-i phwulu-ta.
sky-NOM blue-DEC
'The sky is blue.'
b. Nay-ka aphu-ta.
I-NOM sick-DEC
'I'm sick.'
c. *Mary-ka ttena-ta.
Mary-NOM leave-DEC
(intended) 'Mary leaves.'

b. In relative clause constructions, inflections of statives differ from those of nonstatives; the relativizer of the *un* form gives the nonpast tense for statives, but the past tense for nonstatives.

- (36) a. aphu-un salam
sick-REL person
'the person who is sick'
b. ton-i manh-un salam
money-NOM vast-REL person
'the person who has a lot of money'
c. ttena-un salam
leave-REL person
'the person who left'

c. Statives cannot appear in constructions which involve strong agentivity: they cannot occur in imperatives, propositives, or as complements of the constructions *-lyeko ha* 'to try' and *-c po* 'do' as a try'.⁶

- (37) a. #Kippu-ela/ca.
happy-IMPR/PROP
(intended) 'Be happy/Let's be happy.'
b. #Nay-ka kippu-lyeko ha-ess-ta.
I-NOM happy-in.order.to do-PAST-DEC
(intended) 'I tried to be happy.'
c. #Mary-ka kippu-c po-ess-ta.
Mary-NOM happy-CONN attempt-DEC
(intended) 'Mary was happy as a try.'⁷
- (38) a. Ilccik ttena-ela/ca.
early leave-IMPR/PROP
'Leave early/Let's leave early.'
b. Nay-ka kongpwuha-lyeko ha-ess-ta.
I-NOM study-in.order.to do-PAST-DEC
'I tried to study.'
c. Mary-ka chayksang-ul mantul-c po-ess-ta.
Mary-NOM desk-ACC make-CONN attempt-DEC
'Mary made a desk as a try.'

2. Testing for Accomplishments

a. If *mancy*-adverbials combine with an accomplishment verb, they indicate the runtime of the event in question. In other words, an accomplishment verb involves the entailment relation in (39) and (40): if ϕ is an accomplishment verb, (39) entails (40).

⁶Note that *Be happy* is acceptable in English with an interpretation of 'Feel happy'. This type of reading is possible with *Kippe-ha-ela* in Korean.

- (39) Han sikan maney ϕ -ess-ta.
 one hour in ϕ -PAST-DEC
 'Someone ϕ -ed in an hour.'
- (40) ϕ -ey choytayhan han sikan kelli-ess-ta.
 ϕ -in at most one hour take-PAST-DEC
 'It took at most an hour to ϕ .'

Applied to nonstatives, this test distinguishes accomplishments from activities and achievements. For a sentence formed with an achievement verb, a *maney*-adverbial specifies the elapsed time, the duration from some salient time until when the event in question occurs. For example, in (41b) below, the time specification, one hour, is not the runtime of the event of leaving; it is the time that passes before the leaving occurs. A *maney*-adverbial is normally incompatible with an activity verb, as indicated in (11c). If it does appear with an activity verb, the sentence is coerced to be interpreted inchoatively; e.g. the verb *kongpwuha* 'to study' is interpreted as 'to start to study'. In this case, the *maney*-adverbial specifies the lapse time, which is the same kind interpretation of a *maney*-adverbial in an achievement sentence.⁸

- (41) a. Mary-ka han sikan maney chayksang-ul mantul-ess-ta.
 Mary-NOM one hour in desk-ACC make-PAST-DEC
 'Mary made a desk in an hour.'
- b. Mary-ka han sikan maney ttena-ess-ta.
 Mary-NOM one hour in leave-PAST-DEC
 'Mary left an hour later (from some salient time).'
- c. ??Mary-ka han sikan maney kongpwuha-ess-ta.
 Mary-NOM one hour in study-PAST-DEC
 'Mary started to study an hour later (from some salient time).'

⁸Note that the coerced, inchoative interpretation of *kongpwuha* in (43), i.e. 'to start to study', is the same type of interpretation as *ttena* 'to leave'.

- b. Imperfective Paradox: if ϕ is an accomplishment, ϕ -taka ϕ -ess-la 'was ϕ -ing when ϕ -ed' does not entail ϕ -tss-la ' ϕ -ed'.

This test is applied to activities and accomplishments. The entailment is maintained if ϕ is an activity; but not if ϕ is an accomplishment. In (42), (a) entails that Mary studied; (b) does not entail that she made a desk.⁹

- (42) a. Mary-ka kongpwuha-taka cenhwaha-ess-ta.
 Mary-NOM study-CONN call-PAST-DEC
 'Mary called me when she was studying.'
- b. Mary-ka chayksang-ul mantul-taka cenhwaha-ess-ta.
 Mary-NOM desk-ACC make-CONN call-PAST-DEC
 'Mary called me when she was making a desk.'

3. Testing for Accomplishments and Activities

- a. Accomplishments and activities can occur with the progressive marker *-ko iss*; statives and achievements cannot.

Thus, *aphu* 'to be sick' and *siltm-ty pweuth* 'to pass an exam' in (13c,d) are classified apart from activities and accomplishments, as either statives or achievements.

⁹The term *imperfective paradox* originated from Dowty (1977), where he discusses contrasting entailment relations between different types of verbs. For instance, it was observed that a progressive sentence formed with a predicate like *draw a circle* does not entail its nonprogressive counterpart, whereas one with a predicate like *push a cart* does: (ia) does not entail (ib) but (iia) entails (iib).

- (i) a. John was drawing a circle.
 b. John drew a circle.
- (ii) a. John was pushing a cart.
 b. John pushed a cart.

Dowty called this a 'paradox' in the sense that (ia) entails that John was engaged in bringing-a-circle-into-existence activity but does not entail that he brought a circle into existence.

The *taka* construction in Korean is not really a proper progressive form but a connective compatible with a durative verb. It is used in this test because the same point can be made using this form, whereas the progressive marker, *-ko iss*, is homophonous with the result state marker and thus can be confusing. This will be further discussed in Chapter 4.

- (43) a. Mary-ka nol-ko iss-ta.
Mary-NOM play-PROG be-DEC
'Mary is playing.'
- b. Mary-ka cip-ul cis-ko iss-ta.
Mary-NOM house-ACC build-PROG be-DEC
'Mary is building a house.'
- c. #Nay-ka aphu-ko iss-ta.
I-NOM sick-PROG be-DEC
(intended) 'I'm being sick.'
- d. #Mary-ka sihem-ey pwuth-ko iss-ta.
sky-NOM exam-at pass-PROG be-DEC
(intended) 'Mary is passing the exam.'

b. Accomplishments and activities can occur as complements of verbs such as *sicakha* 'to start', but statives and achievements cannot. This is exemplified in (44); *nol* 'to play' and *phynci-lul ssu* 'to write a letter' are compatible with *sicakha* 'to start', but *phwulu* 'to be blue' and *sihm-ey pwuth* 'to pass an exam' are not.

- (44) a. Mary-ka nol-ki sicakha-ess-ta.
Mary-NOM play-INF start-PAST-DEC
'Mary started to play.'
- b. Mary-ka phynci-lul ssu-ki sicakha-ess-ta.
Mary-NOM letter-ACC write-INF start-PAST-DEC
'Mary started to write a letter.'
- c. #Hamul-i phwulu-ki sicakha-ess-ta.
sky-NOM blue-INF start-PAST-DEC
(intended) 'The sky started to be blue.'
- d. #Mary-ka sihem-ey pwuth-ki sicakha-ess-ta.
sky-NOM exam-at pass-INF start-PAST-DEC
(intended) 'Mary started passing the exam.'

4. Testing for Achievements

ϕ -*nunta* implies that the event has to occur later than the speech time if ϕ is an achievement verb; if ϕ is an activity or an accomplishment verb, the prominent reading is that the event is in progress, with a possible future interpretation as well.

The predicate *sihm-ey pwuth* 'to pass an exam' in (45a) leads to a future interpretation. Thus, it is an achievement predicate. The predicates in (45b,c) usually lead to progressive readings. Therefore, they are activity or accomplishment predicates.

- (45) a. Mary-ka sihem-ey pwuth-nunta.
Mary-NOM exam-at pass-DEC
'Mary passes the exam (in the future).'
- b. Mary-ka kongpwuha-nunta.
Mary-NOM study-DEC
'Mary is studying.'
- c. Mary-ka chayksang-ul mantul-nunta.
Mary-NOM desk-ACC make-DEC
'Mary is making a desk.'

Notice that a generic/habitual reading is also possible with all three aktionsarten, but this will be ignored here.

5. Testing for Atelic Predicates and Result State Verbs

a. if ϕ is an atelic predicate or a result state verb, a sentence of the form (46) entails

(47a) or (47b), respectively.

- (46) han sikan tongan ϕ -ess-ta.
one hour for ϕ -PAST-DEC
' ϕ -ed for an hour.'

(47) a. ϕ -ed at all times in the hour.

- b. The result state of ϕ lasted for an hour.

This adverbial *han sikan tongan* 'for an hour' is unacceptable with telic predicates. Activities and states have the entailment relation in (a), while result state verbs have the one in (b). For instance, it is understood in (48a) that Mary studied at all times in the hour; in (48b) the effect of closing is asserted to have lasted for an hour. Hence *kongpwuha* 'to study' is an activity verb; *mwun-ul tat* 'to close a door' is a result state predicate.

- (48) a. Mary-ka han sikan tongan kongpwuha-ess-ta.
Mary-NOM one hour for study-PAST-DEC
'Mary studied for an hour.'
- b. Mary-ka han sikan tongan mwun-ul tat-ess-ta.
Mary-NOM one hour for door-ACC close-PAST-DEC
'For an hour, there was a state of Mary's having closed the door.'

b. τ *pwuthe* 'from τ ' can occur with atelic predicates and result state verbs, but not with telic predicates.

Since the sentences in (49) are acceptable, it is determined that *kongpwuha* 'to study' and *mwun-ul tat* 'to close the door' could be an activity, a state, or a result state verb. The sentences in (50) are not acceptable, therefore *chaksang-ul mantul* 'to make a desk' and *sihem-cy pwuth* 'to pass an exam' are narrowed down to accomplishment or achievement predicates.

- (49) a. Mary-ka cengo pwuthe kongpwuha-ess-ta.
Mary-NOM noon from study-PAST-DEC
'Mary studied from noon.'
- b. Mary-ka cengo pwuthe mwun-ul tat-ess-ta.
Mary-NOM noon from door-ACC close-PAST-DEC
'From noon, there was a state of Mary's having closed the door.'

- (50) a. #Mary-ka cengo pwuthe chayksang-ul mantul-ess-ta.
Mary-NOM noon from desk-ACC make-PAST-DEC
(intended) 'Mary made a desk from noon.'
- b. #Mary-ka cengo pwuthe sihem-cy pwuth-ess-ta.
Mary-NOM noon from exam-at pass-PAST-DEC
(intended) 'Mary passed the exam from noon.'

6. Testing for Result State Verbs

Only result state verbs occur with the result state marker *-ko/ε iss*.¹⁰

It is determined by this test that *nup* 'to lie down' and *mwun-ul tat* 'to close the door' are result state predicates, but that *phwulu* 'to be blue' and *nol* 'to play' are not.

- (51) a. Mary-ka nup-e iss-ta.
Mary-NOM lie.down-RESULT exist-DEC
'Mary is lying/Mary is in a state of having lied down.'
- b. Mary-ka mwul-ul tat-ko iss-ta.
Mary-NOM door-ACC close-RESULT exist-DEC
'There is Mary with the door closed/Mary is in a state of having closed the door.'
- c. #Hanul-i phwulu-e iss-ta.
sky-NOM blue-RESULT exist-DEC
(intended) 'The sky is in the state of having gotten blue.'
- d. #Nay-ka nol-e iss-ta.
I-NOM play-RESULT exist-DEC
(intended) 'I'm in a state of having played.'

¹⁰Note again that there are two homophonous forms of *-ko iss*: one the progressive marker, the other the result state marker. This will be discussed in detail in Chapter 4.

3.2.3 Statives vs. Nonstatives

While we agree with most of the conclusions drawn in Jeong (1981), we would like to point out that his category of stative predicates is controversial and deserves further discussion.

As he acknowledges, his category of stative predicates corresponds to what traditional grammarians of Korean had called adjectives or descriptive predicates (cf. Choi 1933).¹¹ But they are more commonly considered to constitute a subclass of verbs because of their morphological behavior; hence, they are often called adjectival verbs (cf. Song 1988). They appear as predicates without a copula, as in (52); they can appear in the adnominal position only with a relative marker, as in (53).

(52) John-i aphu-ess-ta.
John-NOM sick-PAST-DEC
'John was sick.'

(53) a. *aphu salam
sick person
(intended)'sick person'
b. aphu-un salam
sick-REL person
'sick person'

Adjectival verbs also have tense-aspect inflections somewhat different from those of nonadjectival verbs. This fact was used as a criterion for statives in the previous section. First, as shown in (54) and (55), the nonadjectival verb *ttena* 'to leave' requires the *nunta* form, whereas the adjectival verb *aphu* 'to be sick' selects the *ta* form.

¹¹Note that their membership is approximately the same as the English predicative adjectives.

- (54) a. Mary-ka ttena-nunta.
Mary-NOM leave-DEC
'Mary leaves.'
b. *Mary-ka ttena-ta.
Mary-NOM leave-DEC
(intended)'Mary leaves.'
- (55) a. *Mary-ka aphu-nunta.
Mary-NOM sick-DEC
(intended)'Mary is sick.'
b. Mary-ka aphu-ta.
Mary-NOM sick-DEC
'Mary is sick.'

Second, the two classes exhibit different inflections in the relative clause construction. For instance as in (56), the *un* form relativizer marks nonpast tense for the adjectival verb *aphu*, but past tense for the nonadjectival verb *ttena*.

- (56) a. aphu-un salam
sick-REL person
'sick person/person who is sick'
b. ttena-un salam
leave-REL person
'person who left'

The paradigm can be illustrated as in Table 3, where each form can be further analyzed as a combination of a tense marker and the relativizer *un*, as indicated in parentheses.¹²

Now it is clear that there is a subclass of adjectival verbs within the class of verbs. Moreover, it is granted that though morphologically motivated, this class may be identified as a semantic class. However, what is unclear and most unsettling is

¹²Notice that there is a gap in the paradigm. Namely, there is no past form for adjectival verbs. To express a past meaning such as 'person who was sick', *te-un* or *ess-te-un*, which is from another paradigm, is used.

Table 3: Relativizers

	ADJECTIVAL VERBS	NONADJECTIVAL VERBS
PAST		un ($\phi + un$)
NONPAST	un ($\phi + un$)	nun ($nu + un$)

whether this class can be identified with the class of stative verbs. If so, there would be no such thing as a nonadjectival stative verb in Korean. This is controversial, especially when we consider the verbs in (57), which are nonadjectivals yet seem to be stative verbs. Let us refer to these verbs as **nonadjectival stative verbs** in our discussion.

- (57) al 'know' ihayha 'understand' kuli 'miss'
 pala 'wish' mit 'believe' kamsaha 'be grateful'
 salangha 'love' nukki 'feel' molu 'be ignorant of'
 mocala 'lack' coucayha 'exist'

In fact, most of Jeong's criteria for statives are morphologically based. Hence, it could be argued that what they really show is simply that there is a morphological class of adjectival verbs within the category of verbs. However, strong evidence for Jeong's claim is found in the test of the progressive marker. As shown above and repeated below in (58), an adjectival verb cannot combine with the progressive marker *-ko iss*. On the other hand, all of the verbs in (57) can appear in a progressive form, as exemplified by (59).

- (58) #Nay-ka aplu-ko iss-ta.
 I-NOM sick-PROG be-DEC
 (intended) 'I'm being sick.'

- (59) Nay-ka tap-ul al-ko iss-ta.
 I-NOM answer-ACC know-PROG be-DEC
 'I know the answer.'

On the other hand, his conclusion is challenged by several facts which strongly suggest that adjectivals and nonadjectival stative verbs form a semantic class of statives. First, in the nonpast tense, adjectival verbs and nonadjectival stative verbs receive simple present interpretations; the other verb classes receive habitual, generic, or futurate present readings. Notice that the prominent reading is generic for (61a) and futurate for (61b), though a progressive reading is also available for (61a). The sentences in (60) do not have any reading other than the simple present.

- (60) a. Pay-ka kophu-ta.
 belly-NOM hungry-DEC
 'I'm hungry.'
 b. Nay-ka tap-ul al-nunta.
 I-NOM answer-ACC know-DEC
 'I know the answer.'
- (61) a. Mary-ka chayksang-ul mantul-nunta.
 Mary-NOM desk-ACC make-DEC
 'Mary makes a desk.'
 b. Mary-ka ttena-nunta.
 Mary-NOM leave-DEC
 'Mary leaves.'

Second, adjectival verbs and nonadjectival stative verbs have present interpretations in a conditional protasis; other verbs have future interpretations, unless interpreted generically. In the sentences in (62), the conditionals are about the situation holding at the time of utterance; in (63) they are about future situations.¹³

¹³The connective *myou* can be interpreted temporally as well as conditionally. See Bak (1980) and Chung (to appear) in this regard.

- (62) a. *Aphu-myen yeykihay.*
sick-COND talk
'Tell me if you're sick.'
- b. *Tap-ul al-myen yeykihay.*
answer-ACC know-COND talk
'Tell me if you know the answer.'
- (63) a. *Chayksang-ul mantul-myen yeykihay.*
desk-ACC make-COND talk
'Tell me now if you will make a desk.'
'Tell me when you make a desk.'
- b. *Isaha-myen yeykihay.*
move-COND talk
'Tell me now if you will move.'
'Tell me when you move.'

Third, futurate present readings are not normally available for adjectival verbs and nonadjectival stative verbs, but they are readily available for the other verbs.

- (64) a. *#Mary-ka nayil aphu-ta.*
Mary-NOM tomorrow sick-DEC
'Mary is sick tomorrow.'
- b. *#Mary-ka nayil tap-ul al-nunta.*
Mary-NOM tomorrow answer-ACC know-DEC
'Mary knows the answer tomorrow.'
- (65) a. *Mary-ka nayil chayksang-ul mantul-nunta.*
Mary-NOM tomorrow desk-ACC make-DEC
'Mary makes a desk tomorrow.'
- b. *Mary-ka nayil ttena-nunta.*
Mary-NOM tomorrow leave-DEC
'Mary leaves tomorrow.'

Thus, considering the three facts illustrated, we are left with mixed results. On the one hand, the distribution of the progressive marker suggests that nonadjectival stative verbs are not statives. On the other hand, several other facts indicate the opposite.

However, it should be pointed out that our discussion so far is rooted in an assumption that the marker *-ko iss*, called the progressive marker, always provides a progressive reading and therefore is limited to nonstatives. Widespread as this assumption may be, it must now be questioned. Careful attention needs to be directed to the fact that the progressive marker is exactly correlated with the morphological distinction of adjectival and nonadjectival verbs. It would be ideal if there were no mismatch between morphology and semantics. The very fact that there is a perfect match between the two is highly suspicious. Rather, it suggests that the distribution of the progressive marker in Korean is sensitive to morphology rather than semantics in this respect and therefore cannot be used as a reliable test for a semantic class of nonstative verbs.

First, note that the progressive marker is often blind to the semantic nature of the predicate. For example, although *concahya* and *iss* have exactly the same meaning 'to exist', the former is nonadjectival, the latter, adjectival. The progressive marker occurs with *concahya*, but not with *iss*, as illustrated in (66):¹⁴

- (66) a. *Sin-un concahya-ko iss-ta*
God-TOP exist-PROG exist-DEC
'God exists.'
- b. **Sin-un iss-ko iss-ta*
God-TOP exist-PROG exist-DEC
'God exists.'

The same contrast is found in other pairs such as *Mocala* and *pwucokha* 'to lack', and *molu* and *mwsikha* 'to be ignorant'. Notice that each pair consist of a native-

¹⁴One might argue that (66b) is not allowed because of some phonological constraint against repetition of the same word *iss*. This does not hold in this example: replacing it with *kegest*, an honorific word with the same meaning and the same subcategory, does not improve the grammaticality.

Korean word and a Sino-Korean word. However, the morphological behavior is not correlated with the origin of the words; *concaŷha*, *pwucokha*, and *mwusikha* are Sino-Korean words, among which only *concaŷha* is nonadjectival. Likewise, among the native-Korean words *iss*, *mocala*, and *molu*, only *iss* is adjectival.

An analogous phenomenon is productive and systematic in loan words. An ending *ha* is obligatorily attached to foreign verbs and adjectives, e.g. the English verb *steal* is imported as *steal-ha*; the adjective *handsome*, as *handsome-ha*. However, such words are imported based on the category of the source language. For instance, the English verb *exist* is subclassified as a nonadjectival verb because it is a verb in English, even though the most prominent Korean counterpart *iss* is adjectival. As a result, the word *exist-ha* 'to exist' can occur with the progressive marker as in (67):

- (67) Sin-un exist-ha-ko iss-ta
 God-TOP exist-PROG exist-DEC
 'God exists.'

Conversely, when an English adjective is imported, it is categorized as an adjectival verb. As a result, it cannot occur with the progressive marker, even though a Korean nonadjectival verb with the same meaning can. *Ignorant* is imported as *ignorant-ha* 'to be ignorant'; it cannot occur with the progressive, while *molu* 'to be ignorant' can, simply because it is nonadjectival.

Second, nonadjectival stative verbs seem to have stative readings even when the progressive marker is attached to them. Both (68) and (69) are descriptions of some static situation. The only difference is that (69) presupposes a relatively narrow temporal perspective toward the situation. For instance, it is more appropriate than

(68) as a continuation for an adverbial clause such as (70), which provides a narrow temporal frame.

- (68) Halmeni-nun atul-uy cwukum-ul molu-ess-ta
 grandmother-TOP son-GEN death-ACC ignorant-PAST-DEC
 'Grandmother was ignorant of son's death.'
- (69) Halmeni-nun atul-uy cwukum-ul molu-ko iss-ess-ta
 grandmother-TOP son-GEN death-ACC ignorant-PROG exist-PAST-DEC
 'Grandmother was ignorant of son's death
 (at the time salient from the context).'
- (70) Nay-ka pangnwonha-ess-ulttay,
 I-NOM visit-PAST-WHEN
 'When I visited her.'

In such cases, the progressive marker seems to indicate temporariness rather than progressiveness. In this respect, the Korean progressive marker may not be exactly the same as the English progressive marker, though they share many other properties. Analogous facts can be found for a limited number of English stative verbs such as *live*, *stand*, *sit*, and *lie*. As Binnick (1968), Bolinger (1971), Dowty (1975:582-583), and Comrie (1976:37) observe, the progressive form of a verb in this group refers to a more or less temporary state, while a nonprogressive form refers to a more permanent state. Thus, it is implied that 6 Railway Cuttings is the speaker's normal residence in (71a) but a temporary one in (71b). Likewise, Mr. Smith's temporary location is well contrasted with the Sphinx's permanent location by the progressive.

- (71) a. I live at 6 Railway Cuttings.
 b. I'm living at 6 Railway Cuttings.
- (72) a. The Sphinx stands by the Nile.

b. Mr. Smith is standing by the Nile.

Thus, it seems reasonable to regard Korean nonadjectival statives as belonging to the semantic class of statives, just as *live*, *stand*, *sit*, and *lie* in English are considered to be statives.

The discussion so far is summarized in (73):

- (73)
1. Adjectival verbs and nonadjectival statives share temporal characteristics and they are distinguished from other Korean predicates.
 2. The progressive marker is often blind to the semantic nature of predicates, but its distribution is constrained by morphological classification.
 3. The progressive form of nonadjectival stative verbs denotes temporariness rather than progressiveness.

Based on these considerations in (73), we conclude that the inability to combine with the progressive marker guarantees that a predicate is a stative; however, the ability of a predicate to occur with the progressive marker does not necessarily mean that it is a nonstative.

If we follow Jeong (1981), this would yield a clear-cut distinction between statives and nonstatives, since there would be semantic correlates in the morphology. However, it would not capture temporal similarities between adjectival verbs and nonadjectival stative verbs. Thus, it does a disservice to the rationale behind the aktionsart classification, and its corresponding verb classification. For this reason, we claim that adjectival verbs and nonadjectival stative verbs should be considered a single semantic class of stative verbs.

3.2.4 On so-called Verbs of Existence

A class of verbs, commonly called verbs of existence, is recognized by some authors (cf. Song 1988, H. Lee 1993, F. Park 1984). It has been claimed that they constitute a natural class of their own, belonging neither to adjectival verbs nor to nonadjectival verbs, as they exhibit inflections distinctive from both classes. H. Lee suggests that the morphological distinction reflects the semantics of existential verbs that belong somewhere inbetween statives and nonstatives.

It will be demonstrated that this inflectional distinction is an accidental fact resulting from a morphophonemic process and that verbs of existence do not necessarily constitute a semantic class in Korean.

Let us first list the lexical items which are claimed to constitute the verbs of existence. There are only three: two words for existence, one for nonexistence:

- (74)
- a. *iss* 'to exist'
 - b. *eps* 'to not exist'
 - c. *kyeysi* 'to exist', an honoric word for *iss*

These verbs pattern with adjectival verbs in a main clause: in the non-past tense, they follow adjectival verbs in requiring the *ta* form of a declarative mood marker.¹⁵ Recall that non-adjectival verbs require the *nunta* form. Thus, the contrast between (75) and (76) is observed:

¹⁵However, the honoric word *kyeysi* 'to exist' is an exception to this pattern.

- (75) a. Pay-ka kophu-ta (*kophu-nunta).
belly-NOM hungry-DEC
'I'm hungry.'
- b. Mary-ka yeki iss-ta (*iss-nunta).
Mary-NOM here exist-DEC
'Mary is here.'
- (76) Mary-ka chayksang-ul mantul-nunta (*mantul-ta).
Mary-NOM desk-ACC make-DEC
'Mary makes a desk.'

However, the situation is exactly the opposite in relative clause constructions. The existential verbs pattern with nonadjectival verbs. For instance, the *nun* form of the relativizer is required for the nonpast interpretation of existential verbs as exemplified by (77) and (78). This is what is expected from a nonadjectival verb, but not from an adjectival verb, according to the paradigm in Table 4, repeated below:

- (77) a. yeki iss-nun salam
here exist-REL person
'people who are here'
- b. yeki eps-nun salam
here not.exist-REL person
'people who are not here'
- (78) a. *yeki iss-un salam
here exist-REL person
(intended) 'people who are here'
- b. *yeki eps-un salam
here not.exist-REL person
(intended) 'people who are not here'

Lee suggests that these exceptions to the paradigm are correlated to the semantic nature of the existential verbs, as they seem to be on the borderline between adjectivals and nonadjectivals in terms of their meanings. *Iss* means 'to exist', a meaning typical of the adjectival type, or 'to reside', one typical of the nonadjectival type.

Table 4: Relativizers

	ADJECTIVAL VERBS	NONADJECTIVAL VERBS
PAST		un (ϕ + un)
NONPAST	un (ϕ + un)	nun (nu + un)

Though it might appear plausible that existential verbs form a semantic class in some sense, this does not seem to be supported by the observed facts in Korean. Instead, we will present a case that the above-mentioned exceptions are purely accidental.

Notice first that the paradigmatic distinction is preserved at least in a formal interrogative marker, a conjunction, and a complementizer. (79) demonstrates that the alternation between *unka* and *nunka* is dependent on the type of verb. In (80), the same kind of alternation is shown in the conjunction *untey/nuntey* 'but' and the complementizer *unci/nunci* 'whether':

- (79) a. Ku kenmwul-i cak-unka/*nunka?
that building-NOM small-INTER
'Is the building small?'
- b. Mary-ka mwues-ul mek-nunka/*unka?
Mary-NOM what-ACC eat-INTER
'What is Mary eating?'
- (80) a. cak-untey/*nuntey 'small but ...'; mek-nuntey/*untey 'eat but ...'
- b. cak-unci/*nunci 'whether it is small'; mek-nunci/*unci 'whether someone is eating'

However, a neutralization occurs when the past morpheme *-ess* or the modal marker *-kyss* appears immediately before these items. In this case, they all maintain the *nun* forms.

- (81) a. Ku kenmwul-i cak-ess-nunka/*unka?
that building-NOM small-PAST-INTER
'Was the building small?'
b. Mary-ka mwues-ul mek-ess-nunka/*unka?
Mary-NOM what-ACC eat-PAST-INTER
'What did Mary eat?'
- (82) a. cak-ess-nuntey/*untey 'was small but ...';
mek-ess-nuntey/*untey 'ate but ...'
b. cak-ess-nunci/*unci 'whether it was small';
mek-ess-nunci/*unci 'whether someone ate'

Note that existential verbs behave like nonadjectival verbs in these environments; they take the *nun* forms rather than the *un* forms, as shown in (83) and (84).

- (83) a. Ton-i iss-nunka/*unka?
money-NOM exist-INTER
'Do you have money?'
b. Ton-i eps-nunka/*unka?
money-NOM not.exist-INTER
'Don't you have money?'
- (84) a. iss-nuntey/*untey 'have (something) but ...';
eps-nuntey/*untey 'don't have (something) but ...'
b. iss-nunci/*unci 'whether there is (something)';
eps-nunci/*unci 'whether there isn't (something)'

Moreover, when the honorific morpheme *-usi* is attached to them, the existential verbs behave exactly like adjectival verbs in the relative construction as well; this is illustrated in (85):

- (85) a. ai-ka iss-usi-un pwun
child-NOM exist-HON-REL person
'people who have a child'
b. ai-ka eps-usi-un pwun
child-NOM not.exist-HON-REL person
'people who don't have a child'

The honorific marker, an inflectional morpheme, does not change the class of verbs in any other environment. Thus, it is unlikely that the marker changes the verb class in this particular environment.

Hence, these two facts are highly suggestive of a morphophonemic explanation for the alternations. One observation about the data is that the *nun* form, instead of the *un* form, appears after a verb (complex) ending with *-ss* or *-ps*. Phonologically these constitute a natural class of tense, as opposed to lax, consonants in Korean. Notice that *-ess*, *-kyss*, *iss*, and *eps* are the only morphemes that appear in these environments and they behave accordingly. Consequently, it is concluded that there is an *un/nun* alternation for the relativizer and some other connectives which is independent of the adjectival vs. nonadjectival distinction;

(86) The *un/nun* Alternation:

1. There are *un/nun* alternations which are conditioned phonologically.
2. If there is an alternation of the *un/nun* forms, the *nun* form, instead of the *un* form, appears immediately after a tense consonant.

Based on (86), the existential verbs are not true exceptions to the paradigm; they belong to the adjectival verbs. Hence, the data does not support that claim that they constitute a semantic class of their own, as Lee suggests.

3.3 Lexical Semantics of Temporal Adverbials

An existential, locating adverbial like *eccy* 'yesterday' can be given a very simple semantics because it does not involve aspectual differences. Thus, with the proposed truth value (87) for *eccy*, the sentence (1) is given its semantics in (88):

$$(87) \text{ } ecy \Rightarrow \lambda P \lambda c [P(c) \ \& \ c \leq yest]$$

$$(88) \text{ } Mary\text{-}ka \text{ } ecy \text{ } ucna\text{-}ess\text{-}ta \text{ 'Mary left yesterday'} \Rightarrow$$

$$\exists c [lcarr(m, c) \ \& \ past(c) \ \& \ c \leq yest]$$

However, aspectual adverbials cannot be handled in this simple way because they are subject to cooccurrence restrictions. Thus, in this section, we discuss aspectual adverbials and their implications. We will draw mainly on formal work by Dowty (1979), Hinrichs (1985), and Krifka (1986, 1989).

Note that though there may be some similarities between Korean and English temporal adverbials, we only make claims about Korean unless otherwise specified. However, because there is no previous formal work on Korean temporal adverbials and thus we draw heavily on the work done on English temporal adverbials, we find it convenient to use some English sentences as a way of introducing earlier work on the subject.

3.3.1 Tongan 'for' and Maney 'in'

The contrasts illustrated in (89) and (90) below have been well documented for many different languages in the world. While the prepositions *for* and *in*, or their counterparts in other languages, equally head measure adverbial phrases, they differ in their distribution with respect to predicates and sentences. Specifically, it has been observed that a *for*-adverbial is compatible only with atelics like *to walk*, whereas an *in*-adverbial occurs only with telics like *to write a letter*.¹⁶

(89) a. Mary-ka han sikan tongan ket-ess-ta.
Mary-NOM one hour for walk-PAST-DEC
'Mary walked for an hour.'

b. #Mary-ka han sikan maney ket-ess-ta.
Mary-NOM one hour in walk-PAST-DEC
'#Mary walked in an hour.'

