

Coerced Relative Clauses in Korean^{*}

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In this paper, I define a coerced relative clause (= CRC) as an adnominal clause which denotes a property of situations that is converted to a property of things when the clause combines with a head noun that denotes a property of things. The property of situations is always determined by the topmost clause of the CRC. This definition makes the range of CRCs clear, compared with previous analyses, but it makes the range wider than previous analyses of the constructions. In filling the missing links between a property of situations and a property of things, I adopt the Generative Lexicon (= GL) Theory. I show that the analysis of CRCs should be pragmatic and the ways of interpreting CRCs are diverse, on the one hand, but that it should be restricted systematically by the meaning specifications of expressions in the GL, on the other. I also show that the GL Theory, in the current form of the Theory, is not sufficient to fill in all missing meaning components necessary in interpreting CRCs. In this respect, we need a more flexible tool than the GL Theory, or extend the GL Theory so that additional meaning components can be included in the meaning specifications of expressions.

Keywords: coerced relative clause, type mismatch, Generative Lexicon, qualia structure

1. Introduction

In Korean, there are various types of adnominal clause:¹⁾

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1) In this paper, I use the following abbreviations: acc(usative case), (imperfective) ad_n(ominal), (modal) adn_m (ominal ending), (perfective) adn_p(ominal ending), c(o)mp(lementizer), dec(larative mood), imp(er)l(ective aspect), n(or)m(ina)l(izer), nom(inative

- (1') Bob-i kaci-ko o-n kes-ul ilh-ess-ta. (typical relative clause)
 -nom have-and come-adn_p thing-acc lose-pst-dec
 'Bob lost the thing that he brought.'
- (2') a. Ann-un Bob-i o-nun kes-ul {cikhyepo, swumki}-ess-ta. (situation, fact)
 -top -nom come-adn_i thing-acc {see, hide}-pst-dec
 'Ann {saw, hid} the {situation, fact} of Bob's coming.'
 b. Ann-un Bob-i o-ass-ta-nun kes-ul patatuli-ess-ta. (proposition)
 -top -nom come-pst-dec-adn_i thing-acc accept-pst-dec
 'Ann accepted the claim that Bob came.'
- (3') a. ?*Bob-i sayngsen-ul thaywu-nun kes-i cawukhay-ss-ta.
 -nom fish-acc burn-adn_i thing-nom be.thick-pst-dec
 'The smoke that arose when Bob was burning fish was thick.'

The new sentences from (1) and (2) are all fine, but the new one from (3.a) is odd, though many factors involved are ignored tentatively. This motivates the distinction between the sentences in (1) and (2), on the one hand, and those in (3), on the other. Since *kes* is semantically null, we can assume that the *kes*-phrases modified by the adnominal clauses in (1) and (2) denote something canonically determined by the adnominal clauses, while those in (3) do not. That is, the canonical meanings of the adnominal phrases are compatible with the meanings of the NPs that are required by the matrix clauses in (1) and (2), but not in (3).

On the other hand, we have to distinguish (1) from (2) and (3):

- (1'') Bob-i kaci-ko o-ass-ta-ko sayngkaktoy-nun sangca-lul ilh-ess-ta.
 -nom have-and come-pst-dec-cmp be.thought-adn_i box-acc lose-pst-dec
 'Bob lost the box that it was thought that he brought.'
- (2'') a. ??Ann-un Bob-i o-n-ta-ko sayngkaktoy-nun {sanghwang, sasil}-ul
 -top -nom come-impf-dec-cmp be.thought-adn_i {situation, fact}-acc
 {cikhyepo, hide}-pst-dec
 {see, swumki}-ess-ta.
 'Ann {saw, hid} the {situation, fact} that it was thought that Bob came.'
 b. ??Ann-un Bob-i o-ass-ta-ko sayngkaktoy-nun cwucang-ul
 -top -nom come-pst-dec-cmp be.thought-adn_i claim-acc
 patatuli-ess-ta.
 accept-pst-dec
 'Ann accepted the claim that it was thought that Bob came.'

- (3'') a. ??Bob-i sayngsen-ul thaywu-ess-ta-ko sayngkaktoy-nun yenki-ka
 -nom fish-acc burn-pst-dec-cmp be.thought-adn_i smoke-nom
 cawukhay-ss-ta.
 be.thick-pst-dec
 'The smoke that was thought to have arisen from Bob's burning fish was thick.'

When the adnominal clauses in (1)-(3) are embedded in a propositional attitude context, the sentence in (1) becomes fine, as shown in (1''), while those in (2) and (3) become odd, as shown in (2'') and (3''). This indicates that the adnominal clause in (1) can be embedded in another clause, while the adnominal clauses in (2) and (3) cannot, and that in cases like (2) and (3), the NPs modified by the adnominal clauses must be related to what the topmost clauses in the adnominal clauses denote. That is, in (2'') the NPs modified by the adnominal clauses must denote a situation of thinking, the fact that it was thought that Bob came, and the claim that it was thought that Bob came. Similarly, in (3''), smoke must be related to the clause formed by the verb *sayngkakhha* 'think', not to the clause formed by the verb *thaywu* 'burn'. In contrast, in (1''), a box is related to the verb *kaci-ko o* 'bring' in the embedded clause in the adnominal clause.

We can summarise the observations so far as follow:

- (4) a. In (1), the adnominal clause can denote a property of things that can be determined by an **embedded** clause in the adnominal clause and that property needs to be **compatible** with the meaning of the NP required by the matrix clause.
- b. In (2), the adnominal clause denotes a property of what the **topmost** clause in the adnominal clause denotes and the property is **compatible** with the meaning of the NP required by the matrix clause.
- c. In (3), the adnominal clause denotes a property of what the **topmost** clause in the adnominal clause denotes and the property is **incompatible** with the meaning of the NP required by the matrix clause.

In (3), without the head nouns, there is incompatibility between the canonical meanings of the topmost clauses of the adnominal clauses and the meanings of the NPs required by the matrix clauses. Therefore, the use of the head noun plays the role of resolving the incompatibility. In this paper, I will show that the adnominal clauses in (3) canonically denote a property of situations described by the topmost clauses. But the head nouns, which are selected by the verbs in the matrix clauses, do not denote a property of situations. The two meanings need to combine as a set intersection, but it would only lead to the empty set. This incompatibility is resolved by coercing a property of situations into a property of things so that the NPs can denote the same as those denoted by typical relative clauses. For this reason, I will call constructions in (3) **coerced relative clauses (= CRCs)**.

As mentioned in Matsumoto (1989), Fiorentino (2007), Collins (2015), etc., CRCs can be observed in other languages than the East-Asian languages. The term “gapless relative clause” has often been used for the constructions in (3) since Kuno (1973), but it can be misleading in that a relative clause with a resumptive pronoun is also a gapless relative clause. Even in an adnominal clause with no gap, if the canonical meaning of the clause is compatible with the meaning that is required by the matrix clause, it is not a CRC. The criterion is whether or not the canonical denotation of the topmost clause of an adnominal clause is compatible with the meaning required by the matrix clause. A relative clause with a resumptive pronoun denotes something based on a long-distance dependent resumptive pronoun. Therefore it denotes something different from what the topmost clause of an adnominal clause denotes canonically.

In this paper, the primary goal is how the mismatch is resolved between the denotation of a CRC and the head noun. But I also discuss two other issues. One is what clauses are CRCs and what clauses are not. The other is why some CRCs are acceptable and why others are not. To do this, the paper is organized as follows. In Section 2, I discuss previous analyses of CRCs. In Section 3, I discuss the range of CRCs based on the uses of *kes* and the distinction of three types of adnominal clause in Korean. In Section 4, I use the Generative Lexicon (= GL)

Theory to see how CRCs are interpreted. To do this, I briefly introduce the Theory and apply it to various types of CRCs. By doing this, I will show that there is no singular consistent way of interpretation to cover all CRCs. This is what we can expect because coercion of a meaning to another meaning is a pragmatic process, and a pragmatic process may involve many contextual considerations. On the other hand, I also show that the GL Theory is restrictive enough to decide whether a CRC is acceptable or not. In Section 5, I conclude the paper.

