An Input-Output Approach to Internally Headed Relative Clauses
Category: Formal Syntax, Formal Semantics

1 Introduction: Besides the externally headed relative clauses (EHRCs), Korean permits internally headed relative clauses (IHRCs), in which the head noun remains inside the relative clause, and the head position is occupied by the nominalizer *kes*.

(1) a. Mary-nun [[Tom-i t sa-o-Φ-n] sakwa]-ul mek-ess-ta. (EHRC)
Mary-top [[Tom-nom t buy-bring-past-ad(nominal))] sakwa]-acc eat-past-ind
b. Mary-nun [[Tom-i sakwa-lul sa-o-Φ-n] kes]-ul mek-ess-ta. (IHRC)
Mary-top [[Tom-nom apple-acc buy-bring-past-adn] KES]-acc eat-past-ind
'Mary ate the apples that Tom bought'

This paper explores the possibility of explaining the peculiarities of IHRCs by proposing that the head of the IHRC denotes a resultative output of the internal head: the internal head is an input to an event, and *kes* is its output.

2 Constraints on IHRCs: IHRCs are subject to various conditions that EHRCs are not, including the Existence Condition, the Locality Condition, and the Relevancy Condition. Sentence (2) is ill-formed on account of the Existence Condition. The internal head *sakwa* 'apple' cannot be existentially quantified: there is no resultative object as a result of 'being healthful', which is in violation of the Existence Condition. IHRCs obey a very strict locality condition. There must not be a CP intervening between the internal head and *kes*, as illustrated in (3). Finally, sentence (4) is ill-formed on account of the Relevancy Condition, which requires that the relative clause event must share the same spatio-temporal location with the embedding event. Sentence (4) is ungrammatical since the relative clause event describes yesterday's event, whereas the embedding event describes today's event.

(2) * Tom-un [[sakwa-ka kenkang-ey coh-un] kes]-ul mek-ess-ta/cohaha-n-ta.
Tom-top [[apple-nom health-to good-adn] KES]-acc eat-past-ind/like-past-ind
'(int) Tom {ate, likes} the apples that are healthful' (Existence Condition)
(3) * [[[Tom-i sakwa-lul sa-w-ass-tako] Sue-ka malha-Φ-n] kes]
[[[Tom-nom apple-acc buy-come-past-comp] Sue-nom said-Φ-adn] KES]
'(int) the apples that Sue said Tom bought' (Locality Condition)
(4) * Mary-nun [[cwuy-ka ecey tomangka-te-n] kes]-ul onul cap-ass-ta.
Mary-top [[mouse-nom yesterday run away-retro-adn]]KES]-acc today catch-past-ind
'(int) Today Mary caught the mouse that ran away yesterday' (Relevancy Condition)

3. An Input-Output Approach: The IHRC in (1a) can form a paraphrase relation with the EHRC in (1b). However, it is not true of every IHRC-EHRC pair. In (5a), for instance, the head noun *san key* 'live crab' must refer to a live crab, whereas in (5b) *kes* can refer to a dead crab, or even something that does not have the shape of a crab.

(5) a. [[Mary-ka t yoliha-Φ-n] san key]
[[Mary-nom t cook-past-adn] live crab] 'the/a live crab that Mary cooked'
b. [[Mary-ka san key-lul yoliha-Φ-n] kes]
[[Mary-nom live crab-acc cook-past-adn]] KES] 'what Mary cooked with a live crab'

The point is that the internal head and *kes* can refer to a different object. If the input

undergoes a physical or chemical change via an event, they can refer to a different object, and otherwise, they refer to the same object of a different spatio-temporal location. This suggests that the head of the IHRC denotes a resultative output of the internal head: the internal head is an input to an event, and *kes* is its output. For instance, in (1b) the internal head *sakwa* 'apple' refers to the apples in the store, and *kes* refers to the apples that were brought to home: *kes* denotes an object that results from John's buying the apples in the store and bringing them to home. In (5b) the internal head *san key* 'live crab' refers to an uncooked crab, whereas *kes* refers to a cooked crab. *Kes* is an output of Mary's cooking the uncooked live crab. Therefore, it may not be alive.

There may or may not be a resultative output of an event. I propose that if there is a resultative output, TP can assign a thematic role—a resultative object role, and it is assigned to *kes*, as illustrated in (6a-b). This amounts to saying that the structure of IHRCs is identical to the structure of the simple DPs like *[elin-kes]* 'the young'. In Korean an XP can be a complement of the head D like *kes* when it has an unsaturated thematic role and is attached by the adnominal marker *(u)n*. For instance, the AP *ali* 'young' contains an unsaturated thematic role and so it can be a complement of the D *kes*, as shown in (8). In this representation the unsaturated thematic role of *eli* 'young' is vertically bound by D. The gist of the claim is that the IHRC in (1b) is represented just like *[elin-kes]*, as illustrated in (9).

(6) a. $[_{TP}\ \ldots]_{(\text{resultative object} = RO)}$ b. $[_{DP}\ [[_{TP}\ \ldots]_{(RO)}]$-(u)n] kes]

(7) $[_{XP(AP,\ VP,\ TP)}\ \ldots]_{(\text{Thematic Role})}$-(u)n D

(8) $[_{DP}\ [\text{eli}_{(\text{theme})}]$-n kes]
$[_{DP}\ [\text{young}_{(\text{theme})}]$-adn KES]

(9) $[_{DP}\ [_{AdnP}\ [_{TP}$ Tom-nom apple-acc buy-bring-past$]_{(RO)}$-adn] KES

Let us now consider how the constraints on IHRC can be explained under the input-output approach. The input-output approach provides a straightforward account for the Existence Condition and the Locality Condition. The Existence Condition results from the claim that IHRCs are licensed when TP can assign a resultative object role. For instance, sentence (2) is ill-formed, since we cannot say that there is a resultative object as a result of 'being healthful'. The Locality Condition also straightforwardly follows if we assume that theta role assignment conforms to the Phase Impenetrability Condition. In (3) the resultative object role of the embedded TP cannot be assigned to *kes*, since CP is a phase.

(10) *Apples are health → ∃x[x there is a resultative object of apples' being healthful]

(11) $[[[_{CP}\ [_{TP}$ Tom-nom apple-acc buy-come-past$]_{(RO)}$-comp] Sue-nom said-Φ-adn] KES]

The Relevancy Condition also follows. The output of the running away event is the mouse which is involved in the running-away event. Put differently, *kes* denotes the mouse which occupies the spatio-temporal location of the running-away event. So it is impossible to catch it today. Interestingly, the IHRC in (12) below is grammatical although the embedding event and the embedded event do not share the same spatio-temporal location. In (4) *kes* denotes the mouse that is in the state of running away. On the other hand, in (12) the output denotes the outcome of Tom's cooking at a certain time—the kimchi that was made at a certain time, and it is still the outcome of Tom's cooking event even today. Therefore, (12) is acceptable.

(12) Mary-ka [Tom-i caknyen-ey kimchi-lul tamk-un-kes]-ul onul mek-ess-ta.
Mary-nom [Tom-nom last year-in kimchi-acc make-adn-KES]-acc today eat-past-ind
'Today Mary ate the kimchi that Tom made last year'