(90) a. #Mary-ka han sikan tongan ku phyenci-lul ssu-ess-ta.
Mary-NOM one hour for that letter-ACC write-PAST-DEC
'#Mary wrote the letter for an hour.'

b. Mary-ka han sikan maney ku phyenci-lul ssu-ess-ta.
Mary-NOM one hour in that letter-ACC write-PAST-DEC
'Mary wrote the letter in an hour.'

Moreover, it has been noted that the sentences compatible with *tongan/for*-adverbials are distributive, whereas those with *maney/in*-adverbials are not; e.g. (89a) entails a sentence with a smaller interval such as (91), but a sentence like (90b) does not entail (92).

(91) Mary-ka samsip pwun tongan ket-ess-ta.
Mary-NOM 30 minute for walk-PAST-DEC
'Mary walked for 30 minutes.'

¹⁶These adverbials will be called *for*-adverbials and *in*-adverbials for English and *tongan*-adverbials and *maney*-adverbials for Korean only.

- (92) Mary-ka samsip pwun maney ku phyenci-lul ssu-ess-ta.
 Mary-NOM 30 minute in that letter-ACC write-PAST-DEC
 'Mary wrote the letter in 30 minutes.'

These observations have been reflected in most formal analyses of temporal adverbials, including Verkuyl (1972), Dowty (1979), Hinrichs (1985), and Krifka (1986, 1989).

In addition to capturing the well-known properties of *for*-adverbials and *in*-adverbials which are shared by *tongan* and *maney*-adverbials, we will make an attempt to provide semantics of *tongan* and *maney*-adverbials which can account for a certain asymmetry between them. This asymmetry involves modifiers such as *choytayhan* 'at most' and *choysohan* 'at least', which refer to upper and lower bounds respectively. As shown in (93) and (94), a *tongan*-adverbial is compatible with both of these modifiers, but a *maney*-adverbial allows only *choytayhan* 'at most':

- (93) a. Mary-ka choytayhan twu sikan tongan ket-ess-ta.
 Mary-NOM at most two hour for walk-PAST-DEC
 'Mary walked for at most two hours.'
 b. Mary-ka choysohan twu sikan tongan ket-ess-ta.
 Mary-NOM at least two hour for walk-PAST-DEC
 'Mary walked for at least two hours.'
- (94) a. Mary-ka choytayhan twu sikan maney ku phyenci-lul ssu-ess-ta.
 Mary-NOM at most two hour in that letter-ACC write-PAST-DEC
 'Mary wrote the letter in at most two hours.'
 b. #Mary-ka choysohan twu sikan maney ku phyenci-lul ssu-ess-ta.
 Mary-NOM at least two hour in that letter-ACC write-PAST-DEC
 '#Mary wrote the letter in at least two hours.'

We will show first that this asymmetry is not easily explained by borrowing the existing analyses of English *for* and *in*-adverbials. Then, we will demonstrate how this can be accounted for in our analysis.

Existing Analyses of *For*-adverbials

Let us review some analyses of *for*-adverbials. This is intended to serve as a brief summary of some representative work in formal semantics on this issue. For detailed discussion on this issue, we refer the reader to Hinrichs (1985). Three major issues involving the semantics of *for*-adverbials can be summarized as in (95). Note that *tongan*-adverbials behave exactly the same way as *for*-adverbials with respect to the facts to be discussed in this section. Therefore, these issues are equally relevant to *tongan*-adverbials.

- (95) 1. Distributivity: a *for*-adverbial selects for atelic predicates like *to walk*, whose reference is distributive in the sense that any temporal parts (down to a certain size) of a walking event are themselves events of walking.
2. Minimal Parts Problem: the distributivity holds for intervals down to a certain size; an extremely small part of a walking event is not considered to be a walking event itself.
3. Noncontiguous Time: it is not required that the time denoted by the complement of a *for*-adverbial is contiguous.

• Dowty (1979): Dowty proposes as part of the meaning of *for*-adverbials a universal quantification over intervals such as in (96). This captures the distributivity of atelics and prevents telics from combining with a *for*-adverbial. This will lead to the truth conditions in (97), with some additional rules which will not be given here (refer to Dowty 1979, chapter 7).

$$(96) \text{ for an hour} \Rightarrow \lambda P \lambda x [hour(n) \ \& \ \forall t [t \subseteq n \rightarrow AT(t, P\{x\})]],$$

where $AT(t_1, \phi)$ is true at any time t iff ϕ is true at the time denoted by t_1 .

$$(97) \text{ Mary walked for an hour} \Rightarrow$$

$$\exists t_1 [past(t_1) \ \& \ hour(t_1) \ \& \ \forall t_2 [t_2 \subseteq t_1 \rightarrow AT(t_2, walk(m))]]$$

The first issue in (95) is reflected in these truth conditions; the rest are not, as Dowty acknowledges.¹⁷

• Hinrichs (1985:234): Hinrichs takes Dowty's approach and makes some adjustments, accounting for the two remaining observations. The minimal parts problem is taken care of; the semantics of *for* shown in (98) contains a condition that if an event holds for the interval denoted by the complement of *for*, then any proper subinterval of that interval is a temporal part of a proper subevent of that event. For instance, if Mary walked for an hour it is required only that all the subintervals of the one hour interval temporally belong to a walking event which is a proper part of the original walking event. Notice that the minimal parts problem does not arise because a small interval is not required to make up an event by itself; rather, it is required to belong to some event that is a proper part of the original event.

$$(98) \text{ for an hour (Hinrichs' original translation)} \Rightarrow$$

$$\lambda S \lambda e_1^* \lambda x^i [an.hour(\lambda t_1 [t_1 \leq e_1^* \ \& \ S(x^i)(e_1^*) \ \& \ \forall t_2 [t_2 < t_1 \rightarrow \exists e_2^* [e_2^* < e_1^* \ \& \ t_2 \leq e_2^* \ \& \ S(x^i)(e_2^*)]])]]]$$

¹⁷Note that a *for*-adverbial is considered a VP modifier. Also, notice that the constant n in (96) is a device to handle scope, defined as (i):

(i) At any index $\ll w.i \gg$, the denotation of n is i .

Moreover, in Hinrichs' formalism the time can be noncontiguous because it is allowed by the nature of the complete join-semilattice of time, or spatio-temporal location, to be precise, that Hinrichs adopts as interval structures: any two separate intervals are joined into another interval in a complete join-semilattice interval structure. Thus, under this analysis a noncontiguous time can be represented as an interval resulting from a join operation of two or more noncontiguous intervals. The translation in (99) is our revision of Hinrichs' original translation (98) in which the superscripts i and s indicate stage-level and individual-level variables respectively. There are two modifications made for our purposes. Hinrichs's stage and individual level distinction is ignored. Also, we use intervals for his spatio-temporal locations: thus variable t instead of l . We believe our rendering captures Hinrichs' point with regard to the relevant issues. (101) is the resulting translation of a sentence under these truth conditions for *for an hour*.¹⁸

$$(99) \text{ for an hour (Our revision of Hinrichs)} \Rightarrow$$

$$\lambda S \lambda e_1 \lambda x [an.hour(\lambda t_1 [t_1 \leq e_1 \ \& \ S(x)(e_1) \ \& \ \forall t_2 [t_2 \subset t_1 \rightarrow \exists e_2 [e_2 < e_1 \ \& \ t_2 \leq e_2 \ \& \ S(x)(e_2)]]]])]$$

$$(100) \text{ Mary walked for an hour} \Rightarrow$$

$$\exists e_1 [walk(m, e_1) \ \& \ past(e_1) \ \& \ \exists t_1 [hour(t_1) \ \& \ t_1 \leq e_1 \ \& \ \forall t_2 [t_2 \subset t_1 \rightarrow \exists e_2 [e_2 < e_1 \ \& \ t_2 \leq e_2 \ \& \ walk(m, e_2)]]]])]$$

(\leq and $<$ are part-of and proper part-of relations, respectively. The part-of relation between an interval and an event such as $t_1 \leq e_1$ is defined as a relation between the

¹⁸Notice that a *for*-adverbial is considered as a VP modifier by Hinrichs.

interval and the temporal extension of the event, i.e. $t_1 \leq e_1 \equiv t_1 \leq \tau(e_1)$. Also, note that the part-of relation between intervals are equivalent to the subset relation, i.e. $t_2 < t_1 \equiv t_2 \subset t_1$.)

• Krifka (1986,1987,1989,1990): Krifka in a series of papers takes a slightly different approach. Compared to Hinrichs', his approach is different in three respects. First, the distributivity is handled by a well-formedness condition which stipulates that a *for*-adverbial selects for an atelic predicate and turns it into a telic one. Thus, this is a specification of the domain of a function. Under this approach the minimal parts problem does not arise overtly since reference is not made to subintervals. However, it is unclear how telics and atelics are distinguished in Krifka's approach.¹⁹ Secondly, as is obvious in the translation in (101) below, the truth conditions of the adverbial do not make reference to an interval. Finally, a function H is used to measure the length of events on an hourly scale.

(101) *for an hour* \Rightarrow

$\lambda P \lambda e [P(e) \ \& \ H(e) = 1 / \text{with a well-formedness condition}]$

(102) *Mary walked for an hour* \Rightarrow

$\exists c [walk(m, c) \ \& \ past(e) \ \& \ H(e) = 1]$

Previous Analyses of *In*-adverbials

• Dowty (1979): Dowty argues convincingly that the truth conditions (103) do not rule out a sentence like (104), which would mean that Mary slept during that hour.

¹⁹Thus, it may be possible that the minimal parts problem still exists in this approach, though covertly.

In other words, he claims that it is unexplained with that form why *in*-adverbials modify only telic predicates to measure the runtime of their corresponding events.

(103) *in an hour* $\Rightarrow \lambda P \lambda x [hour(n) \ \& \ \exists t [t \subseteq n \ \& \ AT(t, P\{x\})]]$

(104) #Mary slept in an hour.

As a way of sorting out telic predicates from atelics, the uniqueness requirement is introduced. The event time of a telic event is unique in the sense that if a telic sentence is true at one interval, then it cannot be true at a subinterval of that interval. This requirement is included in the truth conditions in (105) as the third conjunct in the embedded formula:²⁰

(105) *in an hour* \Rightarrow

$\lambda P \lambda x [hour(n) \ \& \ \exists t_1 [t_1 \subseteq n \ \& \ AT(t_1, P\{x\}) \ \& \ \forall t_2 [(t_2 \subseteq t_1 \ \& \ AT(t_2, P\{x\})) \rightarrow t_2 = t_1]]]$

However, Dowty acknowledges that that condition should be understood as a presupposition rather than part of assertion as suggested here. According to these truth conditions, we can derive the truth conditions of the sentence in (106):

(106) *Mary wrote the letter in an hour* \Rightarrow

$\exists t_1 [past(t_1) \ \& \ hour(t_1) \ \& \ \exists t_2 [t_2 \subseteq t_1 \ \& \ AT(t_2, write(m, the.letter)) \ \& \ \forall t_3 [(t_3 \subseteq t_2 \ \& \ AT(t_3, write(m, the.letter))) \rightarrow t_3 = t_2]]]$

and (104) is ruled out because *sleep* is atelic.

²⁰Again the constant n is as defined above in the translation of *for an hour*.

• Hinrichs (1985): Hinrichs' approach is essentially the same as Dowty's, being different only in the formalism. Thus, with (107), our interpretation of Hinrichs' truth conditional definition of *in an hour*, (108) is our revision of Hinrichs' truth conditions for the sentence.²¹

(107) *in an hour* \Rightarrow

$$\lambda S \lambda e_1 \lambda x [an.hour(\lambda t [e_1 \leq t \ \& \ S(e_1)(x) \ \& \ \forall e_2 [[e_2 \leq e_1 \ \& \ S(e_2)(x)] \rightarrow e_2 = e_1]])]$$

(108) *Mary wrote the letter in an hour* \Rightarrow

$$\exists e_1 [write(m, the.letter, e_1) \ \& \ past(e_1) \ \& \ \exists t [hour(t) \ \& \ e_1 \leq t \ \& \ \forall e_2 [[e_2 \leq e_1 \ \& \ write(m, the.letter, e_2)] \rightarrow e_2 = e_1]]]$$

• Krifka (1986, 1987, 1989, 1990): Besides using the measure function *H* as earlier, Krifka's truth conditions for an *in*-adverbial differ from Dowty's and Hinrichs' in two other respects. First, the time in the phrase is required to be convex, or contiguous. Secondly, the uniqueness requirement is eliminated, as shown in (109). Instead, an independently motivated general pragmatic rule is introduced to account for the telicity requirement for this adverbial which will be discussed shortly.

(109) *in an hour* \Rightarrow

$$\lambda P \lambda e [P(e) \ \& \ \exists t [CONV(t) \ \& \ H(t) = 1 \ \& \ \tau(e) \subseteq t]]$$

(110) *Mary wrote the letter in an hour* \Rightarrow

$$\exists e [write(m, the.letter, e) \ \& \ past(e) \ \& \ \exists t [CONV(t) \ \& \ H(t) = 1 \ \& \ \tau(e) \subseteq t]]$$

The function τ maps events into their runtimes and CONV is defined in (111):

²¹Again, Hinrichs considers this adverbial as a VP modifier: thus *S* in the formulae is a VP variable.

$$(111) \ \forall t_1 [CONV(t_1) \leftrightarrow \forall t_2 \forall t_3 \forall t_4 [t_2 \subseteq t_1 \ \& \ t_3 \subseteq t_1 \ \& \ t_2 \prec t_4 \prec t_3 \rightarrow t_4 \subseteq t_1]]$$

We feel that CONV(*t*) in the semantics of *in*-adverbials should be dropped. Though a contiguous interval is more natural for an *in*-adverbial, as for a *for*-adverbial, we agree with Hinrichs that examples like (112) can be read such a way that the 100 hours is not necessarily a contiguous interval. It is more naturally understood as a sum of noncontiguous times, rather than one continuous interval.

(112) Mary painted the wall in 100 hours.

As Krifka's (1989:98-100) argument for a pragmatic rule replacing the uniqueness presupposition, the reasoning goes as follows. First, *in*-adverbials are upward monotone, as the examples below show. Though the adverbial *in an hour* is usually understood as 'exactly an hour', it is only a conversational implicature by the Maxim of Quantity. This implicature can be cancelled by a continuation like (113). Notice however that the continuation in (114) is not acceptable. The amount of time difference is equally 7 minutes. Then, it can be concluded that *in*-adverbials are upward monotone.

(113) Ann drank a bottle of wine in one hour; in fact, she did it in 53 minutes.

(114) Ann drank a bottle of wine in one hour; #in fact, she did it in 67 minutes.

Let us assume a Gricean maxim of quantity and require that everything else being equal, we strive to be maximally informative. Then, this pragmatic rule forces the value of *n* in *in n hour(s)* to be as small as possible; being upward monotone, a smaller number for *n* is more informative than a bigger one. But it can have a smallest value

only if the predicate or the sentence it combines with is atomic, i.e. nondistributive. If the predicate/sentence is nonatomic such as states and activities, then there is always another smaller value. In this way atelics are destined to violate this pragmatic rule when they are modified by an *in*-adverbial. Therefore, it is argued that they are not allowed to combine with one.

Appealing as this explanation may sound, it does not follow from the pragmatic rule and the monotonicity alone that *in*-adverbials select for telics only. As a way of disproving it, let us take an adverbial like *in exactly two hours* in (115). The presence of the modifier *exactly* makes the sentence maximally informative; once it is true, it is more informative than a sentence like (116) since the former entails the latter. Also it is no less informative than (117) neither entails the other: in a situation where (115) is true, (117) has to be false and *vice versa*.

(115) Mary wrote the letter in exactly two hours.

(116) Mary wrote the letter in three hours.

(117) Mary wrote the letter in an hour.

Now we know that the adverbial *in exactly two hours* has the potential to make the sentence maximally informative. Therefore, upward monotonicity is not an issue any more with respect to *in exactly two hours*. Suppose that there was a sleeping event and that this sleeping event lasted exactly two hours. Thus, if we were to use *in exactly two hours* to modify the event, it should be maximally informative with respect to the temporal dimension. Yet this fact does not help it in modifying

an atelic predicate, as the example (118) proves. It is simply that in English the same proposition is expressed by a sentence with a *for*-adverbial like (119). In other words, *in* and *for*-adverbials have different presuppositions requiring certain types of predicates or sentences.

(118) #Mary slept in exactly two hours.

(119) Mary slept for exactly two hours.

Moreover, it can be shown that upward monotonicity does not necessarily mean between a certain temporal adverbial cannot appear with a certain aktionsart. For instance, the italicized position of the locating adverbial in (120) is upward monotone: if (120) is true, then (121) is also true.

(120) Mary wrote the letter last *monday*.

(121) Mary wrote the letter past *wck/month/year*.

However, this monotonicity does not prevent the adverbial *last monday* from appearing with an atelic predicate as in (122).

(122) Mary was here last *monday*.

Thus, again it is suggested that the restriction of *in*-adverbials to telics cannot be explained by the pragmatic principle and monotonicity.

Consequently, we must conclude that the pragmatic rule cannot replace the uniqueness presupposition.

Discussion on Semantics of *Tongan* 'for' and *Maney* 'in'

We consider Hinrichs' analysis of *for* and *in*-adverbials to be an improvement over Dowty's with the same insights maintained. Thus, it seems unnecessary to compare Dowty with Hinrichs any further. Let us then adopt Hinrichs' analyses of *for* and *in*-adverbials and Krifka's analysis of *for*-adverbials and examine whether and how the asymmetric behavior of Korean adverbials can be accounted for under the adopted versions of the analyses. Since we are not examining their analyses for English temporal adverbials and moreover their analyses are not responsible for Korean data, analyses for Korean based on Hinrichs' and Krifka's analyses of English will be called Hinrichs type and Krifka type analyses, respectively.

It should be examined whether the asymmetry involving modifiers such as *choytayhan* 'at most' and *choysohan* 'at least' can be captured. As shown in (93) and (94) repeated below, a *tongan*-adverbial is compatible with both of these modifiers, but an *maney*-adverbial allows only *choytayhan* 'at most':

- (93) a. Mary-ka choytayhan twu sikan tongan ket-ess-ta.
 Mary-NOM at most two hour for walk-PAST-DEC
 'Mary walked for at most two hours.'
 b. Mary-ka choysohan twu sikan tongan ket-ess-ta.
 Mary-NOM at least two hour for walk-PAST-DEC
 'Mary walked for at least two hours.'
- (94) a. Mary-ka choytayhan twu sikan maney ku pyenci-lul ssu-ess-ta.
 Mary-NOM at most two hour in that letter-ACC write-PAST-DEC
 'Mary wrote the letter in at most two hours.'
 b. #Mary-ka choysohan twu sikan maney ku pyenci-lul ssu-ess-ta.
 Mary-NOM at least two hour in that letter-ACC write-PAST-DEC
 'Mary wrote the letter in at least two hours.'

Let us take Krifka's semantics for *for*-adverbials and examine whether the same type of truth conditions can be given to *tongan*-adverbials. Then, (123) will be a proposed semantics for *han sikan tongan* 'for an hour', according to which the sentence (89a), repeated here, is assigned the truth conditions in (124).

(123) *han sikan tongan* 'for an hour' \Rightarrow

$\lambda P\lambda c[P(c) \ \& \ H(c) = 1 / \text{with a well-formedness condition}]$

(89a) Mary-ka han sikan tongan ket-ess-ta.
 Mary-NOM one hour for walk-PAST-DEC
 'Mary walked for an hour.'

(124) $\exists c[\text{walk}(m, c) \ \& \ \text{past}(c) \ \& \ H(c) = 1]$

Let us put aside the issue of the wellformedness condition which seems to be essentially equivalent to the presupposition requiring atelic sentences. Yet a modification seems to be needed in order to account for sentences like (125) below. The sentence makes reference to a specific interval, but there is no way of referring to the interval in the truth condition in (124), simply because there is no variable for intervals there.

(125) Mary-ka taum twu sikan tongan kongpwuha-ess-ta.
 Mary-NOM next 2 hour for study-PAST-DEC
 'Mary studied for the next two hours.'

On the other hand, the Hinrichs-type semantics for *tongan*-adverbials is consistent with the presence of a definite description, i.e. there are temporal variables as well as event variables in the truth conditions for the sentence (89a) above.²²

²²The presuppositional contents are included in the truth conditions in order to make the given meaning more perspicuous. However, one danger of this practice is the possibility of being under the scope of a negation. In this case, the formula in question becomes false rather than being infelicitous. To avoid this and distinguish between asserted parts and presupposed ones, we will put presupposed parts within parentheses. Therefore, it will be understood that a negation does not affect these presupposed parts.

$$(126) \exists c_1[\text{walk}(m, c_1) \ \& \ \text{past}(c_1) \ \& \ \exists t_1[\text{hour}(t_1) \ \& \ t_1 \leq c_1 \ \& \ (\forall t_2[t_2 \subset t_1 \rightarrow \exists e_2[e_2 < c_1 \ \& \ t_2 \leq e_2 \ \& \ \text{walk}(m, e_2)])]]]]$$

Notice that the condition $t_1 \leq c_1$ is redundant, since it is entailed by the presuppositional content. This is proved in (127):

(127) Proof:

From the presuppositional content, it is known that

(i). $t_2 \subset t_1$, (ii). $e_2 < c_1$, and (iii). $t_2 \leq e_2$.

Then, (iv). $t_2 < c_1$ from (ii) and (iii).

Now, there are two possible cases:

- Case (a) $t_1 \leq c_1$, or
- Case (b) $t_1 \not\leq c_1$, then it follows that $\exists t_2[t_2 \not\leq c_1]$, since t_2 is any subinterval of t_1 and it can be one included in c_1 . This contradicts (iv). Hence $t_1 \leq c_1$.

Therefore, the condition $t_1 \leq c_1$ may be eliminated from the conditions. Then, (126) can be reformulated as (128). But, it is not obvious from the formula that there is a connection between the walking event and the duration of one hour. So, let us make it more perspicuous by putting the entailed formula within the presuppositional part such as (129).

$$(128) \exists c_1[\text{walk}(m, c_1) \ \& \ \text{past}(c_1) \ \& \ \exists t_1[\text{hour}(t_1) \ \& \ (\forall t_2[t_2 \subset t_1 \rightarrow \exists e_2[e_2 < c_1 \ \& \ t_2 \leq e_2 \ \& \ \text{walk}(m, e_2)])]]]]$$

$$(129) \exists c_1[\text{walk}(m, c_1) \ \& \ \text{past}(c_1) \ \& \ \exists t_1[\text{hour}(t_1) \ \& \ (t_1 \leq c_1 \ \& \ \forall t_2[t_2 \subset t_1 \rightarrow \exists e_2[e_2 < c_1 \ \& \ t_2 \leq e_2 \ \& \ \text{walk}(m, e_2)])]]]]$$

However, this provides the wrong truth conditions for (93a) above, as presented in (130).

$$(130) \text{Mary-ka choytayhan twu sikan tongan kel-ss-la} \\ \text{'Mary walked for at most two hours'} \Rightarrow \\ \forall c_1[[\text{walk}(m, c_1) \ \& \ \text{past}(c_1)] \rightarrow \neg \exists t_1[\text{more.than.2.hours}(t_1) \ \& \ (t_1 \leq c_1 \ \& \ \forall t_2[t_2 \subset t_1 \rightarrow \exists e_2[e_2 < c_1 \ \& \ t_2 \leq e_2 \ \& \ \text{walk}(m, e_2)])]]]]$$

While it is understood from (93a) that the maximal length of the event is two hours, the suggested truth conditions allow it to be more than two hours. Namely, if t_1 is one hour long and c_1 is three hours long, it still satisfies the suggested conditions in (130). Instead, (131) seems to be the appropriate truth conditions for the sentence, where the formula $t_1 \leq c_1$ is replaced with $t_1 = c_1$.

$$(131) \forall c_1[[\text{walk}(m, c_1) \ \& \ \text{past}(c_1)] \rightarrow \neg \exists t_1[\text{more.than.2.hours}(t_1) \ \& \ (t_1 = c_1 \ \& \ \forall t_2[t_2 \subset t_1 \rightarrow \exists e_2[e_2 < c_1 \ \& \ t_2 \leq e_2 \ \& \ \text{walk}(m, e_2)])]]]]$$

The Hinrichs-type semantics for *mancŷ*-adverbials is found to be adequate to account for the data introduced above. According to the given truth conditions for *mancŷ*-adverbials in (132), the sentence in (94a) will receive the truth conditions in (133).²³

$$(132) \text{han sikan mancŷ 'in an hour'} \Rightarrow$$

$$\lambda S \lambda x \lambda c_1[\text{an.hour}(\lambda t[c_1 \leq t \ \& \ S(c_1)(x) \ \& \ \forall c_2[[c_2 \leq c_1 \ \& \ S(c_2)(x) \rightarrow c_2 = c_1]])]]$$

$$(133) \text{Mary-ka choytayhan twu sikan mancŷ ku pyuci-lul ssu-ss-la} \\ \text{'Mary wrote the letter in at most two hours'} \Rightarrow \\ \forall c_1[[\text{write}(m, \text{the.letter}, c_1) \ \& \ \text{past}(c_1)] \rightarrow \neg \exists t[\text{more.than.2.hours}(t) \ \& \ (c_1 \leq t \ \& \ \forall c_2[[c_2 \leq c_1 \ \& \ \text{write}(m, \text{the.letter}, c_2) \rightarrow c_2 = c_1]])]]$$

On the other hand, if we take the infelicitous sentence (94b), the derived truth conditions will be (134):

²³We have accommodated the temporal relation $c_1 \leq t$ as part of the presupposition of *mancŷ*-adverbials in (133). This is in part to make the condition parallel to *tongan*-adverbials. But more importantly, we do not see any other way to put this relation as part of assertive content of *mancŷ*-adverbials and at the same time give an adequate truth conditions for *choytayhan* 'at most'. Our semantics of the downward-monotone quantifier *choytayhan* 'at most' does not allow these temporal relations to be part of assertion, as this quantifier is interpreted as involving the negation of 'more than'. These temporal relations $t_1 = c_1$ and $t_1 \leq c_1$ are treated as part of presupposition tentatively here when we discuss *choytayhan* 'at most'.

- (134) #*Mary-ku choysohan two sikan maney ku pyenci-lul ssu-ess-la* ‘Mary wrote the letter in at least two hours’ \Rightarrow
- $$\exists c_1[\textit{write}(m, \textit{the.letter}, c_1) \ \& \ \textit{past}(e_1) \ \& \ \exists t[\textit{at.least.2.hours}(t) \ \& \ (c_1 \leq t \ \& \ \forall c_2[(c_2 \leq c_1 \ \& \ \textit{write}(m, \textit{the.letter}, c_2)) \rightarrow e_2 = e_1])]]]]$$

The two conjuncts in the embedded formula are uninformative. What they say is that the event is temporally part of some time t which is longer than or equal to 2 hours. Thus, the event can be one hour long, two hours long, or longer than 2 hours. In other words, the adverbial does not provide any restriction for the sentence. Since the event has nothing to do with the specified 2 hour duration, the presence of the adverbial seems to make the sentence unacceptable: it is pragmatically unacceptable because of the vacuous modification.

Now we have explained one instance of asymmetry by proposing asymmetric truth conditions for the two types of adverbials: a *longan*-adverbial represents a duration, while an *maney*-adverbial marks a boundary with the part-of/less-than relation. It is intuitively appealing that *maney* ‘in’, which specifies a boundary in the spatial dimension, provides a part-of/less-than relation in the temporal dimension. But the postposition *longan* ‘for’ seems neutral in this regard.

To complete this subsection, our truth conditions for a *longan*-adverbial and a *maney*-adverbial are given here. Note that these adverbials are treated as sentential modifiers in our formalism:²⁴

²⁴The conditions for *han sikan maney* are preliminary at this point for reasons to be discussed momentarily in the next section.

- (135) a. *han sikan longan* ‘for an hour’ \Rightarrow
- $$\lambda P \lambda c_1 [P(c_1) \ \& \ \exists t_1 [\textit{hour}(t_1) \ \& \ c_1 = t_1 \ \& \ (\forall t_2 [t_2 \subset t_1 \rightarrow \exists e_2 [e_2 < c_1 \ \& \ t_2 \leq c_2 \ \& \ P(e_2)])]]]]$$
- b. *han sikan maney* ‘in an hour’ (a preliminary version) \Rightarrow
- $$\lambda P \lambda c_1 [P(c_1) \ \& \ \exists t_1 [\textit{hour}(t_1) \ \& \ c_1 \leq t_1 \ \& \ (\forall e_2 [e_2 \leq c_1 \ \& \ P(e_2)] \rightarrow e_2 = c_1)]]]$$

3.3.2 Two Uses of *Maney/In*-adverbials

In this section we will compare *maney/in*-adverbials with *ey*-adverbials, focussing equally on the Korean and the English adverbials. First, it will be shown that there are two different uses of *maney/in*-adverbials: one as a measure adverbial, the other as a locating adverbial. Then, we will argue that while *maney/in*-adverbials separate telics from atelics, this applies to *maney/in*-adverbials of measuring only. It will be demonstrated that *maney/in*-adverbials of measuring commonly separate accomplishments from the other aktionsarten, whereas *maney/in*-adverbials of locating specify the event time of virtually any kind of aktionsarten.

Two Uses of *Maney/In*-adverbials

In the previous section we deliberately chose accomplishments whenever we discussed *maney/in*-adverbials. The rationale behind this was that the adverbials usually behave in strikingly different manners depending on whether they modify accomplishments or achievements. Several differences are listed below:²⁵

- (136) • *Maney/In*-adverbials always refer to contiguous times for achievements but they sometimes refer to noncontiguous times for accomplishments.

²⁵*Maney/in*-adverbials have two different uses, and these differences are commonly seen between accomplishments and achievements when these adverbials modify them. However, this does not mean that the use of *maney/in*-adverbials is determined by the predicate they modify.

- A contextually given reference time is required for achievements but is not for accomplishments.
- *Maney/In*-adverbials are upward monotone with respect to accomplishments but not with respect to achievements.
- *Maney/In*-adverbials refer to runtimes, or event times, for accomplishments but for achievements they refer to elapsed times, times from a reference point until the given event occurs.

For instance, if we compare the sentences in (117) and (137) below, we notice that (a) the one hour in the letter writing does not have to be one continuous hour but the one hour in the leaving has to; (b) in (137) a specific reference point is required to know from what time the elapsing of an hour is being considered, but it is unnecessary for (117); (c) in a situation where Mary actually wrote the letter in 40 minutes, (117) is acceptable, whereas if Mary did leave in 40 minutes, (137) is not readily acceptable;²⁶ (d) the one hour refers to the time spent in writing the letter in (117) but the time before leaving in (137):

- (117) a. Mary-ka han sikan maney ku phyenci-lul ssu-ess-ta.
 Mary-NOM one hour in that letter-ACC write-PAST-DEC
 'Mary wrote the letter in an hour.'
 b. Mary wrote the letter in an hour.

- (137) a. Mary-ka han sikan maney ttena-ess-ta.
 Mary-NOM one hour in leave-PAST-DEC
 'Mary left an hour later (from some salient time).'

²⁶Dowty (1979:) suggests that it is bad because of a violation of the Maxim of Quantity. Yet, the point is that the pragmatic principle seems to affect accomplishments and achievements differently in this respect.

- b. Mary left in an hour.

Despite these differences, it is observed in many languages that the same *in*-adverbials, or their counterparts, are used for both types of telics (cf. Smith 1993:157). Then, a natural question is whether *maney/in*-adverbials have the same truth conditions with both accomplishments and achievements. If they do, are the truth conditions given above adequate to accommodate the different behavior of achievements? While the same truth conditions are explicitly proposed by Dowty and Hinrichs, most authors are silent on this matter, with the exception of Nerbonne (1984), who acknowledges one of the above-mentioned differences and proposes two different truth conditions for the German preposition *in* 'in' (see Nerbonne 1984:61-62). However, all three authors assume that *in*-adverbials in English and German are compatible only with telics.²⁷ The difference is that Dowty and Hinrichs propose a unified semantics for English *in*-adverbials, whereas Nerbonne suggests two different truth conditions for them.

An example like (138) is often presented to argue that *maney/in*-adverbials select for accomplishments and achievements only (see Dowty 1979:335).

- (138) a. ??Mary-ka han sikan maney ca-ess-ta.
 Mary-NOM one hour in sleep-PAST-DEC
 b. ??Mary slept in an hour.

