[REVIEW]

*The Dynamics of the Language Faculty: Perspectives from Linguistics and Cognitive Neuroscience*

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1. Introduction

The central goal of generative grammar is to provide answers to the following four questions (see Chomsky (1986, 1988)).

1. What is our knowledge of language?
2. How is that knowledge acquired?
3. How is that knowledge put to use?
4. How is that knowledge implemented in the brain?

Many attempts have been made to answer these four questions in various fields such as linguistic theories (phonology, morphology, syntax, semantics, and pragmatics), language acquisition, psycholinguistics, and neurolinguistics (Boeckx and Grohmann (2007)). Although the questions in (1) are separate, they all derive from a single agenda: identifying the properties of the human language faculty. Thus, in order to further understand the language faculty, we have to combine and integrate findings and insights from different fields.

This collection of twelve up-to-date papers entitled *The Dynamics of the Language Faculty: Perspectives from Linguistics and Cognitive Neuroscience* is an interdisciplinary attempt to integrate findings on various intriguing topics in different fields of language research. These papers were all presented at the International Symposium on Language, Mind and Brain: Perspectives

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from Dynamic Syntax and Other Linguistic Theories held at Akita University on October 10th–12th, 2006. This book begins with a brief preface by the editor, which comprehensively summarizes the main points of each of the twelve chapters. Following the preface, the first two chapters are concerned with Dynamic Syntax. The subsequent four chapters, which comprise the Syntax and Semantics section, focus on the nature of quantifiers and ellipsis. The next two chapters in the Lexicon and Morphology section deal with the properties of complex predicates and syntactic and lexical Verb-Verb compounds. The final section, Cognitive Neuroscience, has four experimental studies on the processing of Japanese scrambling and of Japanese causatives by normal and aphasic adults and on roles played by undamaged areas in aphasics’ brains.

It is quite certain that the book with its twelve insightful papers from many different fields will greatly improve our understanding of the language faculty. Yet, one must note that the topics covered are not exhaustive, possibly due both to the schedule constraints of the symposium and to the space limitations of the book. For instance, the book lacks research on phonology and acquisition. In addition, I find it very regrettable that no papers relevant to Question (1b) are included in this book. As an acquisition researcher, I believe that data from acquisition studies provide much evidence for linguistic theories and other related fields, while these fields in turn have implications for the study of acquisition (see Snyder (2007), for example).

In what follows, I will briefly outline each of the papers contained in this book. In line with the objective of the collection, I will also provide findings from some acquisition studies related to some of these papers. By doing so, I will try to demonstrate how valuable and essential this interdisciplinary book is for any researcher interested in the language faculty.

2. Dynamic Syntax: Chapters 1–2

The first section of this book discusses Dynamic Syntax (DS) (e.g. Kempson et al. (2001)). DS is a grammar formalism of the knowledge of language that reflects on-line processing. This knowledge of language is assumed to be a set of constraints on semantic-structure building and directly maps strings onto semantic structures word-by-word, with structural underspecification and subsequent updates. Chapters 1 and 2 of the book introduce how this theory explains challenging issues in the study of Japanese scrambling and relative clauses.
Chapter 1 by Ruth Kempson and Jieun Kiaer, entitled “Japanese Scrambling: The Dynamics of On-line Processing,” focuses on puzzles for minimalist accounts, such as local scrambling, long-distance scrambling, and multiple long-distance scrambling in Japanese. As one example, it is well known that it is difficult to handle the Proper Binding Condition effect illustrated in (2) in minimalist accounts, as indicated by Saito (1992).

(2) *[Hanako-ga \[t_i\] iru to\[j\] Souru-ni\[i\] Taroo-ga \[t_j\] omotteiru.]

Hanako-Nom be Comp Seoul-Loc Taroo-Nom think
‘lit. [That Hanako is \[t_i\] in Seoul\[i\] Taroo thinks \[t_j\].’

Kempson and Kiaer claim that the ungrammaticality of (2) is naturally accounted for by DS, and propose that the semantic-structure building of *Hanako-ga iru* has been completed before the parse of *to*, and any subsequent items cannot be reflected in this completed structure. Thus, *Souru-ni* cannot modify the predicate in the bracketed sequence. They demonstrate that DS properly reflects the dynamics of language processing and provides a more explanatory basis for characterizing many facts in scrambling that are problematic for minimalist accounts.

Chapter 2 by Ruth Kempson and Akiko Kurosawa, “At the Syntax-Pragmatics Interface: Japanese Relative Clause Construal,” mainly investigates two types of Japanese relative clauses, head-final (English-type) relatives (HFRs) and head-internal relatives (HIRs) (Kuroda (1992)), based on DS. This theory assumes LINK transition, which permits the parser to build two paired structures which share an element. HFRs are constructed by a mechanism which induces a LINKed transition from a relative clause structure onto a relative head node. HIRs rely on the lexical entry of the nominalizer *-no*, but this particle induces the same transition as that involved in HERs. They contend that all Japanese relatives as well as English relatives can be uniformly explained by using the same mechanisms of DS.

