Towards a Proper Treatment of Adjuncts in Japanese

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Abstract

In this paper we will discuss interpretation of adverbs in Japanese. We will explore the division of labor between the syntactic requirements, semantic requirements, and discourse-contextual constraints involving adverbial interpretation. It will then be argued that this inter-modular approach utilizing LFG explains various elusive paradigms of the adverbs.
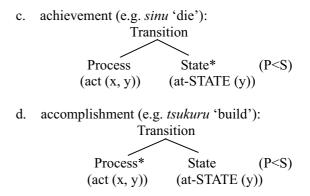
1. Scope Ambiguity and Lexical Semantics

We will start with lexical semantic considerations of adverb scope. Pustejovsky (1991, 1995) argue that different types of adjuncts modify different types of subevents in the event structure of a verb. Under recent assumptions in LFG, lexical semantic information is encoded in f(unctional) structure (Butt 1995, Andrews and Manning 1999, Wilson 1999). There have been a number of proposals concerning the level of lexical semantic representation that can capture the various properties of a verb, including argument projection, aspectual class, transitivity alternation, and so on (Jackendoff 1990, Levin and Rappaport-Hovav 1995, Kageyama 1996, among many others). We conjecture that event structure representations factor out the part of the verb semantics that contribute to the aspectual property of the verb, while leaving the other components of the meaning to be specified by the LCS that accompanies each subevent as shown in (1), in which x and y represent external argument and internal argument, respectively. "*" indicates the head subevent, and "<" means 'precedes' and the structure in the parentheses shows that the corresponding LCS for the subevent.

(1)
  a. state (e.g. *aru* 'exist'):
           State
        (at-STATE (y))

  b. act (e.g. *tataku* 'pound'):
          Process
        (act (x, y))

  c. achievement (e.g. *sinu* 'die'):
             Transition
            ⟋   ﹨
      Process   State*   (P<S)
     (act (x, y)) (at-STATE (y))

  d. accomplishment (e.g. *tsukuru* 'build'):
             Transition
            ⟋   ﹨
      Process*   State   (P<S)
     (act (x, y)) (at-STATE (y))

Adverbial types selected by each subevent will be like follows (cf. Sugioka 1996).

(2) a. [instrument / depictive / manner (Process)]
    b. [result / material (State)]
    c. [time / rate (Transition)]

The lexical semantic approach illustrated above appear to be operative to all relevant cases. However, this is not so. For instance, manner and depictive adverbs in fact differ in what they specify; Manners specify the mode of action (e.g., *yochiyochito* 'in an unstable manner', *hayaku* 'quickly', etc.), and Depictives specify the temporal state of the actor (e.g., *hitoride* 'alone', *damatte* 'silently', etc.). The subtle difference, however, cannot be represented in the modification structure in (2a), where both adjuncts modify "Process". Such a lexical account will run into trouble in face of scopal (un)ambiguity exhibited in (3)-(5). The numbers in the angle brackets represent native speaker's judgment on a given adverbial interpretation. The questionnaire asked 22 native speakers (3rd and 4th years at Akita University, October 2004) to go over (3)-(5) and give to each adverb interpretation the score ranging over four degrees from good to bad (which corresponds to conventional indicators in the literature "OK", "?", "??", "*", respectively), for the acceptability of the English translations (i) and (ii) of each example.

(3) a. Ken ga   Naomi o damatte   suwar-ase-ta.
        Ken Nom Naomi Acc silently sit-Caus-Past
        (i)'Ken silently made Naomi sit.'   <17, 4, 1, 0>
        (ii)'Ken made Naomi silently.'   <11, 6, 4, 1>
    b.   Damatte Ken ga Naomi o suwar-ase-ta.
        (i) 'Ken silently made Naomi sit.'   <15, 5, 2,0>
        (ii)'Ken made Naomi sit silently.'   <0,2,9,11>

(4) a. Ken ga   Naomi ni eigo o   yukkurito   hanas-ase-ta.
        Ken Nom Naomi Dat English Acc fluently   speak-Caus-Past
        (i)'Ken slowly made Naomi speak English.'   <12,6,3,1>
        (ii)'Ken made Naomi speak English slowly.'   <11,7,4,0>
    b.   Yukkurito Ken ga Naomi-ni eigo o hanas-ase-ta.
        (i)'Ken slowly made speak English.'   <13,7,2,0>
        (ii)'Ken made Naomi speak English slowly.'   <10,5,5,2>

(5) a. Ken ga Jiroo o oomatade aruk-ase-ta.
        Ken Nom Jiro Acc with strides walk-Caus-Past
        (i)'Ken made Jiro walk, with vigorous stride.' <2,1,11,8>
        (ii)'Ken made Jiro walk with vigorous stride'   <15,6,1,0>
    b.   Oomatade Ken ga Jiroo o aruk-ase-ta.
        (i)'Ken made Jiro walk, with vigorous stride.' <3,2,9,8>
        (ii)'Ken made Jiro walk with vigorous stride.' <10,7,4,1>

What is remarkable is that in (3b) and (5b), unlike (4b), expected semantic scope ambiguities do not arise. The differences cannot be accounted for nicely only by assuming that linear order correlates with adverbial scope. Lexical semantic considerations for a given adverb class on the whole correlates with more restricted distribution and its interpretation. However, the above data suggest that the lexical semantic account discussed above is insufficient to handle these facts correctly. The next step will be to spell out decisive factors of licensing of each adverb in those examples.