2. Review of Previous Analyses

In this section, I will review three representative approaches of CRCs. First, I will consider a purely pragmatic approach by Matsumoto (1989, 1990, 1997). Noting that in Japanese (and Korean) an argument does not need to be realized in a clause, he assumes that all adnominal clauses are noun-modifying constructions. He further assumes that to interpret a noun-modifying construction, there are three factors involved. One is a frame that is introduced by an expression or a set of expressions. Roughly, if an expression introduces an event or situation, it provides a frame. And an object-denoting expression plays a role of participant in the frame. Another is a host: either the head noun or the adnominal clause provides the frame as a host, and it is also possible that both do. If an expression is not a host, it is a participant in the frame. The last factor is a world view, which is also called a structure of expectation. This provides culturally-based knowledge about the world, and provides us with a way of interpreting new information, new events or new experiences. If we do not have this knowledge to interpret a specific expression, we cannot get the meaning of that specific expression, and the expression is considered odd.

According to his analysis, NPs with an adnominal clause are considered to be understood/interpreted if we can get meaning relationships between expressions in a frame. He deals with all NPs with an adnominal clause, but if only CRCs are considered, he classifies them as follows:

(5) a. clause-host:

meli-ka cohaci-nun chayk

brain-nom get.better-adn_i book

'a book such that if one reads it, the brain gets better'

b. noun-host: (no CRC)

c. clause+noun-host:

sayngsen-ul kwup-nun naymsay

fish-acc grill-adn_i smell

'smell that we get when we grill a fish'

(5.c) is a case where the adnominal clause and the head noun provide a frame together. He did not give any example of a CRC in cases where only the head noun provides a frame.

I do not suppose that Matsumoto's analysis is convincing, because it cannot deal with the differences between three types of adnominal clauses I discussed in Section 1. Even if we are only concerned with CRCs, a purely pragmatic analysis of CRCs is not plausible. A pragmatic analysis of CRCs cannot rule out the following examples:

(6) a. ??Bob-i mayil wuntong-ul ha-n kenkang

-nom every.day exercise-acc do-adn_p health

'health that (one gets when) one exercises every day'

b. ??Bob-i myoki-lul silphayha-n sangche

-nom stunt-acc fail-adn_p wound

'a wound that (one gets when) one fails in a stunt'

In this case, the events denoted by the adnominal clauses can cause the things denoted by the head noun, as in (3). But these examples are not acceptable. In the pragmatic analysis of (6), we could come up with pragmatically conceivable relations between the adnominal clauses and the head nouns in a frame. Thus there is no reason to exclude them from CRCs. CRCs should be restricted more systematically based on specifications of core meanings of expressions. In this respect, we are against any purely pragmatic analysis of CRCs.

Next, I will consider Cha's (1997, 2005) analysis of CRCs. His analysis of CRCs is more extensive and more specific, and reveals more problems for that reason. First, the scope of CRCs is quite narrow. He includes as CRCs only cases where the adnominal clause denotes a property of events which cause something denoted by the head noun. And he claims that in CRCs there is a cause-effect relation between the event denoted by the adnominal clause and the thing denoted by the head noun. Here is an example of his:

- (7) a. [Mary-ka sayngsen-ul kwup-nun] naymsay
 -nom fish-acc grill-adn_i smell
 'the smell from Mary's grilling fish'
 b. $\lambda x \exists y \exists e$ [smell'(x) & fish'(y) & (grilling'(e) & Agent(e, mary')
 & Theme(e, y)) & cause-effect(e, x)]

He claims that the meanings of all NPs with a CRC have the relation of *cause-effect*(e, x), but his explanation is in a vicious circle, because in his analysis, only cases with such a meaning relation are considered CRCs.

He considers other CRCs in my analysis to be ordinary relative clauses with an adjunct gap, claiming that in such a construction, the head noun denotes something that has a thematic role to the event denoted by the predicate in the adnominal clause and the thematic relation can be captured by an adjunct gap in the adnominal clause. But this criterion can be arbitrary. Take the CRC in (8) for example:

- (8) Bob-i_i [e_i sayngsen-ul pha(l-u)n] ton-ul pat-ass-ta.
 -nom fish-acc sell-adn_p money-acc receive-pst-dec
 'Bob got the money for which he sold fish.'

It is a typical CRC in his analysis, but the head noun denotes a property of things that have the thematic relation of purpose with the event denoted by the predicate in the adnominal clause. In some cases, the thematic relation can be expressed as an adjunct:

- (9) a. komwu-ka tha-nun akchwuy
 rubber-nom burn-adn_i bad.smell
 'bad smell that (arises when) rubber burns'
- b. komwu-ka akchwuy-wa.hamkkey tha-n-ta.
 rubber-nom bad.smell-with burn-impf-dec
 'Rubber burns with bad smell.'

(9.a) is a typical CRC in his analysis, and the head noun can occur as an adjunct in the adnominal clause, as shown in (9.b). This clearly shows that his criteria for CRCs are not precise or consistent.

And if he claims that if a head noun can occur in the adnominal clause as an adjunct, the adnominal clause is not a CRC, it can be mysterious in his analysis why the head noun is always understood as related to the situation described by the topmost clause in a CRC. When the head noun is *iywu* 'reason' or *mokcek* 'purpose', the reason or purpose is about the situation described by the topmost clause. And the following examples, which he does not consider CRCs, are odd if the event predicates are embedded in the adnominal clauses:

- (10) a. ttang-i kallaci(??n-ta-ko sayngkaktoy)-nun kamwum
 land-nom crack-(impf-dec-cmp be.thought)-adn_i drought
 'drought to the extent that the land cracks'
- b. meli-ka cohaci(??n-ta-ko sayngkaktoy)-nun chayk
 brain-nom improve-(impf-dec-cmp be.thought)-adn_i book
 'a book that is thought to make your brain better'

If an adnominal clause includes an adjunct gap which cannot be embedded in it, he needs to explain what structural role the adjunct gap plays.

And due to the requirement of a cause-effect relation, he claims that if the adnominal clause is negated, the CRC is not acceptable:

- (11) ??sayngsen-i **an** tha-nun naymsay
 fish-nom **not** burn-adn_i smell
 Intended: 'the smell of fish not burning'

This is because smell arises from the event of burning, and no event of burning would lead to no smell. However, there are cases where no event leads to a certain result:

- (12) a. Bob-un phal-i kwulkeci-ci **anh**-nun wuntong-ul ha-n-ta.
 -top arm-nom become.thick-nml not-adn_i work.out-acc do-impr-dec
 ‘Bob is doing exercise that does not make his arms thick.’
- b. na-nun yehayng-ul ka-ci **mos**-ha-nun aswuywum-ul tallay-ss-ta.
 I-top trip-acc go-nml not-do-adn_i sadness-acc relieve-pst-dec
 ‘I relieved my sadness I felt because I couldn’t take a trip.’

(12.b), in particular, describes a cause-effect relation between the adnominal clause and the head noun, and it should count as a CRC.

Finally, I will briefly mention Lee & Lee’s (2012) analysis of CRCs because it also exploits Pustejovsky’s (1995, 2005) GL Theory in their analysis. They were not explicit about this, but they seem to follow Cha (2005) in assuming that CRCs are cases where the head noun denotes something that results from the situation described by the adnominal clause. As I pointed out, this is problematic in defining CRCs and in explaining why the meaning of the head noun is related to the meaning of the topmost clause of the adnominal clause in a CRC. I will not repeat them here.