3. Syntax and Semantics: Chapters 3–6

Chapter 3 by Kenji Yokota, “On Floating Numeral Quantifiers in Japanese,” demonstrates that the interpretation of Japanese floating numeral quantifiers (FNQs) is determined by prosody and information structure. Specifically, he proposes two types of FNQs, NP-related FNQs and VP-related FNQs. Consider the following examples in (3), involving prosodic elements such as pauses and downstep and intonational phrases indicated by parenthesis, as well as discourses and theme/rheme dictiononomy
proposed by Steedman (2000). Although the surface strings of the answer utterances in (3a) and (3b) are exactly the same, the FNQ in (3a), which is regarded as an NP-related FNQ, forms a single intonational phrase with its host NP, and the sentence has a non-partitive reading. On the other hand, the FNQ in (3b), which serves as a VP-related FNQ, constitutes an intonational phrase with the verb, and the sentence has a partitive interpretation. Yokota assumes that the difference in intonational phrasing found in (3) ultimately lies in the information-structure.

(3) a. Q: I heard that some men who happened to be there got involved in an accident. What kind of accident was it?
   A: (Soko ni iawaseta otoko ga roku-nin) (pause) tero
   there be-Past men 6-Cl terrorism
   DOWNSTEP
   [Theme Background Focus] [Rheme Focus …
   ni makikomareta-n-desu.
in got involved-Nomi-Polite
   ‘Six (and only six) men who happened to be there got involved in terrorism.’

b. Q: I heard that a certain number of men who happened to be there got involved in terrorism. How many got involved in it?
   A: (Soko ni iawaseta otoko ga) (pause) (roku-nin)
   there be-Past men 6-Cl
   PITCH RESET
   [Theme Background] [Rheme Focus …
   tero ni makikomareta-n-desu.
in got involved-Nomi-Polite
   terrorism in got involved-Nomi-Polite
   ‘Six (of the) men who happened to be there got involved in terrorism.’

Chapter 4 by Yukiko Ueda entitled “On Scope and Phases: Reconsidering Structure Building and Interpretation” concerns Ueda’s (2002) new scope calculation system which she describes as a phase-based approach. It deals with inverse scope calculation as a feature-matching syntactic operation, \( F_{\text{quant}} \)-matching. She claims that \( F_{\text{quant}} \)-matching applies to the relevant QPs before the EPP-satisfaction, not at LF. One of the advantages of this new scope system is that it can explain various cross-linguistic scope facts including English inverse scope readings, Greek/Catalan pre/postverbal quantificational subjects, and Japanese \textit{kara} ‘from’ subjects, floating quantifiers, and scrambling. She claims that this phase-based scope system can elimi-
nate the QR parameter.

Chapter 5 by Jun Abe and Chapter 6 by Daiko Takahashi focus on the sloppy identity interpretation of Japanese null arguments. There are at least two types of analyses proposed for explaining why null arguments as in (4) permit sloppy interpretations: Otani and Whitman's (1991) VP-ellipsis analysis (among others) and the NP/argument ellipsis proposed by Oku (1998) and Kim (1999) (among others).

(4) John-ga zibun-o hihansita ra, Mary-mo [e], hihansita.
    -Nom self-Acc criticized and -also criticized
    ‘John criticized himself, and Mary criticized [e].’

Although each of the two analyses has its advantages, Chapters 5 and 6 lend support in favor of the argument analysis.

In Chapter 5, “Identification of Null Arguments in Japanese,” Abe argues that Japanese has at least three types of null arguments, anaphora involving sloppy identity as illustrated in (4), intra-sentential anaphora such as (5), and discourse-based anaphora in sentences such as [e] kita ‘[e] came.’

(5) John-wa [e], kyoo-no gogo kuru to itta.
    -Top today-Gen afternoon come Comp said
    ‘John said [e] would come this afternoon.’

Abe demonstrates with evidence that the device of NP/argument ellipsis best captures null arguments in sentences such as (4). On the other hand, intra-sentential anaphors as in (5) are identified as bound pronouns and discourse-based null arguments are licensed by a null topic. His claim is that Japanese null arguments are not pronominal as those in pro-drop languages such as Italian, and that they have only nominal features.

Chapter 6 by Takahashi, “A Note on Ellipsis of Quantificational Objects in Japanese,” provides a new piece of evidence for the argument ellipsis analysis. Specifically, this analysis can account for the null object construction with inverse scope interpretation such as (6), whereas the VP-ellipsis analysis cannot generate the actual form of (6b).

