**Interpreting quantification within internally headed relative clauses**

Mary Moroney, *Cornell University*

This paper presents fieldwork demonstrating that IHRCs in Yŭn Shan (Southwestern Tai) with internally quantified heads have a non-maximal/non-definite interpretation available, unlike IHRCs in languages like Japanese. This paper argues that, among the current IHRC analyses, Shimoyama's (1999) E-type analysis fits the data best if it is changed to allow for a non-maximal interpretation. This non-maximal interpretation is similar to the available non-maximal interpretation available to anaphoric bare nouns in Inuttut (Gillon 2015) and in Yŭn Shan, but this opens questions on the interpretation of anaphors available cross-linguistically.

**Surprising non-maximal interpretation of Shan IHRCs.** In the Japanese sentence in (1), the numeral meaning 'three' describes both the number of apples peeled and eaten —i.e., the quantity that the IHRC and matrix clause predicates apply to. However, in the corresponding Yŭn Shan sentence in (2) the numeral 'three' only specifies the number of apples that were peeled —the IHRC clause predicate. This non-maximal interpretation is also available when the head is a bare noun (not modified by a quantifier) and a subject, but there isn't space for these examples.

(1) *John-wa [[Mary-ga san-ko-no ringo-o muitekureta] -no]-o tabeta.*
John-TOP Mary-SUBJ three-CL-GEN apple-ACC peeled NO-ACC ate
'Mary peeled three apples and John ate them all.' (Shimoyama 1999, citing Hoshi)

- Apples Mary peeled: 3
- Apples John ate: 3

(2) *Nan Lǐ cǐn pěn [ʔǎn Saj Kham pɤ̀k màmɔ̂ sǎam hwí nâj].*
Nan Li eat up COMP Saj Kham peel apple 3 CL.RND NAJ
'Nan Li ate up apples that Saj Kham peeled of which there are three.'

- Apples S.K. peeled: 3
- Apples N.L. ate: some of the peeled apples

**Analyses for Japanese.** According to previous accounts, including Shimoyama 1999 (S), Grosu & Landman (G&L), and Erlewine & Gould (E&G), which have all focused on Japanese IHRCs, this definite/maximal interpretation comes from a 'THE' or $\sigma$ operation taking place at the top of the relative clause, though the source of this definiteness operation is not agreed upon. This definite interpretation has been assumed or asserted for IHRCs in the majority of languages investigated, Lakhota being a notable exception (Williamson). Examples (3a-3c) represent my interpretation of how each of these previous accounts would each analyze the IHRC in (1).

*Japanese*

(3) a. $\sigma(\lambda x.\exists e[PEEL(e) \wedge Ag(e) = m \wedge Th(e) \in {}^*APPLE \wedge |Th(e)| = 3 \wedge Th(e) = x])$
(G&L style: see (48))

b. (THE)$[\lambda X.X$ apple(s) $\wedge m$ peeled 3[apple parts of $X$]]
(E&G style: see (46c))

c. the maximal individual $a$ such that $[\lambda x \in D_e.\ x$ is apples $m$ peeled$](a) = 1$
(S style: see (37-38))

**Adapting analyses for Shan.** Analyses that assume a definite IHRC interpretation cannot be applied directly to this new data. (4a-4c) are possible IHRC interpretations for (2) adapted from (3a-3c) to exclude the definiteness operation. (The IHRC's subject has also changed from *m* (Mary) to *sk* (Saj Kham).) Note: (4a) is the adaptation of G&L style (3a), and so on.

Yŭn Shan

(4) a. $\lambda x.\exists e[PEEL(e) \wedge Ag(e) = sk \wedge Th(e) \in {}^{*}APPLE \wedge |Th(e)| = 3 \wedge Th(e) = x]$

b. [$\lambda X.X$ apple(s) $\wedge$ *sk* peeled 3[apple parts of $X$]]

c. $\lambda x \in D_e$. $x$ is apples *sk* peeled

With the definite operation removed, G&L's analysis would give the interpretation in (4a). The problem with this is that each $x$ in the set has to have the measure 3, but the matrix clause verb does not actually need to apply to all three peeled apples in Shan. We want it to be possible for only 1 or 2 apples to be eaten. E&G's analysis has a similar problem, shown in (4b). Each $X$ described would have to contain at least 3 apples. (No salient set reading has been found in Yŭn Shan.) The analysis for Shimoyama (1999) with the definiteness operation removed does better since it would not make reference to the number of apples peeled at level of the e-type pronoun, but since the LF of the IHRC was interepreted separtely, that information is not lost (i.e., we know only three apples were peeled).

In Shimoyama's (1999) analysis, the IHRC would adjoin at LF to the IP. In the base position of the IHRC is a free variable that receives its denotation from an assignment function in the utterance context. The IHRC supplies the salient property. Instead of having something like Japanese *-no* being a definiteness operator at D, either there would be no D, or the D would be performing whatever function it usually does to a noun to generate an existential meaning. Then, the argument of the matrix clause would be type $\langle e,t \rangle$, that could be handled like any bare noun in the language. This is not a stretch since Shan, like Mandarin, can have bare nouns as arguments. An unselective binding analysis, as has been proposed for non-maximal IHRC languages like Lakhota (Watanabe), relies on the presence of overt determiners in the language, which Shan lacks, and predicts no IHRC island-sensitivity, which Shan has, so this type of analysis will not be discussed further.

**Implications of indefinite E-type analysis.** Given that this analysis is called the 'E-type' analysis, it may seem peculiar that this analysis has been altered to generate an $\langle e,t \rangle$ type argument. While we generally think of anaphora as referring back to something maximally, bare nouns do not always have to refer anaphorically to the maximal entity, as Gillon (2015) shows for Inuttut. Yŭn Shan seems to allow non-maximal bare nominal anaphora, as in (5). In the second sentence *măa* 'dog' is referring back to the five dogs described in the first sentence, yet it can be non-maximal.

(5) *Măa haa tŏ táŋheŋ mjaw săam tŏ khópkàm. pejâwne măa nâj ʔĕn pĕn*
dog five CL.ANML and cat three CL.ANML fight then dog NAJ run be
'Five dogs and three cats were fighting. Then, dogs ran away.'
Consultant comment: Could be all dogs or some that ran away.

**Conclusion.** This paper explores the issues related to IHRC interpretation as outlined here and the connections these analyses have with the types of anaphora found in a language.

**Select references.** ERLEWINE, MICHAEL YOSHITAKA, and ISAAC GOULD. Unifying Japanese relative clauses: copy-chains and context-sensitivity. *Glossa* 1• GILLON, CARRIE. 2015. Investigating D in languages with and without articles. *Methodologies in semantic fieldwork*• GROSU, ALEXANDER, and FRED LANDMAN. A quantificational disclosure approach to Japanese and Korean internally headed relatives. *JEAL* 21• HOSHI, KOJI. *Structural and interpretative aspects of head-internal and head-external relative clauses* dissertation• SHIMOYAMA, JUNKO. 1999. Internally headed relative clauses in Japanese and E-type anaphora. *JEAL* 8• WATANABE, AKIRA. Parametrization of quantificational determiners and head-internal relatives. *Language and Linguistics* 5• WILLIAMSON, JANIS. An indefiniteness restriction for relative clauses in Lakhota. *The Representation of (In) definiteness*