I will point out some theoretical issues in their analysis. The basic idea of their analysis is the following: (13) is interpreted as (14) with the help of the Agentive qualia in the meaning specifications of the head noun:

- (13) so-lul pha(l)-n ton
 cow-acc sell-adn_p money
 ‘the money that one gets when one sells a cow’

- (14) so-lul phal-ase e_i **pe(l)-n_i** ton
 -and earn-adn_p
 ‘the money that one earns by selling a cow’

The Agentive qualia of *ton* ‘money’ introduces a predicate like *pel* ‘earn’,

which in turn introduces a gap for an argument position and the adnominal clause is interpreted by abstracting over the values for the gap.³⁾

Their analysis might be in the right direction in that they try to apply the GL Theory in analyzing CRCs. But they did so in the wrong way. An Agentive qualia specifies how something comes into being. The Agentive qualia in the meaning specifications of *ton* 'money' should be something like *palhaynggha* 'issue', rather than *pel* 'earn'. Moreover, they also assume that CRCs have a cause-effect relation with the denotation of the head noun, with no motivations mentioned. CRCs must be specified on structural and semantic bases.

Previous analyses do not clearly specify CRCs in three respects. Thus the goal of this paper is to specify what CRCs are in the three respects. First, it is not clear what adnominal clauses belong to CRCs and what adnominal clauses do not. Consider the following examples:

(15) cha-ka se-n iywu
 car-nom stop-adn_p reason
 'the reason that a car stopped'

(16) macha-ka cinaka-n cakwuk
 coach-nom pass-adn_p track
 'a track that (was left after) a coach went by'

(17) meli-ka cohaci-nun chayk
 brain-nom get.better-adn_i book
 'a book such that a person who reads it gets smarter'

(15) could be regarded as an ordinary relative clause that has an adjunct gap. (16) is a NP in which the adnominal clause describes an event that gives rise to a thing that the head noun denotes. In (17), the adnominal clause describes a result state or event due to a thing that the head noun

3) But the introduction of the extra verb needs to be implicit. Otherwise, the gap for the argument should not be subject to island constraints. But we know that in a CRC, the head noun should be related to the situation described by the topmost clause of the adnominal clause.

denotes. In many discussions of CRCs like A.-H. Kim (1999), Sirai and Gunji (1998), Matsumoto (1990), etc., (16) and (17) are taken to be CRCs. But Cha (2005) and Lee & Lee (2012) only consider cases like (16) CRCs. A problem with these analyses is that the range of CRCs is not precisely specified. In this paper, I will include the three cases in the scope of CRCs on the basis of structural and semantic criteria. More concretely, I will claim that a CRC is a construction that can denote a property of situations described by the topmost clause of the adnominal clause but that comes to denote a property of non-situational things by some processes which will be discussed below.

Second, previous analyses of CRCs do not make clear what CRCs are acceptable and what CRCs are not. For example, the adnominal clauses in (8) are not acceptable. The question is how such CRCs are excluded. The two issues are related to the third issue of how the mismatch is resolved between the meanings of a CRC and the head noun. In this paper, I will discuss the range of CRCs on the basis of syntactic and semantic properties. And I also discuss various ways of resolving the incompatibility between a property of situations and a property of things. In the discussions, I adopt the Generative Lexicon (= GL) Theory proposed by Pustejovsky (1995, 2005) and point out what mechanisms can distinguish acceptable CRCs from unacceptable ones.

3. Range of CRCs

3.1. Uses of *kes*

In Section 1, a CRC is defined as an adnominal clause which basically denotes a property of events/situations that needs to be converted to a property of things. And I assume that the basic meaning of an adnominal clause can be identified by the use of *kes*. One question we can ask is why *kes* cannot coerce an event/situation-denoting adnominal clause into denoting a property of things. One simple answer is that the meaning of *kes* is not abundant enough to coerce such a conversion. In Korean, *kes* is a bound noun that is semantically almost null. Thus it requires

an adnominal expression. Since it is semantically almost null, we can assume that the NP headed by *kes* denotes the same thing as the canonical meaning of the adnominal expression. One meaning to add is a presupposition that it denotes a property of non-person objects:

- (18) a. $\llbracket \text{kes} \rrbracket^w = \lambda P \lambda x \{ \text{npo}(x); [P(x)] \}$ ({}: a presupposition; npo: non-person object)
 b. $\llbracket \alpha \text{ kes} \rrbracket^w = \lambda P \lambda x \{ \text{npo}(x); [P(x)](\llbracket \alpha \rrbracket^w) \}$
 $= \lambda x \{ \text{npo}(x) \} [\llbracket \alpha \rrbracket^w(x)]$
 $\simeq \llbracket \alpha \rrbracket^w$ (the presupposition ignored)

In (18.b), α is an adnominal expression, and the meaning of a *kes*-phrase is the same as the meaning of α , ignoring the presupposition.

However, the notion of non-person object is not clear enough. More specifically, *kes* can denote a property of non-person objects, events/situations, facts, propositions, as we saw in (1) and (2), and it can also denote a property of degrees:

- (19) Ann-un Bob-i hayngpokha-n {kes, cengto}-pota te hayngpokha-ta.
 -top -nom be.happy-adn {thing, degree}-than more be.happy-dec
 'Ann is happier than Bob is.'

But it cannot denote a property of places, times, manners, directions, reasons, purposes, etc.:

- (20) a. Ann-un Bob-i ilha-nun {??kes, kos}-ey pangmwunhay-ss-ta.
 -top -nom work-adn_i {thing, place}-at visit-pst-dec
 'Ann visited the place Bob worked.'
 b. Ann-un Bob-i ilha-nun {??kes, sikan}-ey pangmwunhay-ss-ta.
 time-at
 'Ann visited Bob at the time he worked.'
 c. Ann-un Bob-i ilha-nun {??kes, pangsik}-ul ttala-ss-ta.
 manner-acc follow-pst-dec
 'Ann followed the way that Bob worked.'
 d. Ann-un Bob-i iss-nun {??kes, ccok}-ulo solichye-ss-ta.
 be-adn_i direction-to shout-pst-dec
 'Ann shouted in the direction that Bob was located.'
- (21) Ann-un Bob-i ilha-nun {??kes, iywu, mokcek}-(l)ul mwul-ess-ta.
 reason purpose-acc ask-pst-dec
 'Ann asked the {reason for, purpose of} Bob working.'

Places, times, reasons, purposes, manners, directions, etc. could be non-person objects, but they are incompatible with *kes*. This indicates that the meaning of *kes* should be more specifically defined. But I do not know if there is a consistent way of defining the meaning of the word so that it can include general objects, degrees, situations, facts and propositions, excluding places, times, reasons, purposes, manner, directions, etc. I will leave this issue open in this paper.

On the other hand, when an adnominal clause is incompatible with *kes*, the question in (20) and (21) is whether replacing *kes* with another common noun leads to a CRC. It is not always the case. Some of them are cases where the basic meaning of the adnominal clause is compatible with the meaning required by the matrix clause, and others are cases where the basic meaning of the adnominal clause is not compatible with the meaning required by the matrix clause and there is a coercion of the meaning of the adnominal clause into something compatible with the meaning required by the matrix clause. To decide which, we need to show how the basic meaning of an adnominal clause is determined. This is discussed in the next subsection.

3.2. Three ways of interpreting adnominal clauses

In Korean, there are three ways that an adnominal clause can be interpreted. This is closely related to the ways that an adnominal clause is formed. First, there are adnominal clauses that are not subject to any island constraint:

- (22) [[e_i e_j ssu-n_j] chayk-i cal phali-nun_i] salam-un hayngpokha-ta.
 write-adn_p book-nom well be.sold-adn person-top be.happy-dec
 'The person who the book (s)he wrote sells well is happy.'