²⁷Nerbonne suggests that *in*-adverbials are systematically ambiguous between measuring and 'inchoative' readings. Thus, he asserts that an *in*-adverbial can appear with any aktionsart to produce an inchoative reading. But, this is the coerced reading Dowty points out (Dowty 1979:335). Thus, Nerbonne's position is still consistent with Dowty and Hinrichs.

Being unnatural, they are coerced to mean, if they mean anything at all, that Mary fell asleep after an hour had passed. In this case, the stative verbs *sleep* and *can* 'to sleep' are coerced to inchoatives, meaning 'to fall asleep', which is regarded as a subclass of achievements.

Moreover, activity sentences are frequently shown to be incompatible with a *maney/in*-adverbial such as (139).

- (139) a. ??Mary-ka han sikan maney tali-ess-ta.
 Mary-NOM one hour in run-PAST-DEC
 (intended) 'Mary ran in an hour.'
 b. ??Mary ran in an hour.

These sentences, normally an description about an activity, are coerced to become a sentence describing an accomplishment or an achievement. Thus, given appropriate contexts, it could have two possible readings described in (140). In (140a), *run* is coerced to mean 'to run the course'. In (140b) it is coerced to 'to begin to run':

- (140) a. Accomplishment Reading: (She regularly runs a ten mile course. Usually it takes her about one hour and ten minutes. But today was a special day.)
 She ran in an hour.
 b. Achievement Reading: (She wanted to quit the athletic team. Her coach was persistent in dissuading her. The coach left in good spirits after talking with her until noon. She looked happy again.) She ran in an hour.

However, examples like (141), likewise (142), are found in the literature but not explained, even though they seem to counterexemplify the observation described above

that *maney/in*-adverbials occur only with telics.²⁸ Note that the following sentences are potentially ambiguous depending on the relative scope of the progressive marker and the adverbial.²⁹

- (141) Mary was running in an hour.
 (142) Mary-ka han sikan maney tali-ko iss-ess-ta.
 Mary-NOM one hour in run-PROG exist-PAST-DEC
 'Mary was running in an hour.'

Let us take the more natural reading where the adverbial is considered to have wider scope than the progressive (cf. Dowty 1979:346-347). In this case, the clause *Mary was running* is technically stative. Nevertheless, it is not a coerced reading in any way (the unmarked reading is of the stative type). In other words, it doesn't mean that there was a unique interval within a certain hour at which *Mary was running* is true. Nor does it mean that she started running in an hour. This sentence is not given a correct translation using the standard semantics of *in*-adverbials, as the reader can easily determine.

More counterexamples to the claim that *maney/in*-adverbials appear only with telics are found in (143) and (144).

- (143) a. Mary-ka sey sikan maney camcali-ey iss-ess-ta.
 Mary-NOM three hour in bed-in exist-PAST-DEC
 'Mary was in bed in three hours.'
 b. Mary was in bed in three hours.

²⁸Dowty (1979:346-347) in fact discusses an example of this type. However, he does not explain why a noninchoative reading is possible for atelics.

²⁹Let us ignore yet another ambiguity in (141), but not in (142), involving the futurate progressive reading.

(144) Mary was asleep in three hours.

There seems to be one and only one factor which determines what kind of atelics can be modified by an *mancy/in*-adverbial. Namely, the atelic sentences which can be modified by an *mancy/in*-adverbial can also appear with adverbials such as *ccngo-cy* 'at noon' and *John-i tochakha-ess-ul ttay* 'when John arrived', or their English counterparts, whereas those which cannot are not allowed with adverbials of this type. This contrast is illustrated in (145) (148). Note that these are adverbials which locate eventualities at a point, or within a very short interval. In this sense, they differ from other locating adverbials like *eccey* 'yesterday' and *panghak tongan-cy* 'during the break', which involve relatively long intervals.

- (145) a. Cengo-cy/John-i tochaha-ess-ul ttay
 noon-at/John-NOM arrive-PAST-REL time
 Mary-ka tali-ko iss-ess-ta.
 Mary-NOM run-PROG exist-PAST-DEC
 'Mary was running at noon/when John arrived.'
- b. Cengo-cy/John-i tochaha-ess-ul ttay
 noon-at/John-NOM arrive-PAST-REL time
 Mary-ka camcali-ey iss-ess-ta.
 Mary-NOM bed-in exist-PAST-DEC
 'Mary was in bed at noon/when John arrived.'
- (146) a. Mary was running at noon/when John arrived.
 b. Mary was in bed at noon/when John arrived.
 c. Mary was asleep at noon/when John arrived.

- (147) a. ??Cengo-cy/John-i tochaha-ess-ul ttay
 noon-at/John-NOM arrive-PAST-REL time
 Mary-ka tali-ess-ta.
 Mary-NOM run-PAST-DEC
 (intended) 'Mary ran at noon/when John arrived.'
- b. ??Cengo-cy/John-i tochaha-ess-ul ttay
 noon-at/John-NOM arrive-PAST-REL time
 Mary-ka ca-ess-ta.
 Mary-NOM sleep-PAST-DEC
 (intended) 'Mary slept at noon/when John arrived.'
- (148) a. ??Mary ran at noon/when John arrived.
 b. ??Mary slept at noon/when John arrived.

Notice that the unnatural sentences in (147) and (148) can receive coerced interpretations like (149). This fact further suggests that the adverbials *at noon* and *when John arrived* are parallel to *in*-adverbials.

- (149) a. Mary began to run at noon/when John arrived.
 b. Mary began to sleep at noon/when John arrived.

Thus, what seems to be at work is that (a) *mancy/in*-adverbials in these examples locate events at times and (b) these times are points, or very short intervals, like the time referred to by an adverbial *ccngo-cy* 'at noon'. Assuming this, the differences that *mancy/in*-adverbials demonstrate between achievements and accomplishments are precisely those which *mancy/in*-adverbials display between atelics and accomplishments. For instance, the interval involved in (143) can be described as in (150).

(143) Mary was in bed in three hours.

- (150) • The three hours has to be contiguous.
- A reference point to measure the three hours has to be provided in the context. Otherwise, it is infelicitous.
 - (143) does not entail *Mary was in bed in four hours*.
 - The three hour interval is not that during which Mary was in bed. Rather it is understood as the time that passed before she was in that situation.

Consequently, the *mancy/in*-adverbials in this use can be best treated as locating adverbials to which adverbials like *ccngo-cy* ‘at noon’ belong. When an appropriate context is given, the *mancy/in*-adverbial in a sentence like (151) can be ambiguous between measuring and locating.

- (151) John wrote the letter in an hour.
 (a) The duration of John’s writing the letter was within one hour.
 (b) In an hour (of some reference time), John wrote the letter.

Accordingly, a preliminary version of the truth conditional definition of *mancy* in this use is proposed in (152). Note that $t \prec_M c$ reflects the fact that a *mancy*-adverbial locates an event within a time which is (a) later than a contextually salient time, via the free variable t , and (b) later than the salient time by the amount of time, M , specified by the given complement temporal noun.³⁰

- (152) The (preliminary) truth conditions for locating *mancy* ‘in’:

$$\lambda M \lambda P \lambda c [P(c) \ \& \ t \prec_M c],$$

³⁰This is preliminary because a revision is needed to accommodate one difference between *mancy*-adverbials and *in*-adverbials, which will be discussed below.

where the measured precedence relation \prec_M is defined as:

$$t \prec_M c \equiv \exists t_1 [t \prec t_1 \ \& \ t_1 \prec c \ \& \ M(t) \ \& \ \forall t_2 [[t \prec t_2 \ \& \ t_2 \prec c] \rightarrow t_2 \subseteq t_1]]$$

As a result, the sentence (137a) below will have the truth conditions in (153).

- (137a) Mary-ka han sikan mancy ttena-ess-ta.
 Mary-NOM one hour in leave-PAST-DEC
 ‘Mary left an hour later (from some salient time).’

$$(153) \exists c [leave(m, e) \ \& \ past(e) \ \& \ t \prec_{one\ hour} c]$$

On the other hand, the truth conditions proposed in the previous section represent *mancy*-adverbials exclusively as measure adverbials. They are repeated in (154) as the final version.

- (154) The truth conditions for measuring *mancy* ‘in’ (the final version):

$$\lambda M \lambda P \lambda c_1 [P(c_1) \ \& \ \exists t [M(t) \ \& \ c_1 \leq t \ \& \ (\forall c_2 [[c_2 \leq c_1 \ \& \ P(c_2)] \rightarrow c_2 = c_1]])]$$

While we have observed that *mancy*-adverbials usually function as measure adverbials only with accomplishments, the truth conditions in (154) do not exclude the possibility of a measuring *mancy*-adverbial modifying achievement events; the conditions exclude only atelics, since they contain the clause reflecting the uniqueness condition. Nevertheless, the proposed truth conditions seem to be appropriate for two reasons.

First, though achievements are allowed according to the semantics in (154), normally the pragmatic inference disallows them. For instance, the sentence (155) will be infelicitous if the adverbial must be taken to measure the event time. It would be very strange for an event of leaving to last for an hour; thus, this reading is normally dismissed. If it indeed took Mary an hour in leaving, the event is technically considered as an accomplishment.

- (155) #Mary-ka han sikan maney ttena-ess-ta.
 Mary-NOM one hour in leave-PAST-DEC
 (intended) 'Mary spent an hour leaving.'

Second, in rare cases achievements can be modified by a measuring *maney*-adverbial, if the complement of *maney* denotes an extremely short interval like 'one second'. For instance, (156) is acceptable, even though the sentence describes an achievement event. Thus, we need to allow achievements in principle.

- (156) Mary-ka il cho maney salaci-ess-ta.
 Mary-NOM one second in disappear-PAST-DEC
 'Mary disappeared in one second.'

In summary, we have come to notice that (a) two uses of *maney/in*-adverbials are significantly different, (b) in principle, measuring *maney/in*-adverbials distinguish between telics and atelics, though they usually occur only with accomplishments, and (c) locating *maney/in*-adverbials do not distinguish between telics and atelics.

Accordingly, the question to ask is not whether unified truth conditions should and can be given to *maney/in*-adverbials in their use with accomplishments and achievements; rather, it is whether unified truth conditions should and can be given to *maney/in*-adverbials in their use with all aktionsarten. Note that the truth conditions proposed in (154) are aimed at the measuring *maney*-adverbial for telics and therefore are not adequate to account for the locating *maney*-adverbial for atelics. Likewise, the proposed conditions in (152) above account only for the locating *maney*-adverbial.

Thus, it is clear that there are two distinctive functions of *maney/in*-adverbials. However, it is unclear whether they involve homonymy or polysemy, because the adverbials show the same type of ambiguity in Korean and English. We will leave unresolved the problem of deciding whether they are a case of homonymy or polysemy.

Ey-adverbials

The conclusion that *maney/in*-adverbials are different in their uses with accomplishments and the other aktionsarten is reinforced by the existence of *ey*-adverbials in Korean. These adverbials measure the event time of accomplishments but they do not appear with the other aktionsarten. Thus, they precisely correspond to English *in*-adverbials with respect to accomplishments, but correspondence is not shown for achievements, activities, or statives: (157)-(160) show these aktionsarten cannot be modified by an *ey*-adverbial. The sentences in (158)-(160) cannot get coerced inchoative interpretations, either.

- (157) John-i yukkaywol-ey cip-ul ci-ess-ta.
 John-NOM 6 month-in house-ACC build-PAST-DEC
 'John built a house in 6 months.'
- (158) #John-i yukkaywol-ey cenhwaha-ess-ta.
 John-NOM 6 month-in call-PAST-DEC
 (intended) 'John called in 6 months.'
- (159) #John-i sey sikan-ey tali-ess-ta.
 John-NOM 3 hour-in run-PAST-DEC
 (intended) 'John ran/began to run in 3 hours.'
- (160) #John-i sey sikan-ey cali-ey iss-ess-ta.
 John-NOM 3 hour-in bed-in exist-PAST-DEC
 (intended) 'John was in bed in 3 hours.'

Notice that this is consistent with the above conclusion. Namely, accomplishments differ from the other aktionsarten with respect to this temporal adverbial, existence of which is suggested by the different behaviors of *maney/in*-adverbials exhibited between accomplishments and the other aktionsarten. According to our observation, it would be highly unlikely for any language that a certain measure adverbial just

like a *mancy/in*-adverbial modifies either achievements only or accomplishments and states only.

It may be instructive to try to understand how this difference arises between Korean and English. Two facts seem to be involved. First, accomplishments are different from the other aktionsarten in that they provide a natural end point for a given event which is different from its starting point. Therefore, an accomplishment event has a natural interval to measure. On the other hand, achievements are regarded as having one small interval for their event time, which might be considered as the starting and end point. Activities and states, by definition, do not have identifiable end points. Hence, it follows that it is the most natural and the easiest to measure the event time of an accomplishment event, i.e. it is often unnecessary to measure the event time of an achievement event; it would be not as simple to measure the event time of an activity or a stative. Therefore, it is plausible that there exists some temporal adverbial which measures accomplishments only, e.g. Korean *ey*-adverbials and English *in*-adverbials used for accomplishments.

Second, it appears that certain English temporal adverbials contain default information specifying temporal directions, even though the information is not retrievable from its parts. For instance, the adverbials in (161) all locate events at or within certain intervals. Notice that examining the individual lexical items does not readily lead us to conclude that the combinations should mean (a) two years later than now, (b) a month later than Monday, or (c) three hours later than noon. The individual lexical items do not give a clue to why it is *later*, but not *ago/before*.

- (161) a. two years from now
 b. a month from Monday
 c. three hours from noon

On the other hand, Korean does not have this default information about the temporal direction, at least with the adverbials corresponding to (161); the morpheme *hwu* 'later/after' is required to specify the temporal direction as exemplified in (162). Note that the postposition *ey* 'in' is optional in this case.

- (162) a. cikum-pwuthe inyen hwu(-ey)
 now-from 2 year after-in
 'two years from now'
 b. wolyoil-pwuthe han dal hwu(-ey)
 monday-from one month after-in
 'a month from Monday'
 c. cengo-pwuthe sey sikan hwu(-ey)
 noon-from 3 hour after-in
 'three hours from noon'

Likewise, the morpheme *cen* 'before' is necessary for temporal adverbials locating events within an interval prior to some other interval, though it is also the case in English.

- (163) a. cikum-pwuthe inyen cen(-ey)
 now-from 2 year before-in
 'two years before now/ago'
 b. wolyoil-pwuthe han dal cen(-ey)
 monday-from one month before-in
 'a month before Monday'
 c. cengo-pwuthe sey sikan cen(-ey)
 noon-from 3 hour before-in
 'three hours before noon'

Given this fact, it seems clear that English *in*-adverbials occurring in achievements or statives are roughly equivalent to Korean adverbials with *hwu-ey*, as in (162), which mean 'in *x* time later'.³¹ As shown in (161) and (162), the difference is that the English counterparts are not required to include some items like *after/later* which explicitly specify precedence relations. Thus, this fact about English has made it appear that *in*-adverbials in accomplishments are the same as those in the other aktionsarten.

The contrasting examples in (164) and (165) are particularly revealing. While *in an hour* in (164) is ambiguous between measuring and locating, the addition of *from now* makes it locating only, as shown in (165). In other words, *from now* cannot modify the measuring *in*-adverbial, whereas it can modify the locating *in*-adverbial.³²

³¹Note that *maney*-adverbials are not discussed here even though they are almost equivalent to *in*-adverbials. There is a reason for this. While *maney*-adverbials correspond to *in*-adverbials in many respects, the postposition *ey* in general has much more in common with the preposition *in* and therefore a comparison is more meaningful between these two: they are the most widely used in the respective languages; they can be used in the spatial dimension as well as in the temporal dimension with different uses as shown in (i) and (ii):

- (i) a. Spatial Dimension: hakkyo-ey 'in school', pang-ey 'in the room', hanul-ey 'in the sky', etc.
 b. Temporal Dimension (Locating Adverbials): owol-ey 'in May', caknyen-ey 'last year', cengo-ey 'at noon', olwu-ey 'in the afternoon', etc.
 c. Temporal Dimension (Measure Adverbials): han sikan-ey 'in an hour/per hour', halwu-ey 'in a day', etc.
- (ii) a. Spatial Dimension: in school, in the room, in the sky, etc.
 b. Temporal Dimension (Locating Adverbials): in May, in the afternoon, in the morning, in 1996, etc.
 c. Temporal Dimension (Measure Adverbials): in an hour, in a day, etc.

On the other hand, *maney*, presumably a grammaticalized form of *man* 'full' plus *ey*, does not appear in any other environments. Thus, in a way it is an isolated fact that *maney* closely corresponds to *in* in a type of temporal adverbials.

³²The preposition *in* cannot appear together with *from now* in (165b), though it is required when the phrase is not modified by *from now*. Thus, there is a contrast between the sentences in (i):

(164) a. Mary will write a letter in an hour.

b. Mary will close the door in an hour.

(165) a. Mary will write a letter an hour from now.

b. Mary will close the door an hour from now.

Maney versus *In*

Up until now *maney*-adverbials have been treated just like English *in*-adverbials. Indeed, they are *almost* exactly the same. One exception to the correspondence is that an event can provide a *maney*-adverbial with the reference point but an interval cannot; however, in English events and intervals are equally capable of being taken as the reference point for an *in*-adverbial.

- (i) a. *Mary will close the door an hour.
 b. Mary will close the door in an hour.
 c. *Mary will close the door in an hour from now.
 d. Mary will close the door an hour from now.

This seems to be a constraint resulting from some interaction between *in* and a prepositional phrase headed by *from*. We have no clear idea about this interaction, though *in* in (ic) seems redundant in the same way that *before now* in (ii) is:

- (ii) *Mary closed the door an hour ago before now.

At any rate the fact that *an hour* must have a preposition but *an hour from now* must not is a constraint of a sort exhibited in many other English temporal adverbials. English temporal nouns, or noun phrases, are divided into three groups with respect to the presence or the lack of a preposition when they are used as a temporal adverbial, as exemplified in (iii).

- (iii) a. No Preposition: yesterday, today, tomorrow, last year, this year, next year, last month, next month, this afternoon, etc.
 b. Preposition Required: my birthday, the new year's day, 1996, March, etc.
 c. Preposition Optional: Monday, etc.

According to this grouping, *an hour* belongs to the second group but *an hour from now* belongs to the first group. Though it is not completely clear what is the difference between the groups, one tendency is that the temporal nouns, or noun phrases, in the first group contain a lexical item that is context-dependent for the denotation of the temporal word. This could explain why *an hour from now* belongs to the first group: it contains *now*, which is context-dependent.

This is noteworthy as it bears on the two different uses of *mancy/in*-adverbials. While the adverbial in accomplishments works precisely like English *in*-adverbials, the correspondence stops in the other aktionsarten. In particular, all the following sentences except (166) are unacceptable; (166) differs from the rest in that it is a sentence describing an accomplishment.

- (166) Twu sikan-maney swukcey-lul ha-keyss-ta.
 2 hour-in homework-ACC do-MOD-DEC
 'I'll do the homework in 2 hours.'
- (167) #John-i twu sikan-maney tolao-nuu-ta.
 John-NOM 2 hour-in return-NONPAST-DEC
 (intended) 'John comes back in 2 hours.'
- (168) #Twu sikan-maney cenhwaha-keyss-ta.
 2 hour-in call-MOD-DEC
 (intended) 'I'll call you in 2 hours.'
- (169) #Twu sikan-maney tolao-nela.
 2 hour-in return-IMPER
 (intended) 'Come back in 2 hours.'

It should be noted that the English counterparts of the unacceptable examples are all perfectly fine:

- (170) a. John comes back in 2 hours.
 b. I'll call you in 2 hours.
 c. Come back in 2 hours.

Recall that one of the differences exhibited by *mancy/in*-adverbials between accomplishments and the other aktionsarten is that a reference point is required when they modify nonaccomplishments. In the English sentences in (170) the utterance time

is taken as the reference point for the *in*-adverbials. But (167)–(169) are unacceptable because the utterance time cannot be used as a reference point for the *mancy*-adverbials. This can be further shown in examples like (171) and (172). These are a minimal pair in that *moim* 'meeting' refers to an event, whereas *ttay* 'time' refers to an interval.

- (171) ku moim-ihwu sam kaywol maney John-i cenhwaha-ess-ta.
 the meeting-after 3 months in John-NOM call-PAST-DEC
 'John called me three months after the meeting.'
- (172) #ku ttay-ihwu sam kaywol maney John-i cenhwaha-ess-ta.
 the time-after 3 months in John-NOM call-PAST-DEC
 (intended) 'John called me three months after that time.'

Consequently, we will accommodate this difference by revising our truth conditions for *mancy*. This is just like (152), with c' replacing t .

- (173) The (final) truth conditions for locating *mancy* 'in':

$$\lambda M \lambda P \lambda c [P(c) \ \& \ c' \prec_M c],$$

where the measured precedence relation \prec_M is defined such as:

$$c' \prec_M c \equiv \exists t_1 [c' \prec t_1 \ \& \ t_1 \prec c \ \& \ M(t) \ \& \ \forall t_2 [(c' \prec t_2 \ \& \ t_2 \prec c) \rightarrow t_2 \subseteq t_1]]$$

3.3.3 'Ambiguous' Adverbials

Pwuthe 'from/since'

The postposition *pwuthe* combines with a temporal expression referring to a specific time and as a result marks the initial interval of an event. Moreover, it selects for atelic sentences only, as illustrated by the contrast in (174) and (175). As expected of an adverbial selecting for atelics, it is often found with a typical telic sentence,

in which case the resulting sentence is coerced to an iterative interpretation. Thus, (176) is understood as a description about repeated events of a same type, rather than as one about a single event.³³

(174) Mary-ka nayil-pwuthe yuchiwon-ey tani-nunta.
Mary-NOM tomorrow-from kindergarten-to attend-DEC
'Mary attends kindergarten starting tomorrow.'

(175) #Mary-ka nayil-pwuthe yuchiwon-eyse cholepha-nunta.
Mary-NOM tomorrow-from kindergarten-at graduate-DEC
(intended)'Mary graduates from kindergarten starting tomorrow.'

(176) Mary-ka nayil-pwuthe Seoulyek-ey tochiakha-nunta.
Mary-NOM tomorrow-from Seoul.station-to arrive-DEC
'Mary arrives at Seoul Station from tomorrow.'

As it should be obvious by now, *pwuthe* corresponds to English *from* in all respects that have been discussed. However, note that they are not completely parallel, as some instances of *pwuthe* cannot be glossed as 'from'. Consider (177). It cannot be glossed as 'from' as suggested in (178).

(177) John-i ecey pam-pwuthe ca-nunta.
John-NOM last night-from sleep-DEC
'John has been sleeping since last night (and is still sleeping).'

(178) *John has been sleeping from last night.

Note that this should not be interpreted as suggesting that there are two uses of *pwuthe*, i.e. one for 'from' and the other for 'since'. Rather, it is a fact of English that the situation described in (177) above cannot be described by an English sentence in present tense, as shown in (179):

³³This reading is obtained in a situation in which a babysitter needs to pick up Mary each day when the kindergarten bus drops her at some location in the city and for some reason the dropping location has changed to Seoul Station from a nearby station.

(179) *John is sleeping from last night.

Instead, a present perfect sentence has to be used. However, another fact of English is that a *from*-adverbial is not allowed in present perfect as demonstrated in (178) above; *since*-adverbials complement *from*-adverbials in present perfect. (N.B. Korean does not have perfect on the analysis of Korean tense proposed in Chapter 2.) Thus, we have contrasts between (178) and (180), and between the two sentences in (181).

(180) John has been sleeping since last night.

(181) a. John slept from last night on.

b. *John slept since last night.

Consequently it is maintained that a *pwuthe*-adverbial marks an initial event time for an atelic event. Its truth conditions are proposed in (182) along with the truth conditions for (177), a sentence containing it. The initial interval function *I* is defined in (183a) and its mirror image, the final interval function *F*, is also defined for later use:

(182) a. *pwuthe* 'from' $\Rightarrow \lambda t_0 \lambda P \lambda c_1 [P(c_1) \ \& \ \exists t_1 [t_0 \in I(t_1) \ \& \ c_1 =_t t_1 \ \& \ (\forall t_2 [t_2 \subset t_1 \rightarrow \exists c_2 [c_2 < c_1 \ \& \ t_2 \leq c_2 \ \& \ P(c_2)]]]]]$

b. *John-i ecey pam-pwuthe ca-nun-ta* \Rightarrow
 $\exists c_1 [sleep(j, c_1) \ \& \ nonpast(c_1) \ \& \ \exists t_1 [last.night \in I(t_1) \ \& \ c_1 =_t t_1 \ \& \ (\forall t_2 [t_2 \subset t_1 \rightarrow \exists c_2 [c_2 < c_1 \ \& \ t_2 \leq c_2 \ \& \ sleep(j, c_2)]]]]]$

(183) a. $t_1 \in I(t_2)$ iff $t_1 \subset t_2 \ \& \ \neg \exists t_3 [t_3 \subset t_2 \ \& \ t_3 \prec t_1]$

$$b. t_1 \in F(t_2) \text{ iff } t_1 \subset t_2 \ \& \ \neg \exists t_3 [t_3 \subset t_2 \ \& \ t_1 \prec t_3]$$

Note that the value of the function *I*, and likewise, that of *F*, is a set of intervals which include the initial point of a given interval. For instance, if the argument of the function *I* is the denotation of the year 1996, then the value is a set including the denotations of the midnight of the new year's day, the morning of the new year's day, the new year's day itself, January of 1996, the first quarter of 1996, etc., as exemplified in (184).

$$(184) I(t_0) = \{t_1, t_2, t_3, t_4, t_5, \dots\}$$

where $t_0, t_1, t_2, t_3, t_4, t_5$ are denoted by the year 1996, the midnight of the new year's day, the morning of the new year's day, the new year's day itself, January of 1996, the first quarter of 1996, respectively.

Kkaci 'until/by'

The postposition *kkaci* always combines with a temporal expression like *cnngo* 'noon' which refers to a definite time. The resulting temporal adverbial either specifies for an event the final point of its event time or locates a given event within a certain temporal frame. For instance in (185), *scysi kkaci* specifies the duration of the working event as lasting up to three o'clock in (185a) but restricts the event of finishing to occur by three o'clock in (185b).

- (185) a. *Seysi-kkaci ilhay.*
 three.o'clock-POST work
 'Work until three o'clock!'
- b. *Seysi-kkaci kkuthnay.*
 three.o'clock-POST finish
 'Finish it by three o'clock!'

Thus, when used in the first way it is an exact mirror image of *pwuthe* 'from'; a *kkaci*-adverbial marks the final interval of an event, whereas a *pwuthe*-adverbial specifies the initial interval of an event. Thus, *kkaci* can be appropriately glossed in English as either 'until' or 'by'.³⁴

Note also that it is predictable which of the two interpretations a sentence will be given once we know the aktionsart of its interpretation, as demonstrated by the examples below. Moreover, only one of the two readings are available for each type of sentence. In other words, the two interpretations are in complementary distribution.

(186) • 'until' reading:

1. *anca iss-ess-ta* 'sat'
2. *kongpwuha-ess-ta* 'studied'
3. *kongpwuha-ko iss-ess-ta* 'was studying'
4. *aplhu-ess-ta* 'was sick'

(187) • 'by' reading:

1. *Seoul-ey tochiakha-ess-ta* 'arrived in Seoul'
2. *nonmwun-ul ssu-ess-ta* 'wrote a paper'
3. *cam-eyse kkay-ess-ta* 'woke up'
4. *paykmaupwul-ul pel-ess-ta* 'earned one million dollars'

³⁴Note that *kkaci* is not completely equivalent to *until*, as there is at least one difference: *kkaci* always refers to intervals which include their boundaries, whereas *until* does not. In particular, *until* does not include its temporal boundary in a negation. E.g. note that (i) and (ii) have the same meaning except that the speaker is expected to go to school on March 5th in (ii), but not in (i).

(i) *Sauwol oil-kkaci hakkyo an ka-nun-ta.*
 March 5th-until school not go-NONPAST-DEC

(ii) We don't go to school until March 5th.

Note that the verbs in (186) are activities or states, whereas those in (187) are accomplishments or achievements: the generalization is that it is interpreted as 'until' in an atelic sentence but 'by' in a telic sentence.

In no way does the presence of two distinct lexical items in a language corresponding to one lexical item in another language guarantee that that one lexical item is ambiguous. Rather, in most cases in the language with two lexical items, each is more specific in meaning than the single item in the other language. Likewise, the existence of *until* and *by* in English is not proof that *kkaci* is ambiguous in Korean. Rather, *kkaci* seems to have one consistent meaning that marks some kind of a final point, be it a final interval or a deadline. However, there is no explicit way of representing the unified interpretation of 'until' and 'by' at this point; thus for expository purposes, we will assume for now that there are two different *kkaci*'s, one for 'until' and the other for 'by'. After we explicitly define two separate truth conditions for *kkaci*, we will then attempt to find a way to unify those truth conditions.

When used to modify an atelic event, a *kkaci*-adverbial marks the final interval of the event. Accordingly, the truth conditions for *kkaci* in this use can be appropriately represented by (188a). The truth conditions for a sentence containing a *kkaci*-adverbial are illustrated in (188b).

(188) a. *kkaci*₁ 'until' \Rightarrow

$$\lambda t_0 \lambda P \lambda e_1 [P(e_1) \ \& \ \exists t_1 [t_0 \in F(t_1) \ \& \ e_1 =_t t_1 \ \& \ (\forall t_2 [t_2 \subset t_1 \rightarrow \exists e_2 [e_2 \subset e_1 \ \& \ t_2 \leq e_2 \ \& \ P(e_2)]]]]]$$

b. *John-i* *eccy* *pam-kkaci*₁ *ca-ess-ta* 'John slept until last night' \Rightarrow

$$\exists e_1 [sleep(j, e_1) \ \& \ past(e_1) \ \& \ \exists t_1 [last.night \in F(t_1) \ \& \ e_1 =_t t_1 \ \& \ (\forall t_2 [t_2 \subset t_1 \rightarrow \exists e_2 [e_2 \subset e_1 \ \& \ t_2 \leq e_2 \ \& \ sleep(j, e_2)]]]]]$$

Notice that a sentence like (189), with both *pwuthe* 'from' and *kkaci* 'until', is derived in a compositional way, resulting in the truth conditions in (190).

(189) *John-i* *eccy* *pam-pwuthe* *cengo-kkaci* *ca-ess-ta*.
John-NOM last night-from noon-until sleep-PAST-DEC
'John slept from last night until noon.'

(190) $\exists e_1 [sleep(j, e_1) \ \& \ past(e) \ \& \ \exists t_1 [last.night \in I(t_1) \ \& \ noon \in F(t_1) \ \& \ e_1 =_t t_1 \ \& \ (\forall t_2 [t_2 \subset t_1 \rightarrow \exists e_2 [e_2 \subset e_1 \ \& \ t_2 \leq e_2 \ \& \ sleep(j, e_2)]]]]]$

The truth conditions for *kkaci*₂ 'by' need some discussion at this point as it is unclear how it should be distinguished from a similar adverbial involving *icney* 'before/prior to'. There are several differences between them. First, the latter is compatible with atelics as well as telics. Secondly, the latter requires completion before the interval given by the postposition's complement, whereas the former does not; the event can be located within yesterday in (191), but not in (192).

(191) *John-i* *eccy* *kkaci* *ku* *project-lul* *kkuthmay-ess-ta*.
John-NOM yesterday by the project-ACC complete-PAST-DEC
'John completed the project by yesterday.'

(192) *John-i* *eccy* *icney* *ku* *project-lul* *kkuthmay-ess-ta*.
John-NOM yesterday before the project-ACC complete-PAST-DEC
'John completed the project before yesterday.'

Moreover, there is an additional difference; (191) seems to differ from (192) in that the completing event is generally perceived to occur closer to yesterday in (191)

than it is in (192). Nevertheless, it does not seem to be a truth conditional difference as both can be truthfully uttered in the same situation (unless the event occurred within yesterday.) The fact that *iceneŋy* 'before' involves a strict precedence relation between an interval and an event, whereas *kkaci* 'by' involves a nonstrict precedence relation between them, does not contribute to this perceived difference. In other words, the perception that e_2 , the event described in (192), occurs prior to e_1 , the one described in (191), does not follow from the fact that the temporal relations in (191) and (192) are represented as $e_1 \preceq \text{yesterday}$ and $e_2 \prec \text{yesterday}$, respectively. This can be shown by comparing (192) with (193). Notice that (193) is the same as (191) except that *kucckky* 'the day before yesterday' replaces *ecy* 'yesterday' to compensate for the strict-nonstrict order difference. Thus, the temporal relations are (192) $e_2 \prec \text{yesterday}$ vs. (193) $e_1 \preceq \text{the day before yesterday}$; therefore, (192) and (193) are truthconditionally equivalent. Yet, the finishing event in (193) is also generally perceived to occur prior to the event in (192).