2. The dual analysis of adverbs

In this section we will introduce to our alternative semantics the dual analysis of adjuncts/complements proposed in Dowty (2000), in which he argues that the meaning difference results from a complement vs. adjunct ambiguity, not an ambiguity in the adverb per se, and that the availability of both readings will depend on word order.[1]   Take (6) as a simple illustration, which is ambiguous between a complement reading and an adjunct reading.

(6)   a student of high moral principles
        i) a student who studies high moral principles   [complement reading]
        ii) a student who has high moral principles   [adjunct reading]

The point here is that the ambiguity comes from the complement vs. adjunct reading, not from the multiple meanings (if any) of the preposition *of*, though the word order is irrelevant in this case.

      Keeping this in mind, we consider the contrast between (3b) and (4b). To account for their modification relation, we suggest that adverbs in Japanese are not always adjuncts. To be more specific, VP-adverbs such as manners, modifying a specified event and seen as process-related modifiers, can behave like either complements or adjuncts in marked word order (e.g. at the sentence-initial position). This idea seems quite promising in a language like Japanese, since there is no (strong) evidence in support of structural differences between complements and adjuncts in the language. Given this, manner adverbs such as *yukkurito* 'slowly' in (4) can be analyzed either as an adjunct modifying the matrix verb (4bi) or as a complement relating to its head, i.e. the embedded verb (4bii). By contrast, a depictive adverb like *damatte* 'silently' contained in (3) is preferably analyzed as an adjunct, since it will modify event rather than process component. The adverb *oomatade* 'with vigorous stride' in (5), in contrast, is preferably analyzed as a complement (see (5bii)).[2] It should be noted that we do not deny that surface word order will play some part in the interpretation of adverbs. So the scope (un)ambiguity observed in (3)-(5) have to do with a structural nature as well as a (lexical) semantic nature, which follows that c-structure as well as f-structure will participate in semantic interpretation (Yokota 2001). Another important assumption to be introduced here is that a complement generally forms a complex predicate with the head verb at the representation level of grammatical relations (e.g. f-structure for LFG), which permits the complement completing the meaning of its head in a compositional manner. Hence, it seems reasonable to assume that certain types of adverbs are subcategorized for by the head verb.

      We will illustrate the dual analysis hypothesis in LFG. Sentences like (4b) can involve either adverb-as-complement structure (7a) or adverb-as-adjunct (7b). (7a) in effect allows the corresponding sentence to act like a single predicate.

(7) a.   PRED   [*yukkurito hanasu* 'speak slowly'<SUBJ, OBJ>]
          SUBJ   [PRED ...]
          OBJ   [PRED ...]

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[1] We use the terms "argument" and "complement" alternately at appropriate points in this paper, following the conventional usage in the literature.
[2] Adverbs of the same type include *hageshiku (yusaburu)* '(shake)violently', *ryuuchooni (hanasu)* '(speak) fluently', *tsururito (suberu)* 'slip', *gaburito (kamitsuku)* '(bite) violently', *gutto (hipparu)* '(pull) well', *nikotto warau* 'smile', *chiratto miru* 'have a look at'.

b.
$$\begin{bmatrix} \text{PRED} & [\textit{hanasu} \text{ 'speak' <SUBJ, OBJ>}] \\ \text{SUBJ} & [\text{PRED ...}] \\ \text{OBJ} & [\text{PRED ...}] \\ \text{ADJ} & \{[\text{PRED } \textit{yukuurito} \text{ 'slowly'}]\} \end{bmatrix}$$

Depending on contextual factors, a complement analysis of adverbs (7a) might give way to an adjunct analysis of adverbs (7b), and vice versa. In addition, the preferred interpretation might vary among speakers. An advantage with f-structures in (7) based on the dual analysis hypothesis enables us to overcome (potentially) problematic situations involving f-structure representations in LFG, where adjuncts' relative scope to one another is not encoded at f-structure (cf. Andrews and Manning 1999).

We have argued that adverbs classified as process-related (e.g. manner adverbs) restrict the range of events referred to; so that when such adverbs are selected by a verb, they contribute a necessary part of the information that the VP supplies in defining a given situation, just as an object selected by a transitive verb. If these adverbs function as complements, it is then predicted that such adverbs can modify V1 (or the embedded verb) alone from outside the VP. This is ascertained by the examples (4b) and (5b).