The adnominal clause for *salam* is related to the Agent argument of the verb *ssu* 'write', which is located in another relative clause. In this case, since the dependency between the adnominal clause and the gap is not subject to island constraints, we can assume without hesitation that the adnominal clause has a gap for the writer that is bound by the adnominal

ending, which I assume to be a complementizer. In this case, the adnominal ending gets an index for binding.

Second, there are adnominal clauses that are formed by a syntactic movement:

- (23) a. [Bob-i_i e_i swuy-ko.iss-ta-ko sayngkaktoy-nun \emptyset_i] {sikan, cangso}-ey ka-ss-ta.
 -nom rest-impf-dec-cmp be.thought-adn_i {time, place}-at go-pst-dec
 'I visited Bob at the/a time that Bob was thought to be taking a rest.'
- b. *[Bob-i_i e_i ssu-n chayk-i caymiiss-nun \emptyset_i] {sikan, cangso}-ey ka-ss-ta.
 -nom write-adn_p book-nom be.interesting-adn_i {time, place}-at go-pst-dec
 'I visited Bob {when, where} the book he wrote is interesting.'

(23.a) shows that the time and place can be related to the event of taking a rest, while (23.b) shows that the time/place cannot be an event time of writing. The clause with *ssu* 'write' is in a syntactic island. This shows that such an adnominal clause is formed by a syntactic movement, which is subject to island constraints. In this case, we can assume that a null operator moves from the position of the gap to the Spec of CP, which is indicated by \emptyset_i .⁴ Degree-, manner- and direction-denoting adnominal clauses also follow this pattern:

- (19') Ann-un Bob-i hayngpokha-ta-ko sayngkaktoy-nun cengto-pota te
 -top -nom be.happy-dec-cmp be.thought-adn_i degree-than more
 hayngpokha-ta.
 be.happy-dec
 'Ann is happier than Bob is thought to be.'
- (20') c. Ann-un Bob-i ilha-n-ta-ko sayngkaktoy-nun pangsik-ul ttala-ss-ta.
 -top -nom work-impf-dec-cmp be.thought-adn_i manner-acc follow-pst-dec
 'Ann followed the way that Bob was thought to work.'
- d. Ann-un Bob-i iss-ta-ko sayngkaktoy-nun ccook-ulo solichye-ss-ta.
 -top -nom be-dec-cmp be.thought-adn_i direction-to shout-pst-dec
 'Ann shouted towards the place Bob was thought to be located.'

These examples show that degree-, manner- and direction-denoting adnominal clauses can denote a degree/manner/direction related to an em-

4) The proper position of the operator would be the beginning of the CP, not after the head of the CP. But for convenience and clearness of the structural difference, I put it after the head of a CP.

bedded clause in an adnominal clause.

On the other hand, a reason- or purpose-denoting adnominal clause cannot denote a reason/purpose related to an embedded clause in an adnominal clause:

- (24) a. ?*Bob-i ilha-n-ta-ko sayngkaktoy-nun mokcek-i kwungkumha-ta.
 -nom work-impf-dec-cmp be.thought-adn purpose-nom wonder-dec
 'I wonder about the purpose that it is thought that Bob works.'
 b. Bob-i ilha-nun mokcek-i kwungkumha-ta.
 -nom work-adn purpose-nom wonder-dec
 'I wonder about the purpose that Bob works.'

In (24), each adnominal clause only denotes a purpose of the action described by the topmost clause. (24.a) is odd because the purpose of having a belief is unthinkable. It is also the case when *mokcek* 'purpose' is replaced with *iywu* 'reason'. (24.a) would be fine with *iywu* 'reason' because it is possible to have a reason for having a belief, but not with the meaning in which the reason is for Bob's working. In the third type of adnominal clause, the adnominal ending has no index and the CP has no operator.

The differences between the three cases can be captured by the structures in the CPs:

- (25) a. $\text{nun}_i/(\text{u})\text{n}_i$ binding — no island constraints
 b. $\text{nun}/(\text{u})\text{n Op}_i$ movement — subject to island constraints
 c. $\text{nun}/(\text{u})\text{n}$ topmost clauses

Indexing makes an adnominal clause denote a property of things that range over the values for the index, because an indexed gap corresponds to an argument or adjunct and there is no syntactic gap for events or situations.⁵⁾ Thus structures with (25.a) and (25.b) are not cases where

5) An adnominal clause with an indexed adnominal ending and an adnominal clause with an indexed operator are interpreted as follows:

i. $\llbracket \alpha\text{-nun}_i/(\text{u})\text{n}_i \rrbracket^{\text{w.g}} = \lambda_{\text{X}} \llbracket \alpha \rrbracket^{\text{w.g}[x/i]}$
 $\llbracket \alpha\text{-nun}/(\text{u})\text{n Op}_i \rrbracket^{\text{w.g}} = \lambda_{\text{X}} \llbracket \alpha \rrbracket^{\text{w.g}[x/i]}$

The meaning of an adnominal clause is a property of things that the index i can take to verify the clause α .

becomes odd:

- (28) a. ??sayngsen-i tha-ci anh-nun naymsay
 fish-nom burn-nml not-adn_i smell
 ‘the smell that arises from a fish not burning’
 b. ??macha-ka cinaka-ci ahn-un cakwuk
 coach-nom pass-nml not-adn_p track
 the track that remains from a coach not passing

The reason is that the things that are denoted by the head nouns result from the events described by the verbs in the adnominal clauses. Without such events, no smell or track arises.

However, there are cases where negation does not affect the acceptability of a CRC, as pointed out in Yeom (2015). This was illustrated in (12). This shows that the adnominal clauses do not need to denote things that are related to the events denoted by the VPs in the adnominal clauses. The clauses describe situations in which there are no events described by the VPs. Therefore, in a CRC, we can assume that the adnominal clause denotes a situation which may, or may not, be different from an event introduced by a VP.

The difference can be traced to the distinction of what is described by a VP and what is described by a clause. For convenience’s sake, I will use the term **situation** for what is described by a clause as a whole, in comparison with the term **event**, which is reserved for what is described by a VP. If an event and a situation are distinguished, I need to show how an event and a situation are introduced in the process of interpretation. In the standard semantics, the meaning of a VP is a property of events (or, eventualities, including states). A situation described by a clause is spatio-temporally related to an event described by the VP in it. To capture the relations, the variable for situations must be introduced when the variable for events is closed:

- (29) $\llbracket_{VP} \alpha \rrbracket = \lambda w \lambda e [a'w(e)]$
 $\llbracket_{[ASP] [VP \alpha] \beta} \rrbracket = \lambda w \lambda s \lambda t \exists e [s \sqsubseteq w \ \& \ a'_w(e) \ \& \ R(\tau(e), t) \ \& \ \sigma(e) \sqsubseteq \sigma(s) \ \& \ \tau(e) \sqsubseteq \tau(s) = t]$
 ($\sigma/\tau(e)$: the spatial/temporal location of e , R : one of the relations in $\{\subset, =, \supset\}$)
 (Or, simply, $\lambda w \lambda s \lambda t \exists e [s \sqsubseteq w \ \& \ a'_w(e) \ \& \ R(\tau(e), t) \ \& \ e \sqsubseteq s = t]$)

A situation is a segment of a world. R is a relation between two times, which is dependent on the aspectual property of the event.⁶⁾ However, in the discussions below, I will ignore the interpretation of an aspect or a tense. The relation between an event introduced by a VP and a situation described by a clause is captured by the spatial function σ and the temporal function τ which take an event/situation and yields its spatial location and temporal location, respectively. If a situation contains many events, a situation described by a clause can be the collective sum of the events described by the VP. But if a situation includes a single event, then the situation is the same as the event. The inclusion relation between a situation and an event can be represented simply as “ $e \sqsubseteq s$ ”, assuming that e and s can represent either a situation/event or their spatio-temporal location.⁷⁾ And even if the existence of an event denoted by a VP is negated, the resulting situation is believed to hold only at the same spatio-temporal location in which events denoted by the VP are considered.

