

Processing relative clauses in Japanese with two attachment sites

The processing of relative clauses (RCs) with two possible attachment sites (see (1)) have been extensively studied and various factors have been proposed to explain why some languages favor attachment to the local noun (*colonel*) while others to the nonlocal noun (*daughter*). Although different types of languages should be considered in order to determine the exact nature of the phenomena, to date discussion has been almost exclusively restricted to postnominal RCs. In Japanese, the attachment of prenominal RCs has been controversial because of segmentation problems in previous self-paced reading experiments (Kamide & Mitchell, 1997; Kamide et al., 1998). We report a series of experiments that confirm the local preference in KM's items and that indicate that implicit prosody has an effect on attachment preference but not a critical one.

In Experiment 1, segmentation problems in the non-cumulative self-paced reading presentation were eliminated by showing the two head nouns in one region (region 2 in (2)). Results confirmed the preference for local attachment as (2b) was read faster than (2a) in region 2 ($F_1(1,19) = 28.73$, $P < 0.01$; $F_2(1,23) = 13.2$, $P < 0.01$). In regions 3 and 4, the nonlocal attachment was faster in the participants' analysis. In region 3, we replicated a RC-length effect (correlation between RC length and local-nonlocal RT difference: $r = 0.51$, $P < 0.05$), supporting the proposal that implicit prosody affects parsing (Fodor, 2002). Plausibility as measured by two norming studies does not account for reading time in any of the regions except region 4.

Experiment 2 tested the importance of implicit prosody (Fodor, 2002). According to the working memory literature, phonological effects (e.g., phonological similarity and word length effects) are eliminated in the memorization of word lists when participants simultaneously repeat non-sense syllables aloud (*coarticulation* for short). This is because coarticulation suppresses rehearsal in the phonological loop (see Baddeley, 1990, on articulatory suppression). If implicit prosody is effected in the phonological loop, it should be eliminated by coarticulation. However, local attachment was faster than nonlocal attachment in region 2 of (2) when participants read while coarticulating ($F_1(1,23) = 5.01$, $P < 0.05$; $F_2(1,23) = 3.64$, $P = 0.069$) as well as in silence ($F_1(1,23) = 18.38$, $P < 0.01$; $F_2(1,23) = 16.35$, $P < 0.01$) although the difference was smaller when coarticulating (interaction: $F_1(1,23) = 6.27$, $P < 0.05$; $F_2(1,23) = 3.87$, $P = 0.061$). Thus, implicit prosody enhances attachment preference, but it is unlikely to be the decisive factor since the local preference is still observed when prosody is suppressed with coarticulation.

In (2ab), the object NP (headed by 'fingerprint') is scrambled to the front of the clause, hence the RC is initially processed as if it were the matrix clause. It is only in region 2 that readers realize that the RC is not a matrix clause and only then is a matrix predicate predicted. It has been suggested that the nonlocal attachment preference is modulated by the matrix predicate (Frazier, 1990; Gibson et al, 1996). If so, local attachment may be favoured in scrambled orders because the matrix predicate is predicted too late in the sentence. Experiment 3 tested this claim by manipulating word order using the canonical sentences in (3) and their scrambled versions. In the scrambled conditions, local attachment was faster ($P_s < 0.05$) replicating Experiment 1, but in the canonical conditions nonlocal attachment was numerically faster ($F_1(1,34) = 1.35$, $P = 0.25$; $F_2(1,23) < 1$). The interaction ($P_s < 0.05$) partially supports the predicate relevance claims, but the results are inconclusive given the lack of reliable difference between the canonical conditions.

The small difference between the canonical conditions may have occurred because the sentences in (3) are structurally ambiguous and the matrix subject can be temporarily interpreted as part of the RC (although a norming study indicates that plausibility is low). This concern is being addressed in an on-going experiment in which case markers are used to indicate the clause boundary, therefore preventing the matrix subject from being part of the RC. Furthermore, coarticulation will be used in order to verify whether it can affect the attachment preference in this case.

(1) the daughter of the colonel who suffered the accident (from Cuetos & Mitchell, 1988)

(In the examples below, numbers indicate the regions in the non-cumulative self-paced presentations. The plausibility norming studies displayed relevant portions of the sentences without segmentation and readers were asked to judge the naturalness of each item individually.)

(2) a. Non-local attachment (from Kamide & Mitchell, 1997)

1		2	
Hoosekibako-no	sumi-ni nokotteita	hannin-no	shimon-o
jewelry-box-gen	corner-loc left	criminal-gen	fingerprint-acc
3	4		
keisatsu-ga	nantoka mitsukedashita.		
police-nom	somehow discovered		

‘The police somehow found the fingerprint of the criminal that was left behind in the corner of the jewelry box.’

b. Local attachment

1		2	
50dai dansei-to	suiteisareru	hannin-no	shimon-o
50’s male-as	supposed	criminal-gen	fingerprint-acc
3	4		
keisatsu-ga	nantoka mitsukedashita.		
police-nom	somehow discovered		

‘The police somehow found the fingerprint of the criminal who is supposed to be a man in his 50’s.’

(3) a. Non-local attachment (adapted from Kamide & Mitchell, 1997)

1		2		3	
Satsujinka-wa	hoosekibako-no sumi-ni nokotteita	hannin-no	shimon-o		
homicide-dept-top	jewelry-box-gen corner-loc left	criminal-gen	fingerprint-acc		
4					
nantoka mitsukedashita.					
somehow discovered					

‘The homicide department somehow found the fingerprint of the criminal that was left behind in the corner of the jewelry box.’

b. Local attachment

1		2		3	
Satsujinka-wa	50dai dansei-to suiteisareru	hannin-no	shimon-o		
homicide-dept-top	50’s male-as supposed	criminal-gen	fingerprint-acc		
4					
nantoka mitsukedashita.					
somehow discovered					

‘The homicide department somehow found the fingerprint of the criminal who is supposed to be a man in his 50’s.’

References

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