

# Internally-Headed Relatives Instantiate Situation Subordination\*

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## 1. Introduction

Korean is one of the languages that have the Internally Headed Relative Clause (IHRC) construction, in addition to the more familiar Externally Headed Relative Clause (EHRC) construction.<sup>1</sup> IHRCs in Korean are gapless, as the semantic head noun is contained inside, and they are always followed by the grammatical element *kes*, which is best analyzed as a pronoun (see C. Chan and J. Kim 2003, M. Kim to appear, among others). Compare (1) and (2) ('e' below indicates an empty category or a gap).<sup>2</sup>

(1) EHRC construction:

John-un	[ <sub>DP</sub> [e <sub>i</sub>	tomangka]-nun	<b>totwuk<sub>i</sub>]-ul</b>	cap-ess-ta
J.-top	[ [___	run.away]-rel.imprf	<b>thief]-acc</b>	catch-pst-decl

'John caught a/the thief who was running away.'

(2) IHRC construction:

John-un	[ <sub>DP</sub> [ <b>totwuk<sub>i</sub>-i</b>	tomangka]-nun	<b>kes<sub>i</sub>]-ul</b>	cap-ess-ta
J.-top	[ [ <b>thief-nom</b>	run.away]-rel.imprf	<b>kes]-acc</b>	catch-pst-decl

'John caught a/the thief, who was running away.'

The IHRC construction in Korean provides us with a unique opportunity to investigate the principles that govern the mapping between syntax and semantics, as there

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<sup>1</sup> The IHRC construction is found in languages such as Japanese, Quechua, Lakhota, Navajo, Yuman languages which tend to be head-final. See, among others, Cole 1987, Williamson 1987, Culy 1990, Basilico 1996, Grosu and Landman 1998.

<sup>2</sup> For the transcription of the Korean data, the following abbreviations are used:  
acc: accusative; cl: classifier; comp: complementizer; conj: conjunction; cop: copular verb; dat: dative case; decl: declarative sentence ending; fut: future tense; gen: genitive case; imprf: imperfective aspect; inst: instrumental case; loc: locative; nom: nominative case; pass: past tense; prst: present tense; prf: perfective aspect; prg: progressive aspect; rel: relative marker; top: topic.

appear to be discrepancies between its form and meaning (Ohara 1993, Y. Kim 2002). First, although an IHRC is located inside a DP, it is interpreted like an independent sentence, as the English translation for (2) suggests. Second, the semantic head is buried inside the IHRC, but it is interpreted in such a way that it seems to serve as an argument of the embedding predicate; for example, in (2), what John caught was a thief.

In this paper, I propose a way of resolving these syntax-semantics mismatches. I account for the mismatch exhibited by an IHRC by motivating an LF movement of the IHRC: I propose that the RC is a generalized quantifier that operates in the eventuality domain and hence is interpreted in a position higher than its surface position by combining with an event-level denotation of the embedding clause. To solve the other mismatch problem, I propose that the semantic head appears to function as an argument of the embedding predicate because it is indirectly but formally linked to the pronoun *kes*.

## 2. The semantic properties of the IHRC construction in Korean<sup>3</sup>

The IHRC construction in Korean is distinguished from the EHRC construction by a variety of properties. These properties prove challenging to describe.

First, whereas an EHRC restricts the denotation of the semantic head, as illustrated in (3), an IHRC does not, as illustrated in (4) (Jung 1995, Hoshi 1996).

- (3) John-un            [[ e<sub>i</sub> tomangka]-nun            sey    myeng-uy    totwuk<sub>i</sub>]-ul  
 J.-top                [[\_\_ run.away]-rel.imprf    three    cl-gen            thief]-acc  
 cap-ess-ta  
 catch-pst-decl  
 ‘John caught three thieves who were running away.’

- (4) John-un            [[sey myeng-uy    totwuk<sub>i</sub>-i    tomangka]-nun  
 J.-top                [[three cl-gen            thief-nom    run.away]-rel.imprf  
 kes<sub>i</sub>]-ul            cap-ess-ta  
 kes]-acc            catch-pst-decl  
 ‘John caught three thieves, who were running away.’