From the discussions so far, we can characterize CRCs as follows:

- (30) CRCs are adnominal clauses that denote a property of situations but combine with a head noun that denotes a property of objects.

If CRCs are defined as situation-denoting adnominal clauses combined with an object-denoting head noun, the range of CRCs gets bigger than any previous analyses assume. The type mismatch between the denotations of an adnominal clause and the head noun needs to be resolved in Korean. The question is how various CRCs can be interpreted. This is discussed in the next section.

6) If a VP denotes a state, the event time includes the reference time. If a VP denotes an event, the reference time includes the event time.

7) This is rather a sloppy way of using symbols, but I do not think this would lead to any significant confusion.

4. Conversion from Situations to Things

4.1. Basic tools of analysis

A CRC is characterized as an adnominal clause that denotes a property of situations which needs to be converted to a property of things. The crucial property of a CRC is that the clause does not include a gap for a thing that the head noun can denote. That is, there are missing links between the meaning of the adnominal clause and that of the head noun. Consequently, we need to insert some meaning components to fill the missing links when the NP is interpreted. In this process, we need to consider pragmatic factors, but this should also be done systematically. One analysis that allows such a systematic account is the GL Theory.

The goal of the Theory is to predict how a word meaning changes in different contexts when it composes with the meanings of other expressions, by specifying the meanings of expressions richly enough to cover all possible interpretations. For a richer specification of meaning, the GL consists of four main components. (A) The lexical typing structure gives a type for a word positioned within a type system. (B) The argument structure specifies the number and nature of the arguments of a predicate. (C) The event structure defines the event type of the expression and any subevents it may have. Much of the three meaning components was discussed before the Theory is proposed. (D) I suppose that the main contribution of the GL Theory is to include the qualia structures in the meaning specifications of a word to capture a structural differentiation of the predicative force for a lexical item. And the discussion below is more concerned with the qualia structures of expressions.

A qualia structure includes four components, again. The Formal qualia is the component that positions the meaning of a word within a larger domain. That is, it encodes taxonomic information about the lexical item. The Constitutive qualia specifies the relation between an object and its material or constituent parts. One object is part of a larger object, or one object is made of smaller objects or materials. The Constitutive qualia specifies such relations. The Telic qualia specifies the purpose or function of the object, if there is one. The Agentive qualia specifies how the object comes into being.

The four main meaning components are provided as basic materials to deal with in the process of compositional interpretation. The generative aspects are expressed by three rules. Type coercion applies when an argument of a predicate is not of the typical semantic type that the predicate requires. In such a case, the argument is converted to the typical type the predicate selects for, with the help of some meaning component of the argument, often with the help of the qualia structure. Selective binding is another rule that makes a generative interpretation. The meaning of a word is underspecified and when the word combines with an expression, it is interpreted by applying the meaning of the word to some meaning component of that expression. Co-composition is a process that creates a new meaning by more than one function application when the meanings of two expressions are conjoined.

I cannot illustrate the whole system of the GL Theory. I will give a couple of examples:

(31) Bob began a novel.

The verb *begin* selects for an event argument, but the actual argument is an object-denoting NP. Type coercion applies to this case to resolve the type mismatch, and with the help of the Telic quale or the Agentive quale of the object *a novel*, we get the meaning that Bob began {reading, writing} a novel.

The following example illustrates the rule of co-composition:

(32) a. Bob baked a potato.
 b. Bob baked a cake.

(32.a) is an example of a typical use of *bake*, but (32.b) has the meaning that Bob baked something and made a cake. The meaning of creation arises because the Agentive quale of *cake* includes the meaning of *bake something*. That is, a cake is what is created by baking something else. Thus the object *a cake* plays the role of taking the basic meaning of *bake* and yielding a new meaning of creation.

As illustrated in the two examples, the qualia structure plays an important role in interpreting a complex expression in a generative way. Since a CRC arises when the meaning of the clause itself is not compatible with an object-denoting head noun, we need a generative way of combining them. Thus it is expected that the qualia of the two expressions play an important role. In the next subsection, I will discuss various cases of CRCs and show how CRCs get the meaning of a property of things. One thing to mention is that I do not intend to claim that the GL Theory is required to account for CRCs or that I can provide one single consistent way of accounting for CRCs in the framework of the GL Theory. I adopt the GL Theory because it provides the tools that allow us to deal with CRCs more precisely. It turns out that there is no consistent way of dealing of CRCs. This implies that the GL Theory is necessary but not sufficient to deal with CRCs. At the moment, we have to admit that it is the best tools prepared to deal with CRCs.

4.2. CRCs and various ways of interpretations

Since they do not allow a mood marker, CRCs denote properties of situations that are closely related to the denotations of the head nouns. Since a NP modified by a CRC denotes a property of things denoted by the head noun, we need a mechanism that converts a property of situations into a property of things. In this section, I will show how.

One main distinction is whether the head noun is relational or not. First, I will look at cases where the head noun is relational. Zhang (2008) claims that in Chinese, a CRC is possible when it modifies a relational noun. When a head noun is relational, the meaning of the adnominal clause is likely to fill the position of the implicit argument of the head noun. I will start with the simplest case. (15) can be interpreted as follows:

$$\begin{aligned}
 (15') \quad \llbracket \text{cha-ka se-n} \rrbracket &= \lambda w \lambda s \exists x [s \sqsubseteq w \ \& \ \text{car}_w(x) \ \& \ \text{stop}_w(s,x)] \\
 \llbracket \text{iywu} \rrbracket &= \lambda w \lambda y \lambda x [\text{reason}_w(y,x)] \\
 \llbracket \text{cha-ka se-n iywu} \rrbracket \\
 &= \lambda w \lambda y \exists s \exists x [s \sqsubseteq w \ \& \ \text{car}_w(x) \ \& \ \text{stop}_w(s,x) \ \& \ \text{reason}_w(y,s)]
 \end{aligned}$$

In this case, since a situation includes a single event, the situation is the same as the event. The noun *iywu* ‘reason’ is a relational noun and the implicit argument is directly filled with the event/situation described by the adnominal clause.

This meaning relation can be captured by the following rule:

- (33) If α denotes a property of situations and β is a relational noun, then
 $\llbracket \beta \rrbracket = \lambda w \lambda x \lambda y [R_w(y, x)]$ is converted into $\lambda w \lambda P \lambda y \exists s [P_w(s) \ \& \ R_w(y, s)]$.
 That is, $\llbracket [_{NP} [_{CP} \ \alpha] \ \beta] \rrbracket = \lambda w \lambda x \exists s [\llbracket \alpha \rrbracket^w(s) \ \& \ \llbracket \beta \rrbracket^w(x, s)]$

α is an adnominal clause and β is the relational head noun. In this case, no quale is involved in the interpretation process. Thus the resulting meaning can be represented by the meaning of the two expressions.

A similar process can account for the following cases:

- (34) Bob-i sayngsen-ul tatum-un {mokcek, mosup, cangmyen}
 -nom fish-acc dress-adn_p {purpose, figure, scene }
 ‘the {purpose, figure, scene} that Bob dressed fish’

The relation between the situation described by the adnominal clause and the denotations of the head nouns can be diverse, but in the process of interpretation, the meaning of the relational head noun takes the meaning of the adnominal clause to saturate the implicit argument and yields a property of things.

But there are similar but slightly different cases where the implicit argument of a relational noun is filled a little indirectly:

- (35) Bob-i_i [[e_i sayngsen-ul tatum-un]_{CP} swukopi-lul]_{NP} pat-ass-ta.
 -nom fish-acc dress-adn_p reward-acc receive-pst-dec
 ‘Bob got the reward for dressing fish.’

