

## COE Workshop Session 1, Friday 13:45-14:25

### Using the Moses Illusion to investigate the external speech monitor

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#### Abstract

In speaking, people inevitably make mistakes that need to be corrected. Two points at which errors can be caught are just before words are produced (pre-articulatory speech) and just after words are produced (post-articulatory speech). Levelt (1983, 1989) called these the *internal* and *external* monitors.

Both comprehension and self-correction are crucial to any interpersonal communication. Knowing how to optimize understanding and correct errors has potential applications to classroom teaching techniques, business communication, and any other setting where rapid or complete understanding is important.

A great deal of research has been done to investigate the internal loop (e.g. Hartsuiker & Kolk, 2001; Morgan & Wheeldon, 2003; Oomen & Postma, 2002; Wheeldon & Morgan, 2002). In one of the earliest studies, researchers demonstrated that people alter what they say to avoid taboo words, even though autonomic measures demonstrate that they were thinking about the taboo word (their skin sweats; Motley, Camden, & Baars, 1982).

In contrast to the internal monitor, little has been done to explore the workings of the external monitor. We tested how speaking versus writing affected detection of errors in the production system. In addition, we explored how hearing versus reading affected detection of anomalous questions in the comprehension system. We also explored the relationship between the communication skill of participants and the error rate of questions answered.

The questions we used for this experiment were a combination of valid questions testing common knowledge and versions of the *Moses illusion* (Erickson & Mattson, 1981; Hannon & Daneman, 2001). In this illusion, listeners fail to detect anomalous information that is semantically similar to the correct information. Even though it is common knowledge that Noah, not Moses, took animals on the ark, participants usually respond "two" to the question "How many animals of each kind did Moses take on the ark?" Participants were instructed to identify anomalous questions and answer valid questions, with permission to change their answers if they wanted to.

Results indicate that participants are much more likely to correct spoken responses than written ones. Participants also tend to make fewer changes when they read the questions as compared to hearing questions. There is also a positive correlation between communicative skill and number of correct responses overall.

**COE Workshop Session 1, Friday 14:25-15:05**

**A Memory-based sentence processing model**

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**Abstract**

In the syntactic literature, the hierarchical analyses based on phrase structure have succeeded in accounting for various linguistic phenomena. However, there are some linguistic phenomena which involve linear order and are difficult for structure-based accounts, such as topicalization of a `that'-clause. In Lexical Functional Grammar(LFG), it is succeeded in accounting for the topicalization example in terms of grammatical function and LFG-unique mechanism. However, LFG fails in predicting the (un)acceptability of the coordination of an NP and a `that'-clause and Right Node Raising since LFG treats the conjuncts as a set. Other frameworks such as Head-driven Phrase Structure Grammar(HPSG) and Categorical Grammar(CG) analyze the coordination of unlikes: the coordination such that the heads of the conjuncts differ in their syntactic categories. However, these fails in predicting the (un)acceptabilities if the order of conjuncts is changed when the an NP and `that'-clause is coordinated. Furthermore, there are even data which are beyond the scope of revising syntactic theories. In our presentation, we first provide evidences that the linear order in fact affects the (un)acceptabilities of sentences and show the problems for grammar-based accounts. Second, we observe the "linear order effect" which the syntactic constraints imposed by the head are exerted only when the argument is "near enough" to its head. This observational generalization is supported by an insertion of a pause or a phrase between the head and its complement headed by the category which is not allowed to appear; insertion exerts an influence on the (un)acceptabilities without using the syntactic structure. We claim that these data cannot be accounted for syntactically, but should be dealt with in terms of parsing. Then, we propose a memory-based sentence processing model in which the syntactic information is decayed or deactivated as (i) the processing goes on, and (ii) as the predicate-argument structure is seemed to be constructed. This idea is motivated by the assumption that the syntactic information is used only to gain the semantic content and that the working memory is severely limited. We formalize the model and also demonstrate how our model can explain the above-mentioned difficulties and the garden-path effect in an uniform manner.

