A construction-based analysis of the acquisition of East Asian relative clauses.

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1. Language acquisition and language universals

Why are cross-linguistic generalizations like the Noun Phrase Accessibility Hierarchy relevant to our understanding of language acquisition? The answer to this question relies on our view of language universals. In generative linguistics, it is commonly assumed that language universals are based on innate linguistic knowledge. In this approach, languages share some of their basic grammatical properties because the core of human grammar is innate (cf. Crain and Pietroski 2001). However, this view of linguistic nativism is incompatible with what we know about the neurological foundations of the human mind: While language has genetic prerequisites, it is biologically implausible that these prerequisites consist of pre-specified categories and constraints (cf. Quartz and Sejnowski 1997).

A biologically more plausible account for the existence of language universals has been proposed in connectionism and the usage-based model (cf. Elman et al. 1996; Bybee 2005). In this approach, grammar is an emergent phenomenon that is shaped by the processing system grounded in the human brain (cf. Hawkins 2004). Since the processing system plays an important role in language acquisition, there is often a close match between grammatical development and language universals (cf. Bates and MacWhinney 1987).

The Noun Phrase Accessibility Hierarchy is one of the best known linguistic universals, which has been used in numerous acquisition studies to characterize the development of relative clauses (cf. Gass 1979; Eckman et al. 1988; Doughty 1991; Diessel and Tomasello 2005). What all of these studies have shown is that the acquisition of relative clauses follows a
developmental trajectory that is consistent with cross-linguistic constraints on the formation of relative clauses (cf. Shirai and Ozeki this volume). However, the bulk of the acquisition literature is concerned with a few subtypes of relative clauses and has concentrated on European languages. The five papers in this volume are the first acquisition studies that systematically investigate the full range of relative clauses in several East Asian languages.

While the relative clauses of these languages are in accordance with the Noun Phrase Accessibility Hierarchy, the data presented in this volume suggest that the acquisition of East Asian relative clauses does not follow the hierarchy. Specifically, the papers show that SU-relatives (i.e. relative clauses in which the subject is relativized) are not generally acquired prior to DO-relatives (i.e. relative clauses in which the direct object is relativized), suggesting that East Asian relative clauses are learned and processed somewhat differently from relative clauses in European languages.

In what follows I argue that the data presented in this volume are consistent with a usage-based approach to grammar and grammatical development. Specifically, I claim that relative clauses are grammatical constructions that language learners acquire based on their prior knowledge of simple sentences. Since East Asian languages have a different sentence structure from languages like English, the development of East Asian relative clauses takes a different pathway from relative clauses in English and other European languages.

2. A construction-based approach to grammar and grammatical development

The usage-based model is a new theoretical framework that draws on evidence from linguistics (cf. Hawkins 2004; Bybee 2005), developmental psychology (cf. Tomasello 2003; Diessel 2004), sentence processing (cf. Tabor et al. 1997) and connectionism (cf. Elman et al. 1996). In this approach, grammar consists of linguistic signs, i.e. constructions, that combine a specific
form with a particular meaning; that is, constructions are conventionalized form-functions pairings in which syntactic patterns are associated with schematic meanings (Goldberg 1995).

Relative clauses are grammatical constructions that children acquire based on their prior knowledge of simple sentences. The earliest relative clauses that English-speaking children learn are SU-relatives that are attached to the predicate nominal of a copular clause (cf. 1-2) or an isolated noun phrase (cf. 3) (cf. Diessel 2004; Diessel and Tomasello 2005).

(1) Here’s a tiger that’s gonna scare him.
(2) This is the sugar that goes in there.
(3) The girl that came with us.

While these sentences consist of two clauses they are only little different from simple sentences. Specifically, Diessel and Tomasello (2005) argue that children’s early relative constructions share the following features with simple (in)transitive clauses:

1. First, since the copular clause does not denote an independent situation, the whole sentence contains only a single proposition.
2. Second, since the relative clause includes the only proposition, it tends to provide new information like a main clause.
3. Third, if we disregard the deictic pronoun and the copula, children’s early relative clauses involve the same sequence of grammatical relations (i.e. SV(O)) as an ordinary (in)transitive clause.