(193) John-i kucekkey kkaci ku project-lul
 John-NOM the day before yesterday by the project-ACC
 kkuthuay-ess-ta.
 complete-PAST-DEC
 'John completed the project by the day before yesterday.'

The difference appears to be presuppositional. As an answer to the sentence (194), (195b) is less natural than (195a). A sentence like (195b) seems to presuppose existence of a salient temporal frame, or a deadline, for the event, whereas (195a) does not.

- (194) Eneycey kkuthuay-ess-ni?
 when complete-PAST-INTER
 'When did he complete it?'
- (195) a. Nay-ka alki-lonun ecey iceneŋy kkuthuay-ess-ta.
 I-NOM know-as.far.as yesterday before complete-PAST-DEC
 'As far as I know, he completed it before yesterday.'
- b. Nay-ka alki-lonun ecey kkaci kkuthuay-ess-ta.
 I-NOM know-as.far.as yesterday by complete-PAST-DEC
 'As far as I know, he completed it by yesterday.'

We can translate this presupposition as such that a *kkaci*-adverbial, when used to modify a telic event, specifies the final interval for some salient interval and that the event in question is located within this salient interval. Thus, we propose the semantics for *kkaci*₂ in (196). Accordingly, the sentence (191) above is given the truth conditions in (197).

(196) *kkaci*₂ 'by' \Rightarrow

$$\lambda t_0 \lambda P \lambda c_1 [P(e_1) \ \& \ \exists t_1 [t_0 \in F(t_1) \ \& \ c_1 \leq t_1 \ \& \ (\forall e_2 [[c_2 \leq c_1 \ \& \ P(e_2)] \rightarrow e_2 = c_1]]]]$$

(197) $\exists e_1 [finish(j, the.project, e_1) \ \& \ past(e_1) \ \& \ \exists t_1 [yeŋt \in F(t_1) \ \& \ c_1 \leq t_1 \ \& \ (\forall e_2 [[c_2 \leq c_1 \ \& \ finish(j, the.project, e_2)] \rightarrow e_2 = c_1]]]]$

If we compare the proposed truth conditions for *kkaci*₂ with those for *kkaci*₁, repeated below in (188a), we notice two facts about the meaning of *kkaci* which reflect the similarity as well as the difference between the two uses.

(188a) *kkaci*₁ 'until' \Rightarrow

$$\lambda t_0 \lambda P \lambda c_1 [P(e_1) \ \& \ \exists t_1 [t_0 \in F(t_1) \ \& \ c_1 = t_1 \ \& \ \forall t_2 [t_2 \subset t_1 \rightarrow \exists e_2 [e_2 < c_1 \ \& \ t_2 \leq e_2 \ \& \ P(e_2)]]]]$$

Note that the function F marking the set of final intervals for a given interval reflects the similarity that the two uses of *kkaci*-adverbials share. On the other hand, their difference is captured by two sets of conditions. Consider (198), where the relevant parts are separated, for ease of comparison, from the whole truth conditions for the two uses of *kkaci*. One difference is that the event in question e_1 is temporally identified with the interval t_1 in *kkaci*₁, whereas the former is temporally included in the latter in *kkaci*₂. The other difference is that (198a) contains the formula $\forall t_2[t_2 \subset t_1 \rightarrow \exists e_2[e_2 < e_1 \ \& \ t_2 \leq e_2 \ \& \ P(e_2)]]$, the conditions requiring e_1 to be atelic, but that (198a) contains $\forall e_2[[e_2 \leq e_1 \ \& \ P(e_2)] \rightarrow e_2 = e_1]$, which ensures that e_1 is telic.

- (198) a. *kkaci*₁ : $\exists e_1 \exists t_1 [e_1 =_t t_1 \ \& \ (\forall t_2 [t_2 \subset t_1 \rightarrow \exists e_2 [e_2 < e_1 \ \& \ t_2 \leq e_2 \ \& \ P(e_2)])]]$
 b. *kkaci*₂ : $\exists e_1 \exists t_1 [e_1 \leq t_1 \ \& \ (\forall e_2 [[e_2 \leq e_1 \ \& \ P(e_2)] \rightarrow e_2 = e_1])]$

We contend that these two differences are not independent of each other: i.e. the conditions requiring an atelic event seem to be correlated with the temporal identity relation in (198a); likewise, the conditions requiring a telic event are correlated with the temporal inclusion relation in (198b).

First, notice that these differences are exactly the same differences exhibited between *tongan* 'for' and *maney* 'in' when we examine the proposed truth conditions for them, repeated in (135).

- (135) a. *han sikan tongan* 'for an hour' \Rightarrow
 $\lambda P \lambda e_1 [P(e_1) \ \& \ \exists t_1 [hour(t_1) \ \& \ e_1 =_t t_1 \ \& \ \forall t_2 [t_2 \subset t_1 \rightarrow \exists e_2 [e_2 < e_1 \ \& \ t_2 \leq e_2 \ \& \ P(e_2)]]]]]$

b. *han sikan maney* 'in an hour' (as a measure adverbial) \Rightarrow

$$\lambda P \lambda e_1 [P(e_1) \ \& \ \exists t_1 [hour(t_1) \ \& \ e_1 \leq t_1 \ \& \ (\forall e_2 [[e_2 \leq e_1 \ \& \ P(e_2)] \rightarrow e_2 = e_1])]]]$$

We have observed that a *tongan*-adverbial is compatible only with an atelic event; but a measuring *maney*-adverbial, only with a telic event. In fact, this difference led us to include in the truth conditions for *tongan* 'for' and *maney* 'in' those lengthy formulae $\forall t_2 [t_2 \subset t_1 \rightarrow \exists e_2 [e_2 < e_1 \ \& \ t_2 \leq e_2 \ \& \ P(e_2)]]$ and $\forall e_2 [[e_2 \leq e_1 \ \& \ P(e_2)] \rightarrow e_2 = e_1]$, respectively. Therefore, hardly is it surprising that the formula reflecting the distributivity is shared by *kkaci*₁ 'until' and *tongan* 'for', whereas the formula for the uniqueness condition is shared by *kkaci*₂ 'by' and *maney* 'in'. However, it is significant that temporal adverbials modifying an atelic event contain the temporal identity relation rather than the temporal inclusion, whereas those modifying a telic event contain the temporal inclusion relation.

Secondly, as we noted in §3.1, an atelic eventuality is commonly inferred to hold throughout a given interval; but a telic eventuality is usually understood as occurring at some point within a given interval. For example in (15) and (1) repeated below, though modified by the same locating adverbial *eccey* 'yesterday', the atelic eventuality of being sad is generally understood as holding throughout the day, whereas the event of leaving is taken as occurred at some point during the day.

- (15) John-i eccey sulphu-ess-ta.
 John-NOM yesterday sad-PAST-DEC
 'John was sad yesterday.'
- (1) Mary-ka eccey ttena-ess-ta.
 Mary-NOM yesterday leave-PAST-DEC
 'Mary left yesterday.'

Note that this is not to claim that being sad in (15) is asserted to be temporally identical with the interval of 'yesterday'; we explicitly argued in §3.1 that the locating adverbial *ccty* 'yesterday' always specifies the temporal inclusion relation, though it does not exclude the possibility for a given eventuality holding throughout the given interval. Rather, the point is to demonstrate with these examples that temporal adverbials tend to implicate the temporal identity relation with atelics but the temporal inclusion relation with telics. This tendency is particularly revealing in the contrast between (15) and (1) above because the adverbial *ccty* 'yesterday' is regarded as specifying the temporal inclusion relation; nevertheless, the tendency is apparent.

Thus, we suggest that there is a natural connection between atelics and the temporal identity relation, and between telics and the temporal inclusion relation. Accordingly, we claim that if a given temporal adverbial is unspecified between the temporal identity and the temporal inclusion, the relations are given by default: atelics are given the temporal identity relation; telics are given the temporal inclusion.

Once we assume this default relation, we can explain why *longan* 'for' and *kkaci*₁ 'until' share both the atelicity requirement and the temporal identity relation and why *maney* 'in' and *kkaci*₂ 'by' share the telicity requirement and the temporal inclusion relation. Suppose all of these four are unspecified between the identity and the inclusion relations. Then, all the right conditions for the four postpositions are derived by the default assumption.

This assumption is particularly appealing and intuitive when we consider the contrasts between *longan* 'for' and *maney* 'in', and between *kkaci*₁ 'until' and *kkaci*₂ 'by'. Though each pair seem to function exactly in the same way except for the telicity requirement, yet it is the default assumption which makes these pairs be distinct from their pairmate with respect to the telicity requirement only.

Consequently, we could redefine the truth conditions for *longan*-adverbials and measuring *maney*-adverbials such as (199), where R_t is the default temporal relation.

(199) a. *han sikan longan* 'for an hour' \Rightarrow

$$\lambda P \lambda c_1 [P(c_1) \ \& \ \exists t_1 [hour(t_1) \ \& \ c_1 R_t t_1 \ \& \ (\forall t_2 [t_2 \subset t_1 \rightarrow \exists c_2 [c_2 < c_1 \ \& \ t_2 \leq c_2 \ \& \ P(c_2)])]]]]$$

b. *han sikan maney* 'in an hour' (as a measure adverbial) \Rightarrow

$$\lambda P \lambda c_1 [P(c_1) \ \& \ \exists t_1 [hour(t_1) \ \& \ c_1 R_t t_1 \ \& \ (\forall c_2 [(c_2 \leq c_1 \ \& \ P(c_2)) \rightarrow c_2 = c_1]]]]$$

Notice however that these conditions are empirically equivalent to the ones proposed above because the default relation in *longan* 'for' always gets the identity relation and the one in *maney* 'in' is always assigned the inclusion relation. On the other hand, *kkaci* can be assigned unified truth conditions. Recall that we have made reference to *kkaci*₁ and *kkaci*₂ for expository purposes only. The default assumption allows us to assign unified truth conditions proposed in (200):

$$(200) \textit{kkaci} \textit{'until/by'} \Rightarrow \lambda t_0 \lambda P \lambda c_1 [P(c_1) \ \& \ \exists t_1 [t_0 \in F(t_1) \ \& \ c_1 R_t t_1]]$$

These conditions ensure that *kkaci*-adverbials appear in telics as well as atelics, by removing the uniqueness conditions and the distributivity conditions. Nevertheless, the

Table 5: Korean Temporal Adverbial Patterns

aktionsarten	left limit specified by	right limit specified by
atelic	<i>pwuthe</i>	<i>kkaci</i>
telic		<i>kkaci</i>

appropriate temporal relations are provided by the default assumption. As a result, they capture our intuition that *kkaci* is not really ambiguous in Korean.

3.3.4 Some Thoughts on Paradigm

Having discussed major temporal adverbials in Korean and their interactions with different aktionsarten, we cannot fail to make one empirical observation about temporal adverbials. We have noticed that *pwuthe* ‘from’ and *kkaci* ‘until’ are mirror images of each other. They both select for atelics. The former marks the initial interval for an event, whereas the latter specifies the final interval of an event. However, it is conspicuous that *kkaci* ‘by’ lacks its mirror image; there is no temporal adverbial in Korean which specifies the limit of the initiation point exclusively for telics. It can be shown more explicitly in Table 5. The terms left and right limits are used for expository purposes to suggest the time axis which typically goes from left to right.

It seems that the gap in the paradigm is not a logical gap. We do not see any logical reason why *pwuthe*, for instance, does not take a telic sentence and have another interpretation just as *kkaci* does. One might argue that *pwuthe* has exactly this interpretation when it appears with a sentence like (201).

Table 6: English Temporal Adverbial Patterns

aktionsarten	left limit specified by	right limit specified by
atelic	<i>from</i>	<i>until</i>
telic		<i>by</i>

- (201) Swuep-i cengo pwuthe sicakha-ess-ta.
 class-NOM noon from start-PAST-DEC
 ‘The class started at noon.’

Notice, however, that it is not a mirror image of *kkaci* ‘by’ in this use. It marks the initial interval rather than locating the event within some time after noon. Thus, it is more like a mirror image of *kkaci* ‘until’. We refer the reader to Chapter 4, where this type of adverbials is analyzed as modifying result states. According to this analysis, *ccngo pwuthe* ‘from noon’ in (201) modifies the state which resulted from the event of starting class.

English also has this gap in the paradigm. For instance, there is no preposition to fill the gap in (202) which would appear only with telics and make the sentence mean that he completed the project at noon or after that.

- (202) ??John completed his project () noon.

Thus, the paradigmatic table in Table 6 is obtained for English adverbials which is the same as the one for Korean above.

Notice in Table 7 that Japanese shows the same pattern in the paradigm as Korean and English:

Table 7: Japanese Adverbial Patterns

aktionsarten	left limit specified by	right limit specified by
atelics	<i>kara</i> 'from'	<i>made</i> 'until'
telics		<i>made-ni</i> 'by'

Table 8: Names for Precipitation

position	liquid stuff	powdery stuff
in the air	<i>pi</i> 'rain'	<i>nwan</i> 'snow'
on the ground	<i>mwul</i> 'water'	<i>nwan</i> 'snow'

This might be explained by turning to the fact that hardly does a need arise for a mirror image of deadline or due date.³⁵ At least no word for that notion exists either in Korean or in English. This lack of need may contribute to the the gap in the paradigm in these languages as most lexical gaps are correlated with lack of need. For instance, an analogy may be found in the contrast between *pi* 'rain' and *nwan* 'snow'. While essentially the same substance is called either *pi* 'rain' or *mwul* 'water' depending on whether or not it hits the ground, this kind of distinction is not found in *nwan* 'snow'; the substance is invariably called *nwan*, regardless of whether it is coming down from the sky or it is on the ground, as illustrated in Table 8:

This is probably because a significant difference exists between water and snow on the ground with respect to the need for reference; we don't drink/eat snow on the ground, we don't boil it, we don't put it with food, we don't wash our face with it,

³⁵The starting point of a race might be considered as the mirror image of a deadline.

Table 9: Unlikely Temporal Adverbial Patterns

aktionsarten	left limit specified by	right limit specified by
atelics	α	
telics	β	γ

aktionsarten	left limit specified by	right limit specified by
atelics		α
telics	β	γ

aktionsarten	left limit specified by	right limit specified by
atelics	α	β
telics	γ	

we don't rinse with it, etc.

Along these lines, it is not expected for a language to have an adverbial gap in some other positions without a gap in the position found in Korean, Japanese, and English. Namely, the three paradigms suggested below in Table 9 are highly unlikely for a natural language:

We have observed that *in*-adverbials differ from *for*-adverbials precisely in the same way *by*-adverbials differ from *until*-adverbials in English. Also, we noticed that *many*-adverbials and *long*-adverbials exhibit the same difference, just as two uses of *kkaci*-adverbials do. Then, it seems arbitrary that Korean possesses a lexical item for each of *in* and *for*, while *kkaci* covers for *by* and *until*. Thus, it is predicted that (i) some languages may have one lexical item for *in* and *for*, but separate words for *by* and *until*, and further that (ii) some other languages may have one for each pair. Thus, we expect the following two paradigms in Table 10 and 11:

Table 10: Possible Temporal Adverbial Pattern 1

aktionsarten	measure adverbs	locating adverbs
atelic	α 'for'	γ 'until'
telic	α 'in'	δ 'by'

Table 11: Possible Temporal Adverbial Pattern 2

aktionsarten	measure adverbs	locating adverbs
atelic	α 'for'	γ 'until'
telic	α 'in'	γ 'by'

3.4 Conclusion

Despite a natural assumption that a *kkaci*-adverbial would be interpreted as the same regardless of what type of sentences it appears in, we have observed that it 'assigns' different temporal relations depending on *aktionsarten*. Likewise, *longan* and *maney*-adverbials exhibit differences other than the presuppositions about eventuality types. We have demonstrated that their differences are of the same type and categorically determined by *aktionsarten*. This entails that temporal relations can be captured adequately only if they are not fully specified by temporal adverbials or tense, but rather part of them is left to be determined by *aktionsarten*.

CHAPTER IV

Result State and Internal Adverbs

In this chapter, we will discuss result state verbs, as they pose a challenge to a compositional view of adverbial modification. They are involved in adverbial modification which is apparently noncompositional in the sense that certain temporal adverbials appear to modify some semantic subpart of the denotations of these verbs, rather than the denotations of these verbs as a whole; thus, these adverbials are 'internal' in descriptive terms.

4.1 Introduction

Examples such as (1) and (2) pose a challenge to the view that the suffix *-ess* marks the past tense. Even with the marker which we consider to indicate the past, they describe present states of affairs rather than a past event. Thus, they appear to suggest that it be a marker of some other kind such as a perfective marker.

- (1) Ney os-ey cikum hulk-i mwut-ess-ta.
 your clothes-on now mud-NOM stick.to-PAST-DEC
 'Mud is now on your clothes.'
- (2) Mary-ka cikum/onul olwu-ey-nun ppalkan moca-lul ssu-ess-ta.
 Mary-NOM now/this afternoon-in-TOP red hat-ACC put.on-PAST-DEC
 'Mary is wearing a red hat now/this afternoon.'

For (2) to be true, for instance, it is only required that Mary is wearing a red hat at the utterance time; it is entailed that she put it on sometime earlier than the utterance time. In other words, these sentences describe some present states which past events brought about.

These examples are also challenging to the standard approach to adverbial modification: under the given glosses of the verbs, the temporal adverbials in these examples seem to modify not the events denoted by the verbs per se; rather they seem to modify some states that are inferred as holding as a result of the type of event denoted.

What is crucial about the above sentences is not the fact that past tensed sentences are 'used' to describe present states of affairs. In fact, past tense is frequently used to describe present states, for instance, in an exchange like (3) in English:

(3) A: Is Mary in?

B: She left five minutes ago.

B's utterance is 'used' for present purposes, more specifically as an answer to a question about Mary's present state. However, it is hardly controversial that the tense is past and that it is an assertion about a past event: in the given context, the present state of Mary is inferred from the past-tensed sentence.

What IS crucial in (1) and (2) is the fact that the temporal adverb denoting the utterance time is used along with the past tense marker. Thus, there appears to be a contradiction by having both of them in the same clause.

It will be seen that despite these examples a theory of *-css* as aspect marker is inadequate and unmotivated. Instead we will propose an analysis based on the

aktionsarten of the verbs involved in the above sentences. In a nutshell it will be proposed that there are a class of verbs in Korean which are both telic and atelic according to common diagnostics and that the verbs in (1) and (2) belong to this class. We will propose an analysis according to which two eventuality variables are introduced in the semantics of verbs like *ssu* 'to put on/wear' in such a way that sentences involving them can be understood as descriptions of two eventualities, i.e. the telic event and its 'result state' at the same time. Accordingly, in (2) there are two eventualities introduced by the verb: (a) the event of putting on a hat and (b) the result state of wearing it. Under the given reading the past tense is about the event while the temporal adverbials *cikum* 'now' and *onul ohwu-cy-nun* 'this afternoon' modify the state.

In §4.2, elaborating Yang (1977a) and Jeong (1981), we will motivate a subclass of verbs, to be called result state verbs. Moreover it will be shown that the kind of readings in sentences like (1) and (2) always involve a result state verb. Also, we will discuss interactions between result state verbs, tense, and temporal adverbials. Based on this, we will maintain that these readings, to be called result state readings, arise independently of the tense marker *-css* and therefore that the existence of these readings is in fact consistent with the claim that *-css* is a past tense marker.

In §4.3 we will look into some previous approaches to similar constructions in English and German. In §4.4 we will propose an analysis to account for the observed facts about result state verbs.

4.2 Verbs of Result State

Two classes of verbs participate in three different constructions to produce result state readings. We will first describe and motivate these classes of verbs. Then we will see how the three constructions are related and in what respects they differ from one another.

It was suggested in Yang (1977a,b) that verbs in Korean be divided into two sub-categories depending on whether or not they can appear in a result state construction with *-ko iss* or *-e iss*. According to him, 'process-goal separate' verbs, i.e. verbs that can combine with a result marker, can be used to refer either to the achieving stage (i.e. process) or to the achieved stage (i.e. goal). The other class of verbs, 'process-goal fused' verbs, do not distinguish between the two stages. Jeong (1981) proposes a class of verbs called 'resultatives' which essentially correspond to Yang's process-goal separate verbs. The key criterion for Jeong's class of resultatives is again whether a verb can appear with a result marker, i.e. the same test for Yang's process-goal separate verbs. Clearly, both Yang and Jeong recognized the distinction between verbs and moreover that one kind of verb is more complex than the other kind. What Jeong calls resultatives will be called result state verbs.

We will elaborate these approaches in refining the criteria and also distinguishing among result state verbs. Also, we make a crucial connection which has not been explored in the literature between simple result state sentences and *-ko/e iss* constructions.

4.2.1 Result Verbs and Semi-result Verbs

Not all verbs are able to produce a result state reading. Among those capable of producing one, there are also some limitations on what types of temporal adverbials can appear with these verbs to modify the given result state. For instance, temporal adverbials such as *cikum* 'now' can appear with verbs like *mwut* 'to stick to' and *ip* 'to put on/wear' and produce a result state reading, as seen in (1) and (2) above. Adverbials like *hansikan tongan* 'for an hour' and *cungo pwuthe* 'from noon' can also provide a result state reading for these verbs.

On the other hand, *cikum* 'now' is unavailable for a result state reading with a verb like *nch* 'to put', whereas *hansikan tongan* 'for an hour' and *cungo pwuthe* 'from noon' are available, as shown in (4) and (5).

- (4) Peter-ka maykcwu-lul nayngcanggo-ey hansikan tongan
 Peter-NOM beer-ACC refrigerator-in for an hour
 neh-ess-ta.
 put-PAST-DEC
 'Peter put the beer in the refrigerator for an hour.'
- (5) #Peter-ka cikum maykcwu-lul nayngcanggo-ey neh-ess-ta.
 Peter-NOM now beer-ACC refrigerator-in put-PAST-DEC
 (intended) 'Peter put the beer in the refrigerator before now and
 it's in there now.'

There are implicational patterns in these limitations: a nonaspectual (locating) adverbial like *cikum* is more limited than an aspectual adverbial like *hansikan tongan*. Thus, if a verb can appear with a nonaspectual adverbial, it can also appear with an aspectual one; but the converse does not hold. According to these limitations, we can divide verbs into two subclasses: ones that are allowed with both nonaspectual

and aspectual adverbials and ones that are only allowed with aspectual adverbials, to be called **result verbs** and **semi-result verbs** respectively. Together they will be referred to as **result state verbs**. This can be defined more precisely as in (6):

(6) a. **Result Verbs:**

a verb (phrase) α is defined as a result verb (phrase) iff it can appear in the construction below and produce a result state reading with any β or any γ , where β is a variable over temporal adverbials *eccy ohwu-ey-nun* 'yesterday afternoon', *onul ohwu-ey-nun* 'this afternoon', *cikum* and γ is a variable over temporal adverbials *hansikan tongan* 'for an hour' and *cengo pwuthe* 'from noon'.

Mary-ka β/γ α -ess-ta.

Mary-NOM β/γ α -PAST-DEC

'Mary is in the state of having α '-ed β/γ '.

b. **Semi-result Verbs:**

a verb (phrase) α is defined as a semi-result verb (phrase) iff it can appear in the construction above and produce a result state reading with any γ , but with none of β , where β and γ are the same as above.¹

There are two other constructions which provide result state readings similar to the sentences in (1) and (2). Consider the examples in (7) and (8). These are similar to the above sentences in that here also the temporal adverbials modify the result

¹This condition may be too strong, as some semi-result verbs allow *pwuthe*-adverbials but not *tongan*-adverbials. For instance, the verb *sicakha* seems to be a semi-result verb. The sentence (i) has a result state reading.

- (i) Swuep-i cengo-pwuthe sicakha-nun-ta.
class-NOM noon-from start-NONPAST-DEC
'The class starts at noon.'

However, the predicate *sicakha* does not allow *tongan*-adverbials, as shown in (ii). This difference may have to do with the verb *sicakha* being an aspectual verb which has strong focus on the initial stage and that *pwuthe*-adverbials are presumably initial-point oriented but *tongan*-adverbials are not.

- (ii) #Swuep-i seysikan-tongan sicakha-ess-ta.
class-NOM three.hour-for start-PAST-DEC
(on reading) 'The class started and lasted for three hours.'

Thus, we may have to weaken the condition "produce a result state reading with any γ " into "produce a result state reading with some γ ."

states. In particular, the same class of verbs, i.e. result verbs, seem to appear both in (2) and a construction of type (7). However, a sentence of type (8) allows both result verbs and semi-result verbs. We will refer to these constructions as **-ko iss** construction and **-e iss** construction, respectively.

- (7) Mary-ka cikum mwun-ul tat-ko iss-ta.
Mary-NOM now door-ACC close-CONN exist-DEC
'Mary is (here) now, with the door closed.'

- (8) Mary-ka cikum anc-e iss-ta.
Mary-NOM now sit.down-CONN exist-DEC
'Mary is (here) now, sat down.'

These two constructions are also closely related to each other: they are in complementary distribution in that the *-ko iss* construction takes transitive verbs only, whereas the *-e iss* construction allows only intransitive verbs. It is unknown though why semi-result verbs are allowed in the *-e iss* construction, but not in the *-ko iss* construction.

In the next section, we will investigate what semantic generalizations we can make about the class of result verbs. We will use the *-ko iss* construction as the criterion for result verbs rather than the adverbial test for two reasons. First, the *-ko iss* construction seems to determine whether a given verb can appear in the construction or not, more clearly than the adverbial test does. Second, some temporal adverbials can be pragmatically inappropriate for some verbs, e.g. too short durations for some events or states, though other temporal adverbials of the same type are fine. But, the *-ko iss* construction produces a result state reading which is natural without a temporal adverbial. Therefore, the appropriateness problem does not arise for this construction.

However, the *-ko iss* construction can only be used to test transitive verbs, since it does not allow intransitives. Thus, for intransitives, we will have to resort to the adverbial test.

4.2.2 Result States and *-ko iss*

It has been observed that sentences like (9) below are ambiguous (see Chang 1973, Park 1974, Yang 1977a, Jeong 1981). The difference may be rather significant for the revenue of tabloid magazine companies. One reading makes Diana half-naked and the other, totally naked.²

- (9) Diana-ka os-ul pes-ko iss-ess-ta.
 Diana-NOM clothes-ACC take.off-CONN exist-PAST-DEC
 a. 'Diana was taking off her clothes.'
 b. 'Diana was naked.'

(9) has a reading, (9b), which is about a result state of the accomplishment verb meaning, in addition to the progressive reading in (9a). This kind of ambiguity cannot arise for just any verb in Korean. The sentence (10) for instance does not have the result state reading which would amount to (10b).

- (10) Diana-ka cip-ul cis-ko iss-ess-ta.
 Diana-NOM house-ACC build-CONN exist-PAST-DEC
 a. 'Diana was building a house.'
 b. # 'Diana had built a house.'

We will conclude below that the ambiguity shown in sentences like (9) is due to the presence of two homophonous *-ko iss* constructions. Thus, focusing on the result

²For now I will categorize *-ko* vaguely as a connective.

state reading, we will attempt to arrive at a generalization that characterizes the class of result verbs.

First of all, it should be noted that result state readings are available only for transitive verbs, for when an intransitive verb appears in the construction, it is always assigned only a progressive reading, as shown in (11). For a result state reading, the *-e iss* construction is employed for intransitives as shown in (12). Notice that this sentence has no progressive reading. The result state reading for the intransitives will be discussed in the next section, §4.2.3.

- (11) Diana-ka chimtay-ey uwuph-ko iss-ta.
 Diana-NOM bed-in lie.down-CONN exist-DEC
 'Diana is lying down in the bed.'
 (12) Diana-ka chimtay-ey uwuph-e iss-ta.
 Diana-NOM bed-in lie.down-CONN exist-DEC
 'Diana is in the bed, lied down.'

Second, a result state reading is possible only with telic predicates. For instance in (13) with an atelic *swuley-lul mil* 'to push carts', the reading is unambiguously progressive.

- (13) Diana-ka swuley-lul mil-ko iss-ta.
 Diana-NOM cart-ACC push-CONN exist-DEC
 'Diana is pushing carts.'

It was reported in K.-D. Lee (1978) and Nam & Ko (1985) that the result state reading is available to a group of verbs which represent actions of 'putting on/taking off' clothes, hats, or socks as in (14) or verbs that represent 'contacting' to body parts as in (15). As is evident here, Korean has different verbs for putting on/taking off clothes, hats, socks, gloves, belts, etc. Incidentally, notice that there are two verbs

marked # in (14), i.e. *moca-lul pes* 'to take off a hat' and *cangkap-ul pes* 'to take off gloves'. They are marked to indicate that result state readings are unavailable with them. An explanation for this will be given shortly.

- (14) a. *paci-lul ip/pes* 'to put on/take off pants'
 b. *moca-lul ssu/#pes* 'to put on a hat'
 c. *yangmal-ul sin/pes* 'to put on/take off socks'
 d. *cangkap-ul kki/#pes* 'to put on gloves'
 e. *hyektay-lul cha/pes* 'to put on/take off a belt'
- (15) a. *an* 'to embrace'
 b. *i* 'to carry on the head'
 c. *ci* 'to carry on the back'
 d. *cwi* 'to grip'

H. Lee (1991) also notes that there is another group of verbs with the result state reading. These involve 'getting on' a means of transportation as shown in (16):

- (16) a. *cha-lul tha* 'to get on a car'
 b. *cacenke-lul tha* 'to get on a bike'
 c. *pihayngki-lul tha* 'to get on an airplane'
 d. *mal-lul tha* 'to get on a horse'

There seem to be still another group of verbs. These involve 'opening or closing' of space as in (17):

- (17) a. *mwun-ul yel/tat* 'to open/close a door'
 b. *changmwun-ul yel/tat* 'to open/close windows'
 c. *curtain-ul ket/chi* 'to draw/lift a curtain'

It is also interesting to see that the verbs in (16) do not display the symmetry which is evident in most other groups. Namely, this group contains 'getting on' verbs only, excluding the 'getting off' type. This suggests that a result state reading can be obtained for a verb if an event involving that verb produces a visible effect. Being 'visible', of course, is a very vague notion. Yet, we suggest that it is an appropriate characterization of the construction. We can be slightly more specific by defining that an effect is visible if, upon observing a result state, we can retrieve information about what type of event has occurred. This criterion distinguishes the asymmetric verbs in (15b,d) and (16) from the rest. For instance, once one gets in a car, the effect that one is in the car is visible. I.e. we can infer from seeing someone in a car that he/she got in that car. Likewise, once you put on pants or take them off, either way the effect is visible enough for us to see what action you have performed under the assumption that one normally wears pants. The same is true of the verbs in (17).

However, if we take a verb like 'to get off', it is not obvious how we could recover the information. For example, once one is out of a car or an airplane, the effect is not generally visible so that we could notice that one is in the state of having gotten off a car or an airplane, or even whether one has gotten off from anything. This is consistent with the observation that (18a) is good and (18b) bad if John is a bald man frequently wearing a wig and Mary is not. This is expected because it should be visible to neighbors when John is not wearing a wig. Even if Mary wears a wig frequently, as is often the case for a woman wearing a wig, the effect is not as visible to unsuspecting eyes. After all, the effect of a wig on a non-bald woman is not as

striking as on a poor bald man.

- (18) a. John-i kabal-ul pes-ko iss-ta.
 John-NOM wig-ACC take.off-CONN exist-DEC
 i. 'John is taking off a wig.'
 ii. 'John is in a state of having taken off the wig/John is without a wig.'
- b. Mary-ka kabal-ul pes-ko iss-ta.
 Mary-NOM wig-ACC take.off-CONN exist-DEC
 'Mary is taking off a wig.'

The same kind of asymmetry is shown in (19). Turning on the light is normally as visible as turning off the light. But, turning off the radio is not perceived as visible (or perceptible) as turning on the radio.