3. Non-transfer of adjuncts

In this section, given the dual analysis approach discussed in the previous section, we will consider the syntactic and semantic behavior of Japanese adverbs, and then conclude that arguments (or complements) can transfer while adjuncts cannot, contrary to the assumption postulated by Matsumoto (1996) where he claims that both can transfer freely. We start with an example involving a clearly adjunct. Example (8) contains a circumstantial clausal adjunct -*mama* 'with'.[3] (In the translations below, the angle brackets indicate which portion of the sentence is being modified by the adjunct, represented in square brackets.)

(8) a. [Hudangi no mama] Taroo wa supai to [NP *mikkai*]o shita / tsuzuketa / ketteishita / [casual wear Gen-with] Taro Top spy with secret meeting Acc did / continued / decided / kokoromita / nozonda.
tried /hoped
'Taro, [wearing his everyday clothes], <did / continued to / decided to / tried to / hoped to meet secretly with a spy>.' (Note that Taro wore his everyday clothe when he did / continued / decided tried / hoped to meet a spy secretly.)

b. Taroo wa supai-to [NP [hudangi-no-mama-no] *mikkai*]o shita / tsuzuketa / Taro-Top spy-with casual wear-Gen-with-Gen secret meeting Acc did / continued / ketteishita / kokoromita / nozonda.
decided / tried / hoped
'Taro did / continued to / decided to / tried to / hoped to <meet secretly with a spy> [wearing his everyday-clothes].' (Note that Taro did / continued / decided / tried / hoped to meet a spy secretly, where (= at the meeting) he could wear his everyday clothes.)

The differences of sentence meaning show that in (8a) the adjunct clause, which is outside the projection of the VN, unambiguously modifies the main verb, whereas in (8b) the adjunct, which remains within the projection of the VN, modifies only the VN. (8a) reads, for example, 'When Taro tried to meet a spy secretly, Taro wore his everyday clothes'. In this case, the adjunct modifies the main verb *kokoromita* 'tried'. In (8b), on the other hand, 'Taro tried to meet a spy secretly, where (= at the meeting) he would

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[3] The same arguments will hold for other types of clausal adjuncts including temporal, concessive, degree, rationale, and locative, though we do not explore it here.

wear his everyday clothes'. The adjunct clause therefore modifies the VN *mikkai* 'secret meeting' unambiguously.

Matsumoto (1996), with the assumption that adjuncts as well as arguments can be transferred freely, provides the following sentences in (9) as cases of adjunct transfer; the adverbs are supposedly transferred out of the VN phrase, square-bracketed in (9).

(9) a. Sono taihuu wa   fukuzatsuni [$_{VN}$ idoo] o   hajimeta.
      the typhoon Top complicatedly movement Acc began
      'The typhoon began to move in a complicated way.'
   b. Karera wa oohabani kouri-kakaku no [$_{VN}$ nesage] o   kokoromita.
      they Top   broadly   retail.price Gen lowering Acc attempted
      'They attempted to make a broad reduction in retail prices.'

We note that it will often be difficult to determine whether a particular occurrence of an adverb instantiates an adjunct or complement, mainly because in Japanese almost all dependents are optional in context unlike languages like English. Hence, there are few reliable syntactic criteria to be used in determining the identity of a phrase in the language. Under such a difficult situation, though, we will make use of two diagnostic tests that seem especially significant to the present study; one is the *nani* 'what' replacement test, the other is the causative construction test. We reexamine Matsumoto's (1996:72) two examples supposedly involving such VN adjuncts (square-bracketed below); one is a *ni*-marked purpose clause, which can be used with a verb of motion (Miyagawa 1986, Saiki 1987) (10a), and the other is an adverb of result, which can be used with a change of state verb (Nitta 1989) (10b). (The phrases in question are square-bracketed.)

(10) a. Jon wa   [jishin no   higai o   choosa shi ni] chookikan   *tobee* o   suru koto
        John Top earthquake Gen damage Acc research do Pur for.a.long.time visit.USA Acc do Comp
        ni   shita.
        Dat decided
        'John decided to go to the US for a long time in order to survey the earthquake.'
    b. Jon wa   [komakaku] sono kami no *setsudan* o   shita.
       John Top finely   the paper Gen cutting Acc did
       'John cut the paper to very small pieces.'

Matsumoto's account of (10) is, however, wrong. We instead argue that seeming adjuncts such as *ni*-marked purpose clauses and result adverbs are actually transferred complements rather than adjuncts. A descriptive generalization to be drawn is as follows: a VN's argument can transfer, while a VN's adjunct cannot. This generalization is confirmed by the following arguments. Let us begin with the *nani* 'what' replacement test to check whether the phrase in question is really a dependent of a VN.

(11) a.   ??Jon wa   [jishin no higai o choosa shi ni]   chookikan   nani o   suru koto
          John Top earthquake Gen damage Acc research.do.Pur. for.a.long.time what Acc do Comp
          ni shi-mashi-ta ka.
          Dat do-Pol-Past Q
          '(Lit.) What did John decide to do for a long time in order to survey the damage from the
          earthquake?'
     b.   ??Jon wa   [komakaku] nani o   shi-mashi-ta ka.
          John Top finely   what Acc do-Pol-Past   Q
          '(Lit.) What did John do to very small pieces?'