Starting from such simple sentences, children gradually acquire more complex relative constructions that become increasingly different from simple sentences. Based on these data, Diessel (2004) and Diessel and Tomasello (2005) suggest that relative clauses constitute a network of interrelated constructions that children acquire in an piecemeal, bottom-up fashion by relating new relative-clause construction to constructions they already know. The
development begins with SU-relatives in copular constructions, which are similar to simple (in)transitive clauses, and ends with GEN-relatives (e.g. the man whose dog is barking), which are structurally and conceptually distinct from all other relative clauses.

Interestingly, the same piecemeal development has been observed in studies on the acquisition of relative clauses in French (cf. Hudelot 1980), Spanish (cf. Dasinger and Toupin 1994), Hebrew (cf. Dasinger and Toupin 1994), Indonesian (cf. Hermon 2004), and German (cf. Brandt, Diessel, and Tomasello 2006). In all of these languages, children begin to use relative clauses in structures that are similar to simple (in)transitive clauses, suggesting that the acquisition of relative clauses follows a general cross-linguistic pattern. However, Ozeki and Shirai (2005) point out that this pattern does not occur in the acquisition of East Asian relative clauses; in particular, they note that children’s early relative clauses in Japanese and Korean are very different from children’s early relative clauses in English, which they attribute to the particular structure of East Asian relative clauses.

In the remainder of this paper I argue that although East Asian relative clauses are structurally very different from relative clauses in English, there are some striking parallels in the acquisition process. Specifically, I submit the following hypothesis:

Although the acquisition of East Asian relative clauses takes a different pathway from the acquisition of relative clauses in English, the developments are parallel in that they generally involve the language learner’s prior knowledge of simple (in)transitive clauses.

The analysis concentrates on data from three languages: Japanese, Korean, and Chinese (both Mandarin Chinese and Cantonese Chinese). Three aspects will be discussed: (i) word order, (ii) animacy, and (iii) propositional structure.

3. Word order
In the literature on English relative clauses, it has been repeatedly argued that word order is an important determinant of the acquisition and processing of relative clauses (cf. Bever 1970; de Villiers et al. 1979; Hakuta 1981; Diessel and Tomasello 2005). Specifically, it has been claimed that relative clauses are difficult to process and to learn if they deviate from the canonical word order pattern of simple (in)transitive clauses. This is part of the reason why in English DO-relatives tend to cause greater difficulties in processing and acquisition than SU-relatives (cf. Diessel and Tomasello 2005). As can be seen in (4a-b), if we disregard the relative marker, English SU-relatives have the same word order as simple (in)transitive clauses, whereas DO-relatives exhibit a pattern that deviates from the canonical SVO.

\begin{align*}
\text{(4) a. } \text{NP [that V NP] } &= \text{ SVO} \\
\text{SU-relatives [English]} \\
\text{b. } \text{NP [(that) NP V] } &= \text{ OVS} \\
\text{DO-relatives [English]}
\end{align*}

Since the word order hypothesis relies on language-specific properties, the analysis of the English data cannot be automatically transferred to other languages. However, the essence of the hypothesis that the acquisition and processing of relative clauses is influenced by the word order of simple sentences may also hold for the languages examined in this volume. Table 1 provides an overview of the relevant word order properties of English and the three East Asian languages considered in this paper. Three aspects are important:

1. First, while English is SVO, Japanese and Korean are SOV; however, Chinese has the same basic word order as English, i.e. Chinese is also SVO.
2. Second, while English has postnominal relative clauses, Japanese, Korean, and Chinese have prenominal relative clauses, i.e., relative clauses that precede the head noun.
3. Third, while English and Chinese have only head-external relative clauses, in which the head is represented by a gap in the relative clause, Korean and Japanese have also head-internal relatives, in which the head is represented by a noun inside of the relative clause.

