Children’s On-line Processing of Scrambling in Japanese

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Abstract This study investigates the on-line processing of scrambled sentences in Japanese by preschool children and adults using a combination of self-paced listening and speeded picture selection tasks. The effects of a filler-gap dependency, reversibility, and case markers were examined. The results show that both children and adults had difficulty in comprehending scrambled sentences when they were provided as reversible sentences. The reversibility effect was significant for children, whereas the interaction of reversibility and a filler-gap dependency was significant for adults. However, this does not indicate that children’s parsing is fundamentally different from that of adults. For those children who processed the nominative and accusative case markers equally fast, the reactivation of the dislocated constituent was observed in the gap position. These results suggest that children’s processing is basically the same as adults’ in that their sentence processing is incremental and they parse a gap to form a filler-gap dependency.

Keywords Children’s sentence processing · Japanese · Scrambling · Filler-gap dependencies

Introduction

A traditional approach to language acquisition studies investigates children’s linguistic knowledge. Its typical way is to seek the emergence of certain structures, the frequency of their use, and the types and the number of errors in the children’s speech. Within this research domain, many studies have disclosed children’s early linguistic knowledge (see, for example, Crain and Thornton 1998; Guasti 2004), whereas relatively little attention has been paid to what is responsible for their linguistic performance including occasional errors, abbreviated responses, and individual differences.
Researchers have tried to account for these aspects mainly from two perspectives. One considers that children’s non-adult performance is due to their immature discourse-pragmatic abilities (e.g., Crain and Thornton 1998; Gualmini 2004). It is often suggested that the development of discourse-pragmatic abilities is late compared with the development of syntax (e.g., Avrutin and Wexler 1992; Schaeffer 2000), and excluding these factors often discloses children’s linguistic knowledge (e.g., Crain et al. 1996; Otsu 1994). The other perspective suggests that children’s difficulty lies in their limited resources of sentence processing as well as pragmatic factors (e.g., Conroy et al. 2009; Musolino and Lidz 2006; Trueswell et al. 1999). Recent advancements in on-line sentence processing research reveal how people produce and understand sentences in real-time, and the adapting this method to children (see Sekerina et al. 2008 for a summary) has disclosed interesting characteristics of children’s sentence processing (e.g., Felser and Clahsen 2009; Sekerina et al. 2004; Trueswell and Gleitman 2007). Following this approach, the present study investigates Japanese-speaking children’s on-line processing of very simple and basic structures: simple SOV and OSV sentences. In particular, this study is concerned with how children parse the OSV sentences that involve a filler-gap dependency.

Although there are many child language studies in Japanese, only a few of them explore on-line sentence processing (Mazuka 1998), and none focus on preschool children. This is the first to investigate how Japanese-speaking preschool children process sentences in real-time, and the findings should indicate the way to future research in this vein.

Scrambling in Japanese

Japanese is a head-final language, allowing relatively free constituent orderings provided the verb stays at the end of a sentence. A canonical constituent order in Japanese is SOV, as in (1), where a subject is marked with nominative -ga and a direct object with accusative -o. An OSV version in (2), denoting the same meaning, is a non-canonical order derived by the movement of a direct object, an operation dubbed ‘scrambling’ (e.g., Saito 1985; See Nemoto 1999 for a summary).

(1) Miki-ga Mao-o hometa.
   Miki-Nom Mao-Acc praised
   ‘Miki praised Mao.’

(2) Mao-o Miki-ga ____ hometa.
   Mao-Acc Miki-Nom praised
   ‘Miki praised Mao.’

In (2), a direct object moves from its original position to a sentence-initial position, creating a gap as indicated by underlining. Within the Principles and Parameters approach and the Minimalist Program (e.g., Chomsky 1981, 1995, 1998) trace or copy of the moved constituent is assumed in the gap position.

From a psycholinguistic perspective, the psychological reality of the empty element has been investigated to see whether its reactivation is observed in the gap position (e.g., Bever and McElre 1988; Nicol 1993). In the case of Japanese scrambling in (2), a parsing operation proceeds as follows. When the parser encounters the filler (e.g., Mao-o in (2)), it starts looking for a gap to form a filler-gap dependency. At this point, however, the parser cannot decide whether or not the accusative-marked NP is a moved object. Because Japanese allows null arguments, the accusative-marked NP is equally likely to be part of an OV sentence, with an omitted subject. This ambiguity is solved when the parser finds the gap, at which point the