

Gapless Adnominal Clauses in Korean and their Interpretations *

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In Korean there are various gapless adnominal clauses. One common morpheme they share is the adnominalizer *-(u)n*. Assuming that only a relative clause has a gap that is coindexed with the adnominalizer, the meaning of a gapless adnominal clause is determined locally. A NP with an adnominal clause can denote an abstract thing like a situation, a fact or a proposition, except for so-called gapless relative clauses, which denote concrete things. A situation-denoting clause and a gapless relative clause allows no mood marker. A mood marker is required by a proposition-denoting clause, but optionally allowed in a fact-denoting clause. To explain the four meanings, I claim that a clause without a mood marker denotes a property of situations, separate from an event introduced by a verb. A mood marker converts a property of situations to a proposition. A fact is an extensional realization of the corresponding proposition.

Keywords: gapless adnominal clause, situation, fact, proposition, gapless relative clause

1. Introduction

In Korean, a clause precedes a noun with the adnominal ending *(u)n*, which I will call an adnominalizer.¹⁾ An adnominal clause can be interpreted in various ways:²⁾

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- 1) There is another adnominal ending *-(u)l*, which includes a modal meaning and is used to express futurity. It shows a limited distribution. The paper is focused on *-(u)n*.
- 2) In this paper I use the following abbreviations:
acc(usative case), adn(ominal ending), c(o)mp (lementizer), dec(larative mood), hor(ta-

- (1) a. Tom-i kaci-ko o-n sangca (typical relative clause)
 Tom-nom have-and come-adn box
 'a box that Tom brought'
- b. Tom-i o-n {saken, sasil} (situation, fact)
 Tom-nom come-adn {event, fact}
 'the {event, fact} of Tom's coming'
- c. Tom-i o-ass-ta-nun {sasil, cwucang} (fact, proposition)
 Tom-nom come-pst-dec-adn {fact, claim}
 'the {fact, claim} that Tom came'

A typical relative clause includes a gap and denotes a property of things that can fill the gap in it. On the other hand an adnominal clause may not have a gap. Such a structure optionally has a mood marker. With no mood marker, it can denote a situation or fact, and with a mood marker *-ta*, it can denote a fact or proposition. Matsumoto (1988, 1989, 1997) and Cha (1997, 2005) call such gapless adnominal clauses Noun Complement Clauses.

There are constructions that are called "gapless relative" clauses:

- (2) Tom-i sayngsen-ul kwup-nun naymsay
 Tom-nom fish-acc grill-adn smell
 'smell (you get if) Tom grills a fish'

The NP does not denote an abstract object like a situation, fact or proposition, but a thing, with no gap in the adnominal clause. The same construction is observed in Chinese and Japanese, too.³⁾ One property of this construction is that the NP denotes something closely related to the event described by the adnominal clause. There is a similar construction that denotes a place, time, instrument, etc, which is also closely related to the event described by an adnominal clause:

tive mood), imp(erative mood), imp(e)r(fective aspect), int(errogative mood), n(o)m(ina)l(izer), nom(inative case), p(a)st(tense), pl(ural marker), top(ic marker), etc.

3) See Murasugi (1991), Matsumoto (1997), etc. for Japanese gapless relative clauses, and see Tang (1979:243-289), Tsai (1997), Zhang (2007), etc. for Chinese ones.

- (3) Tom-i sayngsen-ul kwup-nun {cangso, sikan, cipkey}
 Tom-nom fish-acc grill-adn {place, time, clamp}
 ‘the {place, time, clamps} Tom grills a fish (with)’

To distinguish them, we need to look into their syntactic and semantic differences.

Ignoring typical relative clauses, we need to classify adnominal clauses by some tests.⁴⁾ First, as Cha (2005) pointed out, one test is the use of a mood marker. We have seen that it is allowed in adnominal clause denoting a proposition or fact. It is also allowed in adnominal clauses denoting place/time/instrument/..., but not in others:

- (4) Tom-i sayngsen-ul kwup-nun-ta-nun {cangso, sikan, cipkey}
 Tom-nom fish-acc grill-impr-dec-adn {place, time, clamp}
 ‘the {place, time, clamps} it is said that Tom grills a fish (with)’
- (5) a. ??Tom-i o-n-ta-nun saken (event)
 Tom-nom come-impr-dec-adn event
 ‘the event of Tom’s coming’
- b. ??Tom-i sayngsen-ul kwup-nun-ta-nun naymsay⁵⁾ (thing)
 Tom-nom fish-acc grill-impr-dec-adn smell
 ‘smell (you get if) Tom grills a fish’

Gapless relative clauses and adnominal clauses denoting time/place/instrument/... can be differentiated by this test.

Only adnominal clauses denoting time/place/instrument/... denote things associated with an embedded clause in them:

4) There are a couple of adnominal clauses that are not dealt with here: internally headed relative clauses and pseudoclefts. One common property they share is that even though *kes* normally denotes a property of inanimate things, a *kes*-phrase can even denote a human being in the two constructions. This is extremely exceptional and they need different analyses, which is beyond the scope of the paper.

5) One reviewer says that if the embedded clause is past tense, the example sounds better. To me it does not sound better, and I do not see any factor that changes the acceptability.

- (6) a. ??Tom-i sayngsen-ul kwup-nun-ta-ko sayngkaktoy-nun naymsay⁶⁾
 Tom-nom fish-acc grill-impr-dec-cmp be.thought-adn smell
 'smell that it is thought that (you get if) Tom grills a fish'
- b. ??Tom-i o-n-ta-ko sayngkaktoy-nun saken
 Tom-nom come-impr-dec-cmp be.thought-adn event
 'the event of Tom's being thought to be coming'
- c. Tom-i o-ass-ta-ko sayngkaktoy-nun {sasil, cwucang}
 Tom-nom come-pst-dec-cmp be.thought-adn {fact, claim}
 'the {fact, claim} that it is thought that Tom came'
- d. Tom-i sayngsen-ul kwup-nun-ta-ko sayngkaktoy-nun {cangso, sikan, cipkey}
 Tom-nom fish-acc grill-impr-dec-cmp be.thought-adn {place, time, clamp}
 'the {place, time, clamps} that it is thought that Tom grills a fish (with)'

In (6), an adnominal clause denoting a situation or a proposition, or a gapless relative clause must denote something related to the topmost clause. (6a) and (6b) are odd because the head nouns *naymsay* 'smell' and *saken* 'event' cannot be associated with the state of being thought. In (6c) the adnominal clause denotes a proposition denoted by the topmost clause, not one denoted by the embedded clause. In (6d), on the other hand, the place/time/instrument is regarded as that of the situation of Tom's grilling a fish, not that of being thought. Cha (2005) claims that the head noun can denote something that can be the source, method, manner, direction, possessive, reason, purpose, goal, topic, or cooperation in relation to the event introduced in the adnominal clause. But I suppose at least that when the head noun corresponds to a reason or purpose of the situation in the adnominal clause, the situation must be that of the topmost clause of the adnominal clause. Thus they behave like gapless relative clauses.

Finally, only adnominal clauses denoting a situation, fact, or proposition can modify the defective noun *kes*:⁷⁾

6) One reviewer says that if *-un-ta-ko* is replaced with *-un kes-i-la-ko*, the sentence becomes fine. But the alternative sentence is not relevant here because it is not a gapless relative clause. It has a subject gap in the complement clause and the embedded clause is an identity statement.

7) Some scholars claim that *kes* is a complementizer, without giving sufficient evidence. Lee (1975), Yang (1975), Jhang (1994), etc. Others call it a nominalizer. But its contribution is exactly like a common noun except for some semantic restriction.