Notice that in (11a) the VN cannot be replaced by *nani* 'what', indicating that the *ni*-marked purpose clause cannot be a dependent of *suru*. Likewise, in (11b) the adverb *komakaku* 'finely' loses its result reading if the NP is replaced by *nani*, which shows that the adverb cannot be a dependent of *suru*. Incidentally, if a result adverb is placed just in front of the main verb *suru*, then its result reading is available as shown in (12), in which *suru* may function as the heavy verb *suru*. Hence, (11b) and (12) are different in nature.

(12) Jon wa   nani o   komakaku shi-mashi-ta ka.
     John Top what Acc finely   do-Pol-Past Q
     '(Lit.) What did John do to very small pieces?'

    We turn to another diagnostic test employing the morphological causative construction (S. Yatabe p.c.): in such a construction, a complement preceding the causer argument is interpreted with respect to the caused event, while an adjunct preceding the causer argument with respect to the causing event. To see this, consider the following example.

(13) a. [Hooseki o] Taroo wa Jiroo ni Hanako kara   nusum-ase-ta.
        jewelry Acc Taro Top Jiro Dat Hanako Source steal-Caus-Past
        'Taro made Jiro <steal> [the jewelry] from Hanako.'
     b. [Nan'no setsumei mo se-zu ni]   Taroo wa Hanako ni   amerika e ik-ase-ta.
        what Gen explanation even do without Taro Top Hanako Dat USA to   go-Caus-Past
        'Taro <made Hanako visit the US> [without giving any explanation to her].'

In (13a) *hooseki o* 'jewelry Acc' is interpreted with respect to the caused event, i.e. *nusumu* 'steal', and it is thus considered an argument of the base verb *nusumu* 'steal'. On the other hand, in (13b) the square bracketed clause is interpreted with respect to the causing event, i.e. causative suffix *-sase* 'make/let do', which suggests that the clause is an adjunct. Now let us check whether the *ni*-marked purpose clause and the result adverb are really adjuncts as Matsumoto claims.

(14) a. [Jishin no higai o choosa shi ni]   Taroo wa Jon ni   tobee o   s-ase-ta.
        earthquake Gen damage Acc research do Pur Taro Top John Dat visit.USA. Acc do-Caus-Past
        'Taro made John <visit the US> [in order for her to do survey the damage from the earthquake].'
     b. [Komakaku] Taroo wa Jon ni   sono kami no setsudan o s-ase-ta.
        finely   Taro Top John Dat the paper Gen cut Acc   do-Caus-Past
        'Taro made John <cut the paper> [finely].'

As indicated in the English translations, both in (14a) and (14b) the adverbials in the square brackets are interpreted with respect to the caused event, namely, the base verb *tobee o s-* 'visit the USA' and *setsudan o s-* 'cut', respectively. It seems, therefore, reasonable to conclude that the *ni*-marked purpose clause and the adverb of result are complements rather than adjuncts.[4]
    The same arguments hold for additional cases provided by Matsumoto (1996:78), in which the main verb is not *suru*, but a control/raising verb supposedly exhibiting the same behavior as light *suru*.

(15)[5] a. Sono taihuu wa [fukuzatsu ni]   *idoo* o   hajimeta.

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[4]   Concerning LFG formalism, we assume that a complement forms a complex predicate with the matrix predicate (e.g. V, VN, VP) at f-structure, and the c-structure (or surface structure) is either mono-clausal or multi-clausal, though it cannot be discussed here in detail for lack of space.
[5]   As is well known, the distinction between result adverbs and manner adverbs is not always clear-cut. Considering

the typhoon Top complicatedly movement Acc began
'The typhoon began to move in a complicated way.'
  b. Karera wa [oohaba ni]   kourikakaku no *nesage* o   kokoromita.
     they Top   substantially retail.price Gen lowering Acc attempted
     'They attempted to make a substantial reduction in retail prices.'

The *nani* replacement test given in (16) shows that the adverbs in question are simply not be of the matrix verbs (*hajime-* 'begin' and *kokoromi-* 'attempt').

(16) a. ??Sono taihuu wa [fukuzatsu ni]   nani o   hajime-mashi-ta-ka.
       the typhoon Top complicatedly what Acc begin-Pol-Past-Q
       '(Lit.) What did the typhoon begin in a complicated way?'
  b. ??Karera wa [oohaba ni] nani o   kokoromi-mashi-ta-ka.
      they Top   substantially what Acc attempt-Pol-Past-Q
      '(Lit.)What did they attempt to do vastly?'

The causative test in (17) shows that the adverbs in question are interpreted with respect to their base verb (i.e. *hajime-* 'begin' and *kokoromi-* 'attempt'), which leads us to analyze such adverbs as complements, not adjuncts.