**COE Workshop Session 1, Friday 15:05-15:45**

**Attributes of language use explained by activities of neurons**

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**Abstract**

The paradigm of activity throws light on the natural intelligence. It is a new realistic concept where every part of body is considered as a tool for activities. That is, a brain or neuron or gene is a tool for activity. A human being exchanges information to do activities in the future. The origin of those activities can trace back to the birth of a first life. Single-cell organisms have continued to evolve the biochemical reaction about three billion years. If a creature makes action, the surroundings change. The creature must change the action for the life conservation. The creature interacts with the surroundings, and it adapts its behavior to the situation that changed. A creature possesses many biochemical reactions, and the subset of reactions is operated according to the demand of the situation. The meeting of supply and demand is the condition of activity that holds true in every creature. A creature does the adaptive biochemical reaction that accompanies materialization of the activity. A nerve system and a genetic system are the results of materialization, and those are tools for intelligent activities from the viewpoint of activity.

The nerve circuit that make possible to replay is formed at the activity in the real world. The knowledge is the information that expresses activities of the nerve circuits. The real meaning is effects on the real world. There are two subsets of activities in a brain. One is semantic activity in a brain and the other is a subset of activities for expression. There are linkages between two subsets of activities. Since a nerve cell unifies many activities into one activity, each subset of activities forms a hierarchical structure. Since the nerve system is organized by use of existing circuits, a growth of intelligence is achieved by adding a new circuit. This principle of extension economizes the circuits for activities. Although the contents of speech are activities of nerve network in which includes parallel connections, the speech is uttered by means of serial activities of a vocal organ. Therefore, the attributes of language originate from 1) real world, 2) brain mechanism, and 3) vocal organ. The language faculty of human is acquired through language use in the real world. So, the so-called universal grammar is mainly based on the attributes of the real world.

**COE Workshop Session 2, Friday 16:00-16:40**

**JFL learners' reading NPs in sentences and isolation**

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**Abstract**

Kashiwagi and Nakayama (2005) (hereafter K&N). investigated American JFL learners' processing of Japanese sentences with 3-morae, 6-morae, and 6-morae NPs with the NP-Genitive-NP structure, as in *Teraki-san-wa kyoojyu-ga dorama-o/ hoomudorama-o/ kuji-no-dorama-o mita to itta*. 'Teraki said that the professor saw the drama/serial drama/9 o' clock drama.'

Their results of a self-paced reading experiment showed that: a) the NP-Genitive-NP evoked significantly slower reading times than the 3- and 6-morae NPs among the native speakers; b) the 3-morae and the NP-Genitive NPs exhibited significantly different reading times among the JFL learners at the higher proficiency (with more than 600 hours of classroom instruction); and c) the three types of NPs were not significantly different among the JFL learners at the lower proficiency (with about 580 hours of classroom instruction). These differences were interpreted as indicating how differently native and non-native speakers utilized their resources, especially working memory, in reading. In this paper, we compare their lower proficiency JFL learners' data on the 6 mora words with the lexical access times of those at the same language level.

An experiment with the lexical decision task was given to five JFL learners who are native speakers of English (the same conditions as those in the K&N study above). 150 words and non-words each were presented by a modified Psyscope (Cohen et al., 1993) in Macintosh G3 to the subjects from the same American university. The percentage of correct responses on words was 95.64% and the residual response time (RRT) of the 6-mora words (e.g., hoomudorama) was 431.75 msec. Though this RRT includes both lexical access and decision making times, let us simply compare it with the K&N RRT (2657.52 msec.), which included the lexical access and parsing times. The 6 mora RRT in sentence processing took the longest among the three types of NPs and was 2.4 times as long as the RRT of the embedded subject (e.g., kyooju-ga). Although K&N concluded that the JFL learners consumed much of their working memory in decoding each phrase, the present finding that the lexical RRT of the 6 mora words was 9.94 times as long as the RRT (-48.3 msec.) of the subject word (i.e., kyooju) suggests that the JFL learners actually consumed more of their working memory in structure building, especially, when they processed the subject NPs, which created new clauses.