(6) a. Taitei-no sensei-o dansi-no dareka-ga
    most-Gen teacher-Acc boy-Gen someone-Nom
    sonkeisiteiru. respect
    ‘lit. Most teachers, some boy respects.’

b. Zyosi-no dareka-mo e sonkeisiteiru.
    girl-Gen someone-also respect
    ‘lit. Some girl respects e, too.’
4. Lexicon and Morphology: Chapters 7–8

Chapter 7 by Hiroto Hoshi and Yoko Sugioka, “Agree, Control and Complex Predicates,” aims to explain the properties of small clause (SC) constructions in Japanese and English. They examine why the fronting of the embedded predicate in Japanese SC constructions (7a) and in English SC constructions (8a) are not allowed, as illustrated in (7b) and (8b).

(7) a. John-ga Mary-o kasiko-ku omotta.
   John-Nom Mary-Acc intelligent think-Pst
   ‘John considered Mary intelligent.’
   b. *[Kasiko-ku], John-ga Mary-o ti omotta.
      intelligent John-Nom Mary-Acc think-Pst
      ‘Intelligent, John considered Mary.’

(8) a. John is easy to consider ∅j (to be) intelligent.
   b. *[How intelligent]i is Johnj easy to consider ∅j (to be) ti?

Hoshi and Sugioka assume that English v triggers Agree for Case feature checking, while Japanese v does not. They also propose that the complex predicate formation is allowed because SC constructions do not involve categories with formal features. In (7a), v does not trigger Agree for Accusative feature checking but the complex predicate [[kasiko ku] omot] checks the Accusative Case feature with the subject of the SC Mary-o as its Theme object at the level of Argument Structure (AS)/Lexical Conceptual Structure (LCS). The sentence in (7b) is illicit because a part of the complex predicate is not permitted to undergo movement. In (8a), the verb consider undergoes complex predicate formation with the adjective intelligent because of the requirement from the tough predicate. This predicate is a control predicate whose Theme subject must semantically control the Theme/Patient of its Action co-argument at AS/LCS. Consequently, the adjective cannot undergo movement as in the Japanese example (7b). Hoshi and Sugioka conclude that their unified analyses for Japanese and English SC constructions attest to the AS/LCS level.

In Chapter 8 “Modularity of Word Formation: Differences between Two Types of Japanese Compound Verbs,” Yoko Yumoto examines some differences between lexical V(erb)(1)-V(erb)(2) compounds and syntactic V-V compounds in Japanese, and provides evidence for the hypothesis of modularity in word formation. Previous studies on verbal compounds such as Yumoto (2005) hypothesize that lexical compounds such as naki-sakebu ‘cry-shout’ are interpreted through amalgamation of the LCS of the two verbs in accordance with patterns which are regulated in the lexicon. On
the other hand, the meaning of syntactic compounds such as *nomi-sugiru* ‘drink-exceed’ are so transparent that they are assumed to be interpreted straightforwardly. Yumoto first argues that the type of syntactic compounds should be determined by the subcategorization feature of V2 and that all the verbs that form a syntactic compound s-select an event argument. She also proposes that the case feature and subcategorization feature of lexical compounds are determined on the basis of the amalgamated LCS. Lexical V-V compounding is controlled by the semantic constraints on the LCS and a morpho-syntactic rule of inheritance. In this way, she justifies the validity of a modular theory of word formation.

5. Cognitive Neuroscience: Chapters 9–12

In Chapter 9, “Cognitive Neuroscience of Scrambling,” Masatoshi Koizumi claims that the study of language should be undertaken from different perspectives such as linguistic, psychological, and neurophysiological perspectives. He and his collaborators are attempting to realize this claim by conducting behavioral and neurophysiological research on scrambling in Japanese. They have performed many behavioral experiments and have found that scrambled sentences take more time to be processed than the corresponding canonical sentences. They have also carried out an fMRI study, which examined activated areas in the left lateral premotor cortex and the left inferior frontal gyrus. From the results of the experiments, Koizumi contends that the human cognitive system has developed in such a manner that the Subject-NonSubject order is easier to process than the NonSubject-Subject order.

Chapter 10 by Hiroko Hagiwara “How the Brain Processes Scrambled Word Order in On-line Sentence Comprehension: Event-related Potential Studies” investigates how Japanese scrambled sentences are processed online by utilizing Event-related Potentials (ERPs). Previous studies demonstrate that some Japanese scrambled sentences require the parser to store scrambled elements temporally in verbal working memory and thus are more costly than canonical sentences. Hagiwara and her colleagues experimentally explored the processing of long scrambled sentences (Adv-Obj-Subj1-Subj2-

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The text contains placeholder symbols (e.g., \[i\]) which need to be properly formatted. For the sake of completeness, let's continue with the description of the experiment on long scrambling. In their experiment on long scrambling, a sustained anterior negativity, allegedly associated with the storage cost of a displaced element in working memory, appeared at about 300ms after the onset of the scrambled NP. In addition, an ERP component P600, relevant to integra-
tion cost of a displaced element for semantic interpretation, was observed at the NP of the pre-gap position before the verb. They found a P600 also at the post gap verbal position in scrambled ditransitive sentences. These results have revealed that the position of filler integration may depend on the construction type, and they lend support to the hypothesis that sentence structures are derived from left to right in an incremental fashion.