(17) a. ?[Fukuzatsu ni] teikiatsu ga   sono taihuu ni *idoo* o   hajime-sase-ta.
     complicatedly low pressure Nom the typhoon Dat movement Acc begin-Caus-Past
     'The low pressure made the typhoon <begin to move> [in a complicated way].'
  b. [Oohaba ni] shachoo ga   karera ni kourikakaku no *nesage* o   kokoromi- sase-ta.
     substantially president Nom they Dat retail.price Gen lowering Acc attempt- Caus-Past
     'The company president made them <attempt to make a reduction in retail prices> [substantially].'

We can now recognize from the observations above that VN-complements can transfer while VN-adjuncts cannot. It may be worth pointing out, in passing, that the proposal treating all adjuncts as complements subcategorized for by the head in some version of HPSG (e.g. Van Noord and Bouma 1994, Bouma, Malouf and Sag 2001) is not sufficient to give a full account of examples discussed in this section.

    Lastly, we provide the PS rules for Japanese covering the facts we have been discussing. We adopt an XCOMP analysis in LFG, originally due to Kaplan and Zaenen (1989), where they propose an analysis of long-distance dependencies in terms of functional uncertainty.

(18) a. S →   XP*   {V,A}
           (↑XCOMP*GF-ADJ) =↓   ↑=↓
                  or
             (↑ADJ) =↓

    b. NP→ XP*   N
             (↑GF) = ↓   ↑=↓

The rule (18a) states that either the XP is XCOMP*GF (except ADJUNCT) or it is an element of the

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this, the bracketed elements in (15) might be ambiguous between two readings; manner (focusing on the process of some action/ motion) and result (focusing on the resulting state of some action/motion), both of which appear to be available without much difficulty in cases like (15). The exploration of such possibilities must be left for future research.

ADJUNCT set. More specifically, (18a) generates a constituent structure in which arguments (except adjuncts) occur immediately dominated by an S. For instance, in VN constructions only arguments of an XCOMP can be allowed two alternative positions, namely, inside/outside a VN phrase. (18b) allows the alternative possibility of the arguments (except adjuncts) appearing inside an NP. In this manner, VP-adjuncts are handled by the rule (18a), while VN-adjuncts by (18b). (Note again that the postulation of adjunct transfer cannot be maintained any more as discussed in the present section.) We will extend the dual analysis of adverbs to the issue of scrambling adjuncts in the next section.

4. Re-examination of adjunct scrambling

As regards scrambling, we follow an assumption that adjunction is in principle quite free, that is, every element is base-generated and there are no major syntactic restrictions (e.g. subjacency (Chomsky 1973)) on either the category or the level of a phrase to which something adjoins (Choi 1996). Scrambling is usually taken to be a phenomenon that does not affect semantics. Scrambling of adjuncts changes the semantic scopes of adjuncts, while scrambling of complements does not. Scrambling of adjuncts out of a complement is not possible, while scrambling of a complement out of a complement is. Hence, adjuncts in the usual case do not undergo scrambling (e.g. Saito 1985, Gunji 1999). Admitting that adverbs do not usually participate in scrambling, we argue that adverbs still can be scrambled as long as they are considered complements selected by the head. Let us first consider the following examples.

(19) scrambling of an object:
    a. John ga   Mary ni shukudai o   suru yooni   itta.
       John Nom Mary to homework Acc do in.such.a.way said
       'John persuaded Mary to do the homework.'
    b. John ga   shukudai o   Mary ni suru yooni   itta.
       John Nom homework Acc Mary to do   in.such.a.way said
    c. Shukudai o   John ga   Mary ni suru yooni   itta.
       homework Acc John Nom Mary to do   in.such.a.way said

(20) scrambling of an adverb:[6]
    a. John ga   Mary ga   kooen de ason-de iru to   omotta.
       John Nom Mary Nom park in   playing   Comp thought
       'John thought Mary was playing in the park.'
    b. Kooen de John ga   Mary ga   ason de-iru to   omotta.
       park in   John Nom Mary Nom playing   Comp thought
    c. John ga   kooen de Mary ga   ason-de iru to   omotta.
       John Nom park in   Mary Nom playing   Comp thought

The argument (or complement)-like behaviour of long fronted adjuncts can be interpretatively motivated; such adjuncts do not function as scene setters of the higher clause. In (20), the locative phrase in sentence-initial position is more closely related to *asobu* 'play' than *omotta* 'thought'. In other words, *omou* 'think' does not normally support a locative of any type, while *asobu* 'play' supports a *-de* phrase. Somewhat informally, the crucial factor in determining the dominant interpretation lies in how easy it is to imagine an appropriate context. In light of cases like (20b), the locative adverb *kooen de* 'in the park' is lexically selected (or subcategorized for) by the verb *asobu* 'play', though in real utterances such a phrase

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[6]   The sentences (20a) and (20b) may be ambiguous. If so, it follows that the adverb can be interpreted to modify the matrix verb as well as the embedded verb. The point here is that an adverb is interpreted with respect to the embedded verb (see also (4b) and (5b) above).

may not be always realized.[7] Taking it into account, we propose that only "subcategorized adverbs" newly recognized here can participate in scrambling. This is supported by an example like (21), which shows that non-subcategorized adverbs (arguably, genuine adjuncts) cannot be scrambled without altering sentence meaning. In (21a) a temporal adjunct *chookikan* 'for a long time' is marked with the genitive marker *no*, and stays within the projection of the VN, hence the adjunct is considered a VN-modifier.