**COE Workshop Session 2, Friday 16:40-17:20**

**Structural priming as a window to the human linguistic representations**

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**Abstract**

Structural priming is a tendency for speakers to reuse previously-produced structures in their later utterances (e.g., Bock & Loebell, 1990; Hartsuiker & Westenberg, 2000). For example, a semantic proposition of a pharmacist giving a medicine to a customer can be realized in two structures in English, namely, the Prepositional Object (PO) Structure or the Direct Object (DO) Structure, as shown in (1). After speakers comprehend or produce a sentence in one structure, PO structure for example, their tendency of using the PO structure in producing ditransitive sentence increases despite the sentence is semantically unrelated to the earlier one, as in (2).

- (1) a. Prepositional Object Structure  
[<sub>S</sub> The pharmacist [<sub>VP</sub> [<sub>V</sub> gave] [<sub>NP</sub> the medicine] [<sub>PP</sub> to the customer]]].  
b. Direct Object Structure  
[<sub>S</sub> The pharmacist [<sub>VP</sub> [<sub>V</sub> gave] [<sub>NP</sub> the customer] [<sub>NP</sub> the medicine]]].
- (2) [<sub>S</sub> The magician [<sub>VP</sub> [<sub>V</sub> showed] [<sub>NP</sub> the rabbit] [<sub>PP</sub> to the girl]]].

Researchers investigated the source of such effect, that is, whether the priming originates from the phonological representation, thematic roles, phrasal categories associated with lexical items, or syntactic structures (e.g., Bock & Loebell, 1990; Scheepers, 2003; cf, Chang, Bock, & Goldberg, 2004). Overall it is concluded that abstract syntactic representations play a significant role.

The phenomenon of structural priming is intriguing, and more crucially useful as a tool that carves out the linguistic representations involved in the processes of human language production and comprehension. A comparison can be made between children's structural representations and those in adult grammar (e.g., Conwell and Demuth, to appear). The nature of structural representations in second language learners, in contrast to those in native speakers, can also be examined (e.g., Loebell & Bock, 2003; Yamashita & Matsumoto, in preparation). In this talk, recent developments in the study of human linguistic representation with structural priming are introduced and examined.

**References**

- Bock, K., & Loebell, H. (1990). Framing sentences. *Cognition*, 35, 1-39.
- Conwell, E., & Demuth, K. (in press). Early syntactic productivity: Evidence from dative shift. *Cognition*.
- Chang, F., Bock, K., & Goldberg, A. (2004). Can thematic roles leave traces in their places? *Cognition*, 90-1, 29-49.
- Hartsuiker, R. J., & Westenberg, C. (2000). Word order priming in written and spoken sentence production. *Cognition*, 75, 1-13.
- Loebell, H., & Bock, K. (2003). Structural priming across languages. *Linguistics*, 41-5, 791-824.
- Scheepers, C. (2003). Syntactic priming of relative clause attachments: Persistence of structural configuration in sentence production. *Cognition*, 89, 179-205.
- Yamashita, H. & Matsumoto, M. (in preparation). Linguistic representations in foreign language production.

## COE Workshop Session 2, Friday 17:20-18:00

### The processing of English number agreement

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#### Abstract

Three experiments were conducted to examine the comprehension processes underlying English reflexive agreement (RA) and subject-verb agreement (SVA). In sentence production, experiments by e.g. Bock, Eberhard, & Cutting (2005) suggest similarities between SVA and pronoun (reflexive and tag-question pronoun) agreement. Agreement errors occur more often when participants complete sentence fragments containing mismatching head and local nouns in subject NPs (as in 2 below) than when they complete fragments with number-matching nouns in subject NPs (as in 1 below). A similar mismatch effect has been found for SVA in comprehension experiments. For example, Nicol, Forster, and Veres (1997) tested sentences like the following with an acceptability judgment task:

1. SS The author of the speech was rewarded.
2. SP The author of the speeches was rewarded.
3. PP The authors of the speeches were rewarded.
4. PS The authors of the speech were rewarded.