- (7) a. Tom-i sayngsen-ul kwup-nun {naymsay, ??kes}-i/ka citokhay-ss-ta.
Tom-nom fish-acc grill-adn {smell, thing}-nom be.terrible-pst-dec
'The smell (you get if) Tom was grilling a fish was terrible.'
- b. Tom-i o-n {saken, kes}-ul mokkyekhay-ss-ta.
Tom-nom come-adn {event, thing}-acc witness-pst-dec
'I witnessed the event of Tom coming'
- c. Tom-i o-ass-ta-nun {sasil, cwucang, kes}-ul al/mit-ess-ta.
Tom-nom come-pst-dec-adn {fact, claim, thing}-acc know/believe-pst-dec
'I knew/believed the {fact, claim} that Tom came'
- d. Tom-i sayngsen-ul kwu-wun {cangso, sikan, tokwu, ??kes}-i/ka
Tom-nom fish-acc grill-adn {place, time, instrument, thing}-nom
{eti, encey, mwues}-i-nya?
{where, when, what}-be-int
'Where/When/What is the {place, time, instrument, thing} Tom grilled a fish (with)?'

Adnominal clauses that are supposed to denote a place/time/instrument cannot modify the noun *kes*. The meaning of *kes* is almost null, and it is expected to reflect the meaning of an adnominal clause without compromising with the meaning of the head noun.

The results of the tests can be summarized as follows:

(8)	mood marker	associate with embedded clause	use of <i>kes</i>
time/place/instrument	O	O	X
gapless rel. clause	X	X	X
fact/proposition	O	X	O
situation	X	X	O

It is expected that the meaning of an adnominal clause with a mood marker differs from that of an adnominal clause without one. Another factor is whether the meaning of an adnominal clause depends on the topmost clause or an embedded clause. And the use of *kes* can exclude the possibility that the head noun can affect the interpretation of an adnominal clause, though not completely. This implicates that all differences in their interpretations surface at the stage of interpreting the adnominal ending *-(u)n* together with a head noun. I will assume that all the different

interpretations are attributed to the interpretation of the adnominalizer, which is the focus of this paper.

The paper is organized as follows. In Section 2, I discuss how relative and non-relative clauses are distinguished and critically review previous analyses of adnominal clauses. In Section 3, I discuss how adnominal clauses that denote a situation, a proposition and a fact are interpreted. I also discuss the interpretation of gapless relative clauses. In Section 4, I wrap up the discussions in the paper.

2. Scope of Gapless Adnominal Clauses and Review of Previous Analyses

2.1. Scope of gapless adnominal clauses

In Korean one characteristic of a typical relative clause is that it is not subject to an island constraint:⁸⁾

- (9) $[[e_i e_j \text{ ssu-}n_j]$ *sose*-i *cal* *naka-nun_i] *cakka-nun* *inho-i-ta*.
 write-adn novel-nom well go.out-adn author-top Inho-be-dec
 ‘The author who the novel that he wrote it sells well is Inho.’*

The same characteristic is also observed in adnominal clauses that denote a time, place, instrument, etc.:

- (10) a. $[[e_i \text{-}\emptyset_P e_j \text{ ssel-}un_j]$ *sayngsen-i* *yalp-un_i] {*kos*, *ttay*, *khal*}⁹⁾
 cut-adn fish-nom thin-adn {place, time, knife}
 ‘the place/time/knife that the fish you cut (then/there/with it) is thin’
 b. $[[e_i \text{-}\emptyset_P e_j \text{ ppop-}un_j]$ *khephi-ka* *cinha-n_i] {*kos*, *ttay*, *kikyey*}
 extract-adn coffee-nom strong-adn {place, time, knife}
 ‘the place/time/machine that the coffee you extracted (then/there/with it) is strong’**

8) Here I only consider the Complex NP Constraint, but a gap can occur in an adjunct clause in a relative clause too.

9) With *kos*, the NP can denote a restaurant in which raw fish is served sliced thin or a part of a fish that is sliced thin. But in this example, the latter reading is relevant.

In (10a), with *kos*, a fish was cut into slices, and the NP can refer to a particular part of the fish that was sliced thin. In (10a) with *ttay*, the NP can refer to a particular time at which the fish was cut thin. In (10c) with *khal*, some cooks cut some fish into slices with a knife. The NP can refer to a knife that one of the cooks used to cut some fish into thin slices. In (10b), if the predictate *cinha* ‘strong’ applies to coffee, it can be considered an individual-level predictate, to which no spatio-temporal location is well-defined. Thus the place or time the NP refers to is determined by the embedded relative clause. And an instrument can only be related to the event of extraction.

This indicates that the denotation of a NP modified by an adnominal clause denoting a time/place/instrument/... shows a long-distance dependency.

On the other hand, meanings of other adnominal clauses are determined locally. We have seen in (6a) that gapless relative clauses cannot be embedded, which indicates that their meanings are determined locally. We also saw in (6b,c) that the meanings of adnominal clauses denoting a situation, fact, or proposition are dependent on the topmost clauses. To capture the long-distance dependency, we can assume that a typical relative clause or an adnominal clause denoting a time/place/instrument /... includes a syntactic gap, which is coindexed with the adnominal ending *-(u)n*. We can consider them all relative clauses. In the other constructions, there is no syntactic gap in them and there is no coindexing with the adnominal ending *-(u)n*:

- (11) i. $-(u)n_i$ (relative clauses)¹⁰
 ii. $-(u)n$ (gapless adnominal clauses)

In this paper I am concerned with non-relative adnominal clauses and I will show that their interpretations are locally determined.

10) A relative clause is interpreted as follows:

i. $\llbracket [_{CP} [s \ \alpha \]-(u)n_i] \rrbracket = \lambda w \lambda x \llbracket \alpha \rrbracket^{w, g[x/i]}$

2.2. Previous analyses of adnominal clauses

Cha (2005) distinguishes adnominal clauses into relative clauses and noun complement clauses. He is more concerned with gapless relative clauses. They are taken to be relative clauses because they denote properties of things. He claims that the denotation of a NP modified by a gapless relative clause is determined by the cause-effect relation between the content of the gapless relative clause and the meaning of the head noun.¹¹⁾ Take a concrete example:

- (12) sayngsen-i tha-nun naymsay
 fish-nom burn-adn smell
 $\lambda x \exists y \exists e [\text{smell}'(x) \ \& \ \text{fish}'(y) \ \& \ (\text{burn}'(e) \ \& \ \text{Theme}(e,y)) \ \& \ \text{cause-effect}(e,x)]$

The smell x is introduced as the result of the event e introduced by the verb *tha* 'burn'.

Lee & Lee (2012) basically accept Cha's observations, but they try to explain them in the generative lexicon theory by Pustejovski (1995). Thus they claim that gapless relative clauses involve the Agentive qualia of the head noun in which the event introduced by the verb in the gapless relative clause can fit.¹²⁾

11) He mentions three types of cause-effect relations:

- (i) *cause-effect relation with sensory head noun*
 [sayngsen-i tha-nun] naymsay
 fish-nom burn-adn smell
 'the smell that comes from fish burning'
- (ii) *cause-effect relation with non-sensory head noun*
 [thayphwung-i cinaka-n] huncek
 typhoon-nom pass-adn trace
 'the trace left after a typhoon hit'
- (iii) *cause-effect relation with non-natural phenomenon*
 [apeci-ka so-lul phal-un] ton
 father-nom ox-acc sell-adn money
 'the money obtained by selling an ox'

12) One reviewer says the following:

- i. "Lee & Lee (2012) is independent of Cha's vague and broad 'cause-effect' proposal. Their thesis is misrepresented here. It is based on the Agentive qualia, the role of 'bringing about.'"