(21) a. [Chookikan-no]   *tobee* o   shita / tsuzuketa / ketteishita / kokoromita / nozonda.
        for.a.long.time-Gen visit.USA-Acc did / continued / decided / tried / hoped
        '(Lit.) (I) did / continued / decided / tried to / hoped to <visit USA> [for a long time]'
    b. [Chookikan] *tobee* o   shita / tsuzuketa / ketteishita / kokoromita / nozonda.
        for.a.long.time visit.USA-Acc did / continued / decided / tried / hoped
        '(Lit.) (I) <visited / tried to visit / hoped to visit USA> [for a long time].'

In (21b), the adjunct *chookikan* is not marked with the genitive case marker, and it is outside the NP, which means that it is no longer an adjunct of the VN. Note that in (21b) the adjunct *chookikan* modifies the main verb *shita / kokoromita / nozonda* etc, but does not modify only the VN *tobee* 'visit USA'. The difference in interpretation between (21a) and (21b) strongly indicates that an adjunct can no longer modify its head alone if it is outside the projection of the head.

    In the remainder of this section, we argue that scrambling of adverbs is motivated by lexical semantic restrictions and perhaps in some cases discourse factors such as focus, which is similar to aboutness conditions (Kuno 1976), characterization conditions (Takami 1992) requiring the rest of the sentence to make a meaningful predication about the fronted element. Consider (22).

(22) a. Sono kikanjuu$_i$ o   [keisatsu ga [[e$_j$ e$_i$ nusunda] yatsu$_j$] o sagashi-te iru rashii].
        the machine gun Acc police Nom   steal guy Acc   search-Prog appear
        'The machine gun, it appears that the police are searching for the guy$_j$ who e$_j$ stole e$_i$.'
    b. Panama$_i$ kara [Amerika wa [[e$_j$ e$_i$ tooboo shita] hito$_j$] o   mitome-nai].
        Panama from America Top   escape did   people Acc recognize-Neg
        'From Panama, America doesn't recognize people$_j$ who e$_j$ have fled e$_i$.'

A functional-syntax approach by Kuno and Takami would explain (22) as follows; if all of a scrambled sentence, including both main and embedded clauses, does give a reading that is "about" the preposed constituent, then the sentence will be acceptable even when scrambled out of a relative clause. There are pairs of acceptable and unacceptable sentences that are structurally identical. This situation would seem to rule out appealing to any structural condition. Instead, it seems necessary to look at the meaning of the sentence and see if the rest of the sentence makes a meaningful predication about the fronted element. The aboutness constraint can account for examples like (22). For instance, (23a) can be paraphrased using a *such that* relative clause; "The machine gun is *such that* the police are searching for the guy who stole it." However, it appears difficult for such a functional account employing the paraphrasability to explain the difference between (23a) and (23b), where an adverb is in the sentence-initial position.

(23) a. Riyuu mo naku [Hanako ga [Taroo ga sono setsu o   shinji-te iru]   to omotteiru].
        reason without   Hanako Nom Taro Nom that theory Acc believe-State that think
        'Without any reason, Hanako thinks that Taro believes in that theory.'
    b. Moomokuteki ni [Hanako ga [Taroo ga   sono setsu o   shinji-te iru]   to omotteiru].
        blindly   Hanako Nom Taro Nom that theory Acc believe-State that think

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[7] The special relationship between a predicate and its dependents could be represented in Pustejovsky's (1995) notion of the *qualia* structure. Such formalization must be left for future research.

'Hanako thinks that Taro blindly believes in that theory.'

The sentence-initial adverb in (23a) must be construed with the matrix verb in (23), while the one in (23b) may not be construed with the matrix verb. As mentioned above, in a functional-syntax view, a scrambled phrase must be characterized by the content of the remnants; that is, the remnant clause as a whole must serve as a characterization of the scrambled element. But it is not clear how the fronted adverbs are related to the entire meaning of the rest of the sentence. To account for (23) straightforwardly, we should consider semantic compatibility between the adverb and either the matrix or embedded verb, which is to be ascribed to the dual analysis of adjuncts/complements than to functional notions such as aboutness or characterization. In (23b), for instance, *moomokutekini* 'blindly' must be analyzed as a complement of the head *shinjiru* 'believe', since adjuncts cannot be transferred as shown in section 3. Note also that in the present account there is no need to characterize certain types of adjuncts (e.g. *moomokutekini* in (19b)) as subcategorized adjuncts. We contend that the so-called subcategorized adjuncts in effect are treated as adverb complements subcategorized for by the head (just like the assumption adopted in Categorial Grammar).