- (36) a. $\llbracket \text{Bob-i sayngsen-ul tatum-un} \rrbracket$
 $= \lambda w \lambda s \exists x [s \sqsubseteq w \ \& \ \text{fish}_w(x) \ \& \ \text{dress}_w(s, \text{bob}, x)]$
 b. $\llbracket \text{swukopi} \rrbracket = \lambda w \lambda y \lambda x [\text{reward}_w(x, y)]$
 c. $a+b = \lambda w \lambda x \exists s \exists y \exists z \exists e' [s \sqsubseteq w \ \& \ \text{reward}_w(x, s) \ \& \ \text{fish}_w(y) \ \& \ \text{dress}_w(s, \text{bob}, y) \ \& \ \text{PAY-FOR}_w(e', z, x, s) \ (\& \ \text{CAUSE-INTO-BEING}(e', x))]$

The noun *swukopi* ‘reward’ is relational and the adnominal clause is supposed to provide an argument for the noun. But this meaning relation needs to be established pragmatically. A crucial relation is the Agentive qualia, which is specified with the predicate PAY-FOR, in the meaning specification of *swukopi* ‘reward’: $\llbracket \text{swukopi} \rrbracket = \lambda y \lambda x [\text{reward}(x,y) \ \& \ \text{Agentive qualia} = \exists e \exists z [\text{PAY-FOR}(e,z,x,y)] \ \dots]$, where $\text{PAY-FOR}(e,z,x,y)$ is ‘there is an event e in which z pays x for y ’. A reward comes into being when there is something laborious and someone who does it is paid for the laborious work. Since $\text{PAY-FOR}_w(e', z, x, s)$ causes x into being, we could add the meaning component ‘CAUSE(e',x)’. The adnominal clause provides the laborious activity for which a reward is paid. For this reason, we get the meaning of a cause-effect relation between the situation described by the adnominal clause and the denotation of the head noun. But this meaning component does not have to be specified because it comes from the fact that the relevant qualia is an agentive qualia.

More generally, in this type of interpretation, the head noun takes the meaning of the adnominal clause and generates the meaning of cause-effect via co-composition:

- (37) If α denotes a property of situations and β is a relational noun, then
 $\llbracket [\text{NP} [\text{CP } \alpha] \beta] \rrbracket = \lambda w \lambda x \exists e \exists e' [\llbracket \alpha \rrbracket^w(e) \ \& \ \llbracket \beta \rrbracket^w(x,e) \ \& \ \text{Ag}_\beta(e', \dots, x, \dots)]$, where
 Ag_β is a predicate included in the Agentive quale of β .

In this way, the meaning of one expression applies to the meaning of another and generates a new meaning of the cause-effect relation. This type of analysis can apply to the following examples too:

- (38) a. *motwu-ka keyulu-n tayska*
 everyone-nom be.lazy-adn cost
 ‘the cost that is paid for everyone being lazy’
 b. *salangha-nun i-lul ponay-nun sulphwum*
 love-adn person-acc send-adn_i sorrow
 ‘The sorrow that (one feels when) one sends someone one loves’

In these examples, the adnominal clauses provide an argument for the

predicates that are introduced by the Agentive quales in the meaning specifications of the head nouns.

Next, consider cases where the head noun is not relational. The existence of such cases is evidence against Zhang's (2008) analysis. (8) is such an example. The adnominal clause and the head noun are primarily interpreted as follows:

- (39) a. 『Bob-i sayngsen-ul pha(l-u)n』
 = $\lambda w \lambda s \exists x \exists e [s \sqsubseteq w \ \& \ \text{fish}_w(x) \ \& \ \text{sold}_w(e, \text{bob}, x) \ \& \ e \sqsubseteq s]$
 $\simeq \lambda w \lambda s \exists x [s \sqsubseteq w \ \& \ \text{fish}_w(x) \ \& \ \text{sold}_w(s, \text{bob}, x)]$
 b. 『ton』 = $\lambda w \lambda x [\text{money}_w(x)]$
 c. a+b = $\lambda w \lambda x \exists s \exists e' \exists x [s \sqsubseteq w \ \& \ \text{fish}_w(x) \ \& \ \text{sold}_w(s, \text{bob}, x) \ \& \ \text{money}_w(x) \ \& \ e' \sqsubseteq s \ \& \ \mathbf{GOT}_w(e', \text{bob}, x)]$

In the meaning of the NP, the meaning component ‘ $\text{MONEY}_w(x) \ \& \ \mathbf{GOT}_w(e', \text{bob}, x)$ ’ is provided by the Telic qualia in the meaning specification of the verb *phal* ‘sell’ in the adnominal clause. The MONEY part is replaced by the meaning of the head noun. The pattern of interpretation can be given as follows:

- (40) If α denotes a property of situations and β is an object-denoting noun, then
 『 $[_{NP} [_{CP} \alpha] \beta]$ 』 = $\lambda w \lambda x \exists s \exists e [[\alpha]^w(s) \ \& \ [\beta]^w(x) \ \& \ \text{Te}_a(e, \dots, x, \dots)]$, where
 Te_a is a predicate in the Telic quale of α .

In this case, the meaning of the adnominal clause takes the meaning of the head noun and generates the meaning of the relation of event-purpose because the new predicate comes from the Telic quale.

Here I need to mention Lee & Lee's (2012) analysis, because they discussed the same phenomenon. They claim that in this case, the Agentive qualia of the meaning of the head noun is involved. But this is problematic in various respects. They claim that the Agentive qualia introduces a predicate like *pel* ‘earn’. But then the following two examples would be both fine:

- (41) a. ??kosaynggha-n ton
 endure.handships-adn_p money
 ‘money that one endures hardships’

- b. kosaynghay-se pe(l)-n ton
 endure.handships-and earn-adn_p money
 ‘money that one earns by enduring handships’

If the Agentive quale of the head noun were added, (41.a) would become fine, as shown in (41.b). But this is not the case.

One more piece of evidence that what is involved is the Telic qualia in the meaning of the VP of the adnominal clause is that when the VP is replaced with a different one, the sentence can be odd:

- (42) ?[[Bob-i sayngsen-ul tatum-un]_{CP} ton]_{NP}
 -nom fish-acc dress-adn_p money
 ‘the money that (Bob got when) he dressed fish’

The verb *tatum* ‘dress’ does not include a Telic qualia which relates the event to money. This means that the event of dressing fish is not necessarily related to making money. This makes (42) a little odd. This shows that the relevant quale is provided by the adnominal clause, not by the head noun. The differences in (8), (41), and (42) arise from the different adnominal clauses. This indicates that what is relevant is a quale provided by the adnominal clause, not a quale from the head noun.

There are cases where the act denoted by the head noun causes the event or situation denoted by the adnominal clause due to a Telic qualia:

- (43) tali-ka thunthunhayci-nun wuntong
 leg-nom get.strong-adn_i exercise
 ‘exercise that (makes) legs strong’

- (44) a. [[tali-ka thunthunhayci-nun]][§]
 = $\lambda w \lambda s \exists y \exists x [s \sqsubseteq w \ \& \ \text{leg}_w(x,y) \ \& \ \text{get.strong}_w(s,x)]$
 b. [[wuntong]] = $\lambda w \lambda e \exists y [\text{exercise}_w(e,y)]$
 (y corresponds to the person who exercises.)
 c. [[tali-ka thunthunhayci-nun wuntong]]
 = $\lambda w \lambda e \exists s \exists x \exists y [s \sqsubseteq w \ \& \ \text{leg}_w(x,y) \ \& \ \text{get.strong}_w(s,x) \ \& \ \text{exercise}_w(e,y)]$

In (44), the Telic qualia of the head noun *wuntong* ‘exercise’ involves

something getting strong, which corresponds to the situation described by the adnominal clause. Thus the situation described by the adnominal clause is understood as the purpose of exercise. Thus we can add the meaning component like ‘FOR-PURPOSE-OF(e,s)’, which I will ignore here. From this, we get the pragmatic meaning that doing exercise leads to physical strengthening. One can think that the Agentive qualia of the verb *thunthunhayci* ‘get strong’ in the adnominal clause involves doing exercise. But getting strong is not necessarily defined for physical strengthening.⁸⁾ More generally, the pattern can be specified as follows:

- (45) If α denotes a property of situations and β is an event-denoting noun, then
 $\llbracket \text{NP} [\text{CP } \alpha] \beta \rrbracket = \lambda w \lambda e \exists s \exists e' (\exists e'') [\llbracket \alpha \rrbracket^w(s) \ \& \ \llbracket \beta \rrbracket^w(e) \ \& \ \text{Te}_\beta(e'', s, e, \dots)]$.