However, the cause-effect relation is too limited. We can see cases where various relations are involved:

- (13) inho-ka cip-ul sa-(??ss-ta-ko sayngkaktoy-nu)n {ton, iywu, mokcek}
 Inho-nom house-acc buy-(pst-dec-cmp be.thought)-adn {money, reason, purpose}
 'the money/reason/purpose {with which, for which} Inho bought the house'
- (14) inho-ka cip-ul sa-n hayngwuy
 Inho-nom house-acc buy-adn act
 'the act of Inho's having bought the house'

In this paper, I do not intend to discuss what relations are involved in gapless relative clauses. But since the reviewer repeatedly claims that Lee & Lee provided the solution, I will briefly show what problems their analysis can have. First, their analysis is not independent of Cha's proposal: they started with Cha's cause-effect proposal but did not counter his proposal empirically. To me it seems that they tried to add some technical elegance to the cause-effect proposal and somewhat extend the coverage of data. Still, the notion of 'bringing about' for an Agentive qualia reflects the cause-effect relation. In their analysis, the cause-effect relation is captured *indirectly* through the Agentive qualia of the head noun. This causes a problem:

- ii. a. ??nay-ka kosayng-ul ha-n ton
 I-nom hardship-acc do-adn money
 'the money that (I) endured hardships' (Lit.)
 b. nay-ka kosayng-ul hay-se pel-un ton
 I-nom hardship-acc do-by earn-adn money
 'the money that (I) earned by enduring hardships'

(iia) is somewhat odd, but (iib) sounds quite natural. In (iia), if the Agentive qualia introduces a predicate 'earn' and the event of enduring hardships is the way of earning money, the NP should be fine. This implies that a gapless relative clause requires a more *direct* relation between the head noun and the event described by the relative clause. And this is related to the issue in (38). It is not clear how the observation in (38b) could be explained.

Second, since their analysis is based on the Agentive qualia, it has the same problems with Cha's proposal when there is no cause-effect relation, as in (14)-(15). There are other examples that are not based on the cause-effect relation:

- iii. buyong xishou de lingshi (Zhang 2008)
 need.not wash.hand DE snack
 'a snack (I/you) need not wash hands' (Lit.)

The Korean equivalent is also acceptable. In these examples, the notion of Agentive qualia does not help.

Third, they claim that the Agentive qualia of *ton* 'money' is related to the predicate 'earn'. The question is why it is not a predicate like 'issue', just as the Agentive qualia of *newspaper* involves the predicate 'publish'.

- (15) a. tali-ka thunthunhayci-nun wuntong
 leg-nom become.strong-adn exercise
 ‘exercise that makes your legs strong’
 b. meli-ka cohaci-nun chayk
 brain-nom improve-adn book
 ‘a book that improves your intelligence’

In (13), the expression in the parantheses makes the NPs odd, and money, a reason or a purpose is not the effect of buying a house. With that expression removed, the NPs are fine. Cha (1997, 2005) might think it is an adjunct gap relative clause. But the clause expressing the situation involved is not embedded in the adnominal clause, which is a characteristic of a gapless relative clause. In (14), the act of doing something is not the effect, but the cause, of the event of doing something. In (15), exercise and a book are not the effects, but the causes, of legs being strengthened and your intelligence improving, respectively. Matsumoto (1989) also gave similar examples in Japanese.

Moreover, there are cases where a gapless relative clause expresses that there is no event involved:

- (16) inho-ka swukcey-lul ha-ci.ahn-un pel/chaykim
 Inho-nom homework-acc do-not-adn punishment/responsibility
 ‘the punishment/responsibility Inho must take for not doing his homework’

Negation is involved in the gapless relative clause, which indicates that there’s no event expressed by the verb. Then there is no possibility that an event denoted by a verb causes the existence of something.

Next, consider Noun Complement Clauses. As the name implies, Cha (2005) claims that a noun complement clause denotes a proposition and the head noun takes it as an argument. Take a concrete example:

- (17) John-i pay-lul mek-un sasil
 John-nom pear-acc eat-adn fact
 fact’(‘eat’(john’,pear’))

Then the meaning of the NP is a proposition. The meaning could be expressed by the following:

(18) That John ate a pear is a fact.

The meaning of a NP modified by a noun complement clause should denote abstract objects that could be quantified over:

(19) manhun uykyen cwung-ey ikes-i coh-ta-nun uykyen-i taypwupwun-i-ta.
 many opinion among-in this-nom good-dec-adn opinion-nom most-be-dec
 'Of the many opinions, most are that this is good.'

NPs modified by a proposition-denoting adnominal clause denote quantifiable objects.

Next I will consider Kim's (2007) analysis of three *kes*-phrases that include a gapless adnominal clause: internally headed relative clauses, situation-denoting and fact-denoting adnominal clauses. The analysis is rather complex because she makes a lot of assumptions. Her basic ideas in the analysis are the following:

- (20) i. The adnominal clause moves and is adjoined to the AspP (IHRCs), the TP (situation-denoting), or the CP (fact-denoting) of the embedding clause;
 ii. *kes* is a pronominal noun and refers back to the property denoted by the adnominal clause;
 iii. the NP headed by *kes* forms a DP with a null D, which has the feature [+definite].

Ignoring the possibility that the movement of an adnominal clause violates the Complex NP constraint, she claims that all *kes*-phrases are definite.

In addition, following Kratzer (2008), she specifies both the meanings of a situation-denoting clause and a fact-denoting clause with respect to situations:

- (21) John-un ku totwuk-i tomangka-nun kes-ul po-ass-ta.
 John-top that thief-nom run.away-adn thing-acc see-pst-dec
 (Roughly) 'John witnessed the unique scene of the minimal situation
 that contains the event of the thief running away.'
- (22) John-un ku totwuk-i tomangka-nun kes-ul al-ass-ta.
 John-top that thief-nom run.away-adn thing-acc know-impr-dec
 (Roughly) 'John knew the unique maximal situation or fact of the
 world that verifies the proposition that the thief was running away at
 that time.'

In an event-denoting sentence the situation is minimal, while in a fact-denoting sentence, the situation is maximal.

Following Barwise (1981), Higginbotham (1983), and Berg (1988), she also claims that a fact-denoting clause does not pass the substitution test: if the thief = Cinho, from (22) we cannot infer the following:

- (23) John-un cinho-ka tomangka-nun kes-ul al-ass-ta.
 'John knew the unique maximal situation or fact of the world that
 verifies the proposition that Cinho was running away at that time.'

There are problems with Kim's analysis. A definite DP is expected to presuppose the content of the *kes*-phrase.¹³⁾ But when a *kes*-phrase denotes a situation, it does not seem to be the case.¹⁴⁾ She admits that a presupposition of a situation can be canceled in the scope of an intensional predicate like 'want'. But in (24), there is no intensional predicate, but

13) One meaning of the feature [+definite] is maximality. Kim (2009) claims that the *kes*-phrase in an IHRC refers to a maximal set of things denoted by an IHRC, which is not the case:

- i. inho-nun mwul-i sstaci-nun kes-ul pat-a masi-ess-ta.
 Inho-top water-nom fall-adn thing-acc take-and drink-pst-dec
 'Inho took some of the water that was falling and drank it.'

Here, Inho did not drink all the water that was falling. Moreover, the *kes*-phrase in an IHRC can be unselectively bound by a quantificational adverb. This implies that the *kes*-phrase might not have the feature [+definite].

14) Chung and Kim (2003) and Chung (1999) also claim that a situation-denoting adnominal clause triggers a presupposition.

uttering this sentence can implicate that Inho did not greet. It does not presuppose that Inho greeted:¹⁵⁾

- (24) na-nun inho-ka insaha-nun kes-ul po-ci mos-hay-ss-ta.
 I-top Inho-nom greet-adn thing-acc see-nml not-do-pst-dec
 'I have not seen Inho greet.'

Second, there is no clear distinction between the notion of a situation and a fact. A situation is defined as a minimal situation denoted by the adnominal clause, while a fact is a maximal situation denoted by the adnominal clause. This is not compatible with the failure of the substitution test. If John knows that a thief ran away and the situation is a maximal one that verifies the complement clause, there is no reason that it does not include the situation that the thief is Cinho.

