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THE SYNTAX-SEMANTICS OF JAPANESE/KOREAN INTERNALLY HEADED RELATIVE CLAUSE CONSTRUCTIONS*

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ABSTRACT. ***The Syntax-Semantics of Japanese/Korean Internally Headed Relative Clause Constructions.*** This paper argues for a number of substantive modifications in earlier analyses of the syntax-semantics of I(nternally) H(eaded) R(elative)s of Japanese and Korean. In contrast to Hoshi (1995), Shimoyama (1999), and especially Kim (2007), who view the relative clause as a proposition containing a DP that forms an E-type anaphoric dependency with a relative-external anaphor, the analysis proposed in this paper views the relative clause as denoting a singleton predicate, thereby bringing these IHRs under a common semantic umbrella with other syntactically distinct relative clause constructions that share with these IHRs the property of necessarily having definite/maximalizing semantics. This paper also offers solutions for certain types of data that raise serious empirical problems for Kim's analysis, in particular, IHRs whose internal head forms a long-distance island-sensitive dependency with the 'anaphor', and IHRs whose head is something other than a singular definite or existentially quantified nominal.

Keywords: internally headed relative, restricted e-type anaphora, unbounded dependency.

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1. INTRODUCTORY REMARKS

The literature of the last thirty years or so has recognized the existence of a semantic type of relative clause construction that is distinct from the traditionally known restrictive and appositive types, and is characterized by necessarily definite (or, sometimes, universal) force, to the exclusion of existential force[2]. In what follows, I will refer to them as 'definite relatives', universal force not being relevant in the context of this article.

Definite relatives occur in a variety of syntactic garbs, in particular, as free relatives (Jacobson 1995), correlatives (Srivastav 1991), externally-headed relatives (Carlson 1977), and internally-headed relatives (Hoshi 1985); see Grosu (2002) for a survey of the relevant literature up to the time of its publication. In this paper, we will will be concerned with certain aspects of the semantics of definite internally-headed relatives (henceforth: IHRs), in the form in which they are realized in Japanese and Korean. In addition to having definite semantics, the IHRs of these languages also exhibit certain semanto-pragmatic constraints, which were pointed out in Kuroda (1976-77), where they were dubbed the 'Relevancy Condition'; these constraints were subsequently elaborated on and refined in Y.-B. Kim (2002) and M.-J. Kim (2007, 2008). It is not known at the moment whether these constraints are present in the definite IHRs of other languages (Hastings 2004, Chapter 4, shows that the IHRs of Imbabura Quechua have definite semantics, but is silent in relation to the presence/absence of relevancy effects).

The IHRs of Japanese/Korean differ superficially from syntactically distinct definite relatives, in particular, from the free relatives and externally-headed relatives (henceforth: EHRs) of English and languages with comparable properties, in the following way: While the latter typically exhibit a relative-internal 'gap', the former have the appearance of complete sentences. This can be appreciated by comparing the English data in (1a-d), which include, respectively, a free relative (adapted from Jacobson 1988), an individual-denoting degree relative (adapted from Carlson 1977 and Grosu & Landman 1998), a degree-denoting relative (adapted from Grosu 2009), and an intensional equational 'reconstruction' relative" (adapted from Grosu & Krifka 2007), with the Japanese example in (2) (= (9) in Shimoyama 1999), which includes an IHR, whose internal head (henceforth: IH) is boldfaced.

(1)
a. I ate [what Mary gave me __] (i.e., everything she gave me, not just some of it).
b. I took away [*?(the) three books that there were __ on the desk]
c. [*(The) nine kilos that your hand-luggage weighs __] will not prevent you from boarding the plane.

[2] The term 'definite relative' is in fact proposed in Dayal (1996). Grosu & Landman (1998) proposed the more encompassing term 'maximalizing relative', which is also suitable for universally quantified cases. As noted in the text, the former term is sufficient for the constructions discussed in this article.

d. [{The, *a} gifted mathematician that you claim to be __] should have solved this trivial problem with greater ease.

(2)
Taro-wa [$_{DP}$[$_{CP}$Yoko-ga reezooko-ni **kukkii-o hotondo** irete-oita]-no]-o
Taro-Top Yoko-Nom refrigerator-Loc **cookie-Acc most** put-Aux-no-Acc
paatii-ni motte itta.
party-to brought
'Yoko put most cookies in the refrigerator and Taro brought {them, *some} to the party.'

In fact, the IHRs under consideration also differ superficially from IHRs with restrictive, rather than definite, semantics in certain languages, in that the IHs of the former, but not of the latter, are 'deficient' in some way. For example, the IHs of the (restrictive) IHRs of Lakhota necessarily lack strong determiners (Williamson 1987), and the IHs of the (restrictive) IHRs of Cuzco Quechua necessarily lack Case (Hastings 2004, Chapter 3). In contrast, the IH in (2) exhibits both Case and a strong determiner, thereby contributing to the impression that the relative clause in (2) is a complete sentence.

The state of affairs just outlined has typically led to quite distinct analytical approaches to data like (1) and (2). Thus, the relative clauses in data like (1a-d) were analyzed in the studies cited in the preceding paragraph as denoting **predicates** of some sort, with the gap within them denoting a variable that undergoes abstraction at the relative CP level. In contrast, most earlier studies that focused on the semantics of Japanese/Korean IHRs analyzed the relative clause as including no gap and as denoting a **proposition**, with the IH functioning as the antecedent of a relative-external E-type anaphor. In particular, this approach was prominently adopted in Hoshi (1995), Shimoyama (1999, 2001), and Kim (2007). A somewhat different approach was adopted by Watanabe (1992), who assumed a gap within the relative clause, but without addressing the semantics of the construction (the gap was posited for syntactic reasons; I return to this point below).

The proponents of an E-type approach just cited observed that the anaphoric dependency they posited is subject to a number of limitations on the range of possible antecedents, and that these limitations are not found in discourses. These authors made certain proposals for dealing with this state of affairs, and in what follows, we will be primarily concerned with the proposals made by Kim (2007), who refines the characterization of the class of possible IHs, and provides analytical tools for dealing with her proposed refinements. Kim (op. cit.) is also important in that she attempts to provide a precise characterization of certain aspects of the Relevancy Condition, which her predecessors had left somewhat vague.

The remainder of this paper is organized as follows: In section 2, I summarize the major ingredients of Kim's analysis of IHRs, briefly illustrating the kind of facts it purports to account for. In section 3, I show that Kim's analysis, while adequate for the range of data she considered, runs into empirical difficulties in relation to data

where the IH and the external anaphor form a 'long-distance dependency', and in some cases, even when they form a 'short dependency.' I also argue that certain aspects of Kim's analysis are conceptually non-optimal. In section 4, I offer an analysis that avoids the empirical and conceptual problems faced by Kim's approach. While essentially retaining Kim's treatment of the relevancy effects, with relativey small changes, my alternative analysis offers a different characterization of the choice of IHs. It also views the input to the semantics as essentially the overt syntactic representation, rather than as a different LF representation, as Kim did. Section 5 is a summary of results.