Since an EHRC reduces the set denoted by the head noun, (3) will be felicitous in a context where there were five thieves running away from the bank and John caught only three of them. But (4) will be false in such a context; it will be true if and only if there were only three thieves running away and John caught all of them. In other words, the content of the IHRC+*kes* string in (4) denotes the maximal entity that satisfies the description of the semantic head (see Shimoyama 1999 for Japanese).

Next, unlike an EHRC, the content of an IHRC restricts the eventuality described by the embedding clause (Kuroda 1976, 1992, Ohara 1993, Y. Kim 2002). To illustrate, compare (5) and (6). These sentences show that an IHRC’s content can restrict the time of the eventuality described by the embedding clause but an EHRC’s content cannot.

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<sup>3</sup> Our discussion will be limited to Korean, but it is assumed that the core part of the proposal carries over to the Japanese IHRC construction.

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- (5) John-un [e<sub>i</sub> tel ik]-un sayngsen<sub>i</sub>-ul mek-ess-ta  
 J.-top [\_\_\_ yet cook]-rel.prst fish-acc eat-pst-decl  
 ‘John ate the fish which was not cooked.’
- (6) John-un [sayngsen-i tel ik]-un kes-ul  
 J.-top [fish-nom yet cooked]-rel.prst kes-acc  
 mek-ess-ta  
 eat-pst-decl  
 ‘John ate the fish when it was not cooked.’

Sentence (5), which illustrates the EHRC construction, will be felicitous in a context where the discourse participants are talking about a particular fish which was uncooked at some point in the past but which got fully cooked at the time when John ate it. But (6) will be true if and only if the fish was uncooked at the time when John ate it.

Consider now (7) and (8). This paradigm shows that unlike an EHRC, the content of an IHRC can stand in a causal relation to the content of the embedding clause.

- (7) John-un [e<sub>i</sub> kangaci-lul ttayli]-n Mary<sub>i</sub>-lul yatanchi-ess-ta  
 J.-top [\_\_\_ puppy-acc hit]-rel.prst M.-acc scold-pst-decl  
 ‘John scolded Mary, who hit a puppy.’
- (8) John-un [Mary-ka kangaci-lul ttayli]-n kes-ul  
 J.-top [M.-nom puppy-acc hit]-rel.prst kes-acc  
 yatanchi-ess-ta  
 scold-pst-decl  
 ‘John scolded Mary because she hit a puppy.’

(7) will be true even if John scolded Mary for not doing her homework. But, for (8) to be true, it must be the case that John scolded Mary because she hit a puppy.

Another notable property of the IHRC construction is that the semantic head varies depending on the context (Kuroda 1992: 153, C. Chung and J. Kim 2003). This property is illustrated by (9), which can be ambiguous in three ways.

- (9) John-un [**koyangi-ka cwi-lul** coch-ko iss]-nun kes-ul  
 J.-top [**cat-nom mouse-acc** chase-comp cop]-rel.imprf kes-acc  
 cap-ess-ta  
 catch-pst-decl  
 ‘A cat was chasing a mouse and John caught the cat.’  
 ‘A cat was chasing a mouse and John caught the mouse.’  
 ‘A cat was chasing a mouse and John caught the cat and the mouse.’

The ambiguity of the above sentence shows that the semantic head of an IHRC is intrinsically indeterminate and hence must be determined by the context in conjunction with the embedding predicate’s semantics.

To summarize, in this section, we saw that the IHRC construction in Korean differs semantically from the corresponding EHRC construction. In the next section, I

propose an analysis which accounts for these distinct properties of the IHRC construction and the two mismatch problems addressed at the outset of the paper.

### 3. Analysis

We begin this section with the semantics of an IHRC, i.e. the embedded clause, and turn to the semantics of *kes*, i.e. the pronoun that follows an IHRC.