A fact must be defined with respect to a minimal situation. If *kes* is replaced with *sasil* 'fact', it sounds odd to say (25), but it is fine to say (26):

15) Kim (2009) gives a similar example, and claims that it triggers a presupposition, saying the following discourse is odd:

- i. ??John-un totwuk-i tomangka-nun kes-ul po-ci.mos-hay-ss-ta. kulentye, totwuk-un tomangka-ci.anh-ass-ta.
 John-top thief-nom run.away-adn thing-acc see-not-do-pst-dec but thief-top run.away-not-pst-dec
 'John did not see the thief run away, but the thief did not run away.'

This is odd not because the presupposition is canceled, but because the two clauses are joined in an odd way. If the discourse is modified slightly, it becomes fine:

- ii. John-un totwuk-i tomangka-nun kes-ul po-ci.mos-hay-ss-ta. totwuk-un tomangka-ci.anh-ass-kittaymwun-i-ta.
 John-top thief-nom run.away-adn thing-acc see-not-do-pst-dec but thief-top run.away- not-pst-be-cause-be-dec
 'John did not see the thief run away, because the thief did not run away.'

One reviewer claims that in Korean a presupposition is not cancelable, with an example like the following:

- iii. ??Kim-un Lee-ka cwuk-un kes-ul molla-ss-ta. Lee-ka cwuk-ci anh-ass-ki-ttaymwuney.
 Kim-top Lee-nom die-adn thing-acc not.know-pst-dec Lee-nom die-nml not-pst- ml-because
 'Kim did not know Lee died, because Lee did not die.'

But this is not a counterexample to the claim that a presupposition is cancelable. First, one counterexample cannot counter cancelability. Second, *molu* 'not.know' is different from *al-ci mos* 'do(es) not know', just as *doubt* is different from *do(es) not think*. Presupposition projection is a kind of scope problem.

- (25) ??John-un totwuk-i tomangka-nun sasil-un al-ciman, cinho-ka tomangka-nun
 John-top thief-nom run.away-adn fact-top know-but Cinho-nom run.away-adn
 sasil-un molu-n-ta
 fact-top not.know-impr-dec
 'John knows the fact that the thief is running away, but not the fact that Cinho is.'
- (26) John-un tomangka-nun salam-i totwuk-i-n sasil-un al-ciman, tomangka-nun
 John-top run.away-adn person-nom thief-be-adn fact-top know-but run.away-adn
 salam-i cinho-i-n sasil-un molu-n-ta.
 person-nom cinho-be-adn fact-top not.know-impr-dec
 'John knows the fact that the thief is running away, but not the fact that Cinho is.'

In (25), the facts are formed with respect to the event of running away, and it is odd to attempt to distinguish the facts based on the same event just with respect to the agent. The facts are not the same, but not separate, either. In (26), the facts are formed with respect to the identification of the agent of running away, which is plausible. That the thief ran away is one fact and that the name is Cinho is another. Facts should be defined with respect to the minimal situations described by predicates.

Moreover, conceptually a situation itself is not a fact. A situation is an object that has a spatio-temporal location, but a fact is not. A situation itself is not true or false, but a fact is true. You do not know a situation but the existence of a situation.

3. Gapless adnominal clauses and their interpretations

3.1. Situation-denoting adnominal clauses

When an adnominal clause denotes a situation, it does not actually denote an event introduced by the verb in the clause. Sometimes it is odd to negate the existence of an event denoted by a verb:

- (27) ??na-nun inho-ka o-ci.anh-nun kes-ul po-ass-ta.
 I-top Inho-nom come-not-adn thing-acc see-pst-dec
 'I saw Inho not come.'

However, there are cases where it is observed that there is no event and a PP can be predicated of a situation in which there is no event described by a verb:

- (28) a. na-nun (ku ttay) inho-ka wus-ci.ahn-nun kes-ul po-ass-ta.
 I-top (the time) inho-nom laugh-not-adn thing-acc see-pst-dec
 ‘Then I saw Inho not laughing.’
- b. na-nun motwu-ka ca-nun kes-ul po-ko hwa-ka na-ss-ta.
 I-top all-nom sleep-adn thing-acc see-and anger-nom come-pst-dec
 ‘I saw everyone sleeping and got angry.’
- c. i tosi-eyse-nun amwuto keli-eyse tampay-lul phiwu.ci.anh-ass-ta.
 this city-in-top anyone street-in cigarette-acc smoke-not-pst-dec
 ‘In this city nobody smokes in the street.’

In (28a), the speaker saw Inho not laughing at a specific time when he was expected to do so. In (28b), what the speaker saw and got angry about is the whole situation in which everyone was sleeping, not each event of each person’s sleeping. In (28c), the city is a place in which nobody smokes in the street, not each place in which each person does not smoke.

To express a situation described by a sentence as a whole, we need to introduce a variable for situations that is different from a variable for events introduced by the verb in the sentence. In order to incorporate the variable for situations in the process of interpretation, I will first discuss the standard interpretations of an aspect and a tense, following Partee (1984), Kratzer (1998), Klein (1994), etc. A VP denotes a property of events, and an Aspect specifies the inclusion relation between the reference time and the event time, and converts the property of events to a property of (reference) times. A tense is like a pronoun, whose value is a (reference) time determined by an assignment, and specifies the precedence/overlap relation between the reference time and the utterance time:

- (29) $\llbracket [_{VP} \alpha] \rrbracket = \lambda w \lambda e [\llbracket \alpha \rrbracket (w)(e)]$
 $\llbracket [_{ASP} \alpha \beta_{ASP}] \rrbracket = \lambda w \lambda t \exists e [\llbracket \alpha \rrbracket (w)(e) \ \& \ R(t, \tau(e))]$, where t is a reference time, $\tau(e)$ an event time, and $R \in \{\subseteq, =, \supseteq\}$.
 $\llbracket [_{TP} \alpha \beta_{TI}] \rrbracket^g = \lambda w \exists e [\llbracket \alpha \rrbracket (w)(g(i)) \ \& \ S(g(i), t_u)]$, where $g(i)$ is a reference time, t_u subscript an utterance time, and $S \in \{<, \circ, >\}$.

But these rules cannot capture the situation described by the sentence as a whole. A variable for situations must be introduced before the variable for events is existentially closed. This means that it must be introduced when an Asp is interpreted:

$$(30) \llbracket [\text{AspP } \alpha \text{ } \beta_{\text{Asp}}] \rrbracket = \lambda w \lambda s \lambda t \exists e [s < w \ \& \ \llbracket \alpha \rrbracket (w)(e) \ \& \ \text{min}(s)[\tau(e) \subseteq \tau(s) \ \& \ \sigma(e) \subseteq \sigma(s)] \ \& \ R(t, \tau(e))], \text{ where } \tau(e/s) \text{ is the temporal location of } e/s; \sigma(e/s) \text{ is the spatial location of } e/s.$$

A situation s is part of a possible world w . A situation must be minimal in that it only includes the events described by the sentence, spatio-temporally. A situation may include only one event, in which case there is no difference between the event e and the situation s . But if there are multiple events in a situation, the situation includes all the spatio-temporal locations of the multiple events. If negation is involved, a situation includes a spatio-temporal location of an event that would occur otherwise.

Then when a tense is interpreted, we get a property of situations:

$$(31) \llbracket [\text{TP } \alpha \text{ } \beta_{\text{Ti}}] \rrbracket^g = \lambda w \lambda s \exists e [\llbracket \alpha \rrbracket (w)(s)(g(i)) \ \& \ S(g(i), t_u)]$$

We know that a situation-denoting adnominal clause does not allow a mood marker. Thus we can assume that the TP combines with the adnominal ending $-(u)n$.¹⁶ The adnominal ending just takes the meaning of the TP and passes it up:

$$(32) \llbracket \alpha_{\text{TP}}-(u)n \rrbracket = [\lambda P.P](\llbracket \alpha \rrbracket) = \llbracket \alpha \rrbracket \\ (\text{or, } \lambda w \lambda s [\llbracket \alpha \rrbracket (w)(s)])$$

The situation-denoting adnominal clause combines with a head noun like *kes*, which is semantically null:

16) It is also possible to assume that all adnominal clauses have the same structure, including a mood marker. But then we would have to assume that such a mood marker is semantically null.