The results revealed longer reading/judgment times for SP sentences than for SS sentences.

Our experiments sought to (a) replicate Nicol et al. and (b) extend its findings to the comprehension of RA. In Experiment 1, the same task as in Nicol et al. was used to test the above conditions for both SVA and RA sentences. The results for SVA replicated Nicol et al. The RA sentences, however, showed a different pattern of results: SP sentences produced longer reading times than SS sentences (a mismatch effect); however, PP sentences showed longer reading times than PS sentences. Two follow-up experiments were conducted to (a) clarify the results for RA sentences and (b) investigate the time course of processing in RA and SVA sentences. Both experiments used a phrase-by-phrase, moving-window reading task. Experiment 2 tested RA sentences under the four conditions above. Experiment 3 tested SS and SP versions of SVA and RA sentences. Preliminary results from Experiment 3 suggest that the mismatch effect (as evidenced by processing slowdown) has a different time course in RA and SVA sentences, appearing at the agreement target in RA sentences, but after the agreement target in SVA sentences. The complete results (under analysis) from Experiments 2 and 3 will be presented. Comprehension and production processes – and the extent to which representations and agreement mechanisms may be shared across the two modalities – will be discussed.

COE Workshop Session 3, Saturday 11:20-12:00

Anatomy of acceptability judgments

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Abstract

1 Background — Prosody-scope Matches and Mismatches in Wh-questions:

Deguchi and Kitagawa (2002) and Ishihara (2002, 2003) pointed out prosody-scope correlation of Wh-interrogatives in Tokyo as illustrated in (1): (**bold capital** = focus / shading = post-focal reduction / ©circle = unreduced H-tone to mark the end of focus prosody /  $\underline{C}^0_{Wh}$  = Wh-interrogative complementizer /  $-C^0_{Wthr}$  = polarity interrogative complementizer ('whether'))

(1)

a. **Local** Focus Prosody ⇒ **Subordinate** Scope:

Keisatu-wa [ kanozyo-ga ano-ban **DAre-to atteita-ka** ] ©mademo shirabeteiru-no?  
police-TOP she-NOM that-night who-with seeing- $\underline{C}^0_{Wh}$  still searching- $C^0_{Y/N}$   
'Are the police still investigating [ **who**<sub>1</sub> she was with t<sub>1</sub> that night ]?'

b. **Global** Focus Prosody ⇒ **Matrix** Scope:

Keisatu-wa [ kanozyo-ga ano-ban **DAre-to atteita-ka** ] imademo shirabeteiru-no?  
who-with  $-C^0_{Wthr}$   $-C^0_{Wh}$   
'**Who**<sub>1</sub> is such that the police are still investigating [ whether she was with him<sub>1</sub> that night ]?'

In this work, we will present and discuss the results of two psycholinguistic experiments, which verify the existence of the prosody-scope as in (1). In the first experiment, which is the extension of the pilot study presented in Kitagawa and Fodor (To appear), 12 pairs of an identical sentence accompanied by two distinct prosodic patterns as in

(1) and (2) were presented to the subjects, auditorily in one group and only in writing in the other, and their acceptability judgments were examined.

(2) **Local** Focus Prosody ⇒ **Subordinate** Scope:

*Kimi-wa* [ Kyooko-ga hontoo-wa **DAre-o aisiteita-to** ] ©mademo omotteiru-no?  
you-TOP -NOM actually who-ACC loved- $\underline{C}^0_{That}$  still think- $\underline{C}^0_{Wh}$   
'Do you still think [ **that** Kyoko actually had a crush on **who** ]?'