2. THE GIST OF KIM'S (2007) PROPOSALS

As alluded to already, Kim pursues two goals, which she views as inter-related: (A) a characterization of the constraints that determine the range of possible IHs, and (B) a characterization of certain effects that had been viewed as falling under the Relevancy Condition; in particular, certain aspectual and temporal dependencies between eventualities described by the relative clause and eventualities described by its matrix.

Concerning (A), Kim assumes a number of factual observations made in Shimoyama (1999, 2001), and adds a few of her own. The following are observations made by Shimoyama and assumed by Kim:

First, in contrast to discourses, the antecedent of the E-type anaphor can only be located inside the relative clause (not, e.g., in an earlier independent sentence), as shown by the contrast between (3) and (4) (= Kim's (14)). In (3), the anaphor may refer to both the books and the newspapers mentioned in earlier sentences, while in (4), the denotation of the IHR is restricted to the newspapers (mentioned in the relative), and may not include the books (mentioned in an earlier sentence), although it is plausible that Chelswu may have shelved both the books and the newspapers that Yeonghee bought and brought.

(3)
Mary bought and brought home three books. She also bought and brought home some newspapers. Bill put *them* (= the books and the newspapers) on the bookshelf.

(4)
Yeonghee-ka **chayk**-ul sey-kwen sa ossta.
Y.nom **book**-acc three-cl buy.came
Chelswu-nun [Yeonghee-ga ttohan **shinmwun**-to sa o]-un
C.-top Y.-nom also **newspaper**-also bought.came]-rel
kes]-ul chaykcang-ey neh-ess-ta.
kes]-acc book-shelf-loc place-past-decl
'Yeonghee bought and brought home three books. She also bought and brought home newspapers and Chelswu put *them* (= the newspapers) on the bookshelf.'

A second observation made by Shimoyama is that a suitable antecedent may not be created by pragmatic accommodation, something that is allowed in discourses, as shown by the contrast between (5a) and (5b) (= (53) and (52) respectively, from Shimoyama 2001, Chapter 3).

(5)
a. Honno suunin-no insee-sika doyoobi-no party-ni ikanakatta.
only a-few-Gen grad-student-sika Saturday-Gen party-to go-Neg-Past
Karera-wa jitsuwa uchi-de term paper-o kaite ita.
they-Top in-fact home-at term paper-Acc writing were
'Only a few graduate students came to the party on Saturday. In fact, they were writing term papers at home.'

b.*[[Honno **suunin-no insee-sika** doyoobi-no party-ni ikanakatta] -no] -ga
only a-few-Gen grad-student Saturday-Gen party-to go-Neg-Past-no-Nom
jitsuwa uchi-de term paper-o kaite ita.
in-fact home-at term paper-Acc writing was
'#Only a few graduate students came to the party on Saturday, and they (= those very students) were in fact writing term papers at home.'

A third point made by Shimoyama is that the IH must play a thematic role within the event described by the relative clause, it being insufficient for it to be properly included in a nominal that plays such a thematic role, as illustrated by the deviance of (6) (= Kim's (16b), which is adapted from Shimoyama's 2001, Chapter 3, example (65)).

(6)
*[Enu namca-na [$_{DP2}$ [$_{DP1}$ **caki anay**]-**uy** kimpap]-ul sonnim-kkey
[every man-indet [[**self wife**]-**gen** sushi]-acc guest.dat.hon
taycepha-∅]-un kes]-ul sonnim-i cwuksi chingchanhayssta.
serve-perf]-rel kes]-acc guest-nom immediately praised
Intended: 'Every man served *his wife's* sushi to the guest and the guest praised *her* immediately after that.'

In addition to these observations of Shimoyama's, Kim shows that the IH need not be explicitly expressed by a nominal constituent, it may also be merely implied by the event's predicate, so long as the latter provides a sufficiently 'salient' characterization of it (see Kim's (18) and her subsequent discussion thereof). For the sake of simplicity, I will ignore this particular refinement in what follows, as well as other observations that rely on the notion 'saliency.'

Concerning (B), Kim exploits proposals made in Parsons (1990) to the effect that certain types of aspect introduce a state, and she combines Parsons' proposals with the analysis of aspect in Kratzer (1998), where aspect mediates between events and times by relating the event/situation time to the topic time. In descriptive terms, Kim proposes to assume the following two necessary conditions for the felicity of IHRs:

(7)
a. The relative clause must describe a temporary state that temporally intersects with the eventuality described by the matrix clause.
b. The intended IH must bear a thematic role in that state.

(7a) is crucial for dealing with (B). To illustrate, Shimoyama (2001, Chapter 3) provides examples (43a) and (57b), which translate into English as (8a) and (8b) respectively (the bracketed strings are expressed in Japanese by IHRs, with the boldfaced phrases as IHs).

(8)
a. [**A white cat** cat came in from the kitchen window] (and it) stole a fish and ran away.
b. [**A gray cat** came in from the kitchen window yesterday] (and it) came back again this morning.