Each of the adnominal clause and the head noun takes the meaning of the other and we get the meaning of the event-purpose relation between the head noun and the adnominal clause.

A little more complex case is (17). The head noun is an object-denoting noun and the existence of a book does not have a direct relation to the event of getting smarter. To get smarter, the possessor needs to read it, and the event of reading is involved in the Telic qualia in the meaning specifications of *chayk* ‘book’. Now reading a book can be related to a situation that the reader gets smart. We can suppose that a person gets smart by some mental activity, which reading a book belongs to. Thus we can assume the Agentive quale = ‘MENTAL-EXERCISE(e) & DO(e',x,e)’, which is replaced with READ(e,x,z) in (46):

- (46) $\llbracket \text{meli-ka cohaci-nun} \rrbracket$
 $= \lambda w \lambda s \exists x \exists y [s \sqsubseteq w \ \& \ \text{brain}_w(y,x) \ \& \ \text{become.smart}_w(s,x)]$
 $\llbracket \text{chayk} \rrbracket = \lambda w \lambda x [\text{book}_w(x)]$
 $\llbracket \text{meli-ka cohaci-nun chayk} \rrbracket$
 $= \lambda w \lambda z \exists s \exists e \exists e' \exists x \exists y [s \sqsubseteq w \ \& \ \text{brain}_w(y,x) \ \& \ \text{become.smart}_w(s,x) \ \& \ \text{book}_w(z) \ \& \ \text{READ}_w(e,x,z)]$

8) We can think of the following example:

i. kyengcey-ka thunthunhayci-ess-ta.
 economy-nom get.strong-pst-dec
 ‘The economy got strong.’

Since the Agentive quale is involved, we get the meaning that reading a book causes becoming smart. The pattern can be given as follows:

- (47) If α denotes a property of situations and β is an object-denoting noun, then
 $\llbracket \text{NP} [\text{CP } \alpha] \beta \rrbracket = \lambda w \lambda x \exists s \exists e' \exists e'' [\llbracket \alpha \rrbracket^w(s) \ \& \ \llbracket \beta \rrbracket^w(x) \ \& \ \text{Te}_\beta(e', \dots, x) \ \& \ \text{Ag}_\alpha(e'', e', s)].$

The Telic quale for the head noun introduces an event e' , which causes the situation s described by the adnominal clause.

The following example involves more complex processes of interpretation:

- (48) son-ul an ssis-eto.toy-nun kansik
 hand-acc not wash-may-adn_i snack
 'snacks such that a person who eats them with a hand does not have to wash the hand'

The intended meaning of the NP needs to be filled with extra meanings that are not overtly expressed. To obtain the intended meaning, we need to consider more meaning components in the meaning specifications of the head noun:

- (49) $\llbracket \text{son-ul an ssis-eto.toy-nun} \rrbracket$
 $= \lambda w \lambda s \exists x \exists y [s \sqsubseteq w \ \& \ \text{hand}_w(y, x) \ \& \ \exists w' [w' \in \text{Dn}(w) \ \& \ \neg \exists e [\text{wash}_w(e, x, y) \ \& \ e \sqsubseteq s]]]$ ⁹⁾
 (Dn(w) is a set of deontic alternatives to w.)
 $\llbracket \text{kansik} \rrbracket = \lambda w \lambda z [\text{snacks}_w(z)]$

We need to connect snacks and situations in which we do not need to wash our hands. First, the Telic qualia for *kansik* 'snacks' introduces a verb 'eat'. Next, a quale needs to introduce a (bare) hand as an instrument argument for eating:

9) A permission statement is interpreted as an existential quantification over deontic alternatives, but the adnominal clause needs to denote a situation. For this reason, I added the condition that $s \sqsubseteq w$, and abstracted over s to get the meaning of a property of situations. This can be supported by the following example:

i. na-nun haksayng-tul-i chwulsekha-ci anha-to.toy-nun sanghwang-ul cikhyepo-ass-ta.
 I-top student-pl-nom be.present-nml not.do-may-adn situation-acc see-pst-dec
 'I saw the situation that students did not have to be present at class.'

- (50) $\lambda w \lambda z \exists x \exists y \exists z \exists s \exists e [\text{snacks}_w(z) \ \& \ e \sqsubseteq s \sqsubseteq w \ \& \ \text{EAT}_w(e, x, z) \ \& \ \text{HAND}_w(y, x) \ \& \ \text{WITH}(e, y) \ \& \ \text{hand}_w(y, x) \ \& \ \exists w' [w' \sqsubseteq \text{Deon}(w) \ \& \ \neg \exists e' [\text{wash}_w(e', y, z) \ \& \ e' \sqsubseteq s]]]$

Here, in a situation s , there are a lot of events e of eating snack and no events e' of washing hands. In order to capture this relation, I need to introduce a generic operator, but I will ignore it. What I want to note is that a hand is newly introduced as the instrument, and that the hand denoted by the explicitly expressed word *son* ‘hand’ in the adnominal clause is anaphorically bound by the hand as the instrument. Thus the repeated meaning component $\text{hand}_w(y, x)$ is crossed out in the meaning representation.

One thing to note in particular is that the hand introduced as an instrument by the head noun is not specified in the major four qualia structures of the meaning specifications for the head noun. To deal with such cases, we need secondary qualia structures in addition to the main four qualia structures. I cannot deal with the secondary quale formally, and I will not give the general pattern for this case.

I have discussed six cases of CRCs, but I do not think it covered all possible cases. Despite the limited number of cases, the ways to get the intended readings require various meaning components to be involved. Here is the summary of the discussions:

- (51) 1. when the head noun is a relational noun:
- A. the property of situation denoted by the adnominal clause directly becomes the argument of the implicit of the head noun:

$$\llbracket [\text{NP} [\text{CP } \alpha] \beta] \rrbracket = \lambda w \lambda x \exists e [\llbracket \alpha \rrbracket^w(e) \ \& \ \llbracket \beta \rrbracket^w(x, e)]$$
 - B. the property of situations denoted by the adnominal clause corresponds to the Agentive qualia of the head noun:

$$\llbracket [\text{NP} [\text{CP } \alpha] \beta] \rrbracket = \lambda w \lambda x \exists e \exists e' [\llbracket \alpha \rrbracket^w(e) \ \& \ \llbracket \beta \rrbracket^w(x, e) \ \& \ \text{Ag}_\beta(e', \dots, x, \dots)]$$
2. when the head noun is a non-relational noun:
- A. the denotation of the head noun can become an argument of the predicate introduced by the Telic qualia of a situation denoted by the adnominal clause:

$$\llbracket [\text{NP} [\text{CP } \alpha] \beta] \rrbracket = \lambda w \lambda x \exists s \exists e [\llbracket \alpha \rrbracket^w(s) \ \& \ \llbracket \beta \rrbracket^w(x) \ \& \ \text{Te}_\alpha(e, \dots, x, \dots)]$$
 - B. the denotation of the adnominal clause corresponds to the Telic qualia of the event denoted by the head noun:

$$\llbracket [\text{NP} [\text{CP } \alpha] \beta] \rrbracket = \lambda w \lambda e \exists s \exists e' (\exists e'') [\llbracket \alpha \rrbracket^w(s) \ \& \ \llbracket \beta \rrbracket^w(e) \ \& \ \text{Te}_\beta(e'', s, e, \dots)]$$

- C. the head noun introduces an event by the Telic qualia that its meaning contains and with the newly introduced event, the NP has the same meaning relations as in 2.B:

$$\llbracket \llbracket_{\text{NP}} \llbracket_{\text{CP}} \alpha \rrbracket \beta \rrbracket \rrbracket = \lambda w \lambda x \exists s \exists e' \exists e'' [\llbracket \alpha \rrbracket^w(s) \ \& \ \llbracket \beta \rrbracket^w(x) \ \& \ \text{Telic}(e', \dots, x) \ \& \ \text{Ag}_s(e'', e', s)]$$
- D. the head noun introduces an event by the Telic qualia in its meaning specifications and the event introduces an additional argument by a secondary qualia.