(2) **Global** Focus Prosody ⇒ **Matrix** Scope:

*Kimi-wa* [ Kyooko-ga hontoo-wa **DAre-o aisiteita-to** ] imademo omotteiru-no?  
you-TOP -NOM actually who-ACC loved- $\underline{C}^0_{That}$  still think- $\underline{C}^0_{Wh}$   
'**Who** do you still think [ Kyoko actually had a crush on ]?'

If the prosody-scope correlation in question is real, (2) should be judged unacceptable because of the combination of **local** focus prosody and a **declarative** C<sup>0</sup> -to 'that' of the subordinate clause, while (2) should be interpreted successfully as a direct Wh-question. The experiment involving silent reading was expected to be influenced by "default implicit prosody" according to the "Implicit Prosody Hypothesis" argued for by Fodor (1998), Hirose (2003), et al.

In the second experiment, which is currently undergoing, a small number of subjects who had confirmed that they could distinguish the two distinct scope interpretations involved in sentences like (1), were asked to read the sentences aloud for each scope interpretation. Their recitation was recorded, phonetically analyzed, and used as stimuli in a perception experiment, in which subjects were asked to identify the scope interpretation induced by the auditory stimuli in each case (by selecting between two answers — one for a direct Wh-question (e.g., *Yamada-san-depsu*. 'It was Mr. Yamada.' and the other for a "yes/no" question embedding an indirect Wh-question (e.g., *Hai*. 'yes')).

#### **References:**

- Deguchi, Masanori and Yoshihisa Kitagawa (2002) "Prosody and Wh-questions," *Proceedings of the Thirty-second Annual Meeting of the North-Eastern Linguistic Society*, 73-92.
- Fodor, Janet Dean (1998) "Learning to Parse?," *Journal of Psycholinguistic Research*, 7.2, 285-318.
- Hirose, Yuki (2003) "Recycling Prosodic Boundaries," *Journal of Psycholinguistic Research*, 32.2, 167-195.
- Ishihara, Shinichiro (2002) "Invisible but Audible Wh-scope Marking: Wh-constructions and Deaccenting in Japanese," *Proceedings of the Twenty-first West Coast Conference on Formal Linguistics*, 180-193.
- Kitagawa, Yoshihisa and Janet Dean Fodor (To appear) "Prosodic Influences on Syntactic Judgments," in Fanselow, Gisbert, et al. (ed(s).), *Gradience in Grammar: Generative Perspectives*, Oxford University Press, Oxford, UK.

**COE Workshop Session 3, Saturday 12:00-12:40**

**Input for learning Japanese:**

**RIKEN Japanese Mother-Infant Conversation Corpus**

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**Abstract**

The input for infant language learning is the speech that mothers and other adults produce around them. In order to investigate language acquisition, it is critical to understand the nature of input that infants are presented with. When speaking to infants (Infant-Directed Speech: IDS), adults modify their speech in certain ways - including prosodic, phonological and lexical level changes. Although a rich literature exists that documents various aspects of Japanese IDS properties, previous studies on phonological and prosodic aspects of Japanese IDS have been based on relatively small sample sizes. In this talk, we will introduce a new corpus of Japanese mothers' speech to infants. The RIKEN Japanese Mother-Infant Conversation Corpus (R\_MICC) consists of 22 mothers' conversations with their 18-24 month old children as well as with adults. The corpus consists of approximately 45 minutes of recording from each mother-infant dyad, totaling 14 hours. Using the coding criteria developed for the Corpus of Spoken Japanese (2004, National Institute for Japanese Language) each mother's speech is transcribed phonologically, and coded for further phonetic details as well as morphological and prosodic characteristics. Analysis of this corpus will allow us to capture the basic characteristics of Japanese infants' language input, such as frequency of consonants and vowels, types of syllables, word types, parts of speech, intonational characteristics etc. For purposes of illustration, we will present a comparison of speech rates between IDS and ADS.