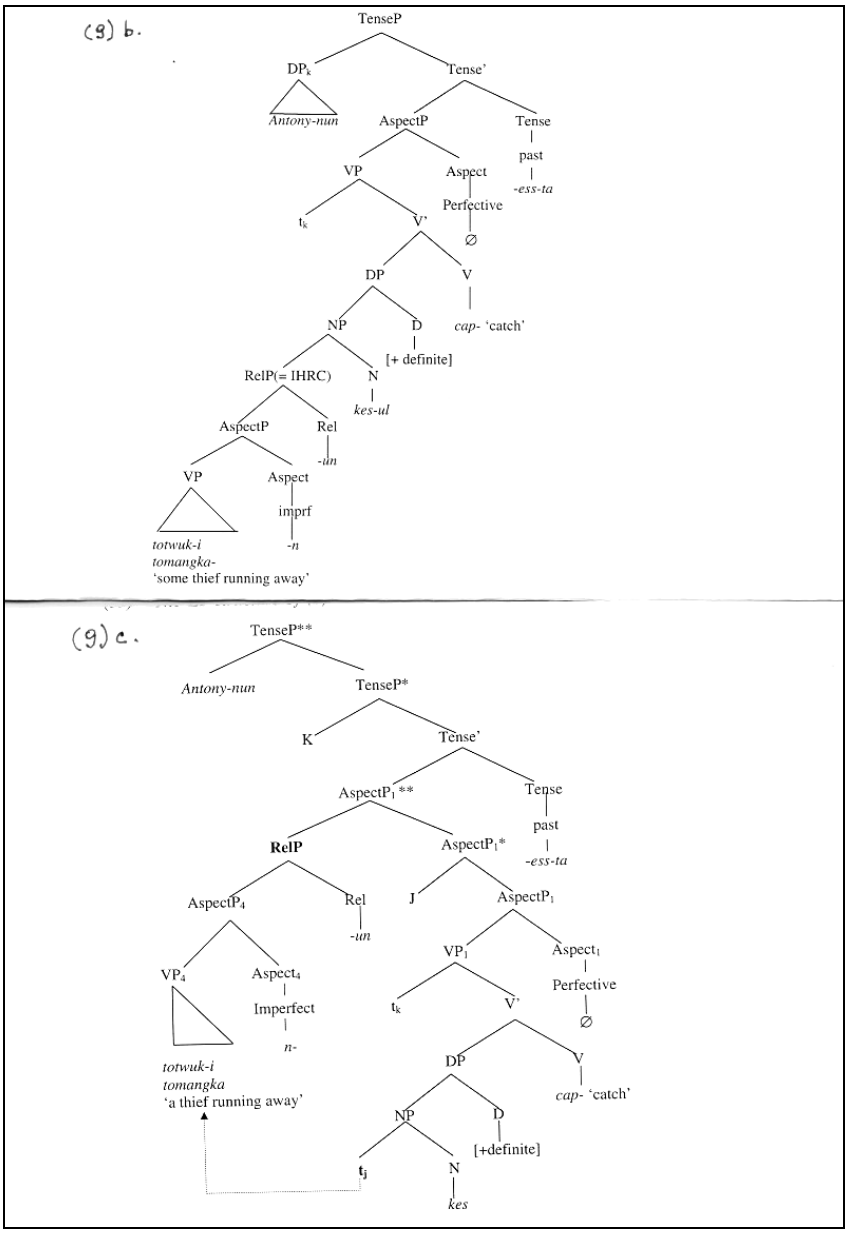
Observe that in both (8a) and (8b), the event described by the IHR fails to temporally intersect with the event described by the matrix. However, the Japanese example corresponding to (8a) is felicitous, while the one corresponding to (8b) is not. (7a) provides an explanation for this contrast: In (8a), the cat was in a temporary state of being in the kitchen as a result of coming in through the window, and this state temporally intersects with the fish-stealing event. In (8b), on the other hand, the cat was no longer in the state brought about by its coming into the kitchen when it returned to the kitchen the following morning. Note also that the felicity of (2) is consistent with (7): the cookies were in a temporary state of being in the fridge when the bringing-to-the-party event was inititated by Wasaburo's taking the cookies out of the fridge.

(7b) is important for dealing with certain aspects of (A). Thus, the state described by the relative may not contain all the thematic participants in the event that gives rise to it (this typically happens when the aspect is perfect; see Kim's (48)), and if the selected IH plays a role in the event described by the relative, but not in the corresponding state, infelicity ensues (see Kim's discussion of her example (25)).

Having noted the principal facts and assumptions that concern (A) and (B), I now briefly outline the formal machinery with which Kim proposes to capture them. I follow Kim in using her example (2), reproduced as (9a) below, for illustration. The surface syntactic representation that Kim attributes to (9a) is shown in (9b) (= Kim's (38)), and the LF representation she proposes, and which thus serves as input to the semantics, is shown in (9c) (= Kim's (39)).

(9)

a. Antony-nun [$_{CP}$ **titwuk**-i tomangka-n-un] kes-ul cap-assta.
Antony-top [**thief**-nom run.away-imprf-rel] kes-acc caught-past
'A thief was running away and Antony caught him (=the thief).



As can be seen in (9b), Kim assumes that the relative CP, which she labels RelP, consists of a VP that consists of the verb and all its thematic arguments), and which serves as complement to the functional head Aspect. The maximal projection AspectP serves as complement to the relative complementizer *-un* (whose Japanese counterpart is null). RelP is sister to the element *kes* (in Japanese, *-no*), which has received a number of analyses in the literature (in particular, it has been viewed by various writers as a nominalizer, a complementizer, or a pronoun; see Kim's footnote 1), and which Kim proposes to view as a Noun. The complex NP parent node is complement to a null determiner, which is stipulatively assigned the feature [+definite]. Importantly, Kim assumes that the relative, in contrast to the matrix, contains no TenseP, and this assumption is crucial for capturing the temporal intersection constraint in (7a). Thus, the translations of the two AspectPs in the relative and the matrix are assumed to include time variables, and these ultimately get un-selectively bound by the matrix Tense, a move which captures the temporal dependence of the state introduced by the subordinate Aspect on the topic time.

In relation to point (A), that is to say, the delimitation of the E-type antecedent to the status of thematic participant in the state introduced by the subordinate Aspect, Kim ensures this result through the combined effect of the following devices: (i) the logical types and specific translations of the various kinds of Aspect, (ii) the type and translation of the relative complementizer *-un*, (iii) the type and translation of *kes*, and (iv) a number of axioms that define the temporal relations between event types and corresponding state types, as well as the constraints on the thematic roles that event-state pairs may or must share. The translations of the imperfective Aspect (which is the relevant one for (9)), of *-un/∅*, and of *kes/no* are provided in (10a-c) respectively (with minor adaptations). The axioms that concern the imperfective say essentially that an event and its in-progress state are contemporaneous, and that they have identical thematic roles, with identical values (reproduction omitted).

(10)

a. $[[\text{Imprf}]] = \lambda Q_{,<e,t>}\lambda s\lambda t_i\ \exists e[Q(e)\ \&\ \text{In-progress}(s,e)\ \&\ t \subseteq \tau(s)]$

b. $[[un/\varnothing]] = \lambda K_{<s,<i,t>>}\lambda L_{<s,\ <i,\ t>>}\ \lambda t_i\ \exists s[K(s)(t_i)\ \&\ L(s)(t_i)]$

c. $[[kes/no_{R,P}]]^g = \lambda s_s.\lambda x_e[g(R)(x)(s)\ \&\ g(P)(x)$

d. $[[un(\alpha)]] = \lambda L_{<s,\ <i,\ t>>}\ \lambda t_i\ \exists s[\alpha(s)(t_i)\ \&\ L(s)(t_i)]$

where *e, s, i/t*$_i$*, t, x, R, P* are variables over events, states, times, truth values, individuals, thematic roles and properties respectively, τ stands for 'running time', and *g* is an assignment function.