Table 1. Basic word order and position of relative clauses

<table>
<thead>
<tr>
<th>Language</th>
<th>Basic word order</th>
<th>Position of RC</th>
<th>Head-internal RC</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>SVO</td>
<td>Postnominal</td>
<td>No</td>
</tr>
<tr>
<td>Japanese</td>
<td>SOV</td>
<td>Prenominal</td>
<td>Yes</td>
</tr>
<tr>
<td>Korean</td>
<td>SOV</td>
<td>Prenominal</td>
<td>Yes</td>
</tr>
<tr>
<td>Chinese</td>
<td>SVO</td>
<td>Prenominal</td>
<td>No</td>
</tr>
</tbody>
</table>

If we look at the word order of (externally headed) relative clauses in the two SOV languages, i.e. Japanese and Korean, we find that SU-relatives do not have the canonical word order like SU-relatives in English. Both SU-relatives and DO-relatives involve particular word orders in Japanese and Korean, which deviate from the basic word order in simple (in)transitive clauses (5a-b).

\[
\begin{align*}
  \text{(5) a.} & \quad [\_ \text{NP} \, \text{V} \, \text{NP}] = \text{OVS} & \text{SU-relatives [Japanese/Korean]} \\
  \text{b.} & \quad [\text{NP} \, \_ \, \text{V} \, \text{NP}] = \text{SVO} & \text{DO-relatives [Japanese/Korean]}
\end{align*}
\]

This may explain why in Japanese and Korean the acquisition and processing of SU-relatives does not appear to be easier than the acquisition and processing of DO-relatives. As Ozeki and Shirai (2005, this volume) have shown, there is no evidence that Japanese-speaking children acquire SU-relatives prior to DO-relatives (cf. Hakuta 1981), and there is also no evidence that L2 learners of Japanese and Korean have fewer difficulties with SU-relatives than with DO-relatives (unless the interpretation is biased by semantic factors; see below) (cf. O’Grady et al. 2000).
Interestingly, in Chinese SU- and DO-relatives seem to differ in terms of both processing and acquisition, but in this case DO-relatives cause fewer difficulties than SU-relatives. Using a reading time experiment, Hsiao and Gibson (2003) found that adult speakers of Mandarin Chinese have fewer difficulties in processing DO-relatives than SU-relatives. The results of this study are consistent with the results of Yip and Matthews’ study reported in this volume. Using diary data from three bilingual Cantonese-English children, they found that two of the children produced DO-relatives prior to SU-relatives, while the third child began to use the two types of relative clauses simultaneously. In accordance with the word order hypothesis, Yip and Matthews explain the early appearance of DO-relatives with the canonical word order of Cantonese. As can be seen in (6a-b), DO-relatives involve the same sequence of subject, verb, and object as basic (in)transitive clauses (i.e. SV(O)), whereas SU-relatives involve a different word order pattern.

(6) a. [ _ V NP] NP = VOS SU-relative [Chinese]
    b. [NP V _ ] NP = SVO DO-relative [Chinese]

Note, however, that the early appearance of DO-relatives could also be explained by the varying distance between filler and gap. As Hsiao and Gibson (2003) have pointed out, while in English DO-relatives involve a longer distance between filler and gap than SU-relatives (cf. 4a.b), in Chinese it is the other way around: In DO-relatives filler and gap occur adjacent to each other, but in SU-relatives they are separated by the verb and object (cf. 6a-b). Both hypotheses, i.e. the word-order hypothesis and the filler-gap hypothesis, are in accordance with the Chinese data; but there is a further finding that favors the word order hypothesis.

As pointed out above, Japanese and Korean have two different types of relative clauses: head-external relatives, in which the head is represented by a gap, and head-internal relatives, in which the head occurs inside of the relative clause. While the papers on Japanese do not
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consider the difference between the two constructions (cf. Ozeki and Shirai; Kanno), Jeon and Kim’s paper on Korean shows that although head-external relatives are more frequent than head-internal relatives, L2 learners of Korean begin to use head-internal relatives prior to head-external relatives. The same developmental order has been observed in L1 studies on the acquisition of Korean relatives: Like adult learners of Korean, Korean children begin to use head-internal relatives before they produce head-external relatives although the latter are much more frequent in the ambient language (cf. Kim 1987; O’Grady et al. 2000). Moreover, Yip and Matthews (2002, this volume) argue that their bilingual Cantonese-English children begin to produce English relative clauses that can be analyzed as head-internal relatives.