- (19) a. pwul-ul khyc/kku 'to turn on/off the light'
 b. radio-lul khyc/#kku 'to turn on/off the radio'

Another condition is needed besides the visibility requirement and telicity condition when we consider unambiguous examples like (10), repeated here. Building a house, a telic predicate, seems to necessarily involve an effect which is visible in every relevant sense. When a house building is completed we cannot fail to notice that there stands a new house. Conversely, if we see a new house, or any house for that matter, we can safely conclude that some house building occurred in the past. Nevertheless, the sentence in (10) lacks a result state reading.

- (10) Diana-ka cip-ul cis-ko iss-ess-la.
 Diana-NOM house-ACC build-CONN exist-PAST-DEC
 #'Diana was in a state of having built a house.'

What separates acceptable examples from ones like (10) is that acceptable ones represent events that are easily reversible; actions of turning on the light, getting on a

bus, putting on clothes, and opening a door can be easily and almost completely reversed, whereas building a house cannot.

The above conditions together are yet only necessary, but not sufficient, conditions for obtaining result state readings for the construction. Observe that a result state reading is unavailable in (20), though the verb *neh* 'to put' is transitive telic and the event it represents is reversible.

- (20) #Peter-ka maykewu-lul nayngcauggo-cy neh-ko iss-ta.
 Peter-NOM beer-ACC refrigerator-in put-CONN exist-DEC
 (intended) 'Peter is a state of having put the beer in the refrigerator.'

One difference between this example and the acceptable ones seems to be that a subject of the verb *neh* 'to put' is a proto-typical agent, but the subjects in the acceptable verbs are not, in the sense of Dowty (1991). Rather, they are also affected by the event correlated with the verb. E.g., if the event in question is 'putting on a hat', of course onto oneself, the individual denoted by the subject assumes some effect of the event. On the other hand, the event of putting some object in a location, which is correlated with *neh*, need not affect the subject.

Summing up the data, we have come to a rough generalization of result verbs in (21). Technically, we have arrived at this conclusion by examining what kind of verbs can appear in the *-ko iss* construction. But, as noted above, this conclusion is justified since the membership of transitive result verbs extensionally coincides with those verbs which can appear in the *-ko iss* construction. We assume that the generalization made in this way is also applied to intransitive result verbs.

- (21) **properties of result verbs:** a verb is a result verb iff

- it is telic.
- it denotes an easily reversible event.
- it denotes an event which involves a visible effect.
- its subject is an experiencer of the event in question.

We suggest without going through an examining process that semi-result verbs share the first two properties with result verbs.

(22) **properties of semi-result verbs:** a verb is a semi-result verb iff

- it is telic.
- it denotes an easily reversible event.

For completeness, some result verbs and semi-result verbs are listed in (23) and

(24):

(23) **Result Verbs:**

a. Transitives:

ip 'to put on (clothes)'	ssu 'to put on (a hat)'
kelchi 'to put on (clothes)'	sin 'to put on (shoes)'
cha/may 'to put on (a belt/watch)'	kki 'to put on (a ring)'
pes 'to take off (clothes)'	kwuphi 'to bend (one's) back'
ci 'to put a load on one's back'	i 'to put a load on one's head'
yel 'to open'	tat 'to close'
khye 'to turn on (light)'	kku 'to turn off (light)'
tha 'to get on (a car/a train)'	mayc 'to initiate (a relation)'
cap 'to grip (a power)'	cuy 'to grip (a knife)'
may 'to tie'	...

b. Intransitives:

kay 'to clear up (weather)'	nwup 'to lie down'
eptuli 'to crouch'	kala anc 'to settle down (in water)'
ttu 'to float up'	el 'freeze up'
toy 'to become (adj./NP)'	nayli 'to come down'
olu 'to go up'	michi 'to get mad'
mwut 'to stick to (a body part/clothes)'	cichi 'to get exhausted'
tol 'to become crazy'	phi 'to bloom (flowers)'
ci 'to set (sun)'	...

(24) **Semi-result Verbs:**

a. Transitives:

neh 'to insert'	twu 'to put'
pilli 'to borrow'	pilyecwu 'to lend'
olli 'to raise'	...

b. Intransitives:

ka 'to go (to a place)'	o 'to come'
sicakha 'to start'	kkutlma 'to end'
salaci 'to disappear'	olu 'to rise'
...	

Thus, in view of the consistent pattern of this class of verbs and their required properties, we can conclude that the result state reading is not a function of the tense marker *-ess* but some lexical feature of result verbs.

4.2.3 Relatedness of *-ko iss* and *-e iss*

The *-e iss* construction takes a member of a subset of the telic **intransitive** verbs and provides a result state reading. Thus, while (25) can describe a simple past event or its result state reading as shown below, (26) only describes the result state of a past event of taking a seat. Therefore, the *-e iss* construction provides the same kind

of result state reading as the *-ko iss* construction. But they differ in distribution with respect to transitivity.

- (25) John-i twis cali-ey anc-ess-ta.
 John-NOM back seat-on sit.down-PAST-DEC
 a. 'John sat down on the back seat.'
 b. 'John is in the back seat.'
- (26) John-i twis cali-ey anc-e iss-ta.
 John-NOM back seat-on sit.down-CONN exist-DEC
 'John is in the back seat.'

(27) and (28) illustrate the telicity and the intransitivity requirements for the construction, respectively. While (27) is unacceptable because the predicate is atelic, (28) is bad because the verb is transitive.

- (27) *John-i ket-e iss-ta.
 John-NOM walk-CONN exist-DEC
 (intended) 'John is in a state of having walked.'
- (28) *John-i moca-lul ssu-e iss-ta.
 John-NOM hat-ACC put.on-CONN exist-DEC
 (intended) 'John wears a hat.'

It seems evident that we get the same kind of reading with *-ko iss* and *-e iss*, even though the required conditions are different. The complementariness in distribution between the two constructions is further corroborated by two facts. Therefore, they seem to constitute a natural class, as suggested by Sung (1972), Yang (1977b), Jeong (1981) and some others.

It is observed in Yang (1977b) that the transitivity co-occurrence restriction of *-ko* and *-e* is not limited to the verb *iss*. The restriction is applied to verbs like *o* 'to come' and *ka* 'to go' (see Yang 1977b:230-231). This is illustrated in (29) and (30), where intransitives require an *-e* form but transitives, a *-ko* form (Yang 1977b:231):

- (29) a. Na-nun cha-lul { tha-ko, *tha-e } o/ka-unta.
 I-TOP car-ACC take take come/go-DEC
 'I come/go by car.'
- b. Ne-nun { *ket-ko, ket-e } o/ka-unta.
 you-TOP walk walk come/go-DEC
 'You come/go on foot.'
- (30) a. Son-ul { cap-ko, *cap-e } o/ka-unta.
 hand-ACC hold hold come/go-DEC
 'Someone comes/goes, with holding someone else's hand.'
- b. Ai-ka cha-ey { *sit-li-ko, sit-li-e }
 child-NOM car-in load-PASS-CONN load-PASS-CONN
 o/ka-ess-ta.
 come/go-PAST-DEC
 'A child came/went, lying in a car.'

Furthermore, it is worth mentioning that historically *-e iss* was used for transitive verbs as well, *-ko iss* being a relatively recent development. S. Kim (1987:168-169) reports that the *-e iss* form had been used for transitive verbs until the 18th century, as illustrated below. In the contemporary Korean language only a *-ko* form is acceptable in these environments.³

- (31) 16th Century [Penyeknoultay Sang 40]:

Achim pap-ul mot mek-e iss-ko ...
 breakfast-ACC cannot eat-CONN exist-and
 '[He] hasn't been able to have breakfast and ...'

- (32) 16th Century [Sohakenhay 2:60]:

Miche [...] mot ha-e kyeyssi-ketun ...
 yet cannot do-CONN exist-if
 'If [someone] haven't been able to do it, ...'

³Notice in (32) that *kyeyssi* is a honorific word for *iss*.

(33) 16th Century [Sohakenhay 5:53]:

sanai [...] ip-e iss-nun kos-ey ...
 man put.on-CONN exist-REL place-at
 'at a place where a man is wearing [...]'

Regarding an Objection

II. Lee (1991) claims that the *-c iss* construction does not necessarily require a telic predicate, citing two 'supposed' counterexamples in (34) and (35). He argues that *sokha* and *sal* counterexemplify the generalization about the construction.

(34) Enehakkwa-nun eti sokha-e iss-ess-eyo?
 linguistics.dept-TOP where belong-CONN exist-PAST-INTER
 'Where did the linguistics department belong?'

(35) Suni-nun ipwuk-ey sal-e iss-ta.
 Suni-TOP North.Korea-at live-CONN exist-DEC
 'Suni is alive in North Korea.'

However, as no evidence is given for this claim, he apparently assumes that the Korean verbs *sokha* and *sal* are just like English *to belong* and *to live* and further that since these English verbs are atelic, the Korean verbs are also atelic. But, this assumption is questionable at best. Recall that all nonadjectival atelic predicates in Korean can appear with the 'progressive marker' *-ko iss*. But, as Lee (1991:209) admits, *sokha* cannot appear in that construction as seen in (36). Accordingly, this fact suggests that *sokha* is an achievement verb.

(36) #Enehakkwa-nun mwunkwatay-ey sokha-ko iss-ta
 linguistics.dept-TOP coll.humanities-to belong-PROG exist-DEC
 (intended) 'The linguistics department is belonging to the college of humanities.'

Moreover, *sokha* patterns with other result verbs in the relative construction. Namely, it takes the *-un* form for the nonpast meaning, rather than the *-nun* form

which one would expect from a nonadjectival atelic predicate. Compare the contrast between (37) and (38). In (37a), the result verb *ssu* 'to put on' combines with the *-un* form relativizer and provides a description about the present state, though it can also describe the past event as well. When it takes the *-nun* form like (b37), it is interpreted as describing a repeated or generic event. On the other hand, the atelic verb *salangha* 'to love' takes the *-nun* form for the present tense but takes the *-un* form for the past interpretation, as shown in (38a) and (38b), respectively.

(37) a. moca-lul ssu- ϕ -un haksayng
 hat-ACC put.on-PAST-REL student
 'students who have a hat on'
 b. moca-lul ssu-n(n)-un haksayng
 hat-ACC put.on-NONPAST-REL student
 'students who are putting on(repeatedly)/put on(generically)'

(38) a. Mary-lul salangha- ϕ -un haksayng
 hat-ACC put.on-PAST-REL student
 'students who loved Mary'
 b. Mary-lul salangha-n(n)-un haksayng
 hat-ACC put.on-NONPAST-REL student
 'students who love Mary'

Observe that the verb *sokha* behaves like a result verb such as *ssu* 'to put on'.

(39) a. mincwutang-ey sokha- ϕ -un haksayng
 Democratic.party-to belong-PAST-REL student
 'students who belong to Democratic Party'
 b. mincwutang-ey sokha-nu-un haksayng
 Democratic.party-to belong-NONPAST-REL student
 'students who will belong/belong(generically) to Democratic Party'

Furthermore, the verb *sal* shows a similar pattern in the relative construction that are unexpected from an atelic predicate in Korean. This verb describes the present state of being alive in the *-un* form but the present state of living in the *-nun* form as

exhibited in (40). The phrases in (40) are slightly different in meaning in the sense that (a) means 'people who have survived', but (b), 'people who live'. In other words, (a) but not (b) presupposes an accident which would have changed the fate.

- (40) a. *sal-φ-un salam*
 live-PAST-REL person
 'people who are alive'
- b. *sal-n(u)-un salam*
 live-NONPAST-REL person
 'people who live'

A phrase like (40a) sometimes presuppose a salient comparison set of people who the person in question could have easily substituted. Consider (41), sentences commonly uttered in a funeral to a grieving widow.

- (41) *Kuman wul-e. Sal-φ-un salam-un sal-ayaci.*
 no.more cry-IMP live-PAST-REL person live-MOD
 'Cry no more. People who have survived should live.'

Thus, it seems that *sal* is polysemous and that *sal* in the context like (41) means 'to survive', a telic predicate in Korean. Now, it may be enlightening to reconsider the example (35) above. It is a meaningful sentence because it is under the context of the Korean War which killed many people and separated many families. The sentence (35) presupposes a salient event which could have claimed the life; the verb *sal* here means something close to 'to survive'.

Hence, we conclude that these two verbs are telic and that they are not exceptions to the generalization about the *-ε iss* construction.

4.2.4 Key Features of Result State Verbs

This subsection will be devoted to discussion of crucial features of result state verbs, i.e. result and semi-result verbs, when they interact with temporal adverbials and tense. They can be summarized as in (42):

(42) Key Features of Result State Verbs:

1. Result state verbs are telic as well as atelic according to common diagnostics, though with different readings.
2. They cannot be accounted for by positing simple lexical ambiguity between a simple event reading and a simple stative reading.
3. The two eventualities involved in a result state verb do not enjoy an equal status with respect to temporal modification.

Bi-telicity of Result State Verbs

As illustrated earlier in Chapter 3 and repeated below, temporal adverbials with *tongan* 'for' and *maney* 'in' are fairly reliable tests for telicity. A telic sentence like (43) is compatible with a *maney* phrase, but not a *tongan* phrase, whereas an atelic sentence such as (44) allows *tongan* phrases only.

- (43) *Sip pwun { *tongan, maney } phodocwu hanpyeng masi-ess-ta.*
 ten minute for in a bottle of wine drank
 'She drank a bottle of wine { *for, in } ten minutes.'
- (44) *Sip pwun { tongan, *maney } phodocwu masi-ess-ta.*
 ten minute for in wine drank
 'She drank wine { for, *in } ten minutes.'

With respect to these tests, one crucial characteristic of result state verbs is that they pass positive tests for a telic sentence as well as ones for an atelic sentence. Notice that (45) and (46) are in fact the same sentence, just as (47) and (48) are the

same. However, (46) and (48) are unacceptable. Thus, the crosshatch, #, should be understood to indicate the intended readings are impossible with the given phrases. In other words, even though a sentence allows both types of temporal adverbials, it provides different types of readings, depending on the choice of modifying temporal adverbial, i.e. a telic reading with *maney* as in (45) but an atelic reading with *tongan* as in (47).

- (45) Sip pwun maney ku paci-lul ip-ess-ta.
 ten minute in the pants-ACC put on
 'She put on the pants in ten minutes.'
- (46) #Sip pwun maney ku paci-lul ip-ess-ta.
 ten minute in the pants-ACC put on
 (on reading) 'She wore the pants in ten minutes.'
- (47) Sip pwun tongan ku paci-lul ip-ess-ta.
 ten minute for the pants-ACC put on
 'She wore the pants for ten minutes.'
- (48) #Sip pwun tongan ku paci-lul ip-ess-ta.
 ten minute for the pants-ACC put on
 (on reading) 'She put on the pants for ten minutes.'

Lexical Ambiguity?

One might suggest, following Ko & Nam (1985), that a verb like *ssu* is lexically ambiguous between two simple meanings of 'to put on' and 'to wear'. Thus, according to this suggestion, it could be argued that *ssu* in the 'to put on' sense behaves as a telic predicate compatible with *maney* 'in', whereas *ssu* in the 'to wear' sense behaves as an atelic compatible with *tongan* 'for'.

However, this line of approach runs into one empirical problem because in one and the same clause a temporal adverb can modify the result state while its tense

modifies the resulting event, as evident in the (a) reading of the sentence (2) repeated below.

- (2) Mary-ka onul ohwu-ey-nun ppalkan moca-ul ssu-ess-ta.
 Mary-NOM today afternoon-in-TOP red hat-ACC put.on-PAST-DEC
 a. 'Mary is wearing a red hat this afternoon.'
 b. 'Mary put on a red hat this afternoon.'

Following Ko & Nam, suppose there are a 'putting on' *ssu* and a 'wearing' *ssu*. If we follow the rules in Chapter 2, we will get the two readings in (50) for the sentence (49), which is exactly like (2) but without the temporal adverb.

- (49) Mary-ka ppalkan moca-ul ssu-ess-ta.
 Mary-NOM red hat-ACC wear/put.on-PAST-DEC
- (50) a. $\exists s[\text{wear}(m,a,\text{red},\text{hat},s) \ \& \ \text{past}(s)]$
 b. $\exists e[\text{put.on}(m,a,\text{red},\text{hat},e) \ \& \ \text{past}(e)]$

If we add the temporal adverb *onul ohwu-ey-nun* to (49), we get (2) with translations in (51). While (51b) corresponds to the (b) reading of (2), (51a) does not match with the (a) reading of (2). Rather, it means (52), which is in fact similar to the (b) reading of (2).

- (51) a. $\exists s[\text{wear}(m,a,\text{red},\text{hat},s) \ \& \ \text{past}(s) \ \& \ \text{this.afternoon}(s)]$
 b. $\exists e[\text{put.on}(m,a,\text{red},\text{hat},e) \ \& \ \text{past}(e) \ \& \ \text{this.afternoon}(e)]$
- (52) Mary wore a red hat this afternoon.

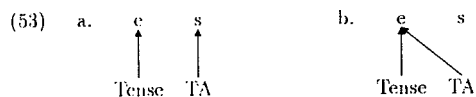
Thus, positing lexical ambiguity proves to be inadequate at best in accounting for result state verbs. If we opt to provide the (a) reading of (2), we at least need a theory

of result state verbs which can make reference to both an event and its result state in the same clause. To anticipate the solution in §4.2.2, one formal way of achieving this is to introduce two eventuality variables in the semantics of result state verbs in such a way that sentences involving them can be understood as descriptions of two eventualities, i.e. the event and its result state.

Secondary Nature of Result State

Once we have decided to adopt a dual event variable approach, it should be noted that the two eventualities involved in a result state verb do not enjoy equal status with respect to temporal modification. Rather, the result state seems to be secondary to the event it results from.

If we take a sentence like (2) above as description of an event and its result state, we may regard the (2a) reading as when the tense modifies the telic event and the temporal adverb modifies the result state. On the other hand, the (2b) reading is obtained when both of them modify the telic event. These modification relations can be represented as in (53), where *c* and *s* stand for the telic event and the result state, respectively, and the arrows, for the modification relations:

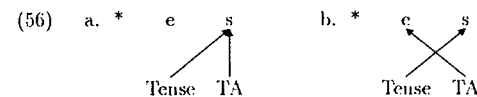


If we allowed the two eventualities to have the same status, we would expect sentences like (54) and (55) to be acceptable. As the modification relations are illustrated below in (56) and (57) for (54) and (55) respectively, in (54) both the adverb *cikum* and

the nonpast tense are meant to modify the result state, whereas in (55) the adverb modifies the event and the tense, the result state. However, they are not acceptable.⁴

(54) #*Cikum ppalkan moca-lul ssu-φ-nta.*
 now red hat-ACC put.on-NONPAST-DEC
 (on reading) 'She is now wearing a red hat.'

(55) #*Ecey ppalkan moca-lul ssu-φ-nta.*
 yesterday red hat-ACC put.on-NONPAST-DEC
 (on reading) 'She put on a red hat yesterday and is still wearing it.'



Thus, when we compare the acceptable and the unacceptable modification relations, we can conclude that the result state is secondary to the event with respect to the modification relations of tense, with a generalization in (57):

(57) Modification of Result State Verbs:

- A temporal adverbial can modify either the event or its result state.
- Tense can modify the event but cannot modify its result state.

4.3 Previous Approaches to Similar Constructions

Some studies have been done on adverbials which modify result states: Dowty (1979) on English *again* and Fabricius-Hansen (1983,1994) and Kamp and Roßdeutscher (1992) both on German *wieder* 'again'. We will discuss them in this section.

⁴The sentence (54) is in fact possible with a reading that 'She is now putting on a red hat'. Under this reading, the modification relations are different from those intended in (54).

4.3.1 Internal Adverbs

The sentence in (58) is (marginally) **ambiguous**, arguably due to the scope differences of the adverb *for four years* (cf. Morgan 1969, McCawley 1971, Lakoff 1972, Dowty 1979), with the example credited to Robert Binnick. The sentence is cited as potentially having at least two readings as paraphrased in (59). Following Dowty we will call (59a) and (59b) durative and internal readings, respectively:⁵

(58) The Sheriff of Nottingham jailed Robin Hood for four years.

(59) a. Durative reading: the Sheriff of Nottingham spent four years bringing it about that Robin Hood was in jail.

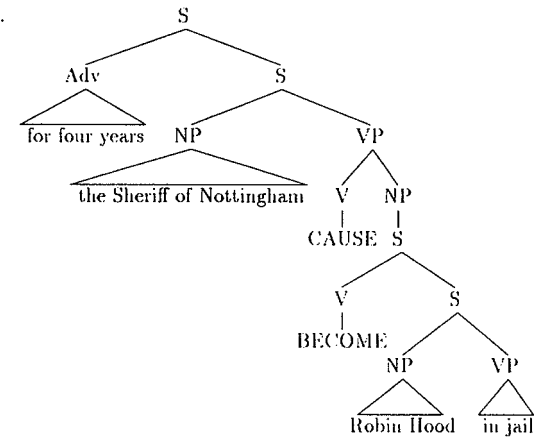
b. Internal reading: the Sheriff of Nottingham brought it about that for four years Robin Hood was in jail. [Dowty 1979:251]

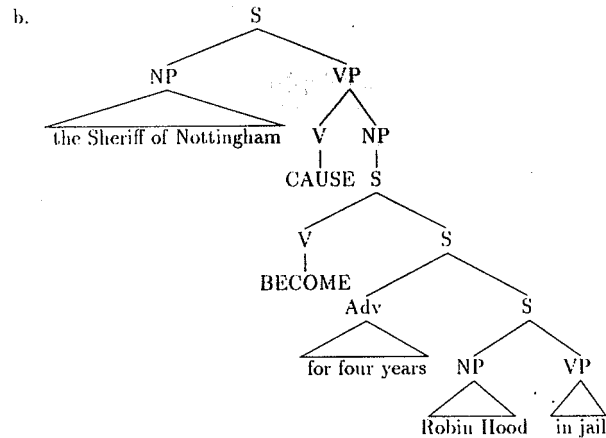
The ambiguity was accounted for by a lexical decomposition analysis of the sort which was then popular among generative semanticists. In fact, these types of examples were used to argue for the lexical decomposition analysis (cf. Dowty 1979). According to this analysis, the two different readings in (59) arise from the logical structures roughly represented in (60). The difference is that the adverb *for four years* has scope over the entire matrix clause in (60a), whereas in (60b) it has scope

⁵There is a third reading in which the sheriff 'repeatedly' jailed Robin Hood, lasting for four years. In fact, Dowty acknowledges that this repetitive reading is much more natural than the durative reading. We admit that the durative reading is hard to get. However, notice that the sole purpose of introducing it is to compare it with the internal reading. Therefore, lack of the durative reading would not affect our discussion in any way.

only over the internal sentence, hence the names 'internal' reading and 'internal adverb'. It is assumed that the iterative reading arises from a logical structure of the sort (60a). Thus, durative and iterative readings are referred to by the cover term **external readings**.

(60) a.





Similar contrasts between external and internal readings are exhibited in a sentence involving the adverb *again* (cf. Morgan 1969, McCawley 1971, 1973, Dowty 1979).

(61) John closed the door again. [Dowty 1979:252]

The two readings, with the appropriate presuppositions within the parentheses, are paraphrased in (62):

- (62) a. external reading: '(John has performed the action of closing the door at least once before) and again he closed it.'
 b. internal reading: 'John has brought it about that the door is again in a closed state (, though he need not have closed it on any earlier occasion.)'

It was also observed that temporal adverbials such as *temporarily* and *until Thursday* can be internal adverbs. The ambiguity with the internal adverb is not limited only

to causatives. The same kind of ambiguity can arise with an inchoative verb, as the sentence in (63) illustrates with the readings in (64).

(63) The lake froze for two months.

- (64) a. Durative reading: it took two months for the lake to be completely frozen.
 b. Internal reading: the lake froze and it stayed that way for two months.

4.3.2 Facts about Internal Readings

Internality of adverbials

It is sometimes claimed (cf. Moens and Steedman 1988) that the internal reading of a sentence like (58) involves the agent's intention; accordingly, the four years is not the actual time served by Robin Hood but the length of the imprisonment intended by the sheriff. Thus, it is claimed that adverbials under this reading are not really internal but external. However, note that this position cannot be held with respect to a sentence like (65).

(65) The temperature rose to about 75 degrees for a few hours, then it gradually fell to 62.

This sentence has a reading "... rose to 75 degrees and remained there for a few hours ...". Note that this cannot be the temperature's intention. Thus, we can maintain that the adverbial is really internal in terms of its semantic scope.

Position and Stress

A sentence like (66) is taken to provide evidence for the claim that the ambiguity is scope-related. It is different from (58) above only in its position of the adverbial *for four years* but it lacks the internal reading. Since an internal reading does not arise

in sentences with a sentence-initial adverbial, it is naturally concluded that internal readings are available only if the adverbial has a VP scope.

(66) For four years the Sheriff of Nottingham jailed Robin Hood.

The same observation is made on German *wieder* (cf. Fabricius-Hansen 1983, von Stechow (to appear), Kamp and Roßdeutscher 1992): there is a strong correlation between the position of *wieder* and the internal/external distinction—*wieder* has scope over the constituents occurring to its right (in an embedded clause), i.e. an internal reading is obtained when *wieder* is within VP. For example, Kamp and Roßdeutscher (1992:94–96) note that when unstressed, the first two sentences in (67) have external readings, whereas the next two sentences receive internal readings. They also note that when *wieder* is stressed all of the sentences receive only the external reading.

- (67) a. weil **wieder** ein Assistenzarzt einen Patienten von
 because again an intern a patient of
 einer Krankheit geheilt hat
 a disease cured has
 'because again an intern has cured a patient of a disease'
- b. weil ein Assistenzarzt **wieder** einen Patienten von einer Krankheit geheilt hat
- c. weil ein Assistenzarzt einen Patienten **wieder** von einer Krankheit geheilt hat
- d. weil ein Assistenzarzt einen Patienten von einer Krankheit **wieder** geheilt hat

Verbs with internal readings

While Dowty (1979) suggests that internal readings are available only with some verbs which involve reversible change-of-state, Fabricius-Hansen claims that external/internal ambiguity can arise where there is no change-of-state verb but only a

stative. Consider (68) and (69), from Fabricius-Hansen (1983:99–100), where (69a,b), different only in stressed words, are two alternative continuations of (68).

(68) Als ich mich das zweite Mal umdrehte,
 when I for the second time turned around
 'When I turned around for the second time.'

- (69) a. war Anna **WIEDER** da.
 was Anna again there
 'Anna was there **AGAIN**.' (external reading only)
- b. war Anna wieder **DA**.
 was Anna again there
 'Anna was **THERE** again.' (internal reading only)

She states that (69a) is "resultative in contrast to" (69b) and that the former means "Anna had come back." Thus, the (69b) reading presumably presupposes that Anna hadn't left the area.

It is not completely clear whether this is the same kind of ambiguity as others. For one thing, while other examples do not require stress on adverbials, a stressed *da* seems to be necessary for the internal reading of (69b). Then, one implication is that the distinction in meaning between the two might be independently derived by the theory of focus in Rooth (1985) (thus, the existence of an 'internal' reading, if it does exist, may be for reasons independent of the observed facts about verb classes.)

4.3.3 Dowty (1979)

Dowty proposes two kinds of analyses to account for the ambiguity of *again*: viewing verbs as ambiguous, or alternatively viewing adverbials as ambiguous. He also points out problems for each alternative.

Verb as Ambiguous

As one way to capture the ambiguity between external and internal readings for a sentence like (70), Dowty proposes the two lexical entries listed in (71); according to this analysis, *open*₁ is a regular transitive verb which takes a term phrase to become a verb phrase, but *open*₂ is a different category, subcategorized for an adverb as argument.

(70) John opens a door again.

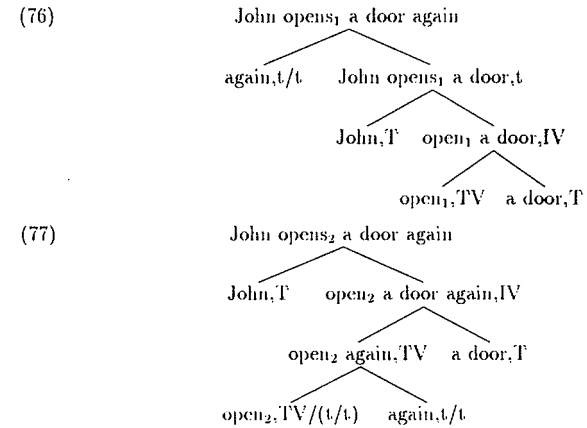
- (71) a. *open*₁ ($\in P_{TV}$) translates into:
 $\lambda\phi\lambda x\phi\{\dot{y}\exists P\{P(x) \text{ CAUSE BECOME } open'(y)\}\}$
 b. *open*₂ ($\in P_{TV/(t/t)}$) translates into:
 $\lambda S\lambda\phi\lambda x\phi\{\dot{y}\exists P\{P(x) \text{ CAUSE BECOME } [S\{\{open'(y)\}\}]\}\}$

Note that it is not farfetched for a verb to take an adverb as argument. For instance, a standard analysis of the contrasts in (72)–(75) is to treat the adverbs as being required by the verbs:⁶

- (72) a. John worded/phrased the letter carefully/politely.
 b. (*)John worded/phrased the letter.
 (73) a. John behaved badly/politely/rudely.
 b. (*)John behaved.
 (74) a. John chose his words carefully/cautiously.
 b. (*)John chose his words.
 (75) a. John put the book on the table.
 b. *John put the book.

⁶Notice that (72)–(74) are starred within the parentheses. This is to indicate that they are grammatical with a different reading.

Accordingly, the two lexical entries of *open* participate in different derivations illustrated in (76) and (77), both of which result in the form (70), from Dowty (1979:261):



These will lead into the truth conditions represented in (78) and (79). The difference in meaning is realized by the difference in the scope of the adverb *again*; in (78), the meaning of *again* is applied to the causing action, whereas in (79) it is applied to the opened state of the door.

(78) $again'([\exists x[door'(x) \ \& \ \exists P\{P(j) \text{ CAUSE BECOME } open'(x)\}]]]$

(79) $\exists x[door'(x) \ \& \ \exists P\{P(j) \text{ CAUSE BECOME } again'([\exists x[door'(x) \ \& \ \exists P\{P(j) \text{ CAUSE BECOME } open'(x)\}]])]]$

The meaning of *again* is given in the form of meaning postulate in (80):⁷

(80) $\forall p\Box[again'(p) \leftrightarrow [p \ \& \ H[\neg p \ \& \ H \dot{p}]]]$

⁷ $H\phi$ is informally defined as "it has been that ϕ " (cf. Prior 1967).

Adverb as Ambiguous

One undesirable aspect of the analysis treating verbs as ambiguous is the proliferation of homophonous words like *open*₁ and *open*₂; according to this analysis, a number of verbs of different categories must be homophonous, as long as they involve the ambiguity between external and internal readings.

Dowty is concerned about this fact and proposes alternatively an analysis under which adverbs like *again*, but not verbs, are treated as ambiguous. Acknowledging that there is no simple way of directly translating the internal adverbial, he resorts to a rather complicated meaning postulate in (S1) which relates the meaning of the 'regular' sentence adverb *again*₁ to that of the verb phrase adverb *again*₂.

$$(S1) \quad \forall x \forall P \forall p \square [again'_2(\hat{y}[P(y) CAUSE BECOME \neg p])(x) \leftrightarrow [P(x) CAUSE BECOME again'_1(p)]]$$

This approach can account for the ambiguity and also allows us to have a significantly smaller number of homophonous lexical items and meaning postulates. Adverbials such as *temporarily* and *momentarily* which produce internal readings will be provided with a meaning postulate of the form identical to (S2) with δ_1 and δ_2 substituting *again*₁ and *again*₂, respectively. Also, adverbials based on a preposition such as *for* α and *until* α only require ambiguity in *for* and *until*. I.e. the number is limited because they belong to a closed category.