#### 3.1. The semantics of an IHRC

In recent literature, the semantics of IHRCs has been studied by several authors. Although the details of these studies differ from each other, they point towards the same direction: IHRCs are quantificational.

First, Strivastav (1991) claims that IHRCs have the same semantics as correlatives: they are generalized quantifiers that denote a function from properties to truth-values. According to Strivastav, correlatives are base-generated adjoined to the embedding clause but they undergo a type-shifting operation where they are converted from entity-denoting terms to generalized quantifiers over the entity domain (p. 661-662).<sup>4</sup>

Second, Fuji (1998) argues that IHRCs in Japanese have the semantics of temporal connectives such as *as soon as* or *immediately after* in English. Within a framework of Discourse Representation Theory (Kamp and Reyle 1993), Fuji posits that the morpheme *no*, which corresponds to *kes* in Korean, is a temporal operator. He proposes that the entire IHRC+*no* string raises at LF to a position higher than the root clause. The two clauses are combined with each other via dynamic conjunction.

Third, Simoyama (1999) claims that IHRCs in Japanese are interpreted like appositives in Demirdache's (1991) system: an IHRC undergoes LF-raising and adjoins to the embedding clause. In this position, the IHRC combines with the embedding clause via a logical connective.

There is no doubt that these quantificational analyses of IHRCs provide genuine insight into the semantics of IHRCs. As they stand, however, they cannot be applied to the semantics of IHRCs in Korean; neither generalized quantifiers that operate in the entity domain (e.g. *every boy*) nor appositive clauses restrict the eventuality described by the embedding clause (see the English translation for (7)). And although the temporal adverbial analysis of IHRCs captures the temporal modifier-like meaning of IHRCs, it fails to account for the cases where the embedded clause bears a causal relation to the embedding clause as we saw in (8).

I offer a new quantificational account of IHRCs which keeps the basic insights of previous research intact but which accommodates the event-restricting semantics of IHRCs in Korean. I claim that the event-restricting semantics of IHRCs in Korean is due to the quantificational semantics of the relative operator (REL). I propose that REL denotes a higher order relation between two sets of eventualities. That is, it is a function that takes a set of eventualities and returns a function that maps another set of eventualities onto truth-values, as given in (10).

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<sup>4</sup> But Strivastav does not make it explicit whether IHRCs have an identical surface structure as correlatives.

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- (10)  $[[REL]] = \lambda f_{\langle s,t \rangle} \lambda g_{\langle s,t \rangle} \text{there is an eventuality } s \text{ such that } f(s) = 1 \text{ and } g(s) = 1,$   
 where  $s$  ranges over eventualities (undefined if there is no  $x$  such that  $f(x) = 1$ ).

As will be shown below in Section 3.3., I posit that the first argument of REL is saturated by the denotation of the embedded clause and its second argument is saturated by an event-level denotation of the embedding clause. Hence, the IHRC, which consists of the embedded clause and REL, has the semantics of a generalized quantifier over the eventuality domain (compare Strivastav 1991).

**3.2. The semantics of *kes***

In recent literature, it has been claimed that the IHRC construction in Korean employs an E-type pronoun strategy (M. Kim to appear; see Hoji 1996, Shimoyama 1999, Matsuda 2002 for Japanese). Under an analysis that treats *kes* as a pronoun, what this means is that *kes* denotes a function that takes a salient property recovered from context and returns the unique, maximal entity that has that property.

Treating *kes* as an E-type pronoun captures both the maximality effect and the context-dependency of its value we saw in (4) and (9), respectively. But it turns out that this analysis is too unconstrained: it predicts that the descriptive content of *kes* can be provided by any salient property in the discourse context, but this property can come only from the content of the embedded clause. To illustrate, consider (11) (see Shimoyama 2002: 130 for Japanese).

- (11) Context: John and Mary are married. Mary does all the shopping for the house and John arranges things when she comes back from shopping.