In the compositional interpretation of (9b), the application of -un to the denotation of the subordinate AspectP (abbreviated as 'α'), yields (10d) as the translation of RelP. (10d) cannot combine with *kes*, because the types do not match. Kim proposes to assume that this mismatch coerces the raising of RelP, with attachment to the matrix AspectP, leaving behind a trace, as shown in (9c). Kim further proposes that

this trace is interpreted as a variable whose type is determined by the need to combine with *kes*, and this variable thus receives the type of states. When the derivation reaches the level of the matrix AspectP, this state variable gets abstracted over, forming AspectP1*, which gets interpreted as a set of states. This set of states can combine with the denotation of RelP, yielding a set of times. This set of times combines with the denotation of Tense, yielding a truth value. This last step also brings about the binding of the temporal variables within the two AspectPs, thus capturing (7a), as noted earlier.

The solution to point (A) relies on the following steps: (i) assignment of the type of states to the variable denoted by the trace of RelP, (ii) abstraction over this variable, (iii) combination of the resulting abstract with (10d), which identifies the variable with the state introduced by AspectP4 in (9c), and (iv) application of *kes* to this variable. Owing to this combination of steps, the assignment function g picks out a thematic role only from the roles defined by the state identified at step (iii). Note that *kes* introduces a set of individuals to which the definite article can apply, much as in E-type anaphors found in discourses, with the difference that these individuals must bear a thematic role in the state defined by *kes* 's sister.

The derivation just outlined takes care of the principal observations concerning (A) that were noted earlier in this section. Thus, the IHR in (4) may not include entities mentioned in an earlier sentence, because these do not play a thematic role in the state described by *kes* 's sister. Similarly, in (5b), the IHR can only denote the students who were at the party, because those who stayed at home play no role in the state at issue. Furthermore, the possessor in (6) is disqualified from serving as IH by the fact that it is not one of the thematic participants in that state. Finally, Kim's example (25) (to which I alluded earlier) is taken care of by the fact that the choice of IHs can be made only with respect to the thematic roles of a state, not of the event that gave rise to it.

3. EMPIRICAL AND CONCEPTUAL PROBLEMS FOR KIM'S ANALYSIS

As we saw in section 2, Kim's 'formal linking' approach adequately takes care of the facts that fall under points (A) and (B). However, Kim's analysis works straightforwardly only for the kind of data she considered, in particular, data in which (i) the IH is a member of the **highest clause** within the relative, and (ii) the IH is a singular definite or existentially quantified expression. Neither (i) nor (ii) are necessary conditions for IHRs, and constructions that do not exhibit one of these properties raise problems for Kim's analysis, as will be seen below.

That (i) is not a necessary condition is shown by the examples in (11)-(12). (11a) = (39a) in Watanabe (2003), (11b) was kindly provided by Akira Watanabe (p.c.), and (12) = (41) in Watanabe (2003), where it is pointed out that the acceptability of such data was earlier signaled by Hoshi (1985) and Kuroda (1999).

(11)
a. Mary-ga [John-ga [zibun-no gakusei-ga **yuuyouna kasetu-o**
Mary-Nom John-Nom self-Gen student-Nom important hypothesis-Acc
teianshita to] jimanshite-ita-no]-no kekkan-o shitekishita.
proposed Czer boasted-had- no-Gen defect-Acc pointed-out
'[John had boasted [that his student proposed **an important hypothesis**]]
and Mary pointed out a defect in **it**.'
b. [[[Zibun-no gakusei-ga juuyouna kasetsu-o
self-gen student-nom important hypothesis-acc
teianshita to] John-ga jimanshite-iru to] minna-ga
proposed Czer John-nom boasting-is C everyone-nom
itte-ita-no]-no kekkan-o Mary-ga shitekishita.
say-had-C-gen defect-acc Mary-nom pointed out
'[Everyone said [that John is boasting [that his student proposed
an important hypothesis]]] and Mary pointed out a defect in **it**.'

(12)
a. [[Mary-ga itsu **ronbun**-o shiageru-ka] John-ga Tom-ni tazunete-ita]-no-ga
Mary-nom when paper-acc finish-Q John-nom Tom-dat asked-had-no-nom
shuppan-sareta.
publish-pass
'[[John had asked Tom [when Mary would finish **a (certain) paper**]] and
that paper was published.
b. [[Mary-ga itsu **ronbun**-o shiageru-ka] John-ga Tom-ni tazunete-ita]-no-no
Mary-nom when paper-acc finish-Q John-nom Tom-dat asked-had-no-gen
shuppan-ga okureta.
publication-nom was delayed
'[[John had asked Tom [when Mary would finish **a (certain) paper**]] and
the publication of that paper was delayed.

These data show that the IH may form an unbounded dependency with its anaphor. However, Watanabe also observed that this dependency shares with other unbounded dependencies of Japanese the property of being subject to certain locality conditions, in particular, to the Complex NP Constraint, as illustrated in (13) (kindly provided by Akira Watanabe, p.c.); additional examples of sensitivity to the Complex NP Constraint can be found in Watanabe (1992, 2003). Concerning the fact that (12a-b), which violate the wh-island constraint, are acceptable, in contrast to (13), see the discussion in Watanabe (2003); this point need not concern us here. This type of sensitivity to a typically syntactic locality restriction constitutes a further way in which the dependencies found in IHRs differ from those found in discourses, as can be appreciated by contrasting (13) with (14).

(13)
*Mary-ga [John-ga [atarashii kasetu-o
Mary-Nom John-Nom new hypothesis-Acc
teianshita gakusei-o] homete-ita-no]-no kekkan-o shitekishita.
proposed student-acc praise-had- no-Gen defect-Acc pointed-out
'Mary pointed out a defect of the new hypothesis that John praised the student who proposed (it).'

(14)
a. Jon-wa [**hitsuji-o san-tou** katteiru *hitujikai-o*] shitteiru.
John-top sheep-acc 3-cl keep shepherd-acc know
Sore-ni-wa meshitsukai-ga esa-o yatteiru.
that-dat-top servant-nom food-acc give
"John knows a shepherd who owns three sheep. The servant feeds them."
b. Jon-wa hitsuji-o san-tou katteiru.
John-top sheep-acc 3-cl-KA keep
[**Sore-ni** yesa-o yaru *meshitsukai-wa*] kyoo-wa yasumi-da.
that-dat food-acc give servant-top today-top holiday-cop
"John has three sheep. The servant who feeds them is on holiday today."

The facts in (11)-(13) obviously require changes in Kim's analysis of IHRs, because the generalizations in (7a-b), on which this analysis is based, incorrectly rule out (11)-(12). In (11a), for example, the relative clause describes a boasting event, and the state induced by this event, whatever its precise nature, does not include the IH as a thematic participant; similar remarks apply to the remaining examples in (11)-(12). To investigate the minimally required analytical changes, it is first necessary to change (7) to an empirically more adequate generalization. I am not at the moment in a position to conduct an extensive investigation of the relevant kinds of data, so I will confine myself to an educated guess, which is formulated in (7') (with modifications of (7) shown in boldface).