Let us next consider another case. Recall that there are many cases where adverbs appear to behave like complements. Examples (taken from Saito 1985:174) like (24) can be straightforwardly accounted for with the dual analysis.

(24) a. [Kono heya de]$_i$ John ga [Mary ga e_i Bill ni au to] omotteiru (koto)
     this room in   John Nom Mary Nom Bill Dat meer that think (fact)
     'John thinks that Mary will meet Bill in this room.'
   b. [Sono seki de]$_i$ John ga [Mary ga e_i Bill no waruguchi o itta to] shuchooshita (koto).
     that meeting at John Nom Mary Nom Bill Gen ill-remarks Acc said that insisted (fact)
     'John insisted that Mary spoke ill of Bill at that meeting.'

In these sentences, the sentence-initial adverbs are construed with the embedded verb, because the scrambled adverbs contain a specific/referential NP. Hence, these adverbs are semantically analyzed as complements under the dual analysis. Lastly, consider examples in (25b) and (26b), taken from Sugisaki (2000: 387-388) with slight modifications, contain the *shika-na(i)* 'only-Neg' constituent. The focus particle *shika* 'only' phrase is always associated with the main verb *na(i)* 'Neg' within the same clause.[8] The present analysis of adjuncts/complements do not treat sentences like (25b) and (26b) as instances of adjunct scrambling, but characterize them as cases of argument (or complement) scrambling where the *shika* phrase is subcategorized for by the Neg.

(25) a. Yukkurito Mary ga [John ga   booru o   nageta] to   itta.
     slowly   Nom   Nom ball Acc   threw   that said
     'Mary said that John slowly threw a ball.' (OK with complement reading for *yukkurito*)
     'Mary said slowly that John threw a ball.'
   b. Yukkurito shika Mary ga [John ga   booru o nage-nak-atta] to   itta.
     slowly only   Nom   Nom ball Acc throw-Neg-Past that said
     'Mary said that John only slowly threw a ball.'

(26) a. Kyuuni   Mary ga   [John ga   naki-dashita to] itta.
     suddenly   Nom   Nom cry-began   that said
     'Mary said that John suddenly started crying.' (OK with complement reading for *kyuuni*)

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8 See for a detailed discussion Muraki (1978), Kato (1985), Sells (1996) and references therein.

    'Mary suddenly said that John started crying.'
  b. Kyuuni <u>shika</u> Mary ga [John ga naki-dasa-<u>nak</u>-atta to] itta.
    suddenly only Nom Nom cry-begin-Neg-Past that said
    'Mary said that John only suddenly started crying.'

5. Conclusion

The central claims we have argued for in this paper are the following. The variance of adverbial interpretation is more of lexical semantic nature than of structural nature. To account for elusive paradigms involving adverbs, we need to reexamine the traditional distinction between adjuncts and complements. To substantiate it, we have shown that a newly identified semantic perspective of the dual analysis of adjuncts/complements is highly valid in the study of syntax/semantics of adverbs. The present study will lead us to argue that placement and interpretation of adverbs cannot be easily explained by a single domain of grammar (e.g. surface phrase structure), but must rather be considered by simultaneous interactions of different components of grammar (e.g. (lexical) semantic structure, syntactic structure, and discourse (information) structure). This line of analysis will be incorporated into the LFG architecture without difficulty.

References

Andrews, A. D. and C. D. Manning. 1999. *Complex Predicates and Information Spreading in LFG*. Stanford, CA: CSLI Publications.
Bouma, G., R. Malouf and I. Sag. 2001. Satisfying constraints on extraction and adjunction. *Natural Language and Linguistic Theory* 19(1), 1-65.
Butt, M. *The Structure of Complex Predicates in Urdu*. Stanford, CA: CSLI Publications.
Choi, H. -W. 1999. *Optimizing Structure in Context: Scrambling and Information Structure*. Stanford, CA: CSLI Publications.
Chomsky, N. 1973. Conditions on transformations. In S. R. Anderson and P. Kiparsky (Eds.), *A Festschrif tfor Morris Halle*. New York: Holt, Rinehart & Winston.
Dalrymple, M. 2001. *Syntax and Semantics volume 34: Lexical Functional Grammar*. Academic Press.
De Kuthy, K. 2000. *Discontinuous NPs in German A Case Study of the Interaction of Syntax, Semantics, and Pragmatics*. Stanford, CA: CSLI Publications.
Dowty, D. 2000. The dual analysis of adjuncts/complements in categorial grammar. *ZAS Papers in Linguistics* 17, 1-20.
Grimshaw, J. and A. Mester. 1988. Light verbs and theta-marking. *Linguistic Inquiry* 19:205-232.
Gunji, T. 1999. On lexicalist treatments of Japanese causatives. In G. Green and R. Levine (Eds.), *Readings in HPSG*, pp. 119-160. Cambridge: Cambridge University Press.
Jackendoff, R. 1972. *Semantic Interpretation in Generative Grammar*. Cambridge, MA: MIT Press.
Jackendoff, R. 1990. *Semantic Structures*. Cambridge, MA: MIT Press.
Kageyama, T. 1996. *Dooshi Imiron* [Verb Semantics]. Tokyo: Kuroshio Publishers.
Kaplan, R. M. and A. Zaenen. 1989. Long-distance dependencies, constituent structure, and functional uncertainty. In M. Baltin and A. Kroch (Eds.), *Alternative Conceptions of Phrase Structure*, pp. 17-42. Chicago: Chicago University Press. Reprinted in M. Dalrymple et al. (Eds.), Formal Issues in Lexical-Functional Grammar, pp. 137-165. Stanford, CA: CSLI Publications.
Kato, Y. 1985. *Negative Sentences in Japanese*. Sophia Linguistica Monnograph 19. Sophia University.
Koizumi, M. 1993. Modal phrase and adjuncts. In P. M. Clancy (Ed.), *Japanese/Korean Linguistics* Volume 2, 409-428. Stanford, CA: CSLI Publications.
Kuno, S. 1976. Subject, theme, and the speaker's empathy. C. Li (Ed.), *Subject and Topic*. New York: Academic Press.