- (33) $\llbracket \text{inho-ka wus-ci.anh n-}\emptyset\text{-un} \rrbracket^{\text{g}}$
 $= \lambda w \lambda s \neg \exists e [s < w \ \& \ \text{laugh}(w)(e, \text{inho}) \ \& \ \sigma(e) \subseteq \sigma(s) \ \& \ \tau(e) \subseteq \tau(s) = g(i)]^{17}$
 $\llbracket \text{kes} \rrbracket = \lambda P.P$
 $\llbracket \text{inho-ka wus-ci.anh nun kes} \rrbracket$
 $= \lambda w \lambda s [\neg \exists e [s < w \ \& \ \text{laugh}(w)(e, \text{inho}) \ \& \ \sigma(e) \subseteq \sigma(s) \ \& \ \tau(e) \subseteq \tau(s) = g(i)]]$

We assume that the basic meaning of a NP headed by a common noun with no demonstrative or quantificational expression is a predicate. Thus when a NP headed by *kes* is used as an argument, it undergoes the ι -operation or \exists -operation. The two possible operations lead to the following two interpretations:

- (34) a. ι -operation: $\lambda x P(x) \Rightarrow \iota x P(x)$
 \exists -operation: $\lambda x P(x) \Rightarrow \lambda Q \exists x [P(x) \ \& \ Q(x)]$
 b. $\llbracket \text{na-nun inho-ka wus-ci.anh n-}\emptyset\text{-un kes-ul po-ass-ta} \rrbracket^{\text{g}}$
 i. $\lambda w [\text{saw}(sp, \iota s \neg \exists e [s < w \ \& \ \text{laugh}(w)(e, \text{inho}) \ \& \ \sigma(e) \subseteq \sigma(s) \ \& \ \tau(e) \subseteq \tau(s) = g(i) < t_u])]$
 ii. $\lambda w \exists s [\neg \exists e [s < w \ \& \ \text{laugh}(w)(e, \text{inho}) \ \& \ \sigma(e) \subseteq \sigma(s) \ \& \ \tau(e) \subseteq \tau(s) = g(i) < t_u] \ \& \ \text{saw}(sp, s)]$
 (Ignoring the aspect and tense of the matrix clause)

The introduction of a situation variable allows us to deal with a situation with a single event or a situation with multiple events in it.

3.2. Gapless relative clauses

In gapless relative clauses, no mood marker is allowed, which is shared with situation-denoting adnominal clauses. And we have seen that if the head noun is *kes*, the adnominal clause cannot be interpreted as a gapless relative clause. This implies that gapless relative clauses inherently denote situations. But then they cannot combine with the meanings of the head nouns directly:

17) There are many proposals about the structures of a negative sentence. See Choi (1993), Sohn (1995), Yoon (1994), to mention a few. I will not go into the details of the structures of a negative clause and their compositional interpretations.

$$\begin{aligned}
(35) \quad & \llbracket \text{naymsay} \rrbracket = \lambda w \lambda x [\text{smell}(w)(x)] \\
& \llbracket \text{sayngsen tha} \rrbracket = \lambda w \lambda e \exists x [\text{fish}(w)(x) \ \& \ \text{burn}(w)(e,x)] \\
& \llbracket \text{sayngsen tha-n-}\emptyset_i\text{-un} \rrbracket^g \\
& = \lambda w \lambda s \exists e \exists x [s < w \ \& \ \text{fish}(w)(x) \ \& \ \text{burn}(w)(e,x) \ \& \ \tau(e) \subseteq \tau(s) = g(i) \circ t_u \ \& \\
& \sigma(e) \subseteq \sigma(s)] \\
& \simeq \lambda w \lambda s \exists x [s < w \ \& \ \text{fish}(w)(x) \ \& \ \text{burn}(w)(s,x) \ \& \ \tau(s) = g(i) \circ t_u] \\
& \llbracket \text{sayngsen tha-n-}\emptyset_i\text{-un naymsay} \rrbracket^g = ?
\end{aligned}$$

Here there is only one event denoted by the verb. Thus the situation described by the clause is the same as the event. A property of situations and a property of things cannot combine.

Gapless relative clauses denote what they do by interactions with denotations of head nouns, with the help of a contextually given relation R_c :

$$(36) \quad \lambda w \lambda x \exists s [\text{smell}(w)(x) \ \& \ \llbracket \text{sayngsen tha-n-}\emptyset_i\text{-un} \rrbracket^g(w)(s) \ \& \ R_c(w)(x,s)]$$

Here the relation R_c is determined by the denotation of the head noun x and the situation s denoted by the gapless relative clause. This implies that the adnominalizer has the function of converting a property of situations to a property of things:

$$\begin{aligned}
(37) \quad & \text{function of } -(u)n: \lambda w \lambda s P(w)(s) \Rightarrow \lambda w \lambda x \exists s [P(w)(s) \ \& \ R_c(w)(x,s)] \\
& \llbracket \alpha_{TP}\text{-}(u)n \rrbracket = \lambda w \lambda x \exists s [\llbracket \alpha \rrbracket (w)(s) \ \& \ R_c(w)(x,s)]
\end{aligned}$$

So far there has been no satisfactory restriction proposed on the relation R , and I do not intend to propose one in this paper.

Instead, I want to point out that by introducing a situation denoted by a whole sentence, we can account for the observations we made in (16). A gapless relative clause primarily denotes a situation described by the clause. Thus it can denote a situation in which there is no event expressed by the verb in it. My analysis also explains the ways the following sentences are interpreted:

- (38) a. taypwupwunuy salam-tul-i [pro cip-ul pha-n] ton-ul naynoh-ass-ta.
 most people-pl-nom house-acc sell-adn money-acc take.out-pst-dec
 'Most people took out the money they (got by) selling their houses.'
- b. ??na-nun [taypwupwunuy salam-tul-i cip-ul pha-n] ton-ul pat-ass-ta.
 I-top most people-pl-nom house-acc sell-adn money-acc take-pst-dec
 'I took the money that most people (got by) selling their houses.'
- c. taypwupwunuy salam-tul-i pwuphayha-n tayska-lul chilu-l.kes.i-ta.
 most people-pl-nom compromise-adn cost-acc pay-mod-dec
 'They will pay for the cost for most people being compromised.'

In (38a), the quantifier takes scope over the adnominal clause, and each person takes out the money he or she got from selling his or her house. It is fine. In (38b), the quantifier occurs in the gapless relative clause, which describes a whole situation in which most people sold their houses. But the money was not paid for the whole situation. Thus the sentence is odd. In (38c), the cost is for the whole situation in which most people are compromised, and the sentence is fine. The three ways of interpretation and their acceptability follow from the fact that the adnominal clause denotes a whole situation. This allows us to explain how (16) is fine.

3.3. Proposition-denoting adnominal clauses

If a mood marker occurs in an adnominal clause, the whole phrase can denote various things, depending on what mood marker it is:

- (39) inho-ka o-ass-ta-nun {cwucang, mal, kaceng}
 Inho-nom come-pst-dec-adn {claim, saying, supposition}
 'the claim/saying/supposition that Inho came'
- (40) ilccik o-{ass-nya-nun cilmwun, la-nun myenglyeng, ca-nun ceyan}
 early come-{pst-int-adn question, imp-adn order, hor-adn suggestion}
 '{the question of whether (I) came early, the order to come early, the suggestion that we should come early}'

First, the meaning of a TP combines with a mood marker. The meanings of a declarative and interrogative mood marker are as follows:

- (41) a. $\llbracket \alpha\text{-ta} \rrbracket = \lambda w \exists s [\llbracket \alpha \rrbracket (w)(s)]$ (a proposition)
 b. $\llbracket \alpha\text{-nya} \rrbracket = \lambda w \lambda w' [\llbracket \alpha \rrbracket (w)(s) = \llbracket \alpha \rrbracket (w')(s)]$ (a set of propositions)

A declarative sentence denotes a proposition, which is expressed as a set of possible worlds in which there is a situation that verifies the sentence. The meaning of a question denotes a set of propositions which correspond to possible answers, following Hamblin (1958) and Karttunen (1977). I will not discuss the meanings of the imperative and exhortative mood markers.¹⁸⁾

Before giving the meaning of the adnominal ending, we need to look at the meanings of head nouns. Some head nouns have corresponding verbs:

- (42) inho-ka iki-ess-ta-ko {cwucang, mal, kaceng}-ha-n-ta.
 Inho-nom win-pst-cmp {claim, say, suppose}-do-impr-dec
 '(pro) claims/says/supposes that Inho won.'