(7')
a. **Some clause within** the relative clause must describe a temporary state that temporally intersects with the eventuality described by the matrix clause **(in worlds in which both are defined)**.
b. The intended IH must bear a thematic role in that state, **and the dependency it forms with the relative-external anaphor must respect locality conditions**.

As far as I can tell, (7') seems adequate for the examples under consideration, where the clause referred to in (7'a) can only be the one that most immediately contains the IH, if we want (7'b) to be satisfied. Thus, propose in (11a-b) is a telic (achievement) predicate whose Theme is in a temporary state of having been proposed at the time

when Mary points out a defect in it (presumably, this state comes to an end when the proponent discards the hypothesis). In (12a-b), finish is also a telic (achievement) predicate, which culminates in some world, with the result that its Theme (i.e., the paper) is in a state of completion in that world, and can thus undergo publication in it. I note that in (12a), one may also infer that the paper was finished in the real world, where it was subsequently published, while in (12b), one may only assume that the paper was finished in some world in which it can undergo publication, but whether this also happened in the real world is left open, since the delay in publication may have been caused by Mary's failure to finish it.

On the assumption that something like (7') is basically correct, it is not obvious how Kim's approach can be extended in a natural way to cope with it. If a property of individuals is created as part of the lexical entry of *kes/no*, this entry will need to be endowed with the power of 'looking' arbitrarily deep inside the thematic participants of the state described by the relative, clearly, a non-compositional move. In addition, this operation will need to be sensitive to syntactic locality conditions. Furthermore, it is not clear how the absence of a TenseP in the minimal clause that contains the IH can be ensured (if we want (7'a) to be respected), since the minimal clauses in (11)-(12) exhibit a variety of complementizers that cannot plausibly be argued to require complements without a TenseP.

Kim's analysis also runs into problems with data that do not exhibit property (ii), and which were brought up in the first paragraph of this section, i.e., data in which the IH is something other than a singular definite or existentially quantified nominal. The problems in question can be illustrated in relation to the Japanese example (2), reproduced in (15) with minor changes; note that 'Aux' in the relative clause has been replaced by 'perf.'

(15)
Taro-wa [$_{DP}$[$_{CP}$Yoko-ga reezooko-ni **kukkii-o** **hotondo** irete-oita]-no]-o
Taro-Top Yoko-Nom fridge-Loc **cookie-Acc** **most** put-perf-no-Acc
paatii-ni motte itta.
party-to brought
'Yoko put most cookies in the fridge and Taro brought them to the party.'

In view of the fact that the predicate of the relative is telic, the perfect aspect introduces a target state (according to Kim; see her discussion of event structure in section 3.1). Kim defines this type of aspect as in (16) (= her (46a); for her definitions of the remaining types of Aspect, see her section 4.2.3).

(16)
$[[\text{Prf-Targ}]] = \lambda Q_{<e,t>}\lambda s\lambda t_i\, \exists e[Q(e) \,\&\, \text{Target}(s,e) \,\&\, t_i \subseteq \tau(s)]$
where e, s, t_i , are variables over events, states and times respectively.

Now, (15) is necessarily understood as saying that Yoko put in the fridge a majority of cookies out of a contextually assumed heap of cookies, and that Taro brought to the party **all** the cookies that Yoko had put in the fridge. Assume now a scenario in which there were eight cookies in the heap, and Yoko put seven of them in the fridge. Kim makes the widely accepted assumption that VP denotes a set of events, and in the scenario under consideration, the VP of the relative denotes a set with more than one member, in particular, with the events in which Yoko puts five, six, and seven cookies in the fridge. Now, when (16) is applied to the VP at issue, there is no guarantee that the event whose existence is asserted is the one in which Yoko puts seven cookies in the fridge, and correlatively, there is no guarantee that the Theme of the state induced by that event will be all the cookies put in the fridge by Yoko. But if the Theme of that state happens to consist of less than seven cookies, the set of entities defined by no will also have less than seven atoms (see (10c)), and the definite operator will pick up the maximal sum of cookies in this set, **whose cardinality will be less than 7.** What this means is that (15) is incorrectly predicted to (also) be true in a situation where Taro brings to the party a plurality of cookies that constituted a majority in the heap from which Yoko took them, but is nonetheless smaller that the total sum of cookies that Yoko put in the fridge. In other words, the correct truth conditions cannot in general be guaranteed under Kim's analysis.

I submit that the problem just noted is directly traceable to the fact that Kim's analysis is based on the E-type strategy, in which – crucially – maximality is imposed by the anaphor, not by the antecedent (Kadmon 1990). Correlatively, this appeal to the E-type strategy also has two consequences that are arguably non-optimal from a conceptual viewpoint: The relative clause is characterized as a proposition, rather than as a predicate, and the CP-external Determiner is marked as [+definite] by fiat, rather than as a consequence of maximality/uniqueness introduced within the relative clause, as has been proposed for the various constructions in (1) (in the studies cited in section 1). These features of Kim's analysis, and in fact of any analysis that makes crucial use of the E-type strategy, constitute enrichments of Universal Grammar, and alternatives that do not introduce such enrichments, such as the one to be presented in section 4, ought to be preferred, *ceteris paribus*.

For all the reasons brought up in this section, I believe that Kim's analysis needs to go back to the drawing board. In the next section, I present an alternative analysis which, while preserving the essentials of Kim's treatment of the relevancy effects described by (7a), seeks to avoid the empirical and conceptual problems that confront her analysis. For perspicuousness, I list these problems here. They are: (i) the lack of an obvious analytical extension to data like (11)-(12) with preservation of compositionality and exclusion of TenseP in the minimal clause that contains the IH, (ii) the failure to guarantee correct truth conditions for certain data whose IH is not a singular nominal, (iii) the failure to assign predicate status to the relative clause, and (iv) the need to stipulate the definiteness of the relative-external determiner.

4. A MODIFIED ANALYSIS OF JAPANESE/KOREAN IHRs

The goal of this section is to outline an analysis of Japanese/Korean IHRs that avoids the problems faced by Kim's, and to do so with a minimum of assumptions[3]. The analysis assumes as semantic background a neo-Davidsonian theory of events and plurality, as in Landman 2000, 2004, with the following central types:

-d is the type of singular and plural individuals.
-e is the type of singular and plural events.
-<e,d> is the type of roles like Agent, Theme, Goal, Experiencer, Concomitant, Instrument, Location, etc.
-<e,t> is the type of sets of events.
-<s,t> is the type of sets of states.