- |    |  |         |                  |              |          |               |
|----|--|---------|------------------|--------------|----------|---------------|
| a. | Onul   | Mary-ka | John-uy          | os-ul        | sa-e     | o-ess-ta      |
|    | Today  | M.-nom  | J.-gen           | clothes-acc  | buy-comp | come-pst-decl |
|    | ‘Today Mary bought and brought home John’s clothes.’                       |         |                  |              |          |               |
| b. | John-un  | Mary-ka | shinpal          | ttohan       | sa-e     |               |
|    | J.-top   | M.-nom  | shoes            | also         | buy-comp |               |
|    | o-n  | kes-ul  | os-cang-ey       | neh-ess-ta   |          |               |
|    | o-n  | kes-acc | clothes-robe-loc | put-pst-decl |          |               |
|    | ‘John put the shoes that Mary also bought and brought home in the closet.’ |         |                  |              |          |               |

In the above discourse, uttering the first sentence makes the clothes that Mary bought for John salient. Furthermore, our world knowledge tells us that it is plausible for one to put clothes in the closet. Hence, under the existing E-type pronoun analysis of *kes*, it is entirely possible that the *kes* in (11b) refers to the clothes for John or the plural entity that consists of the clothes and the shoes that Mary bought and brought home. But the pronoun can refer only to the singular entity that consists of the shoes.

I overcome this difficulty by minimally amending the existing E-type pronoun analyses. I propose that *kes* denotes a function that takes an eventuality and returns a

maximal individual that has a salient property in that eventuality<sup>5</sup> (compare Hoshi 1996, Shimoyama 1999). A formalization of this idea is given in (12).

- (12)  $[[kes]] = \lambda s. \sigma x [x \text{ has a property } P \text{ in } s]$ , where  $\sigma$  is a sum operator and  $s$  ranges over eventuality variables,  $x$  over entity variables and  $P$  over predicates of individuals.<sup>6</sup>

I maintain that the semantics of *kes* is reflected in its syntax. *Kes* spells out a definite article which optionally takes an elided NP sister.<sup>7</sup> In other words, it means something like ‘the NP’ (compare Hoshi 1996, Shimoyama 1999). Here, the definite article contributes the maximality component in (13), and its elided NP sister, which corresponds to the semantic head in our terms, contributes the free property variable  $P$ .

As will be shown in the next section, this proposal captures the intuition that *kes* means something like ‘the maximal entity that has a salient property in the eventuality described by the embedded clause.’ It thus ensures that the descriptive content of *kes* will come only from the content of the embedded clause.

### 3.3. The composition scheme

Let us now put together the proposals made thus far and derive the semantics of the IHRC construction in a compositional manner.

To begin with the overt syntactic structure of the construction, I assume that the IHRC is base-generated as an argument of *kes* and the entire IHRC+*kes* string is base-generated as an argument of the embedding predicate (see C. Chung and J. Kim 2003 for evidence).

Turning now to the semantics, I assume that the embedded clause denotes a set of eventualities (M. Kim 2004, to appear). In addition, I posit that due to a semantic type-mismatch between the IHRC and *kes*, the IHRC raises at LF to a position where it can combine with an event-level denotation of the embedding clause (compare Fuji 1998, and Shimoyama 1999, M. Kim to appear).

Given the Principle of Compositionality, the trace of the raised IHRC is interpreted as an eventuality variable. This variable combines with the denotation of *kes*, saturating its eventuality argument, thereby making it formally linked to the content of the IHRC (compare Hoji 1996, Fuji 1998, Shimoyama 1999).

Following Heim and Kratzer (1998), I assume that movement creates an index node which introduces a lambda operator that binds the trace of the moved material. Since the trace of the raised IHRC denotes an eventuality variable, the node that dominates the index will denote a set of eventualities. This combines with the denotation of the IHRC (or the RelP in (13b) below), yielding a truth-value.

When we apply the proposed system to an actual sentence (13a), we obtain (13b) as its LF structure and (13c) as its truth-conditions.

