
DISSERTATION ABSTRACT

A Unified Analysis for Restrictive Relative Structures at the Syntax-Semantics Interface

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Ph.D. Received: March 2, 2017, University of Tokyo

This thesis investigates the derivation and interpretation of restrictive relative structures in English and Japanese within the framework of generative grammar. It proposes that by applying the sole structure-building operation, Merge, defined as recursive set-formation, our computational system forms a complex sharing structure as one of the autonomous consequences. This shared structure gives us a principled explanation to the properties of restrictive relative structures.

Research on restrictive relative structures is one of the frontiers of generative grammar, which aims to explore the computational system of human language, because they inevitably involve the issue of mapping between two components: syntax and semantics. Consider the example of restrictive relative structures in (1).

- (1) The picture of himself_i [that John_i painted *e* in art class] is impressive.

In (1), the Head Nominal, *picture of himself*, contains the reflexive pronoun *himself* which is coreferential to the subject *John* of the relative clause. Such a coreferential interpretation can be obtained if, at least at the syntax-semantics interface, the Head Nominal is “reconstructed” in the gap position already in order to be c-commanded by the antecedent of the reflexive pronoun as formulated in Binding Condition A (Chomsky (1981)). In restrictive relative structures, a Head Nominal lends itself to interpretation at the gap position inside a modifying relative clause, as well as at its overt, matrix position.

The mechanism of mapping between syntax and semantics that underlies the restrictive relative structures is discussed extensively and thoroughly in previous studies with no unified hypothesis. One of the common syntactic analyses of the reconstruction effects is the Head-Raising analysis, which dates back to the periods of Brame (1968) and Vergnaud (1974) and is later revived in Kayne’s (1994) theory of antisymmetric syntax. The Head-Raising analysis argues that the Head Nominal originates in

and directly moves up from the gap position inside the relative clause. It follows that the reconstructed interpretation is obtained because of the copy created automatically by this movement operation. However, it is also commonly assumed that relative clauses are adjuncts to the Head Nominals and can be interpreted independent of them, as shown in (2).

- (2) a. Which picture_k [that John_i likes e_k] did he_i buy e_{wh}?
 b. *He_i bought a picture_k [that John_i likes e_k].

(Putnum (2007: 131) with slight modification)

In (2a) the proper noun *John* inside the relative clause and the matrix subject *he* can be coreferential, but in (2b) they cannot due to Binding Condition C. This observation demonstrates that only the fronted Head Nominal is reconstructed in e_{wh}, indicating that relative clauses as adjuncts are considered to be only attached to, and do not always accompany, fronted Head Nominals in the course of the derivation. In fact, Fox (1999) claims that any copy of adjuncts in the derivation, except for one, can be ignored for obviating the violation of Binding Condition. Moreover, Henderson (2007) observes that as shown in (3) the absence of the relative clause in e_{wh} does not lead to the anti-reconstruction of the Head Nominal within the relative clause.

- (3) Which [picture of himself]_k [that John_i gave e_k to Mary_j] did she_j take e_{wh} home?

(Henderson (2007: 214) with slight modification)

The fronted Head Nominal in (3) is reconstructed at the gap position e_k, yielding the binding relation between the reflexive pronoun and its antecedent. At the same time, only the Head Nominal is interpreted at the gap position e_{wh}, and the improper binding relation between the proper noun *Mary* and the pronoun *she* is not established. This observation indicates that following the idea that reconstruction effects are obtained via the copy interpretation, Head Nominals move to their overt position from inside relative clauses that do not accompany them in the course of the derivation.

Chapter 1 introduces the two main questions this thesis seeks to explore. The first question addresses the linking relation, such as the reconstruction effect, as established between Head Nominals and relative clauses. The second question attempts to explore how such a linking relation is established between Head Nominals and relative clauses, even though relative clauses are regarded as adjuncts. In addition, the chapter also introduces the Minimalist Program for linguistic theory (Chomsky (1995, 2004, 2008)), under which how restrictive relative structures are formed is discussed.