**COE Workshop Session 4, Saturday 13:40-14:20**

**Parsing and multiple Wh-questions in Japanese**

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**Abstract**

We propose a processing-centric view for Japanese wh-questions. Given the word-order nature of Japanese, wh-arguments occur before sentence-final question particles. Using a left-to-right parsing model, together with top-down prediction, we explore the hypothesis that wh-arguments predict and set in advance the Q-feature value of Comp. We show how this model can account for a range of Japanese wh-question judgments, as discussed in (Watanabe 1992), (Saito 1994) and (Maki 1995).

**COE Workshop Session 4, Saturday 14:20-15:00**

**Becoming syntactic: Psycholinguistic, developmental,  
and evolutionary considerations**

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**Abstract**

Even though adults process language with syntactic representations that they learned as children, work in adult psycholinguistics and language acquisition often proceeds in isolation. A neural network model that attempts to link these two domains will be presented (Chang, Dell, & Bock, 2006). The model makes explicit assumptions about the nature of the learning mechanism, the architecture of the brain, and the nature of meaning, and these assumptions influence the model's behavior in syntactic development and adult processing. I will present two examples where the model helps to address issues in adult and child psycholinguistic work.

An important task for studying syntactic knowledge in adults is structural priming. Structural priming is a tendency for speakers to repeat previously produced sentence structures. The changes to syntactic knowledge in priming are long lasting (Bock & Griffin, 2000), and this suggests that priming could be the same mechanism as learning. The model instantiates this hypothesis by using the same mechanism for language acquisition and priming. One controversy in production is the question of what kinds of representations are primed in these studies. One set of studies suggest that priming is only sensitive to syntactic relations (Bock & Loebell, 1990), while other studies suggest that thematic roles are also involved (Chang, Bock, & Goldberg, 2003). The learning mechanism in the model suggests a way to explain these conflicting results.

Another controversy comes from the language acquisition literature. Developing syntactic knowledge shows different results when tested in tasks such as production (Tomasello, 2000) and preferential looking (Naigles, 2002). The production results suggest that syntax emerges from experience, while the preferential looking supports the existence of innate syntactic biases. Because language acquisition theories are not explicit about the relationship between tasks and representations, it is hard to falsify either of these theories with these experimental results. The model provides an explicit account that can explain the data associated with both tasks, and provides some predictions that can be used to falsify its account.

Finally, the model makes use of mechanisms that are also present in simpler forms in other species (e.g., implicit sequencing learning, spatial processing) and hence it provides some hypotheses about the relationship between neural systems and syntax in evolution.

## COE Workshop Session 4, Saturday 15:00-15:40

### Effects of mathematical calculations and thinking about time on abstract thought

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#### Abstract

Consider the ambiguous statement *The meeting originally scheduled for next Wednesday has been moved forward two days*. To which day has the meeting been moved? Whether people answer Friday or Monday depends on which time perspective they adopt.

Reading or thinking about motion has been shown to influence time perception, making people more likely to adopt either a *moving-ego* (ME) or a *moving-time* (MT) perspective (Boroditsky, 2000; Boroditsky & Ramscar, 2002; Matlock, Ramscar, & Boroditsky, 2005). People in the ME perspective see themselves as moving forward through time, analogous to driving down a highway. In the MT perspective, people see themselves as stationary with time moving towards them, like standing in a stream flowing past them.

However, no study had examined how thinking about time itself would affect its conceptualization. It seemed apparent that thinking about the future or past must make one more likely to adopt ME or MT perspectives, respectively. But the apparently obvious isn't always true, and thus is worth testing.

Another lacuna was the effect performing mathematical calculations might have on abstract thought. Math and time are both experienced as "real" but neither has a concrete representation, making exploration of the connection between the two worthwhile.

Therefore, I investigated how thinking about time and performing mathematical calculations influenced the likelihood of ME or MT perspectives. I replicated previous findings (Matlock et al., 2005) that reading about no motion results in equal likelihood of either perspective, while people reading about physical motion are significantly more likely to adopt a ME perspective (Friday).