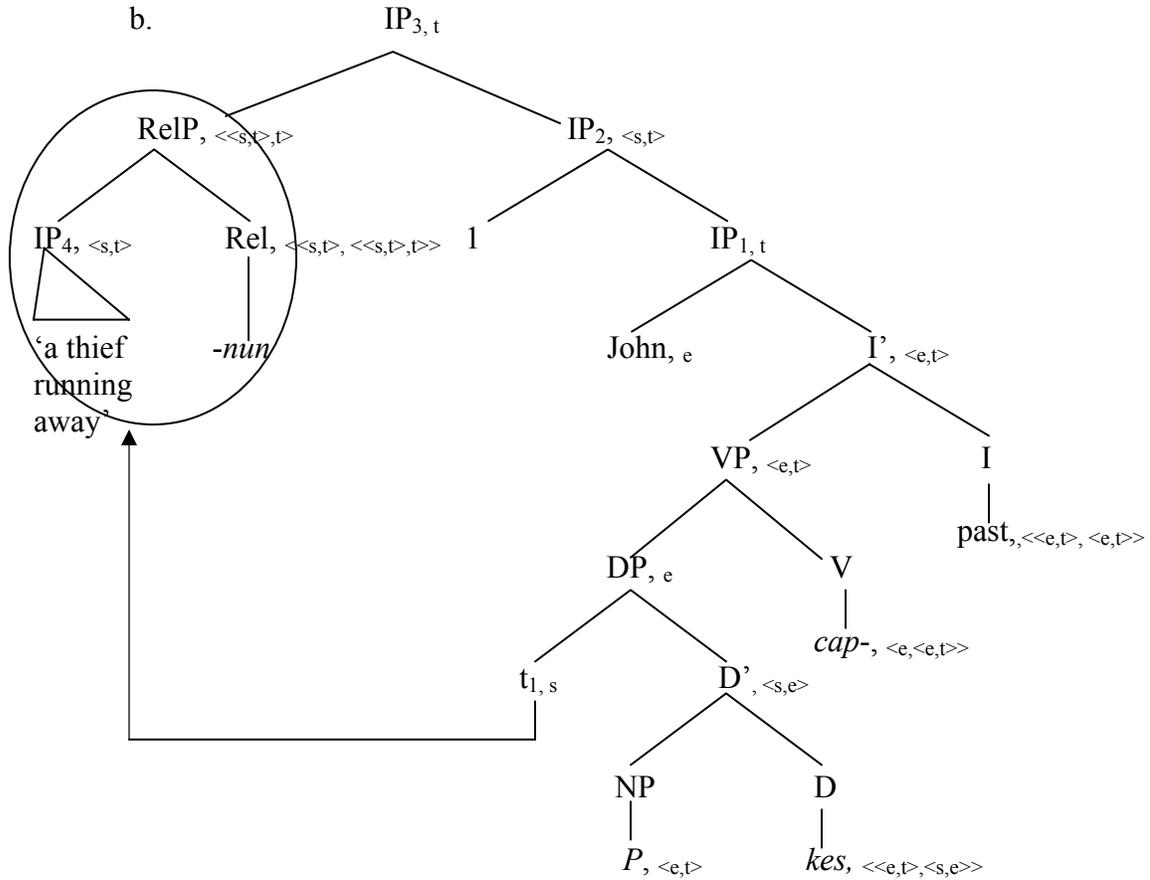
<sup>5</sup> Heim (1990) also posits that the denotation of an E-type pronoun contains a situation argument.

<sup>6</sup> The sum operator in (12) can be replaced by an iota operator as long as it can capture the maximality effect exhibited by *kes* (see Shimoyama 1999 for Japanese IHRCs).

<sup>7</sup> See Elbourne 2002 for arguments for treating pronouns this way.

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- (13) a. John-un [[totwuk-i tomangka]-nun kes]-ul capessta  
 J.-top [[thief-nom run.away]-rel.imprf kes]-acc caught  
 ‘John caught the thief when he (= the thief) was running away.’



- c. There is an eventuality  $s_1$  such that it is an event of a thief running away and there is an eventuality  $s_2$  such that it is an event of John catching the maximal individual  $x$  such that  $x$  has the property of being a thief in eventuality  $s_1$  (undefined if there is no eventuality  $s_1$ ).