However, Dowty points out that the meaning postulate in (S1) is potentially problematic for an independent reason. One of the stumbling blocks in the decomposition

analysis is that the meaning of the analyzed word is more specific than the decomposed paraphrase: e.g. *kill* is more specific than *cause to become not alive*. This problem can be avoided if we adopt to weaken the biconditional meaning postulate into a conditional one (cf. Dowty 1979:203). For instance, it is suggested that the conditional meaning postulate in (S3) replace the biconditional one in (S2).

$$(S2) \quad \forall \varphi \forall x \square [kill'(x, \varphi) \leftrightarrow \varphi(\hat{y}[\exists P[P(x) CAUSE BECOME \neg alive'(y)]])]$$

$$(S3) \quad \forall \varphi \forall x \square [kill'(x, \varphi) \rightarrow \varphi(\hat{y}[\exists P[P(x) CAUSE BECOME \neg alive'(y)]])]$$

Accordingly, an alternative meaning postulate (S4) is proposed:

$$(S4) \quad \forall x \forall P \forall Q \forall p \square [[again'_2(P)(x) \ \& \ \square [P(x) \rightarrow [Q(x) CAUSE BECOME \neg p]]] \rightarrow [Q(x) CAUSE BECOME again'_1(p)]]$$

Dowty also acknowledges that this approach has a problem of its own, as it predicts a wrong entailment relationship. If we consider the internal reading of (S5) where *for the first time* modifies John's being in a hospital, that reading with a meaning postulate for *for the first time* in the form of (S4) makes the sentence (S5) entail not only (S6) but also (S7). This is obviously a wrong prediction which does not match with our intuition. This is because a conditional meaning postulate of the form (S4) will make any internal adverb be closed under entailments.

(S5) Dr. Jones hospitalized John for the first time.

(S6) John was in a hospital for the first time.

(S7) John was in a building for the first time.

4.3.4 Kamp and Roßdeutscher (1992)

Kamp and Roßdeutscher define an operator **RES** on verb meanings, or **concepts** as part of semantic component of a verb: “for process concepts C there are corresponding state concepts P such that the processes instantiating C can be described as processes of the theme ‘becoming P’” (p. 23). For a process concept C, its associated result state concept P is defined as RES(C) and likewise, its associated pre-state concept is defined as PRE(C). Note that if a state *s* instantiates a concept RES(C), or equivalently RES(C)(*s*), it is not entailed that the state resulted from an event *e* instantiating C. For instance, the German intransitive verb *heilen* ‘to heal’ has the concept HEILEN in the semantic component; and its result state concept RES(HEILEN) may be in the semantic component of an adjective *gesund* ‘healthy’. This does not mean that anyone who is healthy got recovered from some disease; she/he may as well remain healthy life-long.

Though the analysis is couched within a dynamic-version of DRT and the data dealt with are German, we seem to get the basic idea transported into our framework with English examples. Accordingly, the intransitive verb *freeze* may be translated into (88):

$$(88) [x, e, s][freeze'(x, e) \ \& \ RES(freeze')(x, s) \ \& \ e \prec s]$$

Notice that the variables, or discourse referents, *x, e, s* are left unbound to accommodate the basic idea of DRT, though they can be treated as lambda-abstracted just like our analysis of a verb.

They did not discuss internal readings with temporal adverbials like *for a month*. Instead, they focused on the German adverb *wieder* ‘again’ and proposed how to get the observed ambiguity involving that particular lexical item. However, in the kind of theory they are employing, *wieder* involves much more complexity than a temporal adverbial like *for a month*, since *wieder* carries a presupposition and according to their theory, presuppositions in turn must be verified or accommodated in a given context. Thus, we will consider simpler temporal adverbials; it seems that internal readings should be explained in the same manner modulo their lexical differences. Then, the truth conditions for the internal reading of (89) below will be roughly like (90) under the assumed translation of *freeze* in (88).

(89) The lake froze for a month.

$$(90) \exists e \exists s [freeze'(the.lake, e) \ \& \ RES(freeze')(the.lake, s) \ \& \ past(s) \ \& \ e \prec s \ \& \ for.a.month(s)]$$

The truth conditions in the proposed form in (90) have a potential problem. They do not reflect our intuition as precisely about the internal reading in terms of the connection between the event and its result state. While the internal reading is paraphrased as in (91), the truth conditions allow a situation where the variable *e* refers to the first freezing event if the lake got frozen, *e*, thawed, and got frozen again, *e*₁, and then remained that way for a month, *s*. In this situation, the state *s* is not a result of the event *e*.

(91) The lake got frozen and remained that way for a month.

This is not to suggest that Kamp and Roßdeutscher's treatment of internal adverbs is flawed; there may be some way within the theory of DRT to eliminate this problem. What we do suggest is that we need some modification of the operator RES if we opt to adopt it in our system.

4.3.5 Fabricius-Hansen (1983,1994)

Fabricius-Hansen adopts Kamp and Roßdeutscher's RES and PRE. Furthermore, she defines Res_T and Pre_T as operators on eventualities corresponding to RES and PRE:

- (92) $Res_T(e)$ and $Pre_T(e)$ are the result state and pre-state of a transition eventuality e such that $T(e)$.

Also, a relation on properties CONTRA is defined:

- (93) $CONTRA(T, T')$ iff $RES(T) = PRE(T')$ & $RES(T') = PRE(T)$

According to this definition, *krank werden* 'to become sick' is in CONTRA relation to *gesund werden* 'to become healthy'.

With these definitions, she proposes truth conditional definitions for *wieder* 'again'. Seven entries are proposed which are dependent on types of predicates and also on whether the adverb involves internal or external readings. We will examine the conditions for *wieder* in internal readings with the predicate *gesund werden* 'to become healthy':

- (94) $wieder(e)(T) :=$
 $T(e) \& \exists e' \exists T' [CONTRA(T, T') \& T'(e') \& e' \prec e \& Res_T(e') = Pre_T(e)]$

The truth conditions for the sentence (95) are derived in the way illustrated in (96):

- (95) Hans wieder gesund wurde
 Hans again healthy became
 'Hans became healthy again.'

- (96) $\exists e [wieder(e)(\lambda c' become.healthy(h, c')) \& past(e)]$
 $\Rightarrow \exists e [become.healthy(h, e) \& \exists c' \exists T' [CONTRA(\lambda c' become.healthy(h, c'), T') \& T'(c') \& Res_T(c') = Pre_{\lambda c' become.healthy(h, c')}(c) \& c' \prec e \& past(e)]]$

Though the derived conditions manage to describe the given internal reading, the way it is captured is unintuitive. The key conditions responsible for the meaning of *wieder* are $T(c')$ and $c' \prec e$: thus, under the approach, the fact that Hans was healthy before and the event e brought him back to that state is reflected by the conditions that there was an event of Hans becoming sick earlier than the event e . Besides being unintuitive, this analysis is unable to give an account to a sentence like (97), where *again* is understood as internal and further, it was the tiger himself who came to the city. In this case, the CONTRA relation does not work, nor will there be a counterevent in which Hans and the tiger are the agent and a theme.

- (97) Hans sent the tiger to nature again.

Rather, the meaning of the adverbial can be more appropriately captured by simpler conditions like (98), where the original RES operator is used.

- (98) $wieder(e)(T) := T(e) \& \exists s [RES(T)(s) \& s \prec e]$

Another potential problem lies in the definitions of the operators Res_T and Pre_T . The values of RES(C) and PRE(C) in Kamp & Roßdeutscher can be reasonably assumed to be unique, as C is a property; however, $Res_T(e)$ or $Pre_T(e)$ cannot. In other words, there is no guarantee that an event results in a particular/unique state.

For example, an event of John getting healthy leads to many different states including John being healthy, being happy, Neighbors envying him, etc. Therefore, an identity relation like $R_{csp}(e') = Prct(e)$ is ill-formed.

4.4 Semantics of Result State Constructions

An adequate semantic account for result state constructions must explain at least the following three facts. First, certain lexical predicates, i.e. result state verbs, involve asserting something about two distinct eventualities: one an event, the other a state resulting from that event. Second, the compositional semantics has access to both, with the second being modifiable only by certain kinds of adverbials, the first modifiable by tense. Third, there are two subclasses, result verbs and semi-result verbs, within the category of result state verbs and adverbial modifications are different according to the subclasses.

The approach that we propose captures these facts, (i) by introducing two eventualities in the semantics of result state verbs and specifying a result relation between the two eventualities, (ii) by providing tense specification only for the event, (iii) by specifying these verbs to take a temporal adverbial as argument and that temporal adverbial to predicate of the result state in the end, and (iv) by treating result verbs and semi-result verbs as two different types which take different types of temporal adverbials as argument.

4.4.1 Semantics of Result Verbs

Based on the discussions in the previous sections, (99) is proposed as a schema for the translation of a result verb. Notice that the relation $RES_{\alpha'}$ is similar in nature to Kamp & Roßdeutscher's RES operator and Fabricius-Hansen's Res_T operator. But this relation differs from RES in that this is a relation defined on eventualities rather than properties; it differs from Res_T in the sense that this relation does not presuppose uniqueness of result states. The truth condition schema also resembles one of Dowty's approaches to internal adverbs; result verbs are subcategorized for adverbials, for which the variable T in (99) stands in.

- (99) $\alpha \Rightarrow \lambda x_1 \dots \lambda x_n \lambda T \lambda e [\alpha'(x_n, \dots, x_1, e) \ \& \ \exists s [RES_{\alpha'}(s, e) \ \& \ T(s)]]$, where α' is the event meaning of the verb α and α is an n place predicate (cf. T is a variable over temporal adverbials).
- (100) $RES_{\alpha}(s, e)$ iff s is a result state of the event e with respect to α , i.e. $RES(\alpha)(\dots, s)$ and $\alpha(\dots, e)$ ⁸.

Accordingly, (101) below can be thought of as an instantiation of the general schema for *ssu* 'to put on/wear'.

- (101) $ssu \Rightarrow \lambda y \lambda x \lambda T \lambda e [\text{put.on}(x, y, e) \ \& \ \exists s [RES_{\text{put.on}}(s, e) \ \& \ T(s)]]$

We define in (100) that RES_{α} is a relation between initiating events and states which are understood as the results of the initiating events of the appropriate type. The relation RES is parameterized to α , the meanings of lexical items, so that it relates an event to states which are canonical results of that event type.

⁸The operator RES is the same as defined above by Kamp & Roßdeutscher.

approach, the first entry always produces a result state reading, whereas a simple event reading can arise with the second entry.

(106) a. $ssu_1 \Rightarrow \lambda y \lambda x \lambda T \lambda e [\text{put.on}(x,y,e) \ \& \ \exists s [\text{RES}_{\text{put.on}}(s,e) \ \& \ T(s)]]$

b. $ssu_2 \Rightarrow \lambda y \lambda x \lambda e [\text{put.on}(x,y,e) \ \& \ \exists s [\text{RES}_{\text{put.on}}(s,e)]]$

Notice that the RES_a relation remains in the second entry, instead of proposing the simpler-looking (107). This is needed, since a result state reading can be obtained when there is no adverb at all. Recall the sentence (1), repeated below, has a result state reading, though it does not have a temporal adverb modifying the result state.

(107) $ssu_2 \Rightarrow \lambda y \lambda x \lambda e [\text{put.on}(x,y,e)]$

(1) Ney os-cy hulk-i mwut-ess-ta.
your clothes-on mud-NOM stick.to-PAST-DEC
'Mud is on your clothes.'

The analysis tree and semantic derivations for (2) with the second lexical entry are obvious and omitted here (see Chapter 2).

4.4.4 Semantics of Semi-result Verbs

Earlier we defined a semi-result verb as a verb which provides an internal reading when it appears in the *-c iss* construction or with adverbials like *hansikan tongan* 'for an hour'. To recall an earlier discussion, a semi-result verb differs from a result verb in two respects: (i) a semi-result verb cannot produce an internal reading with nonaspectual locating adverbials such as *ccey* 'yesterday' and *cikum* 'now'; (ii) it also cannot appear in the *-ko iss* construction. Thus, while the nonaspectual adverbial

onul ohwu-cy-nun 'this afternoon' can restrict the result state in (2), repeated here, notice that this type of reading is not allowed for a sentence with a semi-result verb, as shown in (5). In this regard, English causatives and inchoatives seem to behave like semi-result verbs, as witnessed by (108).

(2) Mary-ka onul ohwu-cy-nun ppalkan moca-lul ssu-ess-ta.
Mary-NOM today afternoon-in-TOP red hat-ACC put.on-TNS-DEC
'Mary is wearing a red hat this afternoon.'

(5) #Peter-ka ecey-nun maykcwu-lul nayngcanggo-cy neh-ess-ta.
Peter-NOM yesterday-TOP beer-ACC refrigerator-in put-PAST-DEC
(on reading) 'Peter brought it about (before yesterday) that the beer was in the refrigerator yesterday.'

(108) a. #Peter put the beer in the refrigerator yesterday.
(on reading) 'Peter brought it about (before yesterday) that the beer was in the refrigerator yesterday.'
b. #The lake froze yesterday.
(on reading) 'It was brought about (before yesterday) that the lake was frozen yesterday.'

To contrast with (5), consider a minimally different sentence in (4), repeated here, which is grammatical when the adverb is aspectual.

(4) Peter-ka maykcwu-lul nayngcanggo-cy hansikan tongan
Peter-NOM beer-ACC refrigerator-in for an hour
neh-ess-ta.
put-PAST-DEC
'Peter put the beer in the refrigerator for an hour.'

It is not completely clear how to syntactically distinguish between the aspectual adverb and the nonaspectual adverb in such a way that result state verbs allow both types of adverbs but semi-result verbs allow only the aspectual adverb. One

stipulation might be to take the nonaspectual adverb as solely sentential, and the aspectual adverb as both sentential and VP-internal. We admit that this position is not readily supported by convincing data from Korean. At least, temporal adverbials are not distinguished by the well-known Thomason and Stalnaker (1973) criteria for sentential and VP adverbs. According to them, temporal adverbials are all sentential modifiers.

However, we notice the same kind of contrast between adverbials, both in English and Korean, i.e. that only aspectual adverbs allow semi-result verbs to have internal readings. Furthermore, it has been observed, as mentioned above, that an internal reading is unavailable with sentence-initial adverbs both in Korean and in English. These two facts, when combined, strongly suggest that nonaspectual adverbs cannot be VP adverbs but aspectual adverbs can.

Thus, the basic idea is that semi-result verbs carry 'potential' result states, which can be triggered by internal adverbs. Internal adverbs, in turn, are limited in membership to aspectual adverbs (and adverbs like *tasi* 'again'). We propose that semi-result verbs take as an argument an internal adverb of IV/IV category. Accordingly, the translation of semi-result verb *neh* 'to put' is proposed to be (109), in addition to a simple one which does not combine with an internal adverb.¹⁰ Accordingly, the verb *neh* 'to put' takes five arguments: the direct object, a subcategorized locative adverbial, and the internal adverbial, to make an IV, then the subject and the Davidsonian event argument. Syntactic and semantic derivations for (61) above are given below

¹⁰ \bar{U} , \bar{U}_1 and \bar{U}_2 are variables over-expressions of IV/IV category, i.e. verb phrase modifiers like PPs and VP adverbs.

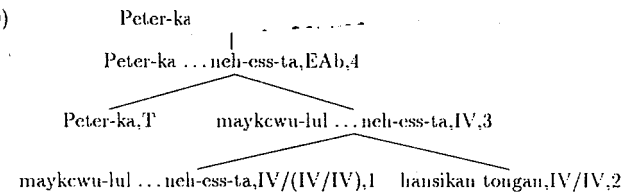
for its internal reading.¹

(109) $neh \Rightarrow \lambda y \lambda \bar{U}_1 \lambda \bar{U}_2$

Key syntactic and seman

below:

(110)



- (111)
1. $\Rightarrow \lambda \bar{U} \lambda x \lambda e [\text{put}(x, \text{the.beer.in.the.fridge}, e) \ \& \ \text{past}(e) \ \& \ \exists s [\text{RES}_{\text{put}}(s, e) \ \& \ \bar{U}(\lambda y \lambda e' [= (y, y, s')](x)(s))]]]$
 2. $\Rightarrow \lambda Q \lambda x \lambda e [Q(x)(e) \ \& \ \text{for.an.hour}(e)]]$
 3. $\Rightarrow \lambda x \lambda e [\text{put}(x, \text{the.beer.in.the.fridge}, e) \ \& \ \text{past}(e) \ \& \ \exists s [\text{RES}_{\text{put}}(s, e) \ \& \ = (x, x, s) \ \& \ \text{for.an.hour}(s)]]]$, by λ -conversion
 $\Rightarrow \lambda x \lambda e [\text{put}(x, \text{the.beer.in.the.fridge}, e) \ \& \ \text{past}(e) \ \& \ \exists s [\text{RES}_{\text{put}}(s, e) \ \& \ \text{for.an.hour}(s)]]]$, by simplification of the vacuous formula $= (x, x, s)$, which means that x equals x in a state s .
 4. $\Rightarrow \lambda e [\text{put}(p, \text{the.beer.in.the.fridge}, e) \ \& \ \text{past}(e) \ \& \ \exists s [\text{RES}_{\text{put}}(s, e) \ \& \ \text{for.an.hour}(s)]]]$
 5. $\Rightarrow \exists e [\text{put}(p, \text{the.beer.in.the.fridge}, e) \ \& \ \text{past}(e) \ \& \ \exists s [\text{RES}_{\text{put}}(s, e) \ \& \ \text{for.an.hour}(s)]]]$, by existential closure

Notice that the derivation of (5), repeated below, is blocked as desired. The nonaspectual locating adverbial *ccc-y-nun* 'yesterday' is of categories TA or MTA, but not of a category IV/IV. Hence, a semi-result verb cannot take it as argument, as the blocked derivation is illustrated in (112).

¹¹Note that IV is of a $\langle e, e, t \rangle$ type, where e is the type for eventualities. Also, we are assuming some obvious syntactic rules for English (cf. Stump 1985 §3).

- (5) #Peter-ka ecey-nun maykcwu-lul nayngcanggo-ey neh-ess-ta.
Peter-NOM yesterday-TOP beer-ACC refrigerator-in put-PAST-DEC
(on reading) 'Peter brought it about (before yesterday) that the beer was
in the refrigerator yesterday.'

- (112) *ecey-nun maykcwu-lul nayngcanggo-ey neh-ess-ta,IV
maykcwu-lul nayngcanggo-ey neh-ess-ta,IV/(IV/IV) ecey-nun,MTA(or TA)

On the other hand, external readings of those sentences are obtained in the obvious way. Namely, the temporal adverbs, of an MTA category, take as arguments simple EAb's, which result from giving *neh* its four arguments.

4.4.5 *-ko/e iss* Constructions

Result state readings are available to sentences of type (113) and (26) as well as (2), repeated below. While (2) is of a simple sentence type based on result state verbs, (113) and (26) involve a connective and an auxiliary verb. In this section, we will investigate how result state readings can be assigned to *-ko/e iss* constructions and how they are assigned unambiguously to these constructions.

- (2) Mary-ka onul ohwu-ey-nun ppalkan moca-ul ssu-ess-ta.
Mary-NOM today afternoon-in-TOP red hat-ACC put.on-PAST-DEC
a. 'Mary is wearing a red hat this afternoon.'
b. 'Mary put on a red hat this afternoon.'
- (113) Mary-ka onul ohwu-ey-nun ppalkan moca-ul
Mary-NOM today afternoon-in-TOP red hat-ACC
ssu-ko iss-ta.
put.on-CONN exist-DEC
'Mary is wearing a red hat this afternoon.'

- (26) John-i twis cali-ey anc-e iss-ta.
John-NOM back seat-on sit.down-CONN exist-DEC
'John is in the back seat.'

In an earlier discussion, we observed that result verbs can appear in any of the constructions but that semi-result verbs can be allowed only in the *-e iss* construction. Also known is that a sentence of type (2) can be ambiguous between event and result state readings, whereas a *-ko/e iss* sentence is not.

Another crucial difference between them lies in the control relation when a transitive verb is involved: the subject of a *-ko iss* construction need not control the result phrase, i.e. the verb phrase marked and ending with the connective *-ko/e*, therefore it does not have to be the agent of the event denoted by the result verb, though the subject is understood as the controller for most result verbs.¹² On the other hand, the subject in a sentence of type (2) is undoubtedly the controller of its verb phrase, thus the agent of the event, if the event in question involves an agent. For instance, when transitives like *mwun-ul ycl/tat* 'to open/close the door' and *pwul-ul khyt/kku* 'to turn on/off the light' appear in the *-ko iss* construction, the subject is not necessarily construed as the controller of the predicate. In (7), Mary is not necessarily the person who closed the door. Notice however that its counterpart in a simple sentence in (114) requires Mary to be the agent of closing.

- (7) Mary-ka cikum mwun-ul tat-ko iss-ta.
Mary-NOM now door-ACC close-CONN exist-DEC
'Mary is (there) now, with the door closed.'
- (114) Mary-ka cikum mwun-ul tat-ess-ta.
Mary-NOM now door-ACC close-PAST-DEC
'Mary is now in a state of having closed the door.'

¹²Note that the subject in the *-e iss* construction is always understood to control the verb phrase.

One might argue with an example like (115) below that there is no essential difference between them in terms of subject control, as it seems that the subject in (115) may not be the agent of the initiating event; it may be the most likely understanding of the sentence, since an akita is after all a dog, however Japanese it may be.

- (115) Ce akita-ka cikum ppalkan cokki-lul ip-ess-ta.
 that akita-NOM now red vest-ACC put.on-PAST-DEC
 'That akita is now wearing a red vest.'

Notice that this sentence does not support the argument, as the verb *ip* 'to put on' does not necessarily involve agentivity even when it is used only eventively. Namely, we still can say a sentence like (116) when its owner actually does all the dressing for the dog.

- (116) Ce akita-ka cikum ppalkan cokki-lul ip-nun-ta.
 that akita-NOM now red vest-ACC put.on-NONPAST-DEC
 'That akita is now putting on a red vest.'

Consequently, an adequate semantic description must account for the differences between the constructions summarized in (117):

(117) **Differences:**

- Subject control: the subject of a *-ko iss* sentence does not always control its result phrase, whereas those of a simple sentence like (2) and an *-e iss* sentence have to.
- Ambiguity: a simple sentence like (2) is ambiguous with both the event reading and the result state reading, whereas a *-ko/e iss* sentence has the result state reading only (ignoring the homophonous progressive *-ko iss* construction.)

It should be obvious that because of the difference in control relations we cannot simply treat *-ko/e iss* constructions as some kind of 'result state' operation of *-ko/e*

iss on simple sentences of result state that would produce unambiguously result state readings.

Syntax of *-ko/e iss* Construction

It will be argued that a *-ko/e iss* construction is best analyzed as involving *iss* of a *IV/(IV/IV)* category taking as argument a modifier-like verb phrase headed by *ko/e*. For instance, the IV part of the sentence (118) will be analyzed as undergoing the derivation illustrated in (119):¹³

- (118) Mary-ka moca-lul ssu-ko iss-ta.
 Mary-NOM hat-ACC put.on-CONN exist-DEC
 'Mary is wearing a hat.'

- (119)
- ```

 moca-lul ssu-ko iss-ta,IV
 / \
iss-ta,IV/(IV/IV) moca-lul ssu-ko,IV/IV

```

First, the result phrase is not a sentential but a verb phrase. Notice in (120) that whether the agent of the result phrase is understood as the same as the subject or not, an explicit noun phrase cannot appear before the result phrase. Therefore, we conclude that the result phrase has to be VP-level. The sentence (120) contrasts with (121); we conclude that a sentence is embedded in the (121) and that *malha* 'to say' subcategorizes for a sentence, even though a verb phrase alone can appear in that position. The difference is that a sentence can appear as argument in (121), whereas it cannot in (120).

<sup>13</sup>However, we will propose below that the connectives *-ko* and *-e* are of different types in order to account for the difference in selectional restrictions.

- (120) Mary-ka (\*caki/\*John-i) mwun-ul tat-ko iss-ta.  
 Mary-NOM self/John-NOM door-ACC close-CONN exist-DEC  
 'Mary is (here), with the door closed (by her/John).'
- (121) Mary-ka (caki/John-i) keki ka-ess-tako malha-unta.  
 Mary-NOM self/John-NOM there go-PAST-COMP say-DEC  
 'Mary says that she/John went there.'

The fact that the agent of the result phrase cannot be specified even when the subject is not the agent is taken to suggest that the agent of the result phrase is unspecified semantically.

Second, the result phrase is a modifier-like category in the sense that intuitively it seems to make semantic contribution typical of a modifier: it qualifies given meanings as an adverbial or an adjective does. Also, the same type of phrase can appear optionally as a VP modifier as shown in (122) and also this phrase is optional, as verified by the acceptable sentence (123).

- (122) Mary-ka ppalkan moca-lul ssu-ko hakkyo-ey ka-ess-ta.  
 Mary-NOM red hat-ACC put.on-CONN school-to go-PAST-DEC  
 'Mary went to school, wearing a red hat.'
- (123) Mary-ka hakkyo-ey ka-ess-ta.  
 Mary-NOM school-to go-PAST-DEC  
 'Mary went to school.'

However, a result phrase is not optional when it appears in the construction that we are concerned with. Thus, the contrast between (124) and (125).

- (124) Mary-ka nwup-e iss-ta.  
 Mary-NOM lie.down-CONN exist-DEC  
 'Mary is lying/Mary is (here), lied down.'
- (125) #Mary-ka iss-ta.  
 Mary-NOM exist-DEC  
 'Mary exists.'

Third, the verb *iss* patterns with auxiliary verbs in Korean with respect to word order variation in that the result phrase cannot be separated from the verb *iss* (see Chung 1995:148-151). Notice in (126) (129) that the argument phrase *ku mwuncey-lul phwullyeko* 'to solve the problem' can be scrambled off the main verb or be separated from the main verb by intervening adverbials.

- (126) Mary-ka ku mwuncey-lul phwullyeko sitohayssta.  
 Mary-NOM the problem-ACC solve tried  
 'Mary tried to solve the problem.'
- (127) Ku mwuncey-lul phwullyeko Mary-ka sitohayssta.  
 the problem-ACC solve Mary-NOM tried
- (128) Mary-ka sitohayssta, ku mwuncey-lul phwullyeko.  
 Mary-NOM tried the problem-ACC solve
- (129) Mary-ka ku mwuncey-lul phwullyeko kkuncilkikey sitohayssta.  
 Mary-NOM the problem-ACC solve persistently tried  
 'Mary persistently tried to solve the problem.'

However, this freedom of ordering is not allowed between an auxiliary and its subcategorized verb phrase, as attested by the examples in (131)-(133).

- (130) Mary-ka cak-ci anh-ta.  
 Mary-NOM short-INF not-DEC  
 'Mary is not short.'
- (131) \*Cak-ci Mary-ka anh-ta.  
 short-INF Mary-NOM not-DEC
- (132) \*Mary-ka anh-ta, cak-ci.  
 Mary-NOM not-DEC, short-INF
- (133) \*Mary-ka cak-ci celtaylo anh-ta.  
 Mary-NOM short-INF absolutely not-DEC  
 'Mary is absolutely not short.'

The verb *iss* patterns with the auxiliary *anh* 'not'.

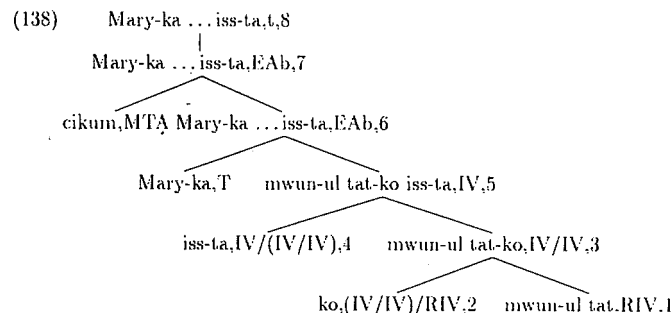
- (124) Mary-ka nwup-e iss-ta.  
Mary-NOM lie.down-CONN exist-DEC  
'Mary is (here), lied down.'
- (134) \*Nwup-e Mary-ka iss-ta.  
lie.down-CONN Mary-NOM exist-DEC
- (135) \*Mary-ka iss-ta, nwup-e.  
Mary-NOM exist-DEC, lie.down-CONN
- (136) \*Mary-ka nwup-e coyonghi iss-ta.  
Mary-NOM lie.down-CONN quietly exist-DEC  
'Mary is (here) quietly, lied down.'
- (137) Mary-ka coyonghi nwup-e iss-ta.  
Mary-NOM quietly lie.down-CONN exist-DEC  
'Mary is (here) quietly, lied down.'

#### Semantics of the *-ko iss* construction

The sentence in (7) is based on one of the few result verbs which often allow the subject of the sentence to not control the result phrase. We will take this sentence as a general case and provide a derivation in this section. We propose that this sentence is obtained by the derivational steps in (138) and (139).<sup>14</sup> The proposed semantics of *-ko* is designed to account not just for the *-ko iss* construction but also for the occurrence of *-ko* without *iss* following. It takes a category of RIV to make an IV/IV category. This category in turn serves as an argument for *iss* in the *-ko iss* construction. It can also be an IV modifier in a sentence like (122) above.

<sup>14</sup>RIV and SIV are the categories for the verb phrases with a result verb and a semi-result verb, respectively. Thus, they abbreviate  $(EAb/TA)/c$  and  $IV/(IV/IV)$  respectively. Also,  $\mathfrak{R}, \mathfrak{N}$  are variables over expressions of the RIV and SIV categories, respectively. As before,  $\mathfrak{U}$  is a variable over expressions of the IV/IV category.

- (7) Mary-ka cikum mwun-ul tat-ko iss-ta.  
Mary-NOM now door-ACC close-CONN exist-DEC  
'Mary is (here) now, with the door closed.'



- (139)
1.  $\Rightarrow \lambda x \lambda T \lambda e [\text{close}(x, \text{the.door}, e) \ \& \ \exists s [\text{RES}_{close}(s, e) \ \& \ T(s)]]$
  2.  $\Rightarrow \lambda \mathfrak{R} \lambda P \lambda y \lambda e' \exists c \exists x [P(y)(e') \ \& \ \mathfrak{R}(x)(\lambda s' [e' \leq_t s'])(c)]$
  3.  $\Rightarrow \lambda P \lambda y \lambda e' \exists c \exists x [P(y)(e') \ \& \ \text{close}(x, \text{the.door}, e) \ \& \ \exists s [\text{RES}_{close}(s, e) \ \& \ \lambda s' [e' \leq_t s'](s)]]$   
 $\Rightarrow \lambda P \lambda y \lambda e' \exists c \exists x [P(y)(e') \ \& \ \text{close}(x, \text{the.door}, e) \ \& \ \exists s [\text{RES}_{close}(s, e) \ \& \ e' \leq_t s]]$ , by  $\lambda$ -conversions
  4.  $\Rightarrow \lambda \mathfrak{U} [\mathfrak{U}(\lambda x \lambda s [\text{exist.in}(x, s) \ \& \ \text{nonpast}(s)])]$
  5.  $\Rightarrow \lambda y \lambda s' \exists e \exists x [\text{exist.in}(y, s') \ \& \ \text{nonpast}(s') \ \& \ \text{close}(x, \text{the.door}, e) \ \& \ \exists s [\text{RES}_{close}(s, e) \ \& \ s' \leq_t s]]$
  6.  $\Rightarrow \lambda s' \exists e \exists x [\text{exist.in}(m, s') \ \& \ \text{nonpast}(s') \ \& \ \text{close}(x, \text{the.door}, e) \ \& \ \exists s [\text{RES}_{close}(s, e) \ \& \ s' \leq_t s]]$
  7.  $\Rightarrow \lambda s' \exists e \exists x [\text{exist.in}(m, s') \ \& \ \text{nonpast}(s') \ \& \ \text{now}(s') \ \& \ \text{close}(x, \text{the.door}, e) \ \& \ \exists s [\text{RES}_{close}(s, e) \ \& \ s' \leq_t s]]$
  8.  $\Rightarrow \exists s' \exists e \exists x [\text{exist.in}(m, s') \ \& \ \text{nonpast}(s') \ \& \ \text{now}(s') \ \& \ \text{close}(x, \text{the.door}, e) \ \& \ \exists s [\text{RES}_{close}(s, e) \ \& \ s' \leq_t s]]$

The truth conditions in the last step in (139) require some explanation on at least two accounts. First, we have translated *iss* into *exist.in* rather than *exist* in

order to reflect that the auxiliary needs a specification about the temporary state of existing under some circumstances. Also, note that (139) captures the fact that the result phrase is not controlled by the subject in this construction – i.e. the individual denoted by  $x$  need not be Mary, though, of course, it is a possibility. On the other hand, most other result verbs like *ip* ‘to put on (clothes)’ and *pes* ‘to take off (clothes)’ seem to be appropriate only when the subject in the construction controls the result phrase. This is consistent with the type of truth conditions in (139) above, because if someone is in a result state of an event of someone putting on a hat, the result state can be only meaningful when the two *someone*’s are the same individual.