In line with much earlier work (including Kim 2007), I assume that VP (i.e., the constituent that consists of the verb and all its thematic arguments) has a denotation of type <e,t>, and I follow Kim in assuming that VP is a complement of Aspect, and that Aspect is interpreted essentially, but not exactly, in the ways she proposes. In particular, I differ from her in assuming that the denotation of Aspect does not introduce existential binding of the event variable, but merely abstraction over it, and that all eventuality variables, in particular, event and state variables, undergo existential closure at the highest clausal level below CP. This means that existential closure applies at the TenseP level if there is a TenseP, and at the ChP level otherwise. The reason for this modification will become clear below.

Relativization-abstraction over an individual variable of type d at the relative CP-level will create an abstract of type <d,t>, a predicate of individuals.

The theory of plurality assumes that the relevant semantic domains are complete atomic Boolean algebras ordered by the part-of operation v and the sum operation t. The central notions here are:

- Pluralization as closure under sum: $*P = \{x: \text{for some } X \subseteq P: x = \sqcup X\}$

- Definiteness as maximalization: $\sigma(P) = \sqcup P$ if $\sqcup P \in P$; undefined otherwise.

- Cardinality as counting atomic parts: $|x| = |\{a \in ATOM: a \sqsubseteq x\}|$

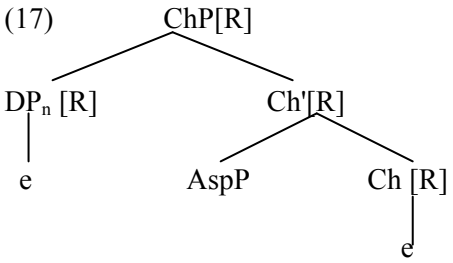
- $(a - b)$ as the relative complement of b in a, the maximal part of a such that $(a - b) \sqcup b = a$.

The heart of the analysis consists of assuming a functional category Ch(oice)P, whose head takes as complement AspectP, and which, at least in Japanese and Korean, is in complementary distribution with TenseP. This category, which I propose to view

[3] An earlier substantially different version of this analysis was proposed in Grosu & Landman (2008). The modifications introduced in the present analysis follow largely from the fact that the earlier paper was basically a reply to Shimoyama (1999), while the present one is a reply to Kim (2007).

as a necessary condition for some clausal constituent that properly contains it to have IHR status, makes it possible to meet all the objections that were raised in the preceding section with respect to Kim's analysis, and also to substantially simplify the highly complex types and translations that Kim assigns to the relative complementizers *–un/∅* and to the relative-external nouns *kes/no,* bringing these elements in line with the analyses typically assigned to comparable elements in the definite relatives of other languages, in particular, in data like those in (1). The internal structure of ChP is shown in (17)[4], and the translations assigned to its Head and Specifier are shown in (18a-b) respectively.

(17)



(18)

a. Ch[R] = $\lambda S \lambda s.S(s) \wedge R(s) = R(\sqcup S)$
b. DP_n [R] = $\lambda S \lambda s.S(s) \wedge R(s) = x_n$

ChP performs a number of important functions. The first is performed by the head Ch, and consists in choosing a thematic role by assigning a value to [R], a semantic feature ranging over thematic roles. The choice of a value is free, but the interpretation resulting from the application of Ch to its complement will be defined just in case the chosen value exists in the set of states denoted by AspectP. In this respect, the assignment of a value to [R] is comparable to the application of the function g to the variable R in Kim's definition of kes/no (see (10c)), so that (18a) could also have been formulated as in (19). For reasons of convenience, in particular, because features can spread by Spec-Head agreement, I will adopt the notation in (18a) in what follows.

(19)

[4] I have placed the head Ch on the right of its complement in (21) to preserve parallelism with the (overt and null) functional categories that appear in (9b).

$[[Ch_R]]^g = \lambda S \lambda s.S(s) \wedge (g(R))(s) = (g(R))(\sqcup S)$

This function of Ch is thus comparable to the function of *kes/no* in Kim's analysis[5], with the crucial difference that the choice of an IH is made **locally within the relative**, and this procedure avoids the compositionality problems that were seen to be faced by Kim's analysis with respect to data like (11)-(12) (see section 3). – For completeness, I note that the value assigned to [R] may be a sum of roles, an assumption that is needed in relation to data like (20) (= (i) in Kim's footnote 8).

(20)
John-un [Mary-ka ku alumtawun yepawu-ekey Sue-lul sokayha-ko
J-top M.-nom that beautiful actress-dat Sue-acc introduce-comp
iss-n-un kes]-ul (takaka-se) ses ta kkyeanassta.
cop-imprf-del kes-acc (approach-and) three all hugged
'Mary was introducing Sue to the beautiful actress, and John hugged all three of them.'

A second important function of Ch is to maximalize the IH via maximalization of the state in which the IH plays a thematic role. This step is crucially needed to avoid the problem encountered by Kim's analysis with respect to data like (15) (see section 3). Recall that Kim's analysis was unable to guarantee that the denotation of the IHR in this example will end up as the totality of the cookies put in the fridge by Yoko. The maximalization imposed by (18a) can guarantee this result, if combined with the assumption introduced earlier in this section that existential quantification over events needs to be replaced with abstraction over them in Kim's translations of the various kinds of Aspect. To see this, let us first make explicit an assumption that underlies (18a): if $\sqcup S$ is the sum of atomic states $s_1, \ldots s_n$, then $R(\sqcup S)$ is the sum of $R(s_1), \ldots R(s_n)$. Now, if (16) is modified as in (21), in which the entire set of events is kept available, it is ensured that the output of applying (21) to VP will include the entire set of corresponding states, so that the subsequent application of (18a) to AspectP will yield the desired result[6].

(21)
$[[\text{Prf-Targ}]] = \lambda Q_{<e,t>} \lambda s \lambda t_i \, \lambda e[Q(e) \,\&\, \text{Target}(s,e) \,\&\, t_i \subseteq \tau(s)]$

[5] As alluded to in section 2, I ignore the salient property variable in (10c) in this paper, in order to keep matters reasonably simple. If desired, this aspect of Kim's analysis can easily be incorporated into mine.

[6] Presumably, Kim could overcome some of the problems raised by data like (15) by incorporating some of my assumptions into her analysis, in particular, by replacing (16) with (21), and by stipulating in the translation of *kes/no* that the R picked out by the function g must belong to the maximal member of the set of states. For this to have the desired effect, however, it will also be necessary to delay the existential closure of the corresponding set of events until after the application of *kes/no* to its argument, an arguably unnatural step.

where e, s, t_i , are variables over events, states and times respectively.

In addition to achieving empirical adequacy, the imposition of maximality on the IH makes good sense from a conceptual perspective. As Kadmon (1990) points out, maximalization in discourse E-type anaphora is imposed by **the anaphor**, since antecedence is not an inherent property of any expression. That is to say, an expression acquires antecedent status just in case an anaphor purports to refer to it, as illustrated in (22), where both continuations of the first sentence yield felicitous results, even though the boldfaced nominal functions as an antecedent in only one of them.