**Derivation of (13c):**

$[[DP]]^g = [[kes]]^g([[t_1]]^g) = \lambda s. \sigma x[x \text{ has the salient property } P \text{ in event } s]([[t_1]]^g) = \sigma x[x \text{ has the salient property } P \text{ in } [[t_1]]^g]$   
 (via function application).

$[[catch]]^g = \lambda x \lambda y \lambda s [catch(x)(y)(s)].$

$[[VP]]^g = [[catch]]^g([[DP]]^g) = \lambda y \lambda s [catch(\sigma x[x \text{ has the salient property } P \text{ in } [[t_1]]^g](y)(s)].$

$[[IP_1]]^g = [[VP]]^g([[John]]^g) = \lambda s[\text{catch}(\sigma x[x \text{ has the salient property } P \text{ in } [[t_1]]^g])(John)(s)].$

$[[IP_2]]^g = \lambda s'[\lambda s[\text{catch}(\sigma x[x \text{ has the salient property } P \text{ in } [[t_1]]^g ])(John)(s)]$   
(via predicate abstraction).

$[[IP_2]]^{[1 \rightarrow s']} = \lambda s'[\lambda s[\text{catch}(\sigma x[x \text{ has the salient property } P \text{ in } s'])(John)(s)]$   
(via variable assignment).

$[[IP_4]]^g = \lambda s[\text{run.away}(a \text{ thief})(s)].$

$[[\text{-nun}]]^g = \lambda f_{\langle st \rangle}. \lambda g_{\langle st \rangle}.$  there is an eventuality  $s$  such that  $f(s) = 1$  and  $g(s) = 1$  (undefined if there is no  $x$  such that  $f(x) = 1$ ).

$[[\text{RelP}]]^g = [[\text{-nun}]]^g([[IP_4]]^g) = \lambda g_{\langle st \rangle}.$  there is an eventuality  $s''$  such that  $\text{run.away}(a \text{ thief})(s'') = 1$  and  $g(s'') = 1$ .

$[[IP_3]]^g = [[\text{RelP}]]^g([[IP_2]]^g) =$  there is an eventuality  $s''$  such that  $\text{run.away}(a \text{ thief})(s'') = 1$  and  $\lambda s[\text{catch}(\sigma x[x \text{ has the salient property } P \text{ in } s''])(John)(s)] = 1$   
(saturating the free variable  $P$ ).

$=$  there is an eventuality  $s''$  such that  $\text{run.away}(a \text{ thief})(s'') = 1$  and there is an eventuality  $s$  such that  $\text{catch}(\sigma x[x \text{ is a thief in } s''])(John)(s) = 1$   
(via existential quantification over eventualities).

These truth-conditions we derived for (13a) seem to match native speakers' intuitions about the meaning of the sentence. It is thus concluded that the proposed analysis derives the correct semantics of the IHRC construction in Korean.

### 3.4. Evaluation of the present proposal

Let us now see how the proposed analysis squares with the problems that concern us in this paper, namely the two syntax-semantics mismatch problems and the distinct properties of the IHRC construction.

First, the LF-raising of an IHRC above the root clause explains why it is interpreted like an independent sentence although it is inside a DP in its surface structure.

Second, the proposed semantics of *kes* explains how the semantic head inside the IHRC is accessed by the matrix predicate.

Third, the quantificational semantics of the IHRC explains why the content of the embedded clause restricts the content of the embedding clause, rather than that of the head noun.

Finally, the sum operator inside the denotation of *kes*, which is contributed by the definite article, explains why it exhibits a maximality effect. On the other hand, the free property variable inside the denotation of *kes*, which is contributed by an elided NP, explains why its value varies depending on the context.



syntactic structure of correlatives in the standard analysis (Strivastav 1991), as schematically represented in (17).

(17) [IP [RelP [... DP<sub>i</sub> ... V]] [IP DP<sub>i</sub>... V]]

Given this, the IHRC construction and the correlative construction seem to differ from each other merely in where the structure in (17) is represented: in the former, it occurs in covert syntax and in the latter, in overt syntax.