#### Semantics of *-e iss* construction

It was noted above that not just result verbs but also semi-result verbs appear in the *-ε iss* construction. We also observed that a result phrase with the *-ε* form is always controlled by the subject, whereas one of the *-ko* form is not. This second point may not be a crucial difference that needs to be specified in the semantics of the connective *-ε*. Rather, it seems that this result could be derived from the same pragmatic principle applied to the *-ko iss* construction under which result phrases with *ip* ‘to put on’ and *tha* ‘to get on (a means of transportation)’ are always subject-controlled, though the proposed truth conditions allow them to be uncontrolled in this way. However, since it will be eventually equivalent whether we specified this fact as part of the semantics of *-ε* or leave it to a pragmatic principle, we choose to specify it in the lexicon of *-ε*. Also, we propose two separate lexical entries for the connective *-ε* in (140), which we are led to do as a consequence of viewing result verbs

and semi-result verbs as belonging to different categories.

- (140) a.  $-e_1, (IV/IV)/RIV \Rightarrow$   
 $\lambda \mathfrak{R} \lambda P \lambda x \lambda e' \exists e [P(x)(e') \ \& \ \mathfrak{R}(x)(\lambda s'[e' \leq_t s'])(e)]$   
 b.  $-e_2, (IV/IV)/SIV \Rightarrow$   
 $\lambda \mathfrak{R} \lambda P \lambda x \lambda e' \exists e [P(x)(e') \ \& \ \mathfrak{R}(\lambda Q \lambda y \lambda s[e' \leq_t s \ \& \ Q(y)(s)])(x)(e)]$

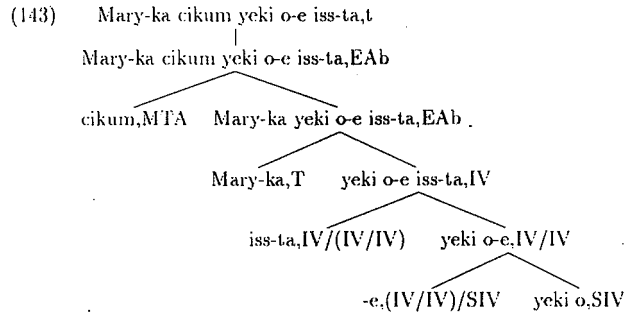
Thus, a sentence with a *-ε<sub>1</sub> iss* construction, e.g. (124), will go through derivations essentially the same as in a *-ko iss* construction shown in (139) above, resulting in the truth conditions in (141) below:

- (124) Mary-ka cikum nwup-e iss-ta.  
 Mary-NOM now lie.down-CONN exist-DEC  
 ‘Mary is (here) now, lied down.’

- (141)  $\exists e' \exists e [\text{exist.in}(m, e') \ \& \ \text{nonpast}(e') \ \& \ \text{now}(e') \ \& \ [\text{lie.down}(m, e) \ \& \ \exists s [\text{RES}_{\text{lie.down}}(s, e) \ \& \ e' \leq_t s]]]$

On the other hand, when a semi-result verb appears in the construction such as (142), it will have a slightly different derivation but lead to the same type of reading. We will omit the semantic derivations, as they will be notational variations of the derivations given in (137) and (138) above, except for the difference in types between RIV and SIV categories.

- (142) Mary-ka cikum yeki o-e iss-ta.  
 Mary-NOM now here come-CONN exist-DEC  
 ‘Mary is here now, having come.’



#### 4.4.6 A Potential Problem and Alternative Analysis

In this subsection, we will point out a potential problem of the proposed analysis of the result state construction. Then, we will sketch an alternative analysis.

##### A Potential Problem

There is a potential problem with the proposed analysis of result state verbs in general. Since the proposal allows TAs to modify either the initiating event or the result state, it is expected also to allow sentences like (144) and (145), where the two eventualities are modified by different TAs. Namely, in (144) *cengo-ey* 'at noon' and *onul ohwu-ey* 'this afternoon' are intended to modify the putting-on event and the wearing state, respectively. However, neither (144) nor (145) is acceptable.

- (144) #Cengo-ey Mary-ka onul ohwu-ey-nun ppalkan moca-lul  
 noon-at Mary-NOM this afternoon-in-TOP red hat-ACC  
 ssu-css-ta.  
 put.on-PAST-DEC  
 (intended) 'Mary put on a red hat at noon and is wearing it this afternoon.'

- (145) #Cengo-ey Mary-ka seysikan tongan ppalkan moca-lul  
 noon-at Mary-NOM 3.hour for red hat-ACC  
 ssu-css-ta.  
 put.on-PAST-DEC  
 (intended) 'Mary put on a red hat at noon and wore it for three hours.'

Notice also that these overgenerations arise partly because we have assumed that a clause can contain multiple TAs which do not constitute a single syntactic unit. Hence, this problem may be avoided if we give up that assumption; once multiple TAs in a clause are viewed as one constituent, the above sentences can be ruled out, since those adverbials in (144) and (145) are not compatible to modify the same eventuality. For instance, the sentences in (146) (148) illustrate that while *cengo-ey* 'at noon' and *seysikan tongan* 'for three hours' can individually modify the state of Mary's being in her office, they cannot appear in the same clause.

- (146) Cengo-ey Mary-ka office-ey iss-ess-ta.  
 noon-at Mary-NOM office-in exist-PAST-DEC  
 'Mary was in her office at noon.'
- (147) Mary-ka Seysikan tongan office-ey iss-ess-ta.  
 Mary-NOM 3.hour for office-in exist-PAST-DEC  
 'Mary was in her office for three hours.'
- (148) #Cengo-ey Mary-ka seysikan tongan office-ey iss-ess-ta.  
 noon-at Mary-NOM 3.hour for office-in exist-PAST-DEC  
 (intended) 'Mary was in her office for three hours at noon.'

It is unclear how exactly we would prevent the two adverbials in (148) from appearing in the same clause. In any case, it seems that (148) is unacceptable for the same reason that (145) is unacceptable. Hence, (145) and (148) may be accounted for by the same constraint if we assume that all temporal adverbials in a clause make up one syntactic/semantic constituent.

### Alternative Analysis

If we want to maintain the assumption that multiple TAs in a clause are not necessarily a constituent and account for the lack of multiple TAs in the result state construction, we may consider a rather different approach in the line of Pustejovsky (1988).

Thus, following the idea of Pustejovsky (1988), we may want to view result state verbs as involving subevent relations depicted in (149), where the event  $e$  is the join of  $e_1$  and  $s_1$ .



Then, a result (state) verb can be analyzed as making reference not to two eventualities as we proposed above, but rather to three eventualities: one event and two subevents of that event which are related to each other via the RES relation. According to this idea, the denotation schema for result verbs is represented as in (150).

(150) A translation schema for result verbs (alternatively):

$$\alpha \Rightarrow \lambda c \exists e_1, s_1 [c = e_1 \sqcup s_1 \ \& \ \alpha' \ \& \ \text{RES}_{\alpha'}(s_1, e_1)]$$

As it may be obvious from (150), this proposal does not allow TAs to directly modify the initiating event  $e_1$  or the result state  $s_1$ ;  $e_1$  and  $s_1$  are existentially quantified, but the variable  $c$ , the join of them, is abstracted over and available for modifications. However, since the event  $c$  has the partitioned structure of  $e_1$  and  $s_1$ , it is not totally unreasonable to assume a pragmatic process by which a TA modifying a superevent

$c$  is understood as modifying its subeventuality  $e_1$  or  $s_1$ , whichever is appropriate in type. For instance, if the adverbial is *hansikan tongan* 'for an hour', it will typically modify the result state  $s_1$  via  $c$ , though it can modify the event  $e_1$  providing a 'coerced' repetitive reading. If the given adverbial is *hansikan maney* 'in an hour', then it will modify the event  $e_1$  via  $c$ .

This approach has a potential to account for the lack of multiple TAs in the result state construction. Since TAs will modify the supereventuality  $c$  directly and  $e_1$  and  $s_1$  indirectly, we can employ the constraint against incompatible temporal adverbials of the sort required to rule out the simple sentence (148) above. Moreover, this analysis would reduce a significant number of ambiguous predicates, as it does not propose many lexical entries for the same form.

One reservation against this alternative is that the pragmatic process is not defined at this point. It is doubtful whether it can be well defined. Therefore, we admit that this is only a suggestion for further research.

### 4.5 Conclusion

We have elaborated the class of result state verbs. By illustrating the connection between the result state reading and the verbs of result state, we have shown that the result state reading is not a function of the tense marker *-ess* per se but some lexical feature of result state verbs.

Also, we have explored a way of accounting for 'noncompositional modifications' by temporal adverbials, in a compositional way. In so doing, we have shown that

one efficient and formally consistent way is to posit that the result state verbs make reference to two types of eventualities as part of their semantics.

## CHAPTER V

### Temporal Clauses and Relativity of Tense

#### 5.1 Relativity of Tense

Korean is a relative tense language in the sense that tense may be interpreted relative to a point other than the moment of speech. For instance in an embedded clause, the same form *Mary-ka ttena-ess* in (1)-(3) refers to different times depending on the tense of the clause into which it is embedded: it refers to some time in the past prior to the time of John's feeling in (1), any time in the past in (2), and possibly some time in the future in (3):

- (1) John-un Mary-ka ttena-ess-tako nukki-ess-ta.  
 John-TOP Mary-NOM leave-PAST-COMP feel-PAST-DEC  
 'John felt that Mary had left.'
- (2) John-un Mary-ka ttena-ess-tako nukki-nun-ta.  
 John-TOP Mary-NOM leave-PAST-COMP feel-NONPAST-DEC  
 'John feels that Mary left/has left.'
- (3) John-un nayil Mary-ka ttena-ess-tako nukki-keyss-ta.  
 John-TOP tomorrow Mary-NOM leave-PAST-COMP feel-MOD-DEC  
 'John will feel tomorrow that Mary left.'

A similar kind of relativity is shown in temporal adverbials such as (4) and (5). The same adverbial clause refers to a past time in (4) and to a future time in (5).

- (4) Mary-ka tochakha- $\phi$ -ul ttay John-i ttena-ess-ta.  
 Mary-NOM arrive-NONPAST-REL time John-NOM leave-PAST-DEC  
 'John left when Mary was arriving.'
- (5) Mary-ka tochakha- $\phi$ -ul ttay John-i ttena-keyss-ta.  
 Mary-NOM arrive-NONPAST-REL time John-NOM leave-MOD-DEC  
 'John will leave when Mary is arriving.'

The relativity of tense is also apparent in nontemporal adverbial clauses in (6): the adjunct in (6a) is interpreted as past of the past while the adjunct in (6b) is interpreted as the same tense as the matrix.

- (6) a. Nun-i o-ess-nikka kil-i mikkulep-ess-ta.  
 snow-NOM come-PAST-because road-NOM slippery-PAST-DEC  
 'The road was slippery because it had snowed.'
- b. Nun-i o-nikka kil-i mikkulep-ess-ta.  
 snow-NOM come-because road-NOM slippery-PAST-DEC  
 'The road was slippery because it was snowing.'

While tense in subordination observes relativity, there are some nontrivial points that distinguish temporal adverbial clauses from embedded complement clauses with respect to temporal interpretation.

First, comparing (1), repeated here, and (7), we notice that they are not completely parallel in relativity. Both sentences have the past tense in the matrix and the subordinate clause. Nevertheless, the event time of the adverbial in (7) needs to be 'immediately' before the event time of the matrix, whereas (1) follows the regular pattern of relativity so that the event time of the embedded clause is simply past relative to the event time of the matrix.

- (1) John-un Mary-ka ttena-ess-tako nukki-ess-ta.  
 John-TOP Mary-NOM leave-PAST-COMP feel-PAST-DEC  
 'John felt that Mary had left.'

- (7) Mary-ka tochakha-ess-ul ttay John-i ttena-ess-ta.  
 Mary-NOM arrive-PAST-REL time John-NOM leave-PAST-DEC  
 'John left when/immediately after Mary arrived.'

Secondly, the difference in tense is neutralized in pairs like (8) and (9), where they are understood to mean the same even though they have different tenses in the temporal adverbials, i.e. nonpast in (8) and past in (9). And it is observed that this kind of tense neutralization occurs when atelic predicates like *aphu* 'be sick' appear in temporal adverbials.<sup>1</sup>

- (8) Mary-ka aphu- $\phi$ -ul ttay John-i ttena-ess-ta.  
 Mary-NOM sick-NONPAST-REL time John-NOM leave-PAST-DEC  
 'John left when Mary was sick.'
- (9) Mary-ka aphu-ess-ul ttay John-i ttena-ess-ta.  
 Mary-NOM arrive-PAST-REL time John-NOM leave-PAST-DEC  
 'John left when Mary was sick.'

These differences will be addressed in this chapter, and it will be shown why they are expected in the general theory of relativity of tense in Korean. Thus, we will maintain that despite these differences the relativity is observed essentially in the same way in both kinds of subordinate clauses.

## 5.2 Structure of Temporal Adverbial Clauses

The canonical structure of Korean time adverbials consists of an NP plus a postposition. A postposition is necessary in most cases, e.g. *caknyen-ey* 'last year'. There

<sup>1</sup>It seems that judgements are split about activity predicates: while almost all speakers agree that the distinctions in tense are neutralized for statives in (6) and (7), some speakers do not agree that it is also true for activity predicates. But the neutralization tends to occur more readily with an activity predicate with a typically longer duration. For example, *ca* 'to sleep' and *hakkyo-cokulo kele-ka* 'to walk towards the school' seem more likely to be neutralized in tense than *kongwon-gyese sanchaykha* 'to take a walk in the park' or *kongpwa* 'to study'.



are a few temporal adverbials in which a postposition is optional, e.g. *ku ttay-(ey)* 'at that time', or not possible, e.g. *eccey* 'yesterday'. Where a subordinating conjunction is commonly employed in other languages as in (10), an NP with a relative clause is used in Korean as demonstrated in (4) below. This use of relative clause constructions for temporal adverbials, it is reported, is also exhibited by other languages such as Hausa, Mandarin, Swahili, Hungarian, and Turkish (cf. Thompson and Longacre 1985:180-181).

(10) John left when Mary was arriving.

(4) Mary-ka tochakha- $\phi$ -ul ttay John-i ttena-*css*-ta.  
 Mary-NOM arrive-NONPAST-REL time John-NOM leave-PAST-DEC  
 'John left when Mary was arriving.'

Since the construction of the temporal adverbial in (4) is based on a relative clause, it would be more faithful to gloss it as 'John left at the time when Mary was arriving'. However, (11) seems to be a more natural expression in English and we do not find a difference in meaning. So, we will continue to gloss in this way.

In this section we will demonstrate that though they are based on relative clause constructions at the syntactic level, the *ul ttay*-adverbials used for temporal adverbials do not follow the regular pattern of relative clauses at the semantic level. This fact suggests that the adverbial clause construction is undergoing a grammaticalization process, which may result in an independent functional category of subordinating conjunctions in the end.

There are three morphologically distinct relativizers: the *un*-form, the *nun*-form, and the *ul*-form relativizers. As briefly discussed in Chapter 3, the *un*-form relativizer

marks nonpast tense for the adjectival verb *aphu* 'to be sick', but past tense for the nonadjectival verb *ttena* 'to leave'.

- (11) a. *aphu-un salam*  
 sick-REL person  
 'sick person/person who is sick'  
 b. *ttena-un salam*  
 leave-REL person  
 'person who left'

On the other, the *nun*-form relativizer combines only with nonadjectival verbs, giving the nonpast interpretation. Notice that the adjectival verb *aphu* 'to be sick' in (12a) is ungrammatical with the *nun*-form relativizer.

- (12) a. \**aphu-nun salam*  
 sick-REL person  
 (intended) 'sick person/person who is sick'  
 b. *ttena-nun salam*  
 leave-REL person  
 'person who leaves/is leaving'

The *ul*-form relativizer takes both kinds of verbs and adds the modal interpretation which is equivalent to *kyess* in the independent clause. This is shown in (13). Note further that this relativizer can take a tensed verb as modal and tense are independent, as illustrated in (14).

- (13) a. *aphu-ul salam*  
 sick-REL person  
 'person who will be sick'  
 b. *ttena-ul salam*  
 leave-REL person  
 'person who will leave'
- (14) *ttena-*css*-ul salam*  
 leave-PAST-REL person  
 'person who might have left'

Table 12: Relativizers

|         | ADJECTIVAL VERBS   | NONADJECTIVAL VERBS |
|---------|--------------------|---------------------|
| PAST    |                    | un ( $\phi + un$ )  |
| NONPAST | un ( $\phi + un$ ) | nun ( $nu + un$ )   |
| MODAL   | ul                 | ul                  |

The paradigm can be illustrated as in Table 12, where the *un*-form and the *nun*-form relativizers can be further analyzed as a combination of a tense marker and the relativizer *un*, as indicated in the parentheses. However, it is acknowledged that the modal relativizer *ul* cannot be divided into identifiable morphemes.

The *-ul ttay*-adverbial is an exception to this regular pattern of relative clause inflections above. Instead, it has its own pattern given in Table 13 with examples in (15). Notice that there is a gap in this paradigm: it lacks a modal relativizer. But once we consider the nature of time adverbials, it is hardly surprising: It has been claimed that English temporal adverbial clauses have factive presuppositions (see Heinämäki 1974). Thus, this lack of irrealis reading is partly expected. What is unexpected, though, is the use of the relativizer *-ul*. It is used as the modal relativizer in the regular pattern in Table 12. It is unknown why the regular *un*-form relativizer is not used for this construction.

- (15) a. Mary-ka ttēna/aphu-ul ttay  
 Mary-NOM leave/sick-REL time  
 'when Mary is sick/leaves'
- b. Mary-ka ttēna/aphu-ess-ul ttay  
 Mary-NOM leave/sick-PAST-REL time  
 'when Mary left/was sick'

Table 13: Tense-Modal Pattern for *ul ttay*-adverbials

|         | ALL VERBS |
|---------|-----------|
| PAST    | ess-ul    |
| NONPAST | ul        |
| MODAL   |           |

Other temporal adverbials follow the regular pattern in (13), e.g. *hwu* 'after' and *ci* 'since'. It is observed in (16)–(18) that the *hwu*-adverbial takes only the past tense:

- (16) Mary-ka tochakha- $\phi$ -un hwu-ey John-i ttēna-ess-ta.  
 Mary-NOM arrive-PAST-REL later.time-at John-NOM leave-PAST-DEC  
 'John left after Mary arrived.'
- (17) #Mary-ka tochakha-nu-un hwu-ey John-i  
 Mary-NOM arrive-NONPAST-REL later.time-at John-NOM  
 ttēna-ess-ta.  
 leave-PAST-DEC  
 (intended) 'John left after Mary was arriving.'
- (18) #Mary-ka tochakha-ul hwu-ey John-i ttēna-ess-ta.  
 Mary-NOM arrive-REL later.time-at John-NOM leave-PAST-DEC  
 (intended) 'John left after Mary would arrive.'

The unacceptability of (18) seems to be due to the same reason that accounts for why the adverbial cannot have the irrealis relativizer. Namely, the factive presupposition in temporal adverbials is incompatible with the presuppositions triggered by irrealis inflections. We will show in §5.3 that (17) is unacceptable on semantic grounds.

### 5.3 Semantics of Relative Tense

Even though we acknowledged early on that Korean tenses are relative, we have, up until now, treated them as if they were deictic. As noted in Chapter 2, it was

purely for our convenience in handling facts which do not directly involve the issue of relative tense. Hence, a sentence with the past tense marker like (19) was tentatively interpreted as (20), which contains a **precedence relation** between the event in question and the speech time.<sup>2</sup>

(19) John-i ttena-ess-ta.  
John-NOM leave-PAST-DEC  
'John left.'

(20)  $\exists e[\text{leave}(j, e) \ \& \ e \prec s]$

As a way of capturing relativity of tense, we will propose that the denotation of a sentence be not a proposition but a propositional function, i.e. a function from events to propositions. This is inspired by Portner (1992), who treats subordinate clauses as propositional functions, i.e. functions from situations to propositions, in his situation-based semantics framework. Our approach will be different from Portner's in two ways. First, we propose that main clauses as well as subordinate clauses denote propositional functions. However, we introduce a rule which converts propositional functions into propositions in a matrix clause. Second, propositional functions as denotations of sentences in our approach are directly derived from the denotation of their lexical components, whereas in Portner propositional functions are obtained when complementizers abstract over reference situations; therefore, his analysis of complementizers is syncategorematic.

<sup>2</sup>A confusion may arise because we use the variable  $s$  in two different purposes. It has been used as a variable over states. But, here and briefly in Chapter 2, it stands for the speech time. To help eliminate a possible confusion, we will use  $s$  exclusively for the speech time in this chapter. Also, one difference between the two uses throughout the dissertation is that  $s$  for the speech time is always unbound in a given formula, whereas  $s$  for states is always bound.

Thus, under our approach the sentence (19) will be given the truth conditions in (21), where the variable  $r$  can be thought of as a reference event. This category will be called Reference Abstract, or RAb.

(21)  $\lambda r \exists e[\text{leave}(j, e) \ \& \ e \prec r]$

The sentence will eventually be interpreted as in (22) when the matrix rule (23) is applied:

(22)  $\exists e[\text{leave}(j, e) \ \& \ e \prec s]$   
where the speech event/time  $s$  is defined as:  
At any index  $\ll w, i \gg$ , the denotation of  $s$  is  $i$ .

(23) **Matrix Rule:**

S14. If  $\alpha \in P_{RAB}$ , then  $F_{14}(\alpha) \in P_t$ , where  $F_{14}(\alpha)$  is  $\alpha$ .

T14. If  $\alpha \in P_{RAB}$  and  $\alpha$  translates as  $\alpha'$ , then  $F_{14}(\alpha)$  translates as  $\alpha'(s)$ .

The workings of this approach for a simple sentence (24) are exemplified in the derivation tree (25) with the corresponding denotations in (26):

(24) Ecey John-i ttena-ess-ta.  
yesterday John-NOM leave-PAST-DEC  
'John left yesterday.'

(25)

```

 Ecey John-i ttena-ess-ta,t,6
 |
 Ecey John-i ttena-ess-ta,RAb,5
 |
 Ecey John-i ttena-ess-ta,EAb,4
 / \
 ecey,MTA,3 John-i ttena-ess-ta,EAb,2
 / \
 John-i,T ttena-ess-ta,IV,1

```

- (26)
1. *Ucna-ess-ta* 'left', IV  $\Rightarrow \lambda x \lambda e \lambda r [leave(x, e) \ \& \ e \prec r]$
  2. *John-i Ucna-ess-ta* 'John left', EAb  $\Rightarrow \lambda e \lambda r [leave(j, e) \ \& \ e \prec r]$
  3. *eccy* 'yesterday', MTA  $\Rightarrow \lambda P \lambda e \lambda r [gest(e) \ \& \ P(e)(r)]$
  4. *Eccy John-i Ucna-ess-ta*, EAb  $\Rightarrow$   
 $\lambda e \lambda r [gest(e) \ \& \ leave(j, e) \ \& \ e \prec r]$
  5. *Eccy John-i Ucna-ess-ta*, RAb (after  $\exists$ -closure)  $\Rightarrow$   
 $\lambda r \exists e [leave(j, e) \ \& \ e \prec r]$
  6. *Eccy John-i Ucna-ess-ta*, t (after the matrix rule)  $\Rightarrow$   
 $\exists e [leave(j, e) \ \& \ e \prec s]$

### 5.3.1 Complement Clauses

The relativity of tense in complement clauses can be captured when we assume following Smith (1978) that the event time of the main clause is also the reference time of the embedded clause. This can be done in our framework by specifying in the denotation of verbs of propositional attitude that the event time is fed into the complement as argument. For instance, we propose (27) as the denotation of *nukki-ess-ta* 'felt'. We can derive (1) below with an additional rule which will combine a transitive verb with a complement clause. Assuming this rule, we will arrive at the translation in (28) for (1):

- (1) *John-i Mary-ka ucna-ess-tako nukki-ess-ta.*  
John-NOM Mary-NOM leave-PAST-COMP feel-PAST-DEC  
'John felt that Mary had left.'
- (27) *nukki-ess-ta* 'felt'  $\Rightarrow \lambda P \lambda x \lambda e \lambda r [feel(x, P(e), e) \ \& \ e \prec r]$
- (28)
1. *Mary-ka ucna-ess-tako*  $\Rightarrow \lambda r \exists e' [leave(m, e') \ \& \ e' \prec r]$
  2. *Mary-ka ucna-ess-tako nukki-ess-ta*  $\Rightarrow$   
 $\lambda x \lambda e \lambda r [feel(x, \exists e' [leave(m, e') \ \& \ e' \prec e], e) \ \& \ e \prec r]$
  3. *John-i Mary-ka ucna-ess-tako nukki-ess-ta*  $\Rightarrow$   
 $\lambda e \lambda r [feel(j, \exists e' [leave(m, e') \ \& \ e' \prec e], e) \ \& \ e \prec r]$

4. *John-i Mary-ka ucna-ess-tako nukki-ess-ta* (after  $\exists$ -closure)  $\Rightarrow$   
 $\lambda r \exists e [feel(j, \exists e' [leave(m, e') \ \& \ e' \prec e], e) \ \& \ e \prec r]$
5. *John-i Mary-ka ucna-ess-tako nukki-ess-ta* (after the matrix rule)  $\Rightarrow$   
 $\exists e [feel(j, \exists e' [leave(m, e') \ \& \ e' \prec e], e) \ \& \ e \prec s]$

We should point out that a simpler translation for *nukki-ess-ta* 'felt' like (29), where the event variable  $e$  is not fed into the embedded proposition, does not capture relativity of tense, though this is often assumed to work properly (cf. Stump 1985:124-125, Ogihara 1992:135).

$$(29) \text{ nukki-ess-ta 'felt' } \Rightarrow \lambda p \lambda x \lambda e \lambda r [feel(x, p, e) \ \& \ e \prec r]$$

For instance, Ogihara proposes (31) as the truth conditions for the Japanese sentence (30), which exhibits the same type of relativity of tense as Korean: the embedded sentence is in the present tense but interpreted as past, since its superordinate clause is in the past tense.

- (30) *John-wa Mary-ga byookid-a to it-ta.*  
John-TOP Mary-NOM ill-PRES COMP say-PAST  
'John said that Mary was ill.'

$$(31) \exists t' [past(t') \ \& \ AT(t', say(j, \exists t [pres(t) \ \& \ AT(t, ill(m))]))]]$$

Notice that in the formula (31) the time  $t$  is independent of  $t'$ . Since a proposition is a set of indices within this framework,  $[\exists t [pres(t) \ \& \ AT(t, ill(m))]]$  will be interpreted as the same regardless of what index the expression is evaluated at.

One implication from our analysis of complement clauses is that there should be no tense directly related to the speech time in Korean. In particular, it is expected that Korean cannot have so-called 'double accessibility readings' (cf. Abusch 1988 and Eng 1987). In English a sentence like (32a) is claimed to have a double accessibility

reading in that Mary was pregnant at the time of John's saying and moreover that Mary is pregnant at the speech time. However, since every tense is relative to its next higher clause in Korean, it is predicted that there is no double accessibility reading in (32b). Under our analysis, the sentence (32b) will be assigned the truth conditions in (33). This is supported by the facts: it can only mean that Mary was pregnant at the time of John's saying.

(32) a. John said that Mary is pregnant.

b. John-i Mary-ka imsinwung-i-lako malha-ess-ta.  
 John-NOM Mary-NOM pregnant-is-COMP say-PAST-DEC  
 'John said that Mary was pregnant.'

(33)  $\exists c[say(j, \exists c'[pregnant(m, c') \ \& \ c' \neq c], c) \ \& \ c \prec s]$

### 5.3.2 Relative Clauses

Relative clauses are crucially distinguished from complement clauses in that tenses within relative clauses can be independent of those in their higher clauses. A sentence like (34) has two readings as indicated. The two readings can be described in theoretical terms by saying that the nonpast tense of the relative clause is relative to the matrix event in the (a) reading but to the speech time in the (b) reading.

(34) John-i Seoul-ey ka-nu-un salam-ul chach-ess-ta.  
 John-NOM Seoul-to go-NONPAST-REL person-ACC seek-PAST-DEC  
 a. 'John sought a person who was going to Seoul (at the time of his seeking).'  
 b. 'John sought a person who is going to Seoul.'

These two kinds of readings for a sentence like (34) are commonly differentiated as *de dicto* and *de re*: (34a), a *de dicto* reading in which John sought whoever meets

the description, and (34b), a *de re* reading in which John sought a certain person and the description for the person is given by the speaker.

What is crucial in a relative clause construction is the fact that the *de re* vs. *de dicto* distinction is correlated with the relativity of tense in the clause, as observed by Kang (1988) as well. Thus, if a relative clause receives a *de dicto* interpretation, the tense in the relative clause is relative to the event time of its immediately higher clause. Conversely, if a relative clause is interpreted as *de re*, its tense is relative to the speech time. For example, in the *de dicto* reading of (34), glossed as (34a), the time of going to Seoul is nonpast relative to the time of seeking. Therefore, the time of going to Seoul can be before the speech time in this reading (but also can be after the speech time). On the other hand, the time of going to Seoul is nonpast relative to the speech time in the *de re* reading of (34), glossed in (34b). Hence, the time of going to Seoul cannot be prior to the speech time. In this case the tenses are independent of each other.

Most approaches handle the *de re* vs. *de dicto* distinction by resorting to scopal differences between the readings, cf. the Quantifying-In rule in PTQ or its variants, Quantifier Store, Quantifier Raising, etc. Thus, as Ladusaw (1977) does for English tense, it seems a natural move to propose a quantification rule of some sort in order to account for this. In fact, Kang (1988) proposes Quantifier Store and Park and Han (1993) propose a Quantifier Raising approach for Korean in this regard.

It will be shown how our approach works to capture the available readings in a consistent way. First, we will adopt the standard view that a relative clause modifies

its head noun of a common noun (CN) category and that a determiner applies to the resulting expression of a CN category to become an expression of an NP category. Thus, we propose (35) and (36) as respective translations for the CN *Seoul-ey ka-nun salam* 'person who goes to Seoul' and the NP *Seoul-ey ka-nun salam* 'a person who goes to Seoul'.<sup>3</sup> The denotation of the optional determiner *enu* 'a' is given in (37) for reference.

(35) *Seoul-ey ka-nun salam* 'person who goes to Seoul'  $\Rightarrow$   
 $\lambda x \lambda r [person(x) \ \& \ \exists e_1 [go.to.Seoul(x, e_1) \ \& \ e_1 \prec r]]$

(36) *Seoul-ey ka-nun salam* 'a person who goes to Seoul'  $\Rightarrow$   
 $\lambda Q \lambda c \lambda r \exists x [person(x) \ \& \ \exists e_1 [go.to.Seoul(x, e_1) \ \& \ e_1 \prec r] \ \& \ Q(x)(c)(r)]$

(37) *enu* 'a'  $\Rightarrow$   $\lambda P \lambda Q \lambda c \lambda r \exists x [P(x)(r) \ \& \ Q(x)(c)(r)]$

Let us assume a standard Quantifier Storage system of Cooper (1975) in which quantificational NPs are stored to be retrieved later in the derivation. The truth conditions in (39) are obtained when the denotation of the object NP is directly applied to the denotation of the verb *chach-css-ta* at that level. On the other hand, if we retrieve the object NP denotation at the sentential level, we will get (40). Note that in (39) the formula  $e_1 \prec e$  reflects the fact that the event of going to Seoul,  $e_1$ , is nonpast relative to the event of seeking,  $e$ . In (40) the event  $e_1$  is specified to be nonpast relative to the speech time. Thus, the facts in relative clauses are adequately captured under our analysis.

<sup>3</sup>Note that some determiners like *enu* 'some/a' are optional in Korean. This is why the same string in (35) and (36) is assigned two different categories and translations.

(38) *chach-css-ta* 'sought'  $\Rightarrow$   
 $\lambda \varphi \lambda x \lambda c \lambda r [seek(x, \lambda r [\lambda Q \lambda c_0 \varphi(Q)(c_0)(r)])(c), c) \ \& \ e \prec r]$

(39)  $\exists e [seek(j, \lambda Q \lambda c_0 \exists x [person(x) \ \& \ \exists e_1 [go.to.Seoul(x, e_1) \ \& \ e_1 \prec e] \ \& \ Q(x)(c_0)(e)], c) \ \& \ e \prec s]$

(40)  $\exists c \exists x [person(x) \ \& \ \exists c_1 [go.to.Seoul(x, c_1) \ \& \ c_1 \prec s] \ \& \ seek_e(j, x, e) \ \& \ e \prec s]$

### 5.3.3 Nontemporal Adverbial Clauses

We propose (41) as a general schema for denotations of subordinating conjunctions: a subordinating conjunction is viewed as a functor which is applied to a subordinate clause and then to the main clause. In doing so, it also relates the event time of the matrix with the reference time of the subordinate clause, capturing the relativity of tense in the subordinate clause. The relation  $R$  refers to the semantic content of a given subordinating conjunction.