Chapter 2 investigates the various reconstruction effects, presenting a detailed insight into the syntax and the semantics of restrictive relative structures. This helps establish that a Head Nominal is essentially shared between a matrix and a relative clause. From this perspective, this chapter further

discusses the syntactic structures of restrictive relatives as has been suggested in the previous studies. It is shown that Kayne’s (1994) Head-Raising analysis and its descendants cannot be adopted because the structure of complementation of those analyses cannot explain the adjunct properties of relative clauses. It is also shown that Henderson’s (2007) sideward movement analysis is untenable as it stands, because of the theoretical problem of the sideward movement operation itself. Employing the hybrid analysis suggested in Sauerland (2003) would aid in figuring out conditions to determine when the reconstruction of Head Nominals is available, but it would not explain the nature of restrictive relative structures, where the Head Nominals are reconstructed inside the relative clause adjuncts.

In Chapter 3, we introduce the two main claims that this thesis concerns itself with. First, we argue that the potential of the operation Merge has not been explored fully and, following Inada’s (2016) idea, claim that it can build a sharing structure that is interpretable as intersecting sets at the semantic interface. It is shown that the intersecting sets yielded by simultaneous applications of External Merge, as shown in (4), enable us to account for the nature of sharing in restrictive relative structures.

$$(4) \quad \text{Merge}(\alpha, \mathbf{HN}), \text{Merge}(\beta, \mathbf{HN}) \rightarrow \{\alpha, \mathbf{HN}\}, \{\beta, \mathbf{HN}\}$$

Second, we argue that the structure of Head Nominals suggested in the previous analyses—not the structure of relative clauses—is too simple to account for the properties of restrictive relative structures. The DP-internal structure and syntax in itself is cited as a major issue in the literature (see Watanabe (2006)), and warrants no reason to assume a simple NP structure in restrictive relative structures. Therefore, we claim that a Head Nominal itself has a layered internal structure of NumP, or $\{\text{Num}, \{\text{NP}\}\}$, and it undergoes DP-internal phrasal movement to Spec,CaseP irrespective of the presence of restrictive relative clauses, as shown in (5).

$$(5) \quad \{\text{D}, \{\{\text{Num}, \{\text{NP}\}\}_k, \{\text{Case}, \{\text{Num}, \{\text{NP}\}\}_k\}\}$$

With these two claims in mind, this thesis proposes a shared Head Nominal NumP movement analysis and an autonomous adjunction mechanism of relative clauses.

$$(6) \quad \begin{array}{ll} \text{i.} & \{\text{Case}, \{\text{Num}, \{\text{NP}\}\}_k\}, \{\text{Case}_R, \{\text{Num}, \{\text{NP}\}\}_k\} & : \textit{Sharing in} \\ & \quad \textit{two boys} \quad \quad \quad \textit{two boys} & \textit{intersecting sets} \\ \text{ii.} & \{\{\text{D}_R, \{\text{Case}_R, \{\text{Num}, \{\text{NP}\}\}_k\}\}, \{\text{C}, \text{TP}\}\} & : \textit{Relative clause} \\ & \quad \textit{who } \emptyset \textit{ two boys (that) you met who two boys} & \textit{formation} \\ & \underbrace{\hspace{15em}} & \\ \text{iii.} & \{\text{D}, \{\{\text{Num}, \{\text{NP}\}\}_k, <\{\text{RELATIVE CLAUSE} \dots\}, \{\text{Case}, \{\text{Num}, \{\text{NP}\}\}_k\}>\}\} & : \textit{Adjunction and} \\ & \quad \textit{the two boys who two boys you met } \emptyset \textit{ two boys} & \textit{NumP movement} \end{array}$$

The proposed derivation results in our computational system yielding the legitimate output of restrictive relative structures at the syntax-semantics interface, which then leads to the formation of restrictive relative structures on the one hand and the reconstructed interpretation of shared Head Nominals on the other.

Chapter 4 introduces three constructions in English and Japanese that will be discussed in Chapters 5-7. The three constructions are adverbial relatives, amount/degree relatives, and attributive comparatives. All three constructions involve the same type of attributive modifications via filler-gap dependencies, as do restrictive relative structures. But, in previous studies, an account given about each of them has been slightly different from that of restrictive relatives because they have shown different interpretative properties. In view of this, we seek to understand how the connection between Head Nominals and non-nominal gaps is established, and what attributes define the differences between English and Japanese.

Chapter 5 claims that adverbial relatives involve relativizing nominal complements of silent adpositions. An English example of adverbial relatives is shown in (8).

- (8) Lily dreaded the time_k [that he had to go [\emptyset_P e_k]].