In Chapter 11, “Neurological Evidence Differentiates Two Types of Japanese Causatives,” Takane Ito, Yoko Sugioka, and Hiroko Hagiwara provide neurological evidence that lexical processing is performed both in the lexicon and in syntax. Many syntactic studies propose that Japanese permits two types of causatives, syntactic or sase causative (SC) (e.g. tat-ase-ru ‘make stand’) and lexical causative (LC) (e.g. tate-ru ‘stand’). Their first experiment reveals that aphasic patients have difficulty with SC, not with LC. Their ERP experiment with healthy adults demonstrates that a type of syntactic computation is involved in the processing of SC, but not in the processing of LC. These results of their experiments suggest that we syntactically compute SC’s bi-clausal structure, while processing of LC involves associative memory.

In Chapter 12, “Intrinsic Mechanisms Underlying the Recovery from Aphasia,” Ken Nagata and his colleagues focus on cerebral blood flow (CBF) and cerebral metabolic rate of oxygen in post-stroke aphasics by utilizing positron emission tomography. One intriguing topic in the research on aphasics is the role of the undamaged areas in the dominant left hemisphere and the role of the non-dominant right hemisphere. One of their case studies reviewed in this chapter statistically compares the regional CBF and the scores of the Standard Language Test for Aphasics by right-handed patients with left hemisphere infarction. Based on the findings, the study proposes that the following three mechanisms may interact to reorganize the language function: recovery of the left language-related area itself, compensation by the areas surrounding the lesion, and compensation by the right hemisphere.

6. A Brief Introduction to Acquisition Studies: A Tentative Supplement

As reviewed above, this book covers influential studies in the fields of linguistic theories, psycholinguistics, and neurolinguistics. This means that this collection faces the questions posed in (1a), (1c), and (1d), and it is convincingly regarded as an ambitious attempt to achieve the central goal of generative grammar: to discover the nature of the human language facul-
ty. Yet the book contains no papers related to the question in (1b). Thus, this section will aim to introduce some acquisition research relevant to the studies in the collection in order to enrich the objective of weighing results from many different perspectives. Although it is not exhaustive, information will be provided on case studies exploring Japanese-speaking children’s knowledge of scrambling (cf. Chapters 1, 9, and 10), relative clauses (cf. Chapter 2), floating quantifiers (cf. Chapter 3), argument ellipsis (cf. Chapters 5 and 6), and causatives (cf. Chapter 11).

First of all, studies such as Otsu (1994) and Murasugi and Kawamura (2005) experimentally show that Japanese-speaking children before/around age 3 can correctly understand scrambled simple transitive sentences. Furthermore, Sugisaki and Isobe (2001) report adult-like comprehension of ditransitive sentences with IO-S-DO-V order in 3- and 4-year olds.

As for Japanese relative clauses, readers can refer to Ozeki and Shirai (2005) and Suzuki (2011) to understand children’s knowledge of English-type relative clauses and to Isobe (2003) for the acquisition of Japanese head-internal relative clauses. These studies demonstrate that children at before/around age 3 have acquired knowledge of relative clauses.

The acquisition of floating quantifiers is reported by Yamamoto (2005) with naturalistic data and Suzuki and Yoshinaga (2004) with experimental data. The latter presents children’s correct interpretation of floating quantifiers. As for the argument ellipsis analysis, Sugisaki (2009) demonstrates experimentally that Japanese-speaking children at ages 4–5 already have knowledge of argument ellipsis.

Finally, the experimental results reported in Chapter 11 are in line with an acquisition study by Okabe (2008). She has demonstrated experimentally that 4- to 6-year-olds can assign the bi-clausal structure to sase causatives and the mono-clausal structure to lexical causatives.

7. Summary

This book provides profound suggestions regarding the nature of the language faculty. The most important characteristic of the book is its interdisciplinary character; it illustrates how to integrate insights from various related perspectives. Thus, it is clear that this book is a must-read for researchers who endeavor to elucidate the properties of our language faculty. In closing, in order for us to pursue the questions in (1), I would like to refer to the guidelines for the generative enterprise from Koizumi’s paper (p. 232): “If we are to understand the nature of language, it is essential for
researchers in the different disciplines to share their findings, to relate them to one another, and more ideally, to integrate the fields into a unified approach to elucidate how the brain enables language.”

REFERENCES


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