(41) **Denotation Schema for Subordinating Conjunctions:**

$\lambda P \lambda Q \lambda c \lambda r \exists c_1 [P(c_1)(c) \ \& \ R(c_1, c) \ \& \ Q(c)(r)]$

Accordingly, the subordinating conjunction *nikka* 'because' is assigned the truth conditions in (42).

(42)  $\lambda P \lambda Q \lambda c \lambda r \exists c_1 [P(c_1)(c) \ \& \ causet(c_1, c) \ \& \ Q(c)(r)]$

They will provide the respective sentences in (6) the truth conditions (43) and (44). Notice that the relativity of tense is captured in both truth conditions; the subordinate clause event  $e_1$  is past in (43) and nonpast in (44), but both relative to  $c$ , the event time of the matrix clause.

- (6) a. Nun-i o-ess-nikka kil-i mikkulep-ess-ta.  
 snow-NOM come-PAST-because road-NOM slippery-PAST-DEC  
 'The road was slippery because it had snowed.'  
 b. Nun-i o-nikka kil-i mikkulep-ess-ta.  
 snow-NOM come-because road-NOM slippery-PAST-DEC  
 'The road was slippery because it was snowing.'

(43)  $\exists c \exists e_1 [snow.come(e_1) \ \& \ e_1 \prec e \ \& \ cause(e_1, e) \ \& \ slippery(the.road, e) \ \& \ e \prec s]$

(44)  $\exists c \exists e_1 [snow.come(e_1) \ \& \ e_1 \not\prec e \ \& \ cause(e_1, e) \ \& \ slippery(the.road, e) \ \& \ e \prec s]$

### 5.3.4 Temporal Adverbial Clauses

Let us now proceed to the treatment of temporal adverbial clauses, our main topic in this chapter. A note is in order here with respect to compositionality. If our concern were to only get the semantics right, it would serve our purposes reasonably well to use the schema for subordinating conjunctions proposed above for the denotations. Thus, we might propose (45) as denotations of *-ul ttay* 'when'.

- (45) *-ul ttay(-ey)* 'when'  $\Rightarrow$   
 $\lambda P \lambda Q \lambda c \lambda r \exists e_1 [P(e_1)(e) \ \& \ e_1 \approx_t e \ \& \ Q(e)(r)]$

Recall, however, that most temporal adverbial clauses including *-ul ttay* adverbials are based on the relative clause construction. Even though no semantic difference will arise between (45) and the ones to be proposed below, we will take the syntactic structure into account in proposing our semantics for temporal adverbials.

The denotations for some head nouns are proposed in (46); the meaning of *hwu* 'afterward' is a set of (event) times which are later than some specific (event) time; likewise, the meaning of *ttay* 'time' is a set of (event) times which are about the same

(event) time as some specific (event) time. Notice that each denotation contains a free variable:

- (46) a. *hwu* 'afterward', CN  $\Rightarrow \lambda c [c_0 \prec c]$   
 b. *ttay* 'time', CN  $\Rightarrow \lambda c [c \approx_t c_0]$  (N.B.  $c_0$  is a free variable)  
 c. the proximity relation  $\approx_t$  is defined such that  
 $c \approx_t e_0$  iff  
 (i)  $c \circ e_0$  or  
 (ii) they are immediately adjacent (i.e. no interval between them)

The definition of the temporal proximity relation  $\approx_t$  follows in spirit Stump's (1985) *when* in English in the sense that the relation indicates 'about the same time' rather than 'exactly the same time'. We will assume without discussion that a relative clause specifies about the free variables in the head noun, e.g.  $c_0$  in (46a,b), thus indirectly constraining the set of times its head noun denotes. More specifically, we assume the approach proposed in Yoon (1993) in allowing the relativizer *un* and *ul* to make certain that the free variable is coindexed with the variable of which the relative clause is predicative. For example, the head noun *hwu* 'afterward' combines with the EAb (48) below by way of the relativizer *un*, resulting in (49a) of a TA category. Notice that in (49a) below there is no free variable. The complex temporal adverbials like (49b,c) are derived in the same manner:

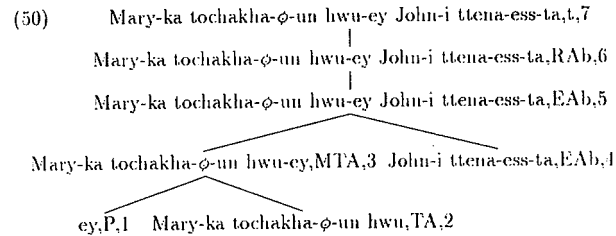
- (47) Mary-ka tochakha- $\phi$   
 Mary-NOM arrive-PAST  
 'Mary arrived'  
 (48) *Mary-ka tochakha- $\phi$* .EAb  $\Rightarrow \lambda e_1 \lambda r [arrive(m, e_1) \ \& \ e_1 \prec r]$   
 (49) a. *Mary-ka tochakha- $\phi$ -un hwu* 'a time after Mary arrived'  
 $\Rightarrow \lambda c \lambda r \exists e_1 [e_1 \prec c \ \& \ arrive(m, e_1) \ \& \ e_1 \prec r]$

- b. *Mary-ka tochakha-ess-ul ttay* 'the time when Mary arrived'  
 $\Rightarrow \lambda e \lambda r \exists e_1 [c_1 \approx_t c \ \& \ arrive(m, e_1) \ \& \ e_1 \prec r]$
- c. *Mary-ka tochakha-ul ttay* 'the time when Mary is arriving/arrives'  
 $\Rightarrow \lambda e \lambda r \exists e_1 [c_1 \approx_t c \ \& \ arrive(m, e_1) \ \& \ e_1 \not\prec r]$

Now we are in a position to give a derivation for a sentence with a complex temporal adverbial like (16), repeated here. Once we make the above assumptions, the derivational steps are essentially the same as the ones with simple temporal adverbials.

- (16) *Mary-ka tochakha-φ-un hwu-(cy) John-i ttena-ess-ta.*  
 Mary-NOM arrive-PAST-REL later.time-at John-NOM leave-PAST-DEC  
 'John left after Mary arrived.'

The syntactic and the semantic derivations are given in (50) and (51), respectively:



- (51)
1. *cy* 'at',POST  $\Rightarrow \lambda P \lambda Q \lambda e \lambda r [P(e)(c) \ \& \ Q(e)(r)]$
  2. *Mary-ka tochakha-φ-un hwu* 'a time after Mary arrived',TA  
 $\Rightarrow \lambda e \lambda r \exists e_1 [e_1 \prec c \ \& \ arrive(m, e_1) \ \& \ e_1 \prec r]$
  3. *Mary-ka tochakha-φ-un hwu-ey* 'after Mary arrived',MTA  $\Rightarrow$   
 $\lambda Q \lambda e \lambda r [\exists e_1 [e_1 \prec c \ \& \ arrive(m, e_1) \ \& \ e_1 \prec e] \ \& \ Q(e)(r)]$
  4. *John-i ttena-ess-ta* 'John left',EAb  $\Rightarrow \lambda e \lambda r [leave(j, e) \ \& \ e \prec r]$
  5. EAb  $\Rightarrow \lambda e \lambda r [\exists e_1 [e_1 \prec e \ \& \ arrive(m, e_1) \ \& \ e_1 \prec e] \ \& \ [leave(j, e) \ \& \ e \prec r]]$   
 $\Rightarrow \lambda e \lambda r [\exists e_1 [e_1 \prec c \ \& \ arrive(m, e_1) \ \& \ [leave(j, e) \ \& \ e \prec r]]]$  (by identity)
  6. RAb  $\Rightarrow \lambda r \exists e [\exists e_1 [e_1 \prec c \ \& \ arrive(m, e_1) \ \& \ [leave(j, e) \ \& \ e \prec r]]]$
  7. t  $\Rightarrow \exists e [\exists e_1 [e_1 \prec c \ \& \ arrive(m, e_1) \ \& \ [leave(j, e) \ \& \ e \prec s]]]$

If we consider the final step in (51), it is easy to see that Mary's arriving time is prior to John's leaving time, as desired.

Recall at this point that the *hwu*-adverbial allows only the past tense; it was observed in (17), repeated below, that the nonpast tense is unacceptable. Given the rules proposed above, we are able to explain why (17) is unacceptable. Applying almost the same set of rules as in (50), we get the truth conditions in (52) for (17):

- (17) #*Mary-ka tochakha-nu-un hwu-(cy) John-i ttena-ess-ta.*  
 Mary-NOM arrive-NONPAST-REL later.time-at John-NOM  
 ttena-ess-ta.  
 leave-PAST-DEC  
 (intended) 'John left after Mary was arriving.'

- (52)  $\exists c_0 [leave(j, c_0) \ \& \ c_0 \prec s \ \& \ \exists e_1 [e_1 \prec e_0 \ \& \ arrive(m, e_1) \ \& \ e_1 \not\prec c_0]]$

Then, it is easy to see that (52) is a contradiction: (a)  $c_1$  is nonpast relative to  $c_0$ , thus  $e_1 \not\prec c_0$ ; (b) also there is a formula  $c_1 \prec c_0$ .

Now let us move on to *-ul ttay*-adverbials. By the standard applications of the rules, we will get (53) and (54) as the truth conditions for (4) and (7), respectively:

- (4) *Mary-ka tochakha-φ-ul ttay John-i ttena-ess-ta.*  
 Mary-NOM arrive-NONPAST-REL time John-NOM leave-PAST-DEC  
 'John left when Mary was arriving.'
- (53)  $\exists c_0 [leave(j, c_0) \ \& \ c_0 \prec s \ \& \ \exists e_1 [c_1 \approx_t c_0 \ \& \ arrive(m, e_1) \ \& \ e_1 \not\prec c_0]]$
- (7) *Mary-ka tochakha-ess-ul ttay John-i ttena-ess-ta.*  
 Mary-NOM arrive-PAST-REL time John-NOM leave-PAST-DEC  
 'John left when/immediately after Mary arrived.'
- (54)  $\exists c_0 [leave(j, c_0) \ \& \ c_0 \prec s \ \& \ \exists e_1 [c_1 \approx_t c_0 \ \& \ arrive(m, e_1) \ \& \ e_1 \prec c_0]]$



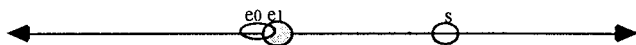


Figure 1: Temporal Relations for (52)

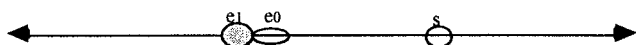


Figure 2: Temporal Relations for (54)

As one can easily verify, these truth conditions coincide exactly with the readings we discussed above. Let us first take (53). We know from (53) that (a) the leaving event  $e_0$  is past relative to the speech time, (b) the arriving event  $e_1$  is nonpast relative to  $e_0$ , and further (c)  $e_1 \approx_t e_0$ . Thus, it follows that the leaving time and the arriving time cannot be remotely separated from each other. Figure 1 represents the relations between the times involved in (53):

If we take (54) on the other hand, we know that (a) the leaving event  $e_0$  is past relative to the speech time, (b) the arriving event  $e_1$  is past relative to the event  $e_0$ , and (c)  $e_1 \approx_t e_0$ . The diagram (55) represents the relations which satisfy these conditions. Notice in (55) that  $e_0$  and  $e_1$  are not separated. Moreover,  $e_1$  is immediately before  $e_0$ . Therefore it is explained why this sentence describes the immediate precedence relation.

### 5.3.5 Iteration of Temporal Adverbials

Besides being able to account for most facts about temporal adverbials, we can also allow temporal adverbials to iterate, an attractive feature in Stump (1985). We derive (55) as in (56) without an addition of rules. (57) is the derived truth conditions for (55):

- (55) Caknyen-ey Mary-ka tochakha-ess-ul ttay(-ey) John-i  
last.year-at Mary-NOM arrive-PAST-REL time-at John-NOM  
ttena-ess-ta.  
leave-PAST-DEC

'Last year John left when Mary had arrived.'

- (56) Caknyen-ey ... John-i ttena-ess-ta,t  
Caknyen-ey ... John-i ttena-ess-ta,RAb  
Caknyen-ey ... John-i ttena-ess-ta,EAB  
caknyen-ey,MTA Mary-ka ... ttena-ess-ta,EAB  
Mary-ka ... ttay-ey,MTA John-i ttena-ess-ta,EAb  
cy,P Mary-ka tochakha-ess-ul ttay,TA

- (57)  $\exists e_0[\text{last.year}(e_0) \ \& \ \text{leave}(j, e_0) \ \& \ e_0 \prec s \ \& \ \exists e_1[e_1 \approx_t e_0 \ \& \ \text{arrive}(m, e_1) \ \& \ e_1 \prec e_0]]$

Let us now take more complicated examples which involve more than one temporal adverbial clause. In particular, we hope to account for the onion effects discussed in Chapter 2.

It has been observed about multiple temporal adverbial clauses that the orders of adverbials affect readings involving them. For example, Roberts (1994) maintains

that (58), with non-parenthetical intonation of the second temporal adverbial clause, is not synonymous with (59), though the only difference between the two sentences is the orders of the adverbial clauses. Korean examples show the same fact; but both of the adverbials have to appear before the main verb, due to a syntactic constraint requiring the main verb to appear in the sentence final position.

(58) When Joan was in Kansas City, she took a walk after she gave her talk.

Joan-i Kansas-ey iss-ulttay, palphyo-lul ha-unhwu,  
 Joan-NOM Kansas-in exist-when presentation-ACC do-after  
 sanchayha-ess-ta  
 take.a.walk-PAST-DEC

'When Joan was in Kansas City, she took a walk after she gave her talk.'

(59) After Joan gave her talk, she took a walk when she was in Kansas City.

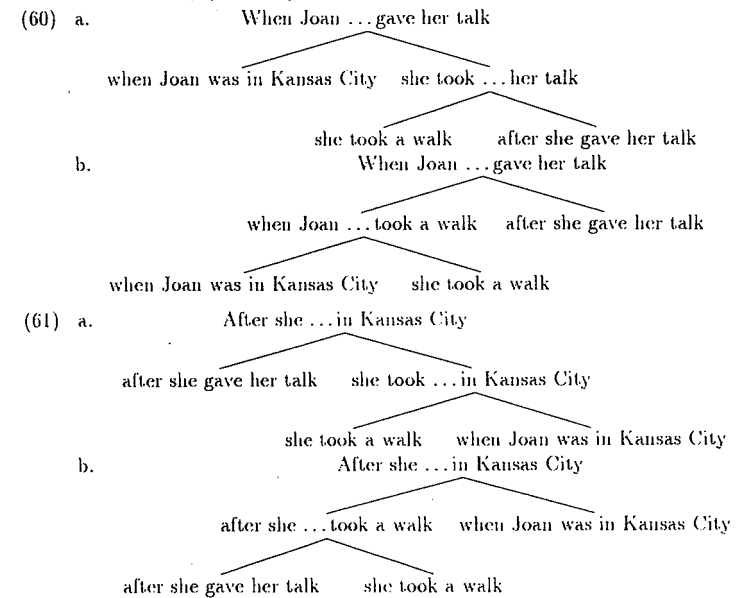
Joan-i palphyo-lul ha-unhwu, Kansas-ey iss-ulttay,  
 Joan-NOM presentation-ACC do-after Kansas-in exist-when  
 sanchayha-ess-ta  
 take.a.walk-PAST-DEC

'After Joan gave her talk, she took a walk when she was in Kansas City.'

According to her, (58) implicates that Joan gave her talk, and took her walk, while in Kansas City, whereas we assume that in (59) Joan went to Kansas City, where she took a walk, after she gave her talk. Thus, if Joan gave her talk in some city other than Kansas City, the situation can be described correctly by (59), but not by (58). This is a case where linear precedence affects scope relations between temporal adverbial clauses in such a way that a preceding clause has a wider scope than a following one.

This is potentially a problem for approaches, like the one we are proposing, which (a) do not allow the notion of discontinuous constituents and (b) are essentially in-

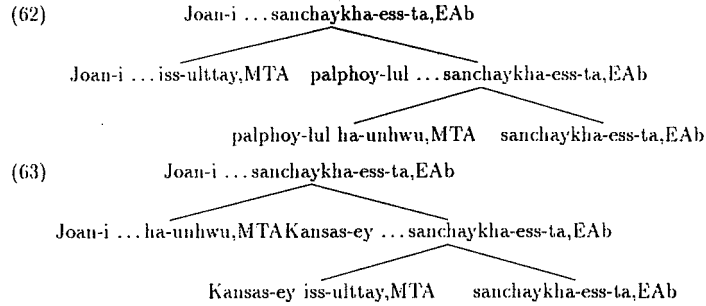
tersective in relations between temporal adverbials in a sentence. In other words, our approach would not be able to distinguish between the English sentences above; (58) would be derived by the respective derivations steps in (60a) or (60b), whereas (59) would be derived by (61a) or (61b).



The point is that all these derivations would lead to the same truth conditions under our approach.

Likewise, the corresponding Korean sentences will not be assigned two distinctive truth conditions under the analysis. If we assume that adjacent adverbials combine

with the matrix first, the Korean sentences in (58) and (59) above will be derived by the steps shown in (62) and (63) respectively.



Accordingly, they are assigned the same truth conditions in (64).

$$(64) \exists e_0, c_1, e_2 [in.Kansas(j, c_1) \ \& \ c_1 \approx_t e_0 \ \& \ c_1 \neq e_0] \ \& [e_2 \prec e_0 \ \& \ talk(j, e_2)] \ \& [walk(j, e_0) \ \& \ e_0 \prec s]$$

However, the Korean adverbial clauses can be plausibly regarded as one constituent for two reasons. First, they are not discontinuous unlike the English examples. Second, subordinating conjunctions come at the end of subordinate clauses in Korean; therefore, when there are two subordinate clauses followed by a matrix clause like the above examples, the first clause can be taken to modify the second subordinate clause, then they together, as a constituent, modify the matrix clause. For example, the sequence of the clauses in (65) can be analyzed in two ways: (66a) or (66b).

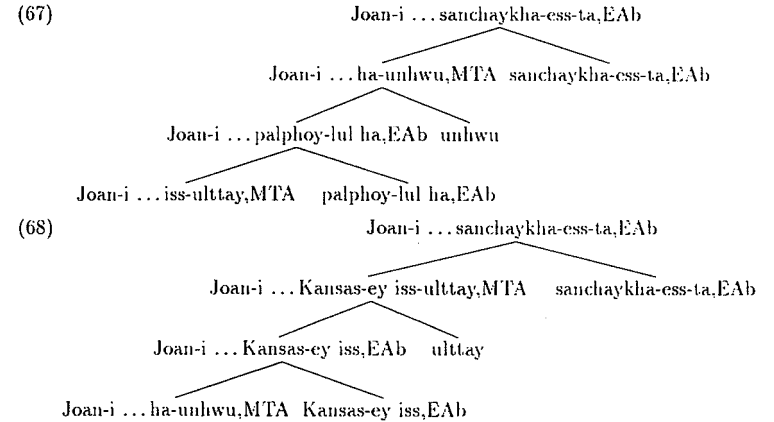
$$(65) \alpha + \text{subordinator} \quad \beta + \text{subordinator} \quad \gamma \text{ (matrix clause)}$$

$$(66) \text{ a. } [\alpha + \text{subordinator} \quad \beta + \text{subordinator} \quad \gamma]$$

$$\text{ b. } [[\alpha + \text{subordinator} \quad \beta] + \text{subordinator} \quad \gamma]$$

Notice that if the sequence is analyzed in the way represented by (66a), the order between  $\alpha$ +subordinator and  $\beta$ +subordinator is not semantically significant in our system. But if we adopt the analysis in (66b), the order is crucial in semantic interpretations.

Thus, we will assume that both analyses are possible in Korean. Then, we can capture the difference in meaning between (58) and (59) by proposing the derivations sketched in (67) and (68).



They will be assigned the truth conditions in (69) and (70) respectively:

$$(69) \exists e_0, c_1, e_2 [walk(j, e_0) \ \& \ e_0 \prec s \ \& \ in.Kansas(j, c_1) \ \& \ c_1 \approx_t e_2 \ \& \ c_1 \neq e_2 \ \& \ talk(j, e_2) \ \& \ e_2 \prec e_0]$$

- (70)  $\exists e_0, e_1, e_2 [walk(j, e_0) \ \& \ e_0 \prec s \ \& \ [talk(j, e_2) \ \& \ e_2 \prec e_1 \ \& \ in.Kansas(j, e_1) \ \& \ e_1 \approx_t e_0 \ \& \ e_1 \not\prec e_0]]$

Note that the different readings can be captured by these truth conditions. The relevant temporal relations between the events can be represented in a simple form in (71). According to the relations in (71a), the event of giving a talk,  $e_2$ , can be temporally included in the event of being in Kansas City,  $e_1$ . On the other hand, according to (71b) the same event  $e_2$  has to precede the event of being in Kansas City  $e_1$ .

- (71) a.  $e_1 \approx_t e_2 \ \& \ e_1 \not\prec e_2 \ \& \ e_2 \prec e_0$   
 b.  $e_2 \prec e_1 \ \& \ e_1 \approx_t e_0 \ \& \ e_1 \not\prec e_0$

Though we can account for the onion effects in Korean without employing other methods, this does not guarantee that our approach can be equally applied to other languages like English. It is only that other more complicated mechanisms are not called for to capture the onion effects in Korean because of some syntactic facts with respect to constituent structure. In order to handle the onion effects in languages like English, one may need an approach like that proposed in Roberts (1994).

#### 5.4 The Puzzle: Neutralization of Relativity

While we have been able to account for most of the facts that temporal adverbials exhibit with respect to the relativity in tense, there still remains a puzzle: why do we get no difference in meaning between (8) and (9), repeated below, despite the

difference in tense in the temporal adverbials? Moreover, why is this limited only to atelic predicates?

- (8) Mary-ka aphu- $\phi$ -ul ttay John-i ttena-ess-ta.  
 Mary-NOM sick-NONPAST-REL time John-NOM leave-PAST-DEC  
 'John left when Mary was sick.'  
 (9) Mary-ka aphu-ess-ul ttay John-i ttena-ess-ta.  
 Mary-NOM arrive-PAST-REL time John-NOM leave-PAST-DEC  
 'John left when Mary was sick.'

An essentially same observation was made in S. Choi (1987:51–53) with respect to the connective *taka*. He notes that the presence of *-ess* does not add to the meaning in an atelic clause. Thus, the pairs of sentences in (72) and (73) are understood as the same.

- (72) a. Hanul-i malk- $\phi$ -taka huli-ess-ta.  
 sky-NOM clean-NONPAST-CONN cloudy-PAST-DEC  
 'The sky was clear and then got cloudy.'  
 b. Hanul-i malk-ess-taka huli-ess-ta.  
 sky-NOM clean-PAST-CONN cloudy-PAST-DEC  
 (73) a. Chelswu-ka cansi kitali- $\phi$ -taka  
 Chelswu-NOM moment wait-NONPAST-CONN  
 swuhwaki-lul noh-ess-ta.  
 phone put.down-PAST-DEC  
 'Chelswu waited for a while and then hung up the phone.'  
 b. Chelswu-ka cansi kitali-ess-taka  
 Chelswu-NOM moment wait-PAST-CONN  
 swuhwaki-lul noh-ess-ta.  
 phone put.down-PAST-DEC

A similar phenomenon has been reported in Japanese too, (cf. Kuno 1973, Soga 1983, Nakazawa 1985). The examples in (74) are from Soga (1983:71) which give the same meaning, even though (74a) and (74b) have different tenses in the temporal adverbial clauses.

- (74) a. *Kyonen Yokohama-ni iru-toki Tanaka-san-ni aw-ta.*  
 last.year Yokohama-in am-when Mr.Tanaka-CASE met  
 'When I was in Yokohama last year, I met Mr. Tanaka.'
- b. *Kyonen Yokohama-ni ita-toki Tanaka-san-ni aw-ta.*  
 last.year Yokohama-in was-when Mr.Tanaka-CASE met  
 'When I was in Yokohama last year, I met Mr. Tanaka.'

A viable answer to this puzzle seems to be found when we consider the pragmatics as well as the semantics of the predicates involved. We claim that (8) and (9) are distinct in truth conditions. We believe that they are **asserted differently but understood as the same** in Dowty's (1986) words. Thus, our proposal is that they do have two different truth conditions (75) and (76), as provided by our rules:

$$(75) \exists e_0 [lcaec(j, e_0) \ \& \ e_0 < s \ \& \ \exists e_1 [e_1 \approx_t e_0 \ \& \ sick(m, e_1) \ \& \ e_1 \neq e_0]]$$

$$(76) \exists e_0 [lcaec(j, e_0) \ \& \ e_0 < s \ \& \ \exists e_1 [e_1 \approx_t e_0 \ \& \ sick(m, e_1) \ \& \ e_1 < e_0]]$$

In (75) and (76) neither entails the other as the only difference between them is the precedence relation. When we consider the relations between the times, the diagrams in Figure 3 below satisfy the conditions in (75) and (76), respectively. The question comes down to asking why the situation depicted by Figure 3.b is understood as the same situation depicted by Figure 3.a and why it is so exclusively when the predicate is atelic.

Before we make any judgement, let us consider parallel cases in other environments. First, let us take a look at (77), where the matrix predicate is atelic. Suppose in Figure 4 below that (a) *s* is the speech time, (b) *e<sub>0</sub>* is the time of being five, and (c) *e<sub>1</sub>* is the time of the death. Then, Figure 4.a will satisfy the truth conditions for

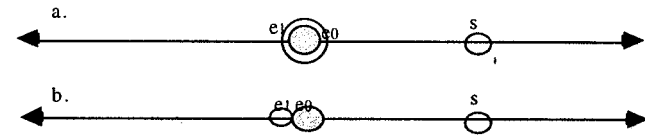


Figure 3: Temporal Relations for (75) and (76), (in that order)

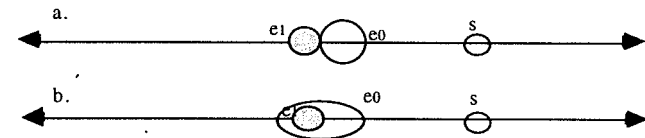


Figure 4: Temporal Relations for (77)

(77). However, the situation depicted by Figure 4.b is what we take the sentence (77) to mean.

- (77) *Apeci-ka tola ka-si-ess-ul ttay John-i*  
 father-NOM back go-HON-PAST-REL time John-NOM  
*tases-sal-i-ess-ta.*  
 five-year-is-PAST-DEC  
 'John was five when his father passed away.'

Another parallel case is found in simple sentences like (78) and (79). In these cases we have relevant relations between only two times: the speech time *s* and the time of sleeping *e<sub>0</sub>* in Figure 5a,b. Given our rules, the truth conditions of (78) and (79) are described correctly by Figure 5.a and Figure 5.b, respectively. However, both sentences are often understood to describe the situation properly represented by Figure 5.a, rather than by Figure 5.b:

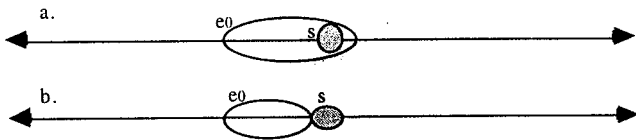


Figure 5: Temporal Relations for (78) and (79), (in that order)

- (78) Mary-ka achim-pwuthe ca-nun-ta.  
 Mary-NOM early.morning-from sleep-NONPAST-DEC  
 'Mary has been sleeping since early this morning.'
- (79) Mary-ka achim-pwuthe ca-ess-ta.  
 Mary-NOM early.morning-from sleep-PAST-DEC  
 'Mary has been sleeping since early this morning.'

One generalization from the three different sets of data is that the event time of an atelic predicate expands to contain overlapping or adjacent times. Moreover, what is special about complex temporal adverbials in the *-ul ttay* construction is that they always provide this kind of environment. Let us also emphasize that this generalization is about only atelic predicates. A natural move, then, seems to look for a clue in the distinction between telic and atelic predicates. Let us consider Dowty's summary of the defining criteria of three classes of predicates in (80):

- (80) A defining criteria of three aspectual classes of predicates (from Dowty 1986:42):
- A sentence  $\phi$  is stative iff it follows from the truth of  $\phi$  at an interval  $i$  that  $\phi$  is true at all subintervals of  $i$ .
  - A sentence  $\phi$  is an activity iff it follows from the truth of  $\phi$  at an interval  $i$  that  $\phi$  is true of all subintervals of  $i$  down to a certain limit in size.
  - A sentence  $\phi$  is an accomplishment/achievement iff it follows from the truth of  $\phi$  at an interval  $i$  that  $\phi$  is false at all subintervals of  $i$ .

According to (80), an atelic predicate, i.e. a stative or an activity, is distinguished from a telic predicate in that if an atelic sentence is true at an interval  $t$ , it is true of all subintervals of  $t$  up to a certain limit in size. Conversely, it follows from (80a,b) that if an atelic sentence is true at  $t$ , it can be true at a superinterval of  $t$ .

Thus, we now understand why an interval at which an atelic sentence is true has the potential to expand to a superinterval. What we do not understand is why we frequently utilize this potential. We claim that this expansion of intervals is a conversational implicature based on default assumptions about the predicate. First, let us recall that the expansion of intervals occurs only when there is another salient interval close to them. Moreover, recall that activity predicates with a short duration tend not to show the neutralization. Then, one plausible hypothesis is that there is a characteristic implicature with atelic predicates such that we assume an atelic state of affairs to continue at least for a while, unless otherwise specified. This hypothesis is consistent with the fact that the neutralization occurs more readily with activity predicates with a longer duration than ones with a shorter one, since our assumption of a continued state of affairs will be weakened for the latter. Moreover, this position is supported by the cancellable nature of the implicature. Consider (S1) and (S2), which are exactly like (4) and (7) above in that they describe the same situation even though they have different tenses:

- (S1) Mary-ka aphu- $\phi$ -ul ttay John-i yenayphyenci-lul  
 Mary-NOM sick-NONPAST-REL time John-NOM loveletter-ACC  
 han thong ssu-ess-ta.  
 one unit write-PAST-DEC  
 'John wrote a love letter when Mary was sick.'

- (S2) Mary-ka aphu-ess-ul ttay John-i yenayphyenci-lul  
 Mary-NOM sick-PAST-REL time John-NOM loveletter-ACC  
 han thong ssu-ess-la.  
 one unit write-PAST-DEC  
 'John wrote a love letter when Mary was sick.'

Notice that (S1) is bad but (S2) is good with the continuation (S3) in a context where John spent a long time writing the letter.

- (S3) Kulentey, phyenci-lul keyu kkethnay-ul cuum Mary-ka  
 however, letter-ACC almost finish-REL time Mary-NOM  
 aphu-ci anhkey toy-ess-la.  
 sick-INF not become-PAST-DEC  
 'However, Mary became not sick by the time he almost finished writing the letter.'

This result is borne out in our analysis: (S1) and (S3) are a contradictory sequence of sentences given their truthconditions, but (S2) and (S3) are compatible. In particular, (S3) specifically excludes the common implicature based on the nature of the atelic predicate.

However, this kind of implicature is not available for telic predicates. Dowty showed explicitly that the definition in (80c) above excludes the possibility that a telic sentence true at  $i$  can be true at  $i'$ , a superinterval of  $i$ . The logic is simple. Let us take the example in (S4) and suppose that it is true at  $i$ . Also suppose it is true at  $i'$ , a superinterval of  $i$ .

- (S4) John built a house.

Now we have the telic sentence in (S4) true at  $i'$ , and it is also true at  $i$ , a subinterval of  $i'$ . This contradicts the definition of telic predicates in (80c). By *reductio ad absurdum*, (S4) cannot be true at  $i'$ , if it is true at  $i$ .

## 5.5 Conclusion

Investigating temporal adverbial clauses which exhibit apparent partial relativity in tense in the system otherwise completely relative, we have explained why they appear to be partial in relativity. It was also revealed that atelic predicates are correlated with this partiality. Thus, this finding once again demonstrates that temporal relations are functions of aktionsarten.

Given that the facts in temporal adverbials are consistent with the general relativity of tense in Korean, we maintain that Korean is still a strictly relative tense language.

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