We argue that adopting the silent P analysis of DP adverbs in Bresnan and Grimshaw (1978) and McCawley (1988), the gap position of Head Nominals of adverbial relatives is embedded in the silent PP structure. We then expand on the various aspects of the adverbial relativization in English and Japanese. These aspects are accounted for by the availability of the silent adpositions and by the shared NumP movement analysis as proposed in this thesis. The thesis states that the Head Nominal NumPs can be either nominal or adverbial, depending on their upper layers of DP-PP.

Chapter 6 considers amount relatives such as those shown in (9).

- (9) It would take days to drink the champagne [they spilled *e* that evening].

In the AR reading of (9), the Head Nominal is interpreted as denoting a degree of only amounts, but not an individual entity, as someone does not have to *drink the champagne they spilled* on the floor. We investigate the source of AR reading by examining the relativization of semi-lexical nouns in Japanese. A type of amount/degree relatives in Japanese, called *Half*-relatives (Ishii (1991)), is shown in (10).

- (10) John-wa [_{DP}[_{CP} Bob-ga yatin-ni tukau] hanbun]-o gyanburu-ni tukau.
 John-TOP Bob-NOM rent-for uses half-ACC gambling-for uses
 ‘John uses for gambling half as much money as Bob uses for the rent.’

(Ishii (1991: 222))

The amount/degree expression *hanbun* ‘half’ is a nominal element in Japanese, but the interpretation assigned is similar to that of equative clauses. We demonstrate that Head Nominals of *Half*-relatives, which are unpronounced lexical items, belong to the class of semi-lexical nouns. Although they are semi-lexical items with only functional meaning, sharing of such expressions denoting amount is allowed in *Half*-relatives because those expressions in Japanese are genuine nominal elements. With reference to this, amount/degree relatives in English have a structure identical to that of restrictive relatives, although the internal A'-movement is considered a case of pied-piping by semi-lexical amount/degree expressions.

In Chapter 7, we explore the syntax and semantics of the attributive comparatives in English and Japanese, and discuss their differences. More specifically, we argue against the claim that Japanese lacks degree abstraction established by a syntactic operation which is available in English. Kennedy and Merchant (2000) observes that in English the comparison of gradability, or the comparison of degrees of some quality, is not always possible, in contrast to the comparison of quantity, as shown in (11).

- (11) a. Pico wrote a more interesting novel [than Brio {did/*wrote a play}].
 b. Michael Jordan has more scoring titles [than Denis Rodman {does/has tattoos}].

The comparison of quality in (11a) is possible only with the deletion of the verbal phrase, including the compared noun phrase. In contrast, the comparison of quantity in (11b) is available with or without the deletion. This restriction tells us that the comparison of quality and that of quantity cannot be treated in the same way. Beck et al. (2004) claims that the level of acceptability of attributive comparatives varies in Japanese, as seen in the cases of the comparison of quality in (12).

- (12) *??/?*Taroo-wa [[Hanako-ga katta] yori] nagai kasa-o katta.*
 Taroo-TOP Hanako-NOM bought YORI long.ATT umbrella-ACC bought
 ‘Taroo bought a longer umbrella than Hanako did.’

(Ishii (1991), Beck et al. (2004: 290))

However, as also reported in Beck et al. (2004), attributive comparatives in Japanese that compare quantity are completely acceptable, as shown in (13).

- (13) *Taroo-wa [[Hanako-ga katta] yori] takusan kasa-o katta.*
 Taroo-TOP Hanako-NOM bought YORI many umbrella-ACC bought
 ‘Taroo bought more umbrellas than Hanako did.’

The contrast between the quality and quantity in (12)-(13) is essentially the same as that observed in the English comparatives in (11). This shows that the two types of comparison, the comparison of quality and that of quantity, cannot be addressed in the same way in both English and Japanese. Therefore, we argue that without deletion of a certain constituent, degree abstraction is unavailable in our computational system and propose a hidden relativization analysis.

Throughout this thesis it is shown that forming intersecting sets as a sharing structure as one of the autonomous consequences of applying Merge gives a principled explanation to the properties of restrictive relative structures. The differences in the various relative constructions discussed in Chapters 5-7 range within a prediction of our shared Head Nominal NumP movement analysis. That is, the differences among these constructions reside in the upper layer of the DP-structure and are grounded only on the variation in the lexicon or the morpho-syntactic features of the relativized elements.

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