Kuno, S. 1978. *Danwa no bunpoo* [Discourse Grammar]. Tokyo: Taishuukan Publishing Co.

Kuno, S. 2002. NPI licensing, o/ga alternation, verb raising and scrambling. In N. M. Akatsuka and Straus (Eds.), *Japanese/Korean Linguistics* Volume 10, 465-480. Stanford, CA: CSLI Publications.

Kuno, S. and K. Takami. 2001. *Nichieigo no jidooshi koobun* [A Functional Analysis of Intransitive Constructions in English and Japanese]. Tokyo: Kenkyuusha.

Levin, R. and M. R. Hovav. 1995. *Unaccusativity: at the syntactic lexical semantic interface*. Cambridge, MA:MIT Press.

Manning, C., I. S. and M. Iida. 1999. The lexical integrity of Japanese causatives. In G. Green and R. Levine (Eds.), *Readings in HPSG*, pp. 39-79. Cambridge: Cambridge University Press.

Matsumoto, Y. 1996. *Complex Predicates in Japanese: a syntactic and semantic study of the notion 'word'*. Stanford, CA: CSLI Publications.

Muraki, M. 1978. The shika nai construction and predicate restructuring. In J. Hinds and I. Howard (Eds.), *Problems in Japanese Syntax and Semantics*, pp. 155-177. Tokyo: Kaitakusha.

Numata, Y. 2000. Toritate [focusing]. In S. Kinsui, M. Kudo and Y. Numata (Eds.), *Toki, Hitei, to Toritate* [Tense, Negation, and Focusing], Tokyo: Iwanami Shoten.

Przepiórkowski, A. 1999. On case assignment and "adjuncts as complements." In Webelhuth, G., J.-P. Koenig, and A. Kathol (Eds.), *Lexical and Constructional Aspects of Linguistic Explanation. Studies in Constraint-Based Lexicalism*, pp. 231-245. Stanford, CA: CSLI Publications.

Pustejovsky, J. 1991. The syntax of event structure. *Cognition* 41, 47-81.

Pustejovsky, J. 1995. *The Generative Lexicon*. Cambridge, MA: MIT Press.

Rooth, M. 1992. A theory of focus interpretation. *Natural Language Semantics* 1, 117-121.

Saito, M. 1985. *Some Asymmetries in Japanese and Their Theoretical Implications*. Doctoral dissertation, MIT.

Sells, P. 1996. The projection of phrase structure and argument structure in Japanese. In T. Gunji (Ed.), *Studies on the Universality of Constraint-Based Phrase Structure Grammars*. Report of the International Scientific Research Program, Joint Research, Project No. 06044133. Osaka University, Graduate School of Language and Culture, pp. 39-60.

Sugioka, Y. 1996. Regularity in inflection and derivation: rule and analogy in Japanese deverbal compound formation. *Acta Linguistica* 45, 231-253.

Sugisaki, K. 2000. Scrambling of adjuncts and last resort. In M. Nakayama and C. J. Quinn, Jr. (Eds.), *Japanese/Korean Linguistics* Volume 9, 379-389. Stanford, CA: CSLI Publications.

Takami, K. 1992. *Preposition Stranding: From Syntactic to Functional Analyses*. Berlin: Mouton de Gruyter.

Van Noord, G. and G. Bouma. 1994. The scope of adjuncts and the processing of lexical rules. In *Proceedingsof the 15th Conference on Computational Linguistics (COLING-94)*, 250-256. Kyoto.

Yokota, K. 2001. Complex-Predicate Formation and Some Consequences in Japanese. In M. Butt and T. H. King (Eds.), *Proceedings of the 6th International Lexical-Functional Grammar Conference*, 324-351. Stanford, CA: CSLI Publications.

Wilson, S. 1999. *Coverbs and Complex Predicates in Wagiman*. Stanford, CA: CSLI Publications.