However, my other results were surprising as the ME perspective (Friday) was significantly more likely in all chronological and mathematical conditions; in no condition was MT more likely. This may relate to a sense of agency (whether people view themselves as "acting" rather than being "acted upon" in their lives), meriting further exploration of this possible correlation.

Despite the similarity across conditions, results show some interesting differences between native English speakers and non-native speakers. Non-native speakers were more likely than native speakers to adopt the MT perspective in the Chronological Backward and Addition conditions, and the ME perspective in the Physical Forward and Subtraction conditions. However, results from native speakers and those who identified themselves as "fluent" were virtually indistinguishable. Therefore, whether this variation is due to systematic differences between languages or comprehension difficulties merits further investigation.

**COE Workshop Session 5, Saturday 16:00-16:40**

**The subsequent incremental anticipation (SIA) model for explaining the processing of Japanese active sentences**

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**Abstract**

This presentation will examine the detailed mechanism governing how native Japanese speakers construct incremental syntactic structures prior to seeing an ending verb. The subsequent incremental anticipation (SIA) model assumes that noun phrases with a particular case particle anticipate subsequent elements out of a finite number of possible candidates. A delay in processing speed is expected to result when this anticipation is not fulfilled. To test this processing model, four experiments were conducted using canonical and scrambled active sentences: (1) Shorter versus longer distance scrambling, (2) VP internal versus VP external scrambling, (3) accusative versus dative scrambling, and (4) single versus double scrambling. Results of all experiments supported the SIA model. Details of the SIA model and explanatory remarks will be presented and opened for discussion.

**COE Workshop Session 5, Saturday 16:40-17:20**

**Processing sandwiched dative NP in Korean via case-prosody interaction**  
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**Abstract**

This paper argues that in Korean, a sandwiched dative NP as in (1) can be resolved incrementally in on-line processing by case-prosody interaction. Based on Dynamic Syntax (Cann et al 2005), which assumes that structure building is incremental from left-to-right, we argue that incremental/local parsing via constructive case is default in Korean (See Miyamoto2002 for Japanese case). And non-local parsing is cued by prosody. We focus on Intonational Phrase boundary(IP).

Experiment1(N=35) is an off-line fragment-phrasing/completion. Subjects were asked to phrase the fragments in (2) and to complete the sequence naturally. Results show a strong correlation between phrasing and completion patterns, showing that readers use implicit prosody for syntactic disambiguation, supporting Fodor's Implicit Prosody Hypothesis. Experiment2(N=30) is an off-line auditory fragment-completion. %refers to IP boundary. After listening sequences like (3a-3b), subjects were asked to complete the sentence naturally. Results strongly support listeners' use of IP boundary for syntactic disambiguation. Experiment3(N=20) is a frame-by-frame self-paced reading, adopting Hirose(2003)'s method. In parsing(4), no significant delay was observed in region 3. This shows that in both on-line and in off-line parsing, implicit prosody prefers to resolve dative NP as in (1a), not as in (1b). Corpus extraction(Sejong2002, 10-million words) shows similar results. 73.7% of sandwiched datives were interpreted as in (1a) and only 26.3% as in (1b). Experiment4(N=14) is a cross-modal self-paced comprehension. Region1 in (5a-b) is presented auditorily and other regions are presented visually. No relative slow-down was observed between region 3 of (5a-5b), confirming the early incorporation of IP boundary at region1. Experiment5(N=10) is a prosodic phrasing test. Subjects were asked to read sentences like (1) naturally. Comprehension questions were asked to confirm their dative NP resolution. Results show that speakers use an IP boundary for early disambiguation of sandwiched dative NPs. Final syllables before IP were measured to confirm IP boundary in K-ToBI(Jun2000). We conclude that case-prosody interaction help readers/listeners/speakers to build structures incrementally.