Such nouns can denote events or objects. But other head nouns like *sosik* 'news', *sasil* 'fact', *somwun* 'rumor', etc. only denote objects.

A noun with the corresponding verb can be used in two ways:

- (43) a. cina-nun inho-ka iki-ess-ta-nun cwucang-ul sey pen hay-ss-ta.
 Cina-top Inho-nom win-pst-dec-adn claim-acc three time do-pst-dec
 'Cina made the claim three times that Inho won.'
 b. inho-ka iki-ess-ta-nun cwucang-i taypwupwun-i-ta.
 Inho-nom win-pst-dec-adn claim-nom most-be-dec
 'Most opinions are that Inho won.'

In (43a), the quantifier *sey pen* 'three times' quantifies over events, while in (43b), *taypwupwun* 'most' quantifies over propositions.

I will discuss a noun from the corresponding verb. Then a noun with no corresponding verb takes only one of the two interpretations. Take *cwucang* 'claim' for example. It has the following two meanings:

- (44) $\llbracket \text{cwucang} \rrbracket = \text{(i) } \lambda w \lambda x [\text{claim}(w)(x)]; \text{ (ii) } \lambda w \lambda e \exists x_p \exists y [\text{claim}(w)(e, y, x_p)]$

I will discuss the first meaning first. The variable x ranges over

18) Arguably, they can be treated as propositions involving modality. Thus they can be dealt with like a declarative sentence.

propositions. But if it combines with a proposition-denoting adnominal clause, as given in (41a), the value of x might be fixed, because (41a) is a fixed proposition. But this is not desirable because a NP can be a quantifier over propositions, as shown in (19). This implies that the adnominal clause also has to denote a property of propositions. There is motivation for this supposition. In (45), the adnominal clause denotes a proposition that Inho did a good deed.

- (45) Inho-ka senhayng-ul hay-ss-ta-nun somwun-tul-un motwu sasil-lo tulena-ss-ta.
 Inho-nom good.deed-acc do-pst-dec-adn rumor-pl-top all fact-as turn.out-pst-dec
 ‘The rumors that Inho did good deeds turned out as facts.’

But actual rumors may be more specific than that, say, that he saved a girl in jeopardy, that he gave some money to a neighbor in need, etc. Thus the adnominal clause must denote a set of propositions, and the meaning of the adnominal ending must be defined as follows:

- (46) $\llbracket \alpha_{MP}\text{-nun} \rrbracket = \lambda w \lambda x_p [x_p \models \llbracket \alpha \rrbracket]$ (x_p : a variable over propositions; $\alpha \models \beta$: α entails β)

It is a set of propositions that entail α . The head noun modified by the clause is interpreted as follows:

- (47) $\llbracket \alpha_{MP}\text{-un cwucang} \rrbracket = \lambda w \lambda x_p [\text{claim}(w)(x_p) \ \& \ x_p \models \llbracket \alpha \rrbracket]$

(48) illustrates how a NP modified by a proposition-denoting adnominal clause is interpreted:

- (48) a. motun inho-ka iki-ess-ta-nun cwucang-un hewuy-i-ta.
 all Inho-nom win-pst-dec-adn claim-top false-be-dec
 ‘All claims that Inho won are false.’
 b. $\llbracket \text{inho-ka iki-ess-ta} \rrbracket^g =$
 $\lambda w \exists s [s < w \ \& \ \text{win}(w)(e, \text{inho}) \ \& \ \tau(e) \subseteq \tau(s) = g(i) \ \& \ \tau(s) < t_u \ \& \ \sigma(e) \subseteq \sigma(s)]$
 $\llbracket \text{inho-ka iki-ess-ta-nun} \rrbracket^g = \lambda w \lambda x_p [x_p \models p]$, where $p = \llbracket \text{inho-ka iki-ess-ta} \rrbracket^g$
 $\llbracket \text{inho-ka iki-ess-ta-nun cwucang} \rrbracket^g = \lambda w \lambda x_p [x_p \models p \ \& \ \text{claim}(w)(x_p)]$
 $\llbracket \text{motun inho-ka iki-ess-ta-nun cwucang} \rrbracket^g = \lambda w \lambda P \forall x_p [x_p \models p \ \& \ \text{claim}(w)(x_p) \rightarrow P(x_p)]$
 $\llbracket \text{hewuy-i-ta} \rrbracket = \lambda w \lambda x [\text{false}(w)(x)]$
 $\llbracket \text{motun inho-ka iki-ess-ta-nun cwucang-un hewuy-i-ta} \rrbracket$
 $= \lambda w \forall x_p [x_p \models p \ \& \ \text{claim}(w)(x_p) \rightarrow \text{false}(w)(x_p)]$

Now consider (44ii), where the head noun denotes a property of events. In this meaning, the variable for propositions is existentially closed. In order to combine with a property of propositions, which is the denotation of a proposition-denoting adnominal clause, the meaning of the head noun undergoes what is called existential disclosure. It is proposed by Dekker (1993).¹⁹⁾ The precise process is rather complicated, and here I will only give the basic idea of it:

$$\begin{aligned}
 (49) \llbracket \text{cwucang} \rrbracket &= \lambda w \lambda e \exists x_p \exists y [\text{claim}(w)(e, y, x_p)] (= \text{claim}') \\
 &\Rightarrow \lambda w \lambda x_p' [\lambda e \exists x_p \exists y [\text{claim}(w)(e, y, x_p)] \ \& \ x_p = x_p'] \text{ (existential disclosure)} \\
 &\Rightarrow \lambda w \lambda x_p' \lambda e \exists x_p \exists y [\text{claim}(w)(e, y, x_p) \ \& \ x_p = x_p'] \text{ (dynamic binding)} \\
 &= \lambda w \lambda x_p' \lambda e \exists y [\text{claim}(w)(e, y, x_p')] \\
 &= \text{claim}'' (= \langle x_p' / x_p \rangle \text{claim}')
 \end{aligned}$$

The variable x_p is bound by the existential quantifier. But if $x_p = x_p'$ is added and x_p' is bound by a lambda operator, it has the effect of opening the variable x_p . At first, $x_p = x_p'$ lies outside the scope of the existential quantifier. But the variable x_p is dynamically bound, as in the following example:

$$\begin{aligned}
 (50) \text{ I was taken care of by a doctor. He was handsome.} \\
 \simeq \text{ I was taken care of by a handsome doctor.}
 \end{aligned}$$

19) Dekker (1993) exploits static and dynamic semantics in explaining the following examples:

- i. a. Every captain whistles.
- b. A captain of₂ the SS. Enterprise whistles

captain is a relational noun, but a ship may, or may not be introduced in the NP. To deal with both cases, the basic meaning of the noun is given as follows:

$$\text{ii. } \llbracket \text{captain} \rrbracket = \lambda w \lambda x \exists y [\text{captain}'(w)(x, y)]$$

Then in (ia) this meaning is used without change. But in (ib), the variable y is disclosed so that *of₂ the SS. Enterprise* is incorporated as the value of y . A similar process is needed when a noun denoting a property of events combines with a proposition-denoting adnominal clause. The use of the discourse referent 2 is not fully motivated. It is just introduced to designate which implicit argument is existentially disclosed.