How do we account for the early appearance of head-internal relatives? Yip and Matthews (this volume) suggest that head-internal relatives appear early because they resemble simple sentences. Consider the following Korean example from Jeon and Kim’s paper.

    ‘John returned the book he borrowed.’

In this example, the relativized noun *chayk* ‘book’ occurs inside of the relative clause so that both subject and object precede the verb as in an ordinary transitive sentence. In other words, the early appearance of head-internal relatives may be due to the fact that they involve the same word order as simple (in)transitive clauses (cf. Yip and Matthews 2002, this volume).

4. Animacy

Closely related to word order is the animacy of the participants expressed in a relative clause. A number of studies have argued and presented evidence that animacy plays an important role in the acquisition and processing of relative clauses. Examining Dutch and German corpus
data, Mak et al. (2002) observed that while SU-relatives are commonly used with both animate and inanimate head nouns, DO-relatives are almost exclusively attached to inanimate NPs. Moreover, they report the results of an experiment in which DO-relatives caused prolonged reading times when they are attached to an animate head noun. Similar results were obtained in an eye-tracking study by Traxler et al. (2002) and in various acquisition studies of relative clauses in English and other European languages (Bever 1970; Correâ 1995).

The papers of this volume show that animacy is also an important factor in the acquisition of East Asian relative clauses. For instance, Ozeki and Shirai observe that L2 learners of Japanese tend to associate SU-relatives with animate head nouns, while DO-relatives are mostly attached to inanimate nouns. Similarly, Jeon and Kim report that the Korean L2 learners of their experiment produced many errors if they were supposed to use a DO-relative headed by an animate noun, and Kanno’s study shows that L2 learners of Japanese have great difficulties with relative clauses including two animate referents.

Generalizing across all of these studies, we may conclude that a purely syntactic account is not sufficient to explain the acquisition and processing of relative clauses. But why is animacy relevant? Animacy is an important semantic factor for the acquisition and processing of relative clauses because it correlates with grammatical relations. Across languages, subject and object are associated with particular semantic roles. In a prototypical transitive clause, the subject functions as actor or agent of an activity that affects the entity encoded in the direct object. Since the agent is an intentional being, the subject of a prototypical transitive clause tends to be animate, whereas the object is usually an inanimate entity. Note, however, that in intransitive clauses the subject is not associated with a particular semantic role. With unergative verbs, the intransitive subject tends to be animate, but with unaccusative verbs, the subject is often an inanimate entity.

In the usage-based approach, (in)transitive clauses are grammatical constructions, i.e. form-function pairings, in which the associations between grammatical relations and semantic
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roles are part of our linguistic knowledge. Since (in)transitive constructions are among the earliest constructions in language acquisition, they play an important role in grammatical development. The previous section has shown that the word order of these constructions affects the acquisition of relative clauses; but it is not just the sequential order of nouns and verbs that influences the acquisition process, but also the semantic features that are associated with grammatical relations. Language learners know that the subject is more likely to be expressed by an animate referent than the direct object, which affects their expectations in on-line processing. An animate NP at the beginning of a clause is expected to function as subject, whereas an inanimate NP does not give rise to a particular expectation because an inanimate referent provides both a ‘good’ object, if it occurs in a transitive clause, and a ‘good’ subject, if it occurs in an (unaccusative) intransitive clause.