(22)
Three boys walked into the building. An hour later, {*those boys* walked out,
the building collapsed}.

In the analysis I am proposing, the thematic participant chosen as IH is a **necessary antecedent**, and it thus makes sense to assign maximality to it as part of assigning to it antecedent status.

Important functions are also performed by the specifier of ChP. As can be seen in (18b), a free individual variable is introduced, and this free variable is equated with the previously maximalized IH. Thus, (18b) performs one of the functions of (10c), the introduction of an individual variable. However, in contrast to (10c), this free variable is not abstracted over in (18b). Therefore, it can remain free until the level of the relative CP, thereby enabling CP to end up as a **predicate** of entities, rather than as a **proposition**, a result whose conceptual desirability was pointed out in section 3. Note also that abstraction can be delayed as long as desired, with the result that data like (11)-(12) are in no way problematic.

There are a number of additional welcome consequences of the way in which ChP has been characterized in (17)-(18).

First, the relative complementizer *–un/*∅ can be interpreted in essentially the same way as, say, *that/*∅ in English relatives, i.e., the identity function on propositions, or, if one prefers, as a trigger for abstraction (i.e., a function from propositions to properties). The complex and rather exotic translation in (10c) is thus no longer necessary. Correlatively, the noun *kes/no* can also receive a far simpler translation than (10c), in particular, λx.x (i.e., the identity function on entities), which enables it to combine with CP by intersection, as is typically the case in other non-appositive relative constructions.

Second, due to the maximalization implemented by the head Ch, the relative CP is interpreted as a **singleton** predicate, thereby making it unnecessary to stipulate the definiteness of the CP-external Determiner. Just as in other constructions whose input to a determiner is a singleton predicate (in particular, in (1a-d)), existential quantification gives infelicitous results, since it conflicts with the denotation of that predicate by implicating that it may fail to be a singleton. There is thus no need to

stipulate the definiteness of the determiner, since only a definite determiner will achieve felicity.

Third, the deviance of data like (13) can be accounted for by assuming that the null category in [Spec, ChP] is the trace left by the cyclic A-bar raising of a null operator (henceforth: NO). This approach to data like (13) was in fact proposed in Watanabe (1992), with the difference that Watanabe assumed that the NO originates in the very specifier of the DP that forms the IH. This proposal is non-optimal for a number of reasons: (i) placing the NO within the IH makes it hard to assign distinct interpretations to the NO and the IH, unless we want to view the IH as the non-maximal projection D', an undesirable state of affairs; (ii) Watanabe's proposal allows any DP to serve as IH, so long as island restrictions are respected, and this may overgenerate, since the VP may contain DPs that do not play a thematic role in the state defined by Aspect; (iii) finally, it is unclear how data with 'multi-headed' IHRs, such as (20), can be analyzed. For all these reasons, I propose that the NO needs to be launched from [Spec, ChP].

Fourth, the absence of a TenseP in clauses that immediately contain an IH can be expressed by stating that Tense may not select ChP as complement (in languages that exhibit the restriction in (7'a)).

This concludes our general description of the functions performed by ChP. I will now illustrate how the theory works in relation to the example in (2)/(15).

I assume that the input to semantics has the general form in (9b), augmented with the category ChP. The relevant structure of the IHR in (2)/(15) is thus as shown in (23).

(23)
Taro-wa [$_{DP}$[$_{NP}$[$_{CP}$[$_{ChP}$∅[$_{Ch'}$ [$_{AspP}$[$_{VP}$Yoko-ga reezooko-ni **kukkii-o hotondo** irete]
Taro-Top Yoko-Nom fridge-Loc **cookie-Acc most** put-
-oita]∅]] ∅]-no]-∅]–o paatii-ni motte itta.
perf-Ch-Czer-no-Det-Acc party-to brought
'Yoko put most cookies in the fridge and Taro brought them to the party.'

The structure in (9c) plays no role in my analysis, because the raising of RelP and its adjunction to the matrix AspectP is no longer necessary. Recall that Kim's principal reason for raising RelP was to ultimately create a sister of *kes/no* from which the latter could pick out a suitably delimited IH. Since this task is accomplished by Ch in my analysis, there is no need to raise RelP. For completeness, I note that the restriction in (7'a) is captured effortlessly without appeal to RelP raising. As noted in section 2, Kim accounts for the temporal dependency between the relative and its matrix by assuming that at the point where the matrix Tense combines with AspectP_1** in (9c), Tense binds the temporal variable within the denotation of both the matrix clause and the relative clause. But since this double binding constitutes un-selective binding, which is unbounded

(and, I note in passing, insensitive to syntactic islands as well[7]), Tense can bind the temporal variable within the relative in a structure like (9b), as well as in the more complex structures necessitated by data like (11)-(12).

The compositional interpretation of (23) starts with the VP, which receives the interpretation in (24) (for ease of analysis, *most cookies* has been assigned the semantics of 'more than half of the cookies').

(24)
$\lambda e.PUT(e) \wedge Ag(e)=Yoko \wedge *COOKIE\ (Th(e)) \wedge IN(e)=FRIDGE \wedge |Th(e)| > |\sqcup(*COOKIE) - Th(e)|$

The next step concerns the level of AspectP, where (16) applies to (24), yielding (25).

(25)
$(\lambda Q_{<e,t>} \lambda s \lambda t_i\ \lambda e[Q(e)\ \&\ Target(s,e)\ \&\ t_i \subseteq \tau(s)])$
$(\lambda e.PUT(e) \wedge Ag(e)=Yoko \wedge *COOKIE(Th(e)) \wedge IN(e)=FRIDGE \wedge |Th(e)| > |\sqcup(*COOKIE) - Th(e)|) =$

$\lambda s \lambda t_i\ \lambda e[PUT(e) \wedge Ag(e)=Yoko \wedge *COOKIE(Th(e)) \wedge IN(e)=FRIDGE \wedge |Th(e)| > |\sqcup(*COOKIE) - Th(e)|\ \&\ Target(s, e)\ \&\ t_i \subseteq \tau(s)]$

The next level is that of Ch', where (18a) needs to apply to (25), after a value has been chosen for [R]. The only choice that will yield an interpretation consistent with Kim's axioms regarding thematic roles in events and corresponding states is Theme, so assume that (18a) and (18b) get specified as in (26a-b). We thus apply (26a) to (25), and then apply (26b) to the output. The output of the latter operation is (27).

(26)

a. $Ch[Th] = \lambda S \lambda s.S(s) \wedge Th(s) = Th(\sqcup S)$

[7] The absence of locality restrictions on un-selective binding is demonstrated in (i) with respect to a donkey-construction, which shows that this process is unbounded, as well as insensitive to the Complex NP Constraint. The reading of interest here is the one where the italicized expression has the same scope as *a professor*, both being un-selectively bound by *whenever*.