The pronoun *He* lies outside the existential quantifier *a doctor*, but in the resulting meaning, the property of being handsome, which is associated with the pronoun, goes into the scope of the existential quantifier *a handsome doctor*. Similarly, $x_p = x_p'$ goes into the scope of the existential quantifier, and x_p opens though x_p' .

The meaning in (49) will combine with that of a proposition-denoting adnominal clause and yield the following:

- (51) $\llbracket \text{inho-ka iki-ess-ta-nun cwucang} \rrbracket$
 $= \lambda w \lambda e \exists x_p' [x_p' \models p \ \& \ \langle x_p' / x_p \rangle \text{claim}'(w)(x_p')(e)]$ (p is given in (48b).)
 $= \lambda w \lambda e \exists x_p' [x_p' \models p \ \& \ \exists y [\text{claim}(w)(e, y, x_p')]]$

To get this meaning, the meaning of the adnominal ending should be given as follows:

- (52) $\llbracket \alpha\text{-nun cwucang} \rrbracket = \lambda w \lambda e \exists x_p' [x_p' \models \llbracket \alpha \rrbracket \ \& \ \langle x_p' / x_p \rangle \text{claim}'(w)(x_p')(e)]$
 $\llbracket \alpha\text{-nun} \rrbracket = \lambda R \lambda w \lambda e \exists x_p' [x_p' \models \llbracket \alpha \rrbracket \ \& \ \langle x_p' / x_p \rangle R(w)(x_p')(e)]$

Then (43a) can be interpreted as follows:

- (53) $\llbracket \text{sey pen} \rrbracket = \lambda P \lambda Q \exists X [\#(X)=3 \ \& \ P(w)(X) \ \& \ Q(w)(X)]$, where $\#(X)$
 $=$ the number of X .
 $|$ $\llbracket \text{inho-ka iki-ess-ta-nun cwucang} \rrbracket$
 $| = \lambda w \lambda e \exists x_p' [x_p' \models p \ \& \ \exists y [\text{claim}(w)(e, y, x_p')]]$
 $| /$
 $\llbracket \text{inho-ka iki-ess-ta-nun cwucang-ul sey pen} \rrbracket$
 $= \lambda P \lambda Q \exists X [\#(X)=3 \ \& \ P(w)(X) \ \& \ Q(w)(X)]$
 $(\lambda w \lambda e \exists x_p' [x_p' \models p \ \& \ \exists y [\text{claim}(w)(e, y, x_p')]])$
 $= \lambda Q \lambda w \exists X [\#(X)=3 \ \& \ \exists x_p' [x_p' \models p \ \& \ \text{claim}(w)(X, y, x_p')] \ \& \ Q(w)(X)]$
 $|$ $\llbracket \text{cinho-nun ha} \rrbracket = \lambda w \lambda e \lambda e' [\text{do}'(w)(e', \text{cinho}, e)]$
 $| /$
 $\llbracket \text{cinho-nun inho-ka iki-ess-ta-nun cwucang-ul sey pen ha-ess} \rrbracket^{\text{g}}$
 $= \lambda w \exists s \exists e' [s < w \ \& \ \exists X [\#(X)=3 \ \& \ \exists x_p' [x_p' \models p \ \& \ \text{claim}(w)(X, y, x_p')] \ \& \ \text{do}(w)(e', \text{cina}, X) \ \& \ \sigma(e') \subseteq \sigma(s) \ \& \ \tau(e') \subseteq \tau(s) = g(i) < t_u]]$

In the meaning of *ha* 'do', it takes an event-denoting NP as the internal argument, but the VP denotes a property of events. That is why the verb takes two event arguments e and e' . The variable X ranges over plural events and it is bound by the quantifier *sey pen* 'three times'. This makes the situation s include the spatio-temporal locations of all the events denoted by the quantifier NP.

3.4. Fact-denoting adnominal clauses

We have seen that conceptually a fact must be distinguished from a situation. One peculiarity of a fact-denoting adnominal clause is that it optionally allows a mood marker. The main task I need to do is to account for the two observations.

First, conceptually if a clause denotes a fact, it means there is an actual situation that verifies the clause.²⁰⁾ A situation is a spatio-temporal object that can be perceived. A fact is true in the actual world. It is an object of knowledge, not an object of perception. A situation itself is not a fact, but the existence of the situation is. And a proposition can be true or false, depending on whether a situation verifying the proposition actually exists in each possible world. Thus it is an abstract concept that is defined with respect to a set of possible worlds. A proposition becomes a fact in a possible world if it is true in that possible world. The relations between them can be given as follows:

- (54) Suppose that α is a property of situations. Then
 a situation s in a possible world w : $\iota s[\alpha(w)(s)]$
 a proposition p : $p = \lambda w \exists s[\alpha(w)(s)]$
 a fact f in a possible world w : $f = \exists s[\alpha(w)(s)]$

20) For definitions of a fact, see Stanford Encyclopaedia of Philosophy or Wittgenstein's (1921) *Tractatus Logico-Philosophicus*. Peterson (1997) also specifies the relations between a situation, a fact and a proposition:

- i. ' $R_{ep}(u,v)$ ' =: 'u occurs iff v is true' (relation between an event and a proposition)
 ' $R_{fp}(u,v)$ ' =: 'u makes v true' (relation between a fact and a proposition)
 ' $R_{ef}(u,v)$ ' =: ' $\exists p[R_{ep}(u,p) \ \& \ R_{fp}(v,p)]$ ' (relation between an event and a fact)

Here an event must be replaced with a situation, and R_{sp} can be replaced with the following:

- ii. ' $R_{sp}(u,v)$ ' =: 'u exists iff v is true'

The notion of fact is closer to a proposition than to a situation. But the difference between a fact and a proposition should be clear. Suppose that Inho is walking with a girl, and that Yuna claims that the girl is Inho's sister but Mina claims that she is his girlfriend. Yuna knows that Inho is the captain of a soccer team, and Mina knows that he is Cinho's brother. In this context we can say the following:

- (55) yuna-nun inho-ka caki yetongsayng-kwa keleka-n-ta-ko cwucangha-ko,
 Yuna-top Inho-nom his sister-with walk-impr-dec-cmp claim-and
 mina-nun inho-ka caki yecachinkwu-wa keleka-n-ta-ko cwucangha-n-ta.
 Mina-top Inho-nom his girlfriend-with walk-impr-dec-cmp claim-impr-dec
 kulentey twu cwucang-i motwu thuli-e.
 but two claim-nom both wrong-dec
 'Yuna claims Inho is walking with his sister, and Mina claims that he is walking
 with his girlfriend. But the two claims are both wrong.'

This indicates that the claims Yuna and Mina make are taken to be separate ones. But you cannot say the following:

- (56) yuna-nun chwukwuthim cwucang-i han yeca-wa keleka-nun kes-ul a-n-ta.
 Yuna-top soccer.team captain-nom one woman-with walk-adn thing-acc know- impr-dec
 mina-nun cinho-uy hyeng-i han yeca-wa keleka-nun kes-ul a-n-ta.
 Mina-top Cinho-of brother-nom one woman-with walk-adn thing-acc know-impr-dec
 ??kulentey na-nun twu sasil-ul motwu a-n-ta.
 but I-top two fact-acc both know-impr-dec
 'Yuna knows the captain of the soccer team is walking with a girl, and Mina knows
 Cinho's brother is walking with a girl. And I know the two facts.'

What Yuna knows and what Mina knows are not the same fact, which is why (23) does not follow from (22). But they are not taken to be separate facts, either. Facts exist in the actual world. What Yuna knows and what Mina knows are formed on the basis of one situation in the actual world. Thus the two are not separate. This can be contrasted with the following:

- (57) yuna-nun inho-ka chwukwuthim cwucang-i-la-nun kes-ul a-n-ta.
 Yuna-top inho-nom soccer.team captain-be-dec-adn thing-acc know-impr-dec
 mina-nun inho-ka cinho-uy hyeng-i-la-nun kes-ul a-n-ta.
 Mina-top inho-nom Cinho-of brother-be-dec-adn thing-acc know-impr-dec
 kulentey na-nun twu sasil-ul motwu a-n-ta.
 but I-top two fact-acc both know-impr-dec
 ‘Yuna knows Inho is the captain of the soccer team, and Mina knows he is Cinho’s
 brother. And I know the two facts.’