This explains why language learners have particular difficulties with DO-relatives that are attached to an animate NP. As Mak et al. (2002) and Traxler et al. (2002) have shown, when a relative clause is attached to an inanimate head noun SU- and DO-relatives are equally difficult to process, but when the head is an animate referent DO-relatives are much more difficult than SU-relatives. In accordance with these studies, Ozeki and Shirai (this volume) observe that L2 learners of Japanese tend to convert DO-relatives to SU-relatives if they are headed by an animate noun, and Jeon and Kim (this volume) report that the Korean L2 learners of their experiment often produced SU-relatives, instead of the target DO-relative, if they selected an animate referent as the head of the relative clause.

5. Propositional structure

In addition to word order and animacy, there is third factor suggesting that the acquisition of relative clauses is based on the language learner’s prior knowledge of simple sentences. As pointed out in Section 2, the earliest relative clauses that English-speaking children produce are
attached to the predicate nominal of a copular clause or to an isolated NP (cf. Diessel and Tomasello 2000; Diessel 2004). Since a copular clause and an isolate NP do not express a full proposition, children’s early relative constructions are semantically simple sentences.

However, Ozeki and Shirai (in press) have shown that Japanese-speaking children begin to use relative clauses in different grammatical patterns. Examining naturalistic data from five Japanese-speaking children, they found that not even half of the relative clauses in their data are attached to the predicate nominal of a copular clause or an isolated NP. Together these two types of relative clauses account for only about 40% of the relatives in their data; that is, the majority of children’s early relatives in Japanese are embedded in structures that do not match the dominant pattern in early child English.

However, that does not mean that the acquisition of Japanese relative clauses starts with constructions that are semantically more complex than the relative constructions in early child English. In fact, there is evidence that early Japanese relatives resemble simple sentences, just like children’s early relative clauses in English. However, the development takes a different pathway.

In Japanese (as well as in many other East Asian languages), there is a continuum of noun modification ranging from adjectives to clauses (cf. Ozeki and Shirai 2005). A noun modifier can be a simple adjective (cf. 8), a tense-inflected adjective (cf. 9), an adjective with a complement (cf. 10), or a clause (cf. 10) (examples from Ozeki and Shirai 2005, in press).

(8) 
[kireena] hoteru

beautiful hotel

‘A beautiful hotel’

(9) 
[oisikatta] pizza

was.delicious pizza

‘A pizza that was delicious.’
(10) [kami-ga nagai] hito
    hair-NOM long person
    ‘A person whose hair is long.’

(11) [ken-ga katta] hon
    ken-NOM bought book
    ‘The book that Ken bought’

While all of these constructions serve as noun modifiers, they differ in terms of their meaning. Ozeki and Shirai (2005) point out that there are hardly any noun modifiers in their data that describe an ongoing activity in the surrounding situation. Instead, the vast majority of children’s early relatives function to define a nominal referent; they usually include a stative verb and are attached to a generic head noun. Interestingly, the same type of relative clause is dominant in the speech of Korean-speaking children (cf. Kim 1987). According to Ozeki and Shirai (2005) these relative constructions are only little different from attributive adjectives. Since adjectives express properties of nouns, rather than full propositions, we may assume that children’s early relative constructions in Japanese and Korean typically include only a single proposition. Thus, the developments of Japanese and Korean relatives appear to be similar to the development of English relatives in that they originate from structures that are semantically similar to simple sentences (in that they denote only a single state of affairs). However, the source constructions are very different: In English relative clauses originate from copular constructions including a propositionally empty main clause, whereas in Japanese and Korean they develop from attributive constructions specifying a semantic feature of the head noun. Thus, one might hypothesize that the incremental development of relative clauses from simple sentences is characteristic of the acquisition of relative clauses across different language types.

Conclusion
This paper has argued that although East Asian relatives are structurally very different from relative clauses in English and other European languages, there are some striking cross-linguistic parallels in the acquisition of relative clauses. The earliest relative constructions that language learners produce share important properties with simple sentences. Across languages, early relative clauses tend to involve the same sequence of nouns and verbs as ordinary (in)transitive clauses, involve the prototypical link between grammatical relations and semantic roles, and are embedded in structures that describe only a single state of affairs even if the whole structure consist of two clauses.

References


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