**Example**

(1) Jina-nun Pomi-hanthey Mina-ka sakwa-lul ece cwuessta-ko malhaysse.  
 -TOP -DAT -NOM apple-ACC yesterday gave-COMP said

a. Jina said to Pomi that Mina gave an apple to Pomi.

(Sandwiched-Dative NP: matrix reading)

b. Jina said that Mina gave an apple to Pomi.

(Sandwiched Dative NP: embedded reading)

(2) Jina-TOP Pomi-DAT Mina-NOM apple-ACC yesterday....

(3) a. Jina-TOP% Pomi-DAT Mina-NOM apple-ACC yesterday....

b. Jina-TOP Pomi-DAT% Mina-NOM apple-ACC yesterday....

(4) Jina-TOP Pomi-DAT Mina-NOM apple-ACC(region1) yesterday(region2)

Heri-DAT(region3) gave-COMP (region4) said(region5)

(5) a. Jina-TOP Pomi-DAT% Mina-NOM apple-ACC(region1) yesterday(region2)

Heri-DAT(region3) gave-COMP(region4) said(region5)

b. Jina-TOP Pomi-DAT% Mina-NOM apple-ACC(region1) yesterday(region2)

adverb(region3) gave-COMP(region4) said(region5)

COE Workshop Session 5, 17:20-18:00

**If wide-scope negation isn't hard because the parser gets stuck,  
what does explain the problem?**

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**Abstract**

The 'not-because' construction in English is ambiguous between narrow-scope negation (BEC>NOT), as in (1a), and wide-scope negation (NOT>BEC), as in (1b):

- (1) The guard dogs didn't bark because ...  
a. ... they'd all been drugged. BEC>NOT: For the reason stated, the dogs did not bark.  
b. ... they heard an intruder. NOT>BEC: The dogs barked for a reason as yet unstated.

Frazier and Clifton (1996) observed a marked processing dispreference for NOT>BEC, and attributed this to parsing strategies encouraging persistence of the BEC>NOT analysis that is initially assigned. We report self-paced reading data clearly demonstrating that NOT>BEC is not, after all, dispreferred in every syntactic context, and argue that this necessitates an explanation couched in altogether different terms.

Our experimental design crossed two factors, Scope and Clause Type. In the first of three successive frames, we presented constructions biased either to BEC>NOT or to NOT>BEC, which either appeared as main clauses or were embedded in *if*-clauses. Frame 2 displayed a follow-up question as a second sentence or a main clause (after main- and *if*-clause Frame 1, respectively); finally, Frame 3 offered two answer alternatives, one of which the participant selected as fitting better. Although previous findings of notably slower processing for NOT>BEC were replicated in the main-clause context, reading times for NOT>BEC and BEC>NOT did not differ in the *if*-clause context. Our finding of a Scope x Clause Type interaction ( $p < .001$  by participants;  $p < .01$  by items) is incompatible with a 'persistence' explanation, which predicts processing difficulty for NOT>BEC sentences, across the board.

We propose instead that the usual dispreference for NOT>BEC requires an account referring to its marked linguistic properties — specifically, its unusual prosody and pragmatics — noting that these are mitigated by the *if*-clause context. In that context, the major break between subordinate and main clause tends to suppress any prosodic boundary before *because*, just as NOT>BEC utterances require (Hirschberg and Avesani, 2000). At the same time, the main clause that is syntactically guaranteed by sentence-initial *if* promises to satisfy the need for remarks beyond the bare statement of an event's non-reason. While determining the contributions of prosody versus pragmatics necessitates further experimentation, the role of either or both of these factors in the on-line resolution of the *not-because* ambiguity is now clear.

**References**

- Frazier, L., & Clifton, C., Jr. (1996). *Construal*. Cambridge, MA: The MIT Press.  
Hirschberg, J., & Avesani, C. (2000). Prosodic disambiguation in English and Italian. In A. Botinis (Ed.), *Intonation: Analysis, Modelling and Technology*. Dordrecht: Kluwer Academic Publishers.