As the descriptions of the six cases show, there is no singular way of interpreting CRCs. This is due to pragmatic factors that are involved in connecting a situation described by the adnominal clause and the denotation of the head noun. The only generalization is that a NP with a CRC involves a type mismatch, and that to resolve the type mismatch, the denotation of a CRC, which is a property of situations, has to be converted to a property of things by existentially closing the situation variable and adding some meaning components linking a situation to a thing, with the help of some major and secondary qualia structures of the head noun or the VP in the adnominal clause.

4.3. What pragmatics determines

Despite the complexity of pragmatic factors, there should be restrictions in considering the pragmatic factors. Consider the examples in (6), which is repeated here for convenience:

- (6) a. ??mayil wuntong-ul ha-n kenkang
 every.day exercise-acc do-adn_p health
 ‘health that one gets when one exercises every day’
- b. ??myoki-lul silphayha-n sangche
 stunt-acc fail-adn_p wound
 ‘a wound that one gets when one fails in a stunt’

Pragmatically, it is plausible to assume that there is a cause-effect relation between exercising every day and becoming healthy and between failing in an acrobatic stunt and getting a wound. But the two examples are

unacceptable. They can be compared with the following:

- (52) a. mayil wuntong-ul ha-n thunthunha-n tali
 every.day exercise-acc do-adn_p be.strong-adn leg
 ‘strong legs that one gets when one exercises every day’
- b. kyeytan-eyse nemeci-n sangche
 staircase-at fall-adn_p wound
 ‘the wound that one gets when one falls at a staircase’

These examples are acceptable. This indicates that even though there are pragmatic factors involved in interpreting CRCs, the interpretations should be constrained somehow so that those in (6) and those in (52) can be differentiated.

The GL Theory constrains possible interpretations through the meaning specifications of expressions. Which qualia is adopted in interpretation is a pragmatic matter, and we need to consider the context in choosing which one to use, but each qualia is not specified based on the vague notion of pragmatic plausibility. To get strong legs, we need to exercise. That is, the Telic quale of *wuntong* ‘exercise’ can be assumed to make something strong or make someone do well in doing something. On the other hand, exercising and health are not directly related. The Telic quale of *wuntongha* ‘do exercise’ is not related to the overall health of someone who does exercise. Similarly, the Agentive quale of *sangche* ‘wound’ is a thing that arises from an event that causes cutting or breaking skin. Falling to the ground can be considered such an event, but failing in performing a feat is not considered such an event. This should come from the meaning specification of *myoki* ‘feat’, which does not necessarily require a physical event that can cause cutting or breaking skin.

Similarly, we have seen in (8), (38), and (42) that it is a crucial factor whether a certain qualia or an argument is specified in a lexicon. The common noun *tayska* ‘reward’ is a relational noun, but *ton* ‘money’ is not. And the verb *phal* ‘sell’ provides the Telic qualia of making money, but the verb *tatum* ‘dress’ does not. This shows that even though pragmatic factors are considered in interpreting CRCs, the acceptability of a CRC

is determined by the precise specifications of the meanings of expressions. In this respect, we must admit the effectivity of the GL Theory in accounting for CRCs.

5. Conclusion

In this paper, I try to specify the range of CRCs on the basis of their structural and semantic properties. This has the effect of widening the range of CRCs. This causes more complexity in interpreting CRCs. I tried to cover various cases of CRCs, though not the entire range of them, in the framework of the GL Theory. I showed that there is no unique way of interpreting CRCs, but that we need to apply various mechanisms allowed in the GL Theory, to cover various cases of CRCs. This does not mean that the GL Theory is not necessary to analyze CRCs in that the Theory explains what CRCs are allowed and what CRCs are not.

However, there are cases where the basic tools that the GL Theory provides are not sufficient to deal with CRCs, as we saw in (40). In CRCs, we need to fill up some missing links between the situation described by the adnominal clause and the denotation of the head noun. In most cases, the missing links can be filled by the mechanisms provided by the GL Theory. But to cover cases like (48), the GL Theory needs to be extended somehow, and it should be done in a restricted way. This issue is beyond the scope of this paper. And there are other issues that are not dealt with in this paper. For example, if a CRC has a conjoined structure and the head noun is related to one conjunct, the NP becomes odd. This shows that the interpretation of a CRC is not simply a matter of filling some missing links. For this reason, I can say that the GL Theory is necessary, but not sufficient, to deal with CRCs.

References

- Cha, Jong-Yul. (1997). Type-hierarchical Analysis of Gapless Relative Clauses in Korean. *Paper presented at the 4th International Conference on HPSG*. Cornell University.
- _____ (2005). *Constraints on Clausal Complex Noun Phrases in Korean with Focus on the Gapless Relative Clause Construction*. doctoral dissertation. University of Illinois at Urbana-Champaign.
- Collins, Chris. (2015). Gaps, ghosts and gapless relatives in spoken English. *Studia Linguistica* Volume 69, Issue 2, pages 191-235.
- Fiorentino, Giuliana. (2007). European relative clauses and the uniqueness of the Relative Pronoun Type. *Rivista di Linguistica* 19.2, 263-291.
- Kim, Alan Hyun-Oak. (1999). Oblique Cases and VP Truncation in the So-Called Gapless Relative Clauses. *Presented at the Conference on Korean Linguistics, LSA Summer Institute*, University of Illinois at Urbana-Champaign.
- Kuno, Susumu. (1973). *The Structure of Japanese Language*. MIT Press.
- Lee, Chungmin and Jeong-Shik Lee. (2012). Gap in “Gapless” Relative Clauses in Korean and Other Asian Languages. *UCLA Working Papers in Linguistics, Theories of Everything* Volume 17, Article 25: 204-214.
- Matsumoto, Yoshiko. (1989). Japanese-Style Noun Modification ... in English. *Proceedings of the Fifteenth Annual Meeting of the Berkeley Linguistics Society*, pp. 226-237.
- _____ (1990). The Role of Pragmatics in Japanese Relative Clause Constructions. *Lingua* 82: 111-129.
- _____ (1997). *Noun-Modifying Constructions in Japanese: A Frame-Semantics Approach*. Amsterdam: John Benjamins.
- Pustejovsky, James. (1995). *The Generative Lexicon*, MIT Press, Cambridge, MA.
- _____ (2005). *Meaning in Context: Mechanisms of Selection in Language*, MIT Press, Cambridge.
- Sirai, Hidetosi and Takao Gunji. (1998). Relative Clauses and Adnominal Clauses. *Topics in Constraint-based Grammar of Japanese*, 17-38. Kluwer Academic Publishers.
- Yeom, Jae-Il. (2015). Gapless Adnominal Clauses in Korean and their Interpretations. *Language Research* 51.3, 597-627.
- Zhang, Niina. (2008). Gapless Relative Clauses as Clausal Licensors of Relational Nouns. *Language and Linguistics* 9.4:1005-1028, 2008.

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