(i) Whenever a professor$_i$ rewards [every student who visits *{some, a particular bank*$_k$*}*], he$_i$ receives a nice cheque from its$_k$ director.

b. $DP_n[Th] = \lambda S \lambda s.S(s) \wedge Th(s) = x_n$

(27)

$\lambda s \lambda t_i\ \lambda e[PUT(e) \wedge Ag(e)=Yoko \wedge *COOKIE(Th(e)) \wedge IN(e)=FRIDGE \wedge$

$|Th(e)| > |\sqcup(*COOKIE) - Th(e)|\ \&\ Target(s, e)\ \&\ t_i \subseteq \tau(s)]\ \&$

$Th(s) = Th(\sqcup \lambda s \lambda t_i\ \lambda e[PUT(e) \wedge Ag(e)=Yoko \wedge *COOKIE(Th(e)) \wedge IN(e)=FRIDGE \wedge$

$|Th(e)| > |\sqcup(*COOKIE) - Th(e)|\ \&\ Target(s, e)\ \&\ t_i \subseteq \tau(s)])\ \&\ \wedge\ Th(s)=x_n$

Observe that the maximalization of the set of states in conjunction with the specification that these states are target states of corresponding events ensures that the maximal state corresponds to a maximal event, and also that the themes of both eventualities are themselves maximal.

We have now reached the highest level (below CP) of the clause that most immediately includes the IH (in this case, the entire relative clause), and Existential Closure applies to the two eventualities, yielding (28).

(28)

$\exists s \lambda t_i\ \exists e[PUT(e) \wedge Ag(e)=Yoko \wedge *COOKIE(Th(e)) \wedge IN(e)=FRIDGE \wedge$

$|Th(e)| > |\sqcup(*COOKIE) - Th(e)|\ \&\ Target(s, e)\ \&\ t_i \subseteq \tau(s)]\ \&$

$Th(s) = Th(\sqcup \lambda s \lambda t_i\ \lambda e[PUT(e) \wedge Ag(e)=Yoko \wedge *COOKIE(Th(e)) \wedge IN(e)=FRIDGE \wedge$

$|Th(e)| > |\sqcup(*COOKIE) - Th(e)|\ \&\ Target(s, e)\ \&\ t_i \subseteq \tau(s)])\ \&\ \wedge\ Th(s)=x_n$

In this particular case, the next level is that of RelP, but in constructions like (11)-(12) there are intervening levels of representation, whose interpretation proceeds in the normal way. In either type of situation, the free variable x_n gets abstracted over when RelP is reached. In the derivation at issue here, we get (29).

(29)

$\lambda x_n.\exists s \lambda t_i\ \exists e[PUT(e) \wedge Ag(e)=Yoko \wedge *COOKIE(Th(e)) \wedge IN(e)=FRIDGE \wedge$

$|Th(e)| > |\sqcup(*COOKIE) - Th(e)|\ \&\ Target(s, e)\ \&\ t_i \subseteq \tau(s)]\ \&$

$Th(s) = Th(\sqcup \lambda s \lambda t_i\ \lambda e[PUT(e) \wedge Ag(e)=Yoko \wedge *COOKIE(Th(e)) \wedge IN(e)=FRIDGE \wedge$

$|Th(e)| > |\sqcup(*COOKIE) - Th(e)|\ \&\ Target(s, e)\ \&\ t_i \subseteq \tau(s)])\ \&\ \wedge\ Th(s)=x_n$

At the level of the Complex NP, (29) vacuously intersects with $\lambda x.x$ (the denotation of *no*), yielding (29) again.

(29) denotes a set that contains only the unique maximal sum of cookies that Yoko put in the fridge, which constituted a majority out of a contextually assumed

heap of cookies, and which once put in the fridge, temporarily remained in a state of being in the fridge. The application of the determiner (which, recall, can only be definite) to (29) yields (30) as the denotation of the complex DP, whose content is, in words, the unique maximal sum of cookies put in the fridge by Yoko.

(30)

$\sigma(\lambda x_n.\exists s \lambda t_i\ \exists e[PUT(e) \wedge Ag(e)=Yoko \wedge *COOKIE(Th(e)) \wedge IN(e)=FRIDGE \wedge$

$|Th(e)| > |\sqcup(*COOKIE) - Th(e)|\ \&\ Target(s, e)\ \&\ t_i \subseteq \tau(s)]\ \&$

$Th(s) = Th(\sqcup \lambda s \lambda t_i\ \lambda e[PUT(e) \wedge Ag(e)=Yoko \wedge *COOKIE(Th(e)) \wedge IN(e)=FRIDGE \wedge$

$|Th(e)| > |\sqcup(*COOKIE) - Th(e)|\ \&\ Target(s, e)\ \&\ t_i \subseteq \tau(s)])\ \&\ \wedge\ Th(s)=x_n)$

When the matrix is interpreted, Tense will bind the temporal variables within the matrix and the relative, and (23) will receive the interpretation that Taro brought to the party the sum of cookies defined by (29), which was in a temporary state of being in the fridge at the moment when the event of bringing them to the party was initiated by Taro picking the cookies out of the fridge. This is the intuitively correct interpretation.

5. SUMMARY OF RESULTS

This paper has closely examined the most ambitious attempt to date (as far as my knowledge goes) to analyze Japanese/Korean IHRs in terms of the E-type strategy, with the twin goals of accounting both for the delimitation of possible IHs and for temporal dependencies between the relative and its matrix: Kim (2007). It was shown that while the analysis presented in this study is empirically adequate for the specific data it addresses, it runs into serious problems when confronted with additional data, in particular, with IHRs whose IH exhibits a long-distance dependency with its anaphor, and/or with IHRs whose IH is something other than a singular definite or indefinite nominal. It was also argued that this analysis is conceptually non-optimal for reasons that follow from its reliance on the E-type strategy; in particular, from the fact that the relative clause is characterized as a proposition, rather than as a predicate, and from the fact that uniqueness/maximality is imposed by the anaphor, rather than by factors internal to the relative.

On the positive side, this paper has proposed an alternative analysis that overcomes both the empirical and the conceptual problems just noted.

This paper also raises a number of interesting issues, which at this stage can only be left for further research. Among them, I note the following:

- [I] While the proposed functional category Ch(P) does the necessary analytical work, and can also be invoked to distinguish definite IHRs from other superficially similar constructions, it dominates no overt material other than its complement in the languages we have considered. It would

thus be of interest to investigate whether independent morphological support for can be found in other languages.

- [II] Is the temporal dependency of the relative on its matrix a necessary property of definite IHRs in general, or is it limited to certain languages only?

Answers to these questions will have to await a detailed investigation of a wider variety of languages.

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