Finally, the present analysis accounts for why IHRCs in Korean parallel direct perceptual reports in Korean and participial small clauses in other languages, as noted by M. Kim (to appear): that is, (i) why in all these constructions, the embedded eventuality temporally overlaps with the embedding eventuality, (ii) the embedded clause tends to contain only stage-level predicates in the sense of Carlson (1977), and (iii) the embedded clause is syntactically smaller than a full clause.

In view of the present analysis, these parallels are also expected; they pattern together, because their semantics all involve connecting two sets of eventualities.

### 5. Remaining issue: adding a temporal element

The proposed analysis carves out an important semantic condition on the interpretability of the IHRC construction in Korean. A descriptive generalization of the phenomenon is that, in order for a sentence containing an IHRC to be interpreted, the embedded clause must describe an eventuality which temporally intersects with the eventuality in the description of the embedding clause.

To see this, compare (21) and (22) below. Suppose that these sentences were uttered in a context where John and Mary had a fight, and John lost it, so he did something to get his revenge on Mary. Notice that, although it seems felicitous to say either (21) or (22) in the given context, only the latter is grammatical (or acceptable).<sup>8</sup>

(21) \*John-un      Mary-ka      ecey              cangnankam-ul      kaci-ko  
          J.-top        M.-nom        yesterday        toy-acc              have-comp  
          no-n        kes-ul        peliessta  
          play-rel.prf   kes-acc        threw.away  
          Intended: ‘John threw away the toy that Mary played with yesterday’

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<sup>8</sup> When the embedded aspect is progressive, the contrast between (21) and (22) disappears, as shown in (i) and (ii), because, in this case, the embedded event time and the embedding event time intersect.

- (i) John-un            Mary-ka            cangnankam-ul            kaciko            **nol-ko**  
      J.-top            M.-nom            toy-acc            with            **play-comp**  
      **iss-nun**        kes-ul            (ppassa-se)            peliessta  
      **cop-rel.imprf**   kes-acc            (took.away-conj)        threw.away  
      ‘John threw away the toy that Mary was playing with a toy (by taking it from her).’
- (ii) John-un            Mary-ka            cangnankam-ul            senmwul-lo        **pat-ko**  
      J.-top            M.-nom            toy-acc            present-as        **receive-comp**  
      **iss-nun**        kes-ul            (ppassa-se)            peliessta  
      **cop-rel.imprf**   kes-acc            (took.away-conj)        threw.away  
      ‘John threw away the toy that Mary was receiving as a present (by taking it from her).’

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(22)	John-un	Mary-ka	ecey	cangnankam-ul
	J.-top	M.-nom	yesterday	toy-acc
	senmwul-lo	pat-un	kes-ul	peliessta
	present-inst	receive-rel.prf	kes-acc	threw.away
	‘John threw away the toy that Mary received as a present yesterday.’			

What is responsible for the difference between the two sentences? I suggest that this contrast is due to the fact that the embedded predicate of (21) is atelic whereas that of (22) is telic. When embedded predicate is atelic, the IHRC does not describe an eventuality that temporally intersects with the embedding event. When the embedded predicate is telic, however, the IHRC describes a target state, i.e. a state that results from the culmination of the event described by the embedded predicate, and this state temporally intersects with the embedding event.

This analysis, if correct, suggests that we need to add a temporal element to the present system, thereby making the two sets of eventualities described by the embedded clause and the embedding clause temporally intersect (see M. Kim in progress).

## **6. Conclusion**

In this paper, I accounted for the discrepancies between the syntax and semantics of the IHRC construction in Korean, which have been longstanding problems in the literature. I proposed that the semantics of the relative operator quantifies over sets of eventualities and that *kes* is a pronominal definite description which contains an eventuality variable. The proposed analysis suggests that the semantics of relative clauses is more flexible and varied than has been assumed in the literature. It also suggests a strong parallel between relative operators and determiners.

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