Assuming that an individual-level predicate also expresses a situation, two situations lead to two different facts. This supports the idea that facts are based on situations, and that facts are “concrete” objects in that they exist in each possible world. In contrast, propositions are abstract ones in that they are defined across possible worlds.

Conceptually, a possible world should be a set of facts in that possible world. But if a possible world is a basic unit, a fact cannot be captured, model-theoretically. Instead, we can assume that a proposition is a basic unit and that a possible world is a set of propositions that are true in that possible world. Then a fact in a possible world is just a proposition that is true in that possible world. Since a proposition is a basic unit, the relation of entailment must be defined indirectly:

- (58) a. $w = \{p: p \text{ is true in } w\}$
 b. A proposition p is a fact in $w \Leftrightarrow p \in w$.²¹⁾
 (I will represent a fact as p_w .)
 c. A proposition p_1 entails another p_2 , that is, $p_1 \models p_2$, iff $\{w \mid p_1 \in w\} \subseteq \{w \mid p_2 \in w\}$.

Under these assumptions, the meaning of a fact-denoting adnominal clause with a mood marker can be defined as follows:

- (59) $\llbracket [\alpha_{MP}-(u)n] \rrbracket = \lambda w \lambda x_p [x_p \models \llbracket \alpha \rrbracket \ \& \ x_p \in w]$
 $\llbracket \text{sasil} \rrbracket = \lambda w \lambda x_p [x_p \in w]$
 $\llbracket \alpha_{MP}-(u)n \text{ sasil} \rrbracket = \lambda w \lambda x_p [x_p \models \llbracket \alpha \rrbracket \ \& \ x_p \in w]$

21) A fact should be defined with respect to a possible world because a fact can be embedded in an opaque context:

i. John believes it is a fact that Mary loves him.

That Mary loves John is not a fact, though it is in John’s doxastic alternatives.

The meaning of a mood phrase is a proposition. Then the meaning of an adnominal clause is a set of propositions or a property of propositions.

Without a mood marker, a TP denotes a property of situations. If it is used in the position for a fact-denoting adnominal clause, we might suppose that a null mood marker is used. But we could not make such an assumption without sufficient evidence. Instead, we can derive a property of facts from a property of situations, using the interpretation rule given in (37), which is repeated here:

- (60) a. $\llbracket \alpha_{\text{TP}}(\text{u})\text{n} \rrbracket = \lambda w \lambda x \exists s [\llbracket \alpha \rrbracket (w)(s) \ \& \ R_c(w)(x,s)]$
 If x ranges over facts, $R_c = \lambda w \lambda s \lambda x_f [x_f = \exists s' [s \leq s' \ \& \ s' \text{ occurs in } w]]$
 (x_f : a variable over facts)
 b. $\llbracket \alpha_{\text{TP}}(\text{u})\text{n} \rrbracket = \lambda w \lambda x_f \exists s [\llbracket \alpha \rrbracket (w)(s) \ \& \ x_f = \exists s' [s \leq s' \ \& \ s' \text{ occurs in } w]]$

Here R_c is a relation between a situation and a fact. A fact can include a larger situation than what is actually expressed.²²⁾ With the help of this relation, we can get a property of facts from a property of situations. A fact can be captured from a situation because a fact exists in a possible world, not across possible worlds. On the other hand, I assume that a fact in a possible world w is a proposition that is true in w . Thus (60) can be converted to something like the following:

$$(61) \llbracket \alpha_{\text{TP}}(\text{u})\text{n} \rrbracket = \lambda w \lambda x_p [x_p \models \lambda w' \exists s [\llbracket \alpha \rrbracket (w')(s)] \ \& \ x_p \in w]$$

The relation between situations is converted to a relation of entailment between propositions.

A concrete example is given here:

22) It might be possible to assume an inclusion relation between facts. But I do not know of any analysis in which such a relation is proposed. Thus I will only assume such relations between situations and propositions.

- (62) $\llbracket \text{inho-ka iki-}\emptyset_{i-n} \rrbracket^g =$
 $\lambda w \lambda s \exists s [s < w \ \& \ \text{win}(w)(e, \text{inho}) \ \& \ \tau(e) \subseteq \tau(s) = g(i) < t_u \ \& \ o(e) \subseteq o(s)] (= P)$
 $\Rightarrow \lambda w \lambda x_p [x_p \models \lambda w' \exists s [P(w')(s)] \ \& \ x_p \in w]$
 $| \llbracket \text{sasil} \rrbracket = \lambda w \lambda x_p [x_p \in w]$
 $| /$
 $\llbracket \text{inho-ka iki-}\emptyset_{i-n} \text{sasil} \rrbracket^g = \lambda w \lambda x_p [x_p \models \lambda w' \exists s [P(w')(s)] \ \& \ x_p \in w]$
 \Rightarrow (i) $\lambda w \iota x_p [x_p \models \lambda w' \exists s [P(w')(s)] \ \& \ x_p \in w]$ (ι -operation)
 (ii) $\lambda Q \lambda w \exists x_p [x_p \models \lambda w' \exists s [P(w')(s)] \ \& \ x_p \in w \ \& \ Q(x_p)]$ (\exists -operation)

The NP denotes a property of facts. When it is used as an argument, it undergoes the ι -operation or the \exists -operation.

4. Conclusion

In this paper, I showed that when an adnominal clause combines with a head noun, there are various ways of interpretations. I assumed that the various interpretations arise when the adnominal ending *-(u)n* is interpreted. They are summarized here:

- (63) a. $\llbracket [_{CP} [_{MP} \alpha] -(u)n] \rrbracket = \lambda w \lambda x [\llbracket \alpha \rrbracket^{w, g(x/i)}]$ (relative clauses)
 b. $\llbracket \alpha_{TP} -(u)n \rrbracket = [\lambda P.P](\llbracket \alpha \rrbracket) = \llbracket \alpha \rrbracket$ (situations)
 c. $\llbracket \alpha_{TP} -(u)n \rrbracket = \lambda w \lambda x \exists s [\llbracket \alpha \rrbracket(w)(s) \ \& \ R_c(w)(x, s)]$ (gapless relative clauses)
 d. $\llbracket \alpha_{MP} -(u)n \rrbracket =$ (propositions)
 (i) $\lambda w \lambda x_p [x_p \models \llbracket \alpha \rrbracket]$
 (ii) $\lambda R \lambda w \lambda e \exists x_p' [x_p' \models \llbracket \alpha \rrbracket \ \& \ \langle x_p' / x_p \rangle R(w)(x_p')(e)]$
 e. $\llbracket \alpha_{MP} -(u)n \rrbracket =$ (facts)
 (i) $\lambda w \lambda x_p [x_p \models \llbracket \alpha \rrbracket \ \& \ x_p \in w];$
 (ii) $\llbracket \alpha_{TP} -(u)n \rrbracket = \lambda w \lambda x_p [x_p \models \lambda w' \exists s [\llbracket \alpha \rrbracket(w')(s)] \ \& \ x_p \in w]$

This shows that the semantics of an adnominal clause is not consistent.

However, this is not surprising because an adnominal expression tends to combine with a head noun with various meaning relations. Consider the adjective *proud*:

- (64) a. proud son
 b. proud father
 c. proud achievement
 d. proud occasion

In a situation in which a father is proud of his son about his son's achievement at a certain occasion, the adjective *proud* can be used with various head nouns with various meaning relations. This is contrasted with the same adjective in its predicative use after the head noun: it is only predicated of the logical subject. In Korean all adnominal expressions come before the head noun. Thus it is expected that an adnominal expression can have various meaning relations with the head noun.

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