Toward a Unified Analysis of the Scope Interpretation of Complex Predicates in Japanese: Evidence from the Light Verb Construction

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Abstract

In this paper, I first make an observation that there is a certain parallelism in the scope interpretation possibilities of adverbs and quantifiers with respect to different types complex predicates in Japanese, drawing on a comparison of the light verb construction and the causative construction. I will then argue that previous approaches to complex predicates in Japanese in the lexicalist tradition (Matsumoto 1996; Manning et al. 1999) fail to capture this generalization successfully. Finally, building on a novel approach to syntax/semantics interface in HPSG by Cipollone (2001), I develop an analysis of the semantic structure of complex predicates that accounts for the empirical observation straightforwardly.

1 Introduction

The 'biclausality' of complex predicates has always been one of the central topics in Japanese generative grammar since its very inception (see Kuroda (1965), Kuno (1973) and Shibatani (1976) for earliest discussions). Certain complex predicates (with the causative construction being the representative case) in Japanese, despite the lexical integrity of the governing and governed predicates, exhibit apparent biclausality effects with respect to interpretive phenomena such as binding, adverb scope and quantifier scope.[1]

In classical transformational grammar, this fact was accounted for by positing biclausal deep structure for these constructions and stipulating that the deep structure is the relevant representation for these interpretive phenomena. Nowadays, this picture might appear to be too simplistic, but it should be noted that this seemingly rather outdated perspective has an important claim (albeit rarely made explicit even in those days) tied to it that is often absent in subsequent more 'sophisticated' approaches. That is, in this classical picture, the notion of 'biclausality' is one and the same for *all* the interpretive phenomena in question. An immediate implication of this claim is that whether or not a particular construction exhibits biclausality with respect to any of these phenomena should strictly coincide with whether or not it does so for other phenomena. The validity of this claim is of course an empirical question. To the best of my knowledge, however, dissenting voices to the classical account have largely neglected to address this question explicitly, despite the fact that they often end up abandoning this claim of the earlier approach.

The apparent biclausality of complex predicates has been a significant challenge to nonderivational theories of grammar. It was not until the late nineties that

[†]I would like to thank Bob Levine, Carl Pollard, David Dowty, Detmar Meurers and the participants of the 12th HPSG conference for helpful discussion. Of course, all remaining errors are mine.

[1]The observation that these biclausality effects are not exhibited unsystematically, that is, that they are found only with interpretive phenomena and not with lower-level morphological/phonological phenomena in such constructions is attributed to Paul Kiparsky by Manning et al. (1999).

a fully elaborate and precise account of this long-standing problem was worked out by Manning et al. (1999). While this work counts as a distinguished milestone in the development of HPSG as a fully surface-oriented lexicalist theory, what they effectively did there was to accommodate each of the apparent puzzles by bringing in separate techniques independently developed up to that point in the literature of HPSG and LFG. Manning et al. (1999) remain silent as to this apparently chimeric aspect of their proposal.[2] In particular, the question of whether the analysis straightforwardly extends to other complex predicate constructions in Japanese (including those that do not exhibit biclausality for the phenomena mentioned above), is not seriously considered. As we will see in subsequent sections, however, Manning et al.'s (1999) approach faces significant problems precisely because of the mutual unrelatedness of the mechanisms they employ in accounting for different biclausality phenomena. That is, in their analysis, there is no way to straightforwardly capture the empirical generalization that the availability of scope ambiguity for adverbs and quantifiers always coincides.

This paper first presents data from the light verb construction in Japanese, which does not exhibit the kind of scope ambiguity for adverbs and quantifiers observed in the causative construction. After closely examining the problems this construction poses to previous approaches to complex predicates in lexicalist frameworks (Manning et al. (1999) and Matsumoto (1996)), I proposes an alternative to Manning et al.'s (1999) analysis, building on the work by Cipollone (2001), which introduces a novel approach to syntax-semantics interface in HPSG. The proposed analysis, while still maintaining all the insights of Manning et al.'s (1999) original proposal, overcomes its deficiency by giving a more unified treatment of adverb scope and quantifier scope. The present approach, therefore, is in a sense an attempt to recover an overlooked insight from the era of classical transformational grammar in the contemporary lexicalist setup.

2 Semantic properties of raising and control light verbs

2.1 Raising and control light verbs

As was noted by the pioneering work by Grimshaw and Mester (1988), the combination of so-called light verbs (LVs) and verbal nouns[3] (VNs) in Japanese exhibits a somewhat surprising pattern of argument realization; the arguments of the VN, which is categorically a noun, are sometimes allowed to appear verbally case-marked.[4] Thus, in the following pair, (1a) exhibits a case assignment pattern quite

[2] In fact, they do suggest in their conclusion (although in passing) that the 'complex argument structure' is the source of biclausality for these phenomena in their analysis. However, upon closer examination, it turns out that this is not really the case. See the discussion in the following sections for further details.

[3] In this paper, I will refer to (typically Sino-Japanese) argument-taking nouns with verb-like meanings that can appear in construction with light verbs as 'verbal nouns'.

[4] By 'verbal case', I mean, following Iida (1987:104) among others, forms of case marking such as that in *Jon o* 'John ACC' or *Jon ni* 'John DAT', that are typical of arguments of verbs; by contrast,

expected of a nominal category where the goal argument *Tookyoo e no* 'to Tokyo' of the VN *yusoo* 'transport' appears with the genitive marker *no*, whereas (1b) is an instance of the unexpected pattern where the same goal argument gets realized in a verbal case without the genitive marker.

(1) a. Karera wa Tookyoo e no bussi no yusoo o si-ta.
they TOP Tokyo DAT GEN goods GEN transport ACC do-PAST
'They transported goods to Tokyo.'

b. Karera wa Tookyoo e bussi no yusoo o si-ta.

Since VNs don't by themselves have the ability to assign verbal cases to their arguments, the LV is presumably responsible for the verbal case marking on an argument of a nominal category here. Grimshaw and Mester (1988) proposed an analysis of the light verb construction in which the arguments of a VN can be totally or partially transferred to the LV and be realized in verbal cases. They dubbed this process 'argument transfer'.

It was later discovered by Matsumoto (1996) that the range of verbs that trigger 'argument transfer' is not limited to the genuine LV *suru* 'do'; there are a number of raising and control verbs that exhibit patterns of case marking in which 'argument transfer' has arguably taken place. Matsumoto gives the following example to illustrate this point:

(2) Karera wa Tookyoo e bussi no yusoo o hazime-ta.
they TOP Tokyo GOAL goods GEN transport ACC begin-PAST
'They began transporting goods to Tokyo.' (Matsumoto 1996:77)

In (2), the raising verb *hazime* 'begin' subcategorizes for an accusative-marked VN. Just as in (1b), the goal argument *Tookyoo e* 'to Tokyo' of the embedded VN appears in a verbal case here. The verbs that enter into this construction with the VN they subcategorize for have meanings and functions similar to raising and control verbs in English. In particular, the subject of the embedded predicate (i.e. the VN) is identified with one of the arguments of the verbs themselves. For this reason, Matsumoto calls these verbs 'raising and control light verbs'. I follow Matsumoto (1996) in this terminology.[5]

2.2 Problems of Matsumoto's (1996) analysis: adjunct scope and quantifier scope

2.2.1 Matsumoto's (1996) analysis of the light verb construction

Matsumoto (1996) employs the mechanism of functional uncertainty (Kaplan and Zaenen 1989) in LFG to formulate an analysis of LVC. In a nutshell, in his analysis,

forms of case marking with the genitive marker that are typical of arguments of nouns such as that in *Jon no* 'John GEN' or *Jon e no* 'John DAT GEN' are called 'nominal case'.

[5] I will sometimes call these verbs simply as 'light verbs' just for convenience sake, departing from the original use of the term. Also, see Matsumoto (1996) for an extensive list of verbs that fall under this category.

(f-structural) dependents (arguments and adjuncts) of the embedded VN can syntactically (i.e. in the c-structure) appear as sisters of the embedding LV by means of functional uncertainty.[6] The functional uncertainty relation is independently motivated in his analysis in order to account for the (functional) biclausality phenomena in other types of complex predicates.

As pointed out by Yokota (1999), Matsumoto's (1996) analysis incorrectly predicts the possibility of 'adjunct transfer'. That is, sentences like (3b) are predicted to have a reading in which the adjunct syntactically appearing in the verbal modifier form (which is indicated by the absence of the genitive marker on the adjunct in this sentence) semantically modifies the embedded VN. That kind of reading, however, is simply unavailable for these sentences (Yokota 1999).[7]

(3) a. Bussyu wa Koizumi ni tyokusetu no hoobei o
Bush TOP Koizumi DAT direct GEN visit-US ACC
mitome-ta.
permit-PAST
'Bush permitted Koizumi a direct visit to US.'

b. Bussyu wa Koizumi ni tyokusetu hoobei o mitome-ta.
Bush TOP Koizumi DAT directly visit-US ACC permit-PAST
'Bush in person permitted Koizumi to visit US.'

An important fact that has hitherto been unnoticed in the literature is that quantifiers behave in the same way as adjuncts with respect to the possibilities of scope interpretation in LVC.[8] A quantificational argument of the VN that is transferred to the LV and that appears verbally case-marked in the higher verbal projection must obligatorily take scope over the LV.

(4) a. Zeikan wa gyoosya ni Huransu kara no wain dake no
customs TOP trader DAT France from GEN win only GEN
yunyuu o mitome-ta.
import ACC permit-PAST
'Customs let the trader only import wine from France.' (permit $>$ only)

b. Zeikan wa gyoosya ni Huransu kara wain dake yunyuu o
customs TOP trader DAT France from wine only import ACC
mitome-ta.
permit-PAST

[6] Space limitations preclude me from giving a detailed examination of Matsumoto's (1996) analysis. For a fuller discussion, see Kubota (2005).

[7] Matsumoto (1996) actually claims that 'adjunct transfer' is possible in LVC. For an extensive discussion on the nonevidencehood of the apparent cases of adjunct transfer brought up by Matsumoto (1996), see Yokota (1999) and Kubota (2005).

[8] Strictly speaking, NPs with focus particles are not (canonical) quantifiers. However, they behave like quantifiers in that they are scope-taking elements, which is the only crucial property relevant to the discussion here. I use these items throughout this paper because the relevant distinction in meaning is clearer than cases involving more 'canonical' quantifiers.

'The only thing customs let the trader import from France was wine.' (only > permit)

In (4a), in which the genitive-marked quantificational NP *wain dake no* 'only wine' appears inside the projection of the embedded VN, the quantifier obligatorily takes scope lower than the LV. By contrast, (4b), in which the same quantificational argument gets transferred to the LV and appears without the genitive marker, only allows a reading in which the quantifier takes scope over the LV. The relevant readings are indicated as the English translations of these sentences.

To sum up the observations we have made so far, the raising and control light verb construction does not exhibit scope ambiguity of quantifiers in much the same way as it does not allow adverb ambiguity. As it will become clear below, the correlation of the behaviors of adverbs and quantifiers has an important consequence for their theoretical treatment.

2.2.2 Mismatches of syntactic structure and semantic scope of some complex predicates

In contrast to LVC, in some complex predicate constructions, scope ambiguity is observed for both adjuncts and quantifiers.[9] One well-known example of the discrepancy between syntactic structure and semantic scope is the causative construction. As noticed by at least as early as Shibatani (1976), sentences like the following are ambiguous between two readings.

(5) Taroo wa Hanako ni damatte terebi o mi-sase-ta.
Taro TOP Hanako DAT silently TV ACC watch-cause-PAST
'Taro made Hanako silently watch the TV'
'Taro silently made Hanako watch the TV.'

In one reading, the adverb modifies the whole complex predicate, giving rise to an interpretation in which the referent of the matrix subject, Hanako, is taken to be the person who is silent. In the other reading, the adverb modifies the embedded verb root and the referent of the subject of the embedded verb root, Taro, is taken to be the person who is silent.

It has also been noted in the literature (Kitagawa 1994; Manning et al. 1999) that similar scope ambiguity is observed with respect to quantificational NPs. The following sentence, which contains a quantificational NP *biiru dake* 'only beer', is ambiguous between two readings, as differentiated by the two English translations:

(6) Naomi wa Ken ni biiru dake nom-ase-ta.
Naomi TOP Ken DAT beer only drink-cause-PAST
'Naomi made Ken drink beer only.' (cause > only)
'The only thing Naomi made Ken drink was beer.' (only > cause)

[9] In fact, this is the very reason that Matsumoto (1996) introduced the functional uncertainty schema which allows not only arguments but also adjuncts of the embedded predicate to syntactically appear as sisters of a higher verb, causing overgeneration in the case of LVC.

The generalization that emerges from the observations made in the previous and present sections is that in the case of (at least) some complex predicates including causatives, narrow scope readings are possible for both adverbs and quantifiers, while in the case of the raising and control light verb construction, such readings are systematically unavailable; the scope of adverbs and quantifiers is entirely determined by their syntactic positions in the latter case.

While Matsumoto's (1996) analysis of complex predicates, as it originally stands, is not equipped with a mechanism that deals with quantifier scope, it is easy to extend his analysis with one along the lines of the proposal by Halvorsen and Kaplan (1995). In this analysis, quantifier scope ambiguity is accounted for by representing quantifier scope at the level of semantic structure and stipulating an uncertainty relation on the mapping between the f-structure and the semantic structure. While this analysis accounts for the scope ambiguity of the causative construction straightforwardly, it comes at the cost of overgeneration in LVC. Without further stipulation, it wrongly predicts that a similar scope ambiguity is possible in LVC. What is worse, the stipulation needed to prevent this overgeneration has to be independent from the one that prevents adverb scope ambiguity in LVC since the two phenomena are dealt with separate mechanisms in this setup.

To summarize the discussion up to this point, in spite of the fact that the data clearly point to a generalization that a certain kind of scope ambiguity is observed in one type of complex predicate (compound verbs including causatives) while it is not in the other (the light verb construction) with respect to both adverbs and quantifiers, there appears to be no principled way of capturing it in the LFG-based architecture proposed by Matsumoto (1996), even if one extends the analysis with a mechanism of quantification.

3 Proposal: a theory of semantic complexity of complex predicates

In this section, I develop a more coherent analysis of the phenomena observed in the previous section. Given the strong parallelism between the scope-taking behaviors of adverbs and quantifiers, it is more plausible to construct a theory of syntax and semantics of complex predicates in which the observed parallelism follows from a single factor, rather than being accounted for separately.

As a basis of the theory to be developed below, I take up a recent proposal by Cipollone (2001), in which an analysis of the Japanese causative construction is given in terms of 'a highly restricted form of structured meanings' (Cipollone 2001:41).[10] In this analysis, Cipollone (2001) proposes to account for the mismatch between syntax and semantics in the causative construction by means of introducing slight compositionality in semantics. That is, the sublexical scope of

[10] For the original motivation for the structured meaning approach in formal semantics, see Cresswell (1985). For a discussion on how the setup adopted here differs from this original approach, see Cipollone (2001).

adverbs in the causative complex predicate is licensed by manipulating the internal structure of the semantic representation of a phrase. This obviates the need for resolving all semantic scope in the lexical representation of the head verb, as is done by Manning et al. (1999) (henceforth MSI), while still maintaining lexical integrity.

In this paper, I argue for an extension of Cipollone's (2001) approach mainly from empirical considerations. As will become clear below, a systematic and simple analysis of the scopal properties of different types of complex predicates in Japanese can be obtained by extending the approach of Cipollone (2001) but not that of MSI.

In the next section, we will see that applying MSI's analysis straightforwardly to the raising and control LVs suffers from overgeneration of the kind strikingly similar to that found in Matsumoto's (1996) analysis. After identifying the problems of MSI's approach, I will argue in the final section that by exploring the possibilities opened up by Cipollone, we will be able to obtain a significantly improved perspective from which we can account for the observed parallelism of the scope-taking behaviors of adverbs and quantifiers quite neatly with just a minimum number of stipulations.

3.1 The lexicalist analysis of causatives by Manning et al. (1999)

MSI present several pieces of evidence (including morphological patterns in reduplication and nominalization and ellipsis in question-answer pairs) for the lexicalist analysis of causatives in Japanese.[11] Based on these pieces of evidence, they formulate an analysis of the causative construction in which the verb root and the causative suffix constitute one morphological word. The challenge that such an analysis faces is, of course, how to accommodate the apparent biclausality phenomena with this underlying assumption. What MSI effective do to resolve this problem is to introduce separate mechanisms/constraints operating on lexical entries of verbs to create a rich lexical representation for the head verb in which all scopal relations are, as it were, 'preconfigured'.

More specifically, adverb scope ambiguity of the causative construction is accounted for by adopting the adjunct-as-argument mechanism (van Noord and Bouma 1994). That is, in their analysis, there are two lexical operations that apply to the lexical entry for a verb: one for creating a complex causative verb from the verb root and the other for inserting an adjunct to the ARG-ST list. Since the semantic scope of the causative predicate and the adverb is fixed at the point of application of these rules, the relative scope relation between the two differ depending on the order of application of these two operations.[12] If the adjunct is first added to the

[11] Due to space limitations, the discussion in this section is highly condensed. For a more extensive discussion, the reader is referred to Kubota (2005). Also, the full set of evidence and relevant arguments, see Manning et al.'s (1999) original work (section 2).

[12] The procedural metaphor adopted here and throughout the paper is of course just for expository convenience.

lexical entry for the base verb and then the operation for causative formation applies, we get a lexical entry like the following, where the adjunct scopes lower than the causative suffix:

(7) *hasir-ase* 'cause to run'

$$\begin{bmatrix} \textit{verb} & \\ \text{PHON} & \textit{hasir-ase} \\ \text{SUBJ} & \langle \boxed{1}\text{NP}_i \rangle \\ \text{COMPS} & \langle \boxed{2}\text{NP}_j, \boxed{3}\text{ADV[CONT } \boxed{4}\text{]} \rangle \\ \text{ARG-ST} & \langle \boxed{1}, \boxed{2}, \langle \text{PRO}_j, \boxed{3} \rangle \rangle \\ \text{CONT} & \boxed{4}\begin{bmatrix} \text{NCL} & \begin{bmatrix} \textit{cause-rel} & \\ \text{ACTOR} & i \\ \text{UNDERGOER} & j \\ \text{EFFECT} & \begin{bmatrix} \textit{silent-rel} & \\ \text{ARG} & \begin{bmatrix} \textit{run-rel} & \\ \text{RUNNER} & j \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Quantifier scope is also determined lexically. Building on the work by Pollard and Yoo (1998), MSI develop a lexicalized version of the Cooper storage mechanism of quantifier scope in HPSG, which is formulated as a constraint on objects of type *stem*. Roughly speaking, in this analysis, all quantifier meanings are first collected from the arguments by the lexical head that subcategorizes for it. The quantifiers thus collected are then either retrieved by that lexical head or passed up to a higher head. Thus, in a causative sentence, if the object of the verb root is a quantifier, it is either retrieved by this verb root or inherited to the higher causative suffix and retrieved by the latter. In the former case, we get the narrow scope reading. What is crucial here is that the relevant constraint targets objects of type *stem*. The verb root in the causative construction does not count as an independent word, but it counts as a token of type *stem*. This makes it possible for the verb root to retrieve the quantifier by itself, giving rise to the narrow scope reading.

3.2 Problems of MSI's analysis

MSI's analysis of causatives can successfully account for adverb scope ambiguity and quantifier scope ambiguity while fully maintaining the lexical integrity hypothesis. The tricks they make use of to achieve this goal are (i) the adjunct-as-argument analysis (for adverb scope) and (ii) the lexical quantifier retrieval mechanism (for quantifier scope).

In this section, I will argue that this approach encounters a significant problem when one tries to extend it to other types of complex predicates that are not discussed in their original paper. Because of the dissociation of the mechanisms accounting for the two scopal phenomena, MSI's approach fails to capture the generalization that adverbs and quantifiers behave in a similar way with respect to the availability of scope ambiguity for different types of complex predicates.

3.2.1 Compound verbs that do not exhibit scope ambiguity

It has often been pointed out in the literature of complex predicates in Japanese (Kageyama 1993; Matsumoto 1996; Yumoto 2002) that not all Japanese compound verb constructions have uniform syntactic and semantic properties. In particular, there is a class of compound verbs[13] including *V-wasureru* 'forget to V' and *V-naosu* 're-V' that do not exhibit scope ambiguity of adverbs and quantifiers, as opposed to those including causatives that do allow for such ambiguity.

(8) a. Jon wa sono ziken o koi ni tuuhoo-si-wasure-ta.
John TOP that accident ACC intentionally report-do-forget-PAST
'John deliberately forgot to report that accident.'

b. Jon wa sono ziken o koi ni tuuhoo-si-naosi-ta.
John TOP that accident ACC intentionally report-do-redo-PAST
'John deliberately re-reported that accident.'

(8a) does not allow an interpretation in which the adverb *koi ni* 'intentionally' semantically modifies the V1 (the first element of the compound verb), where the act of reporting the accident, which John forgot to carry out, was supposed to be intentional. Likewise for (8b). The only legitimate interpretation available for this sentence is one in which the adverb semantically modifies the V2 (the second element of the compound verb), where intentionality is ascribed to the aspect of redoing something, not to the act itself that was redone.

As noted by Yumoto (2002), quantifier scope data go parallel to the above adverb scope data. Again, the narrow scope interpretation is unavailable for these verbs.

(9) a. Naomi wa yooguruto dake tabe-wasure-ta.
Naomi TOP yogurt only eat-forget-PAST
'The only thing that Naomi forgot to eat was yogurt.'

b. Naomi wa yooguruto dake tabe-naosi-ta.
Naomi TOP yogurt only eat-redo-PAST
'The only thing that Naomi ate again was yogurt.'

(9a) unambiguously means that the only thing Naomi forgot to eat was yogurt. A reading in which the quantifier takes scope lower than the V2 is unavailable. Likewise, the only reading available for (9b) is one that can be paraphrased as the English translation given above, where the quantifier takes wide scope.

The existence of the kind of compound verbs that do not allow scope ambiguity is somewhat troublesome for MSI's analysis. Analyzing them on a par with the causative construction leads to overgeneration. Given that different mechanisms are in charge of controlling the availability of different scope interpretations of adverbs and quantifiers in their analysis, it turns out that separate stipulations are needed to block unwanted narrow scope readings for adverbs and quantifiers.

[13] Following Matsumoto (1996), I will call this type of compound verbs 'type III' compound verbs.

As we have already seen, LVC shows the same pattern as these compound verbs. In the next section, it will become clear that the fact that the correlation of the patterns of adverb scope and quantifier scope obtains cutting across different types of complex predicates makes it even more difficult for MSI's approach to get the facts right and give them a uniform explanation. It would end up in stipulating a set of similar constraints at different places in the grammar (one at the level of lexical rules and the other at the level of lexical entries).

3.2.2 Light verbs

Unlike compound verbs, both the embedded predicate (VN) and the embedding one (LV) are independent words in LVC. This can easily be confirmed by the fact that it fails the the set of tests used by MSI to determine the wordhood of the causative construction:[14] in reduplication, what is reduplicated is the verb alone and not the sequence of the VN and the LV (10); it is not possible to make a nominalized form from the sequence of the accusative-marked VN and the LV by *-kata* suffixation (11); in question-answer pairs, the LV alone can serve as a perfectly well-formed answer to a question (12). All of these data point to the LV's independent status as a word.

(10) hoobei o mitome mitome
visit-US ACC permit permit
'permitting visits to US repeatedly'

(11) *hoobei o mitome-kata
visit-US ACC permit-way
intended: 'the way to permit someone to visit US'

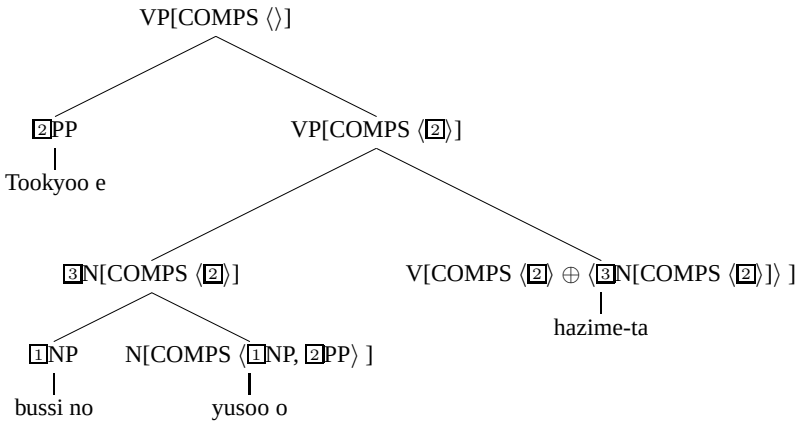
(12) Hoobei o mitome-ta? – Mitome-ta (yo).
visit-US ACC permit-PAST permit-PAST
'Did you permit him to visit US? – Yes, I did.'

Thus, in LVC, the VN and the LV do not form a morphological word but the two are put together in the syntax.

In HPSG, the standard way of analyzing constructions in which arguments of an embedded predicate are realized as arguments of a higher one is to employ the mechanism of argument composition (Hinrichs and Nakazawa 1994). Following previous analyses of Korean light verbs by Ryu (1993) among others, I will assume a version of the argument composition mechanism in which the arguments of the VN are *optionally* inherited to the LV, given the optionality of argument transfer (Grimshaw and Mester 1988; Matsumoto 1996). Thus, an analysis of sentence (2), which involves transfer of one argument from the VN to the LV, can now be sketched out as follows:

[14] Further evidence comes from the fact that adverbs and matrix arguments can be places between the LV and VN. See Kubota (2005) for relevant examples.

(13)



Note that the goal argument PP *Tookyoo e* 'to Tokyo', tagged as 2, originally starts out as an argument of the embedded VN and then inherited to the higher verb and discharged in the projection of this higher verb.

Now a problem arises when one combines this fairly uncontroversial approach to LVs with MSI's analysis of complex predicates. Recall once again that, in MSI's analysis, adjuncts are formally treated on a par with arguments as elements that appear on the argument structure list of a predicate. Thus, if an adjunct inserted to the argument structure list of the embedded VN is raised to the higher verb by argument composition, the narrow scope reading for an adverb appearing in the higher verbal projection is wrongly licensed for sentences like (3b).

The quantifier scope mechanism assumed by MSI is also problematic in that it overgenerates with respect to LVC in an analogous fashion. In a nutshell, the problem is that nothing prevents the embedded VN from retrieving quantifiers amalgamated from its arguments, since it counts as an independent *stem*. This gives rise to the illicit narrow scope reading.

Thus, MSI's approach suffers from overgeneration with respect to both adverb and quantifier scope in LVC. The real problem, however, is the fact that there do not seem to be any straightforward way of predicting the unavailability of narrow scope readings for adjuncts and quantifiers in terms of a single principle. The two phenomena could of course be accounted for separately. For example, the fact that adjuncts of a VN cannot be inherited by the subcategorizing LV could be accounted for either by formulating the lexical rule for adjunct insertion in such a way that it does not apply to VNs or by adding a constraint on the lexical entries for raising and control LVs to the effect that elements that can be inherited from the VN are confined to true arguments.[15] Likewise, the fact that narrow scope interpretations are impossible for transferred quantifiers might be accounted for by a stipulation on the lexical entries for raising and control LVs to the effect that if an inherited argument is a quantifier, its quantificational force must not already have

[15]This requires the use of the DEPS feature (Bouma et al. 2001), which is a diacritic feature for distinguishing true arguments from adjuncts in the adjunct-as-argument setup.

been retrieved by the embedded VN.

The stipulations needed to block overgeneration in each case, however, are completely independent of each other. This means that a straightforward extension of MSI's approach to raising and control LVs shares an undesirable property with Matsumoto's (1996) analysis that no principled explanation is given to the parallelism of the behaviors of adverbs and quantifiers.

In order to account for the observed parallelism neatly, one needs a system in which a single representation serves as a controlling factor for the availability of scope ambiguity of different kinds of scope-taking elements (adverbs and quantifiers). In the next section, I will show that one can develop such a system quite easily building on a recent proposal by Cipollone (2001), which makes crucial use of partially transparent semantic representations and noncompositional semantic assembly in terms of it.

3.3 Extending Cipollone's (2001) structured semantics for complex predicates

Cipollone (2001) proposes an analysis of Japanese complex predicates that follows MSI in maintaining the lexical integrity hypothesis but crucially departs from it by rejecting the adjunct-as-argument analysis for adverb scope ambiguity. Roughly put, Cipollone dispenses with this mechanism at the expense of introducing slight noncompositionality in semantics. In his analysis, the internal semantic structure of a complex predicate is made partially transparent so that an adjunct modifying it can look inside and pick up the portion it scopes over. As will become clear in what follows, the merit of adopting Cipollone's (2001) system is that it opens up a possibility for developing an analysis that accounts for the parallelism of adverb scope and quantifier scope in a uniform and elegant manner, something which none of the previous lexicalist analyses of complex predicates (Matsumoto 1996; Manning et al. 1999) have been able to accomplish.

In Cipollone's (2001) original formulation, however, adverb scope and quantifier scope are not treated in a fully parallel fashion. In that paper, the quantifier scope mechanism is just a borrowing from MSI and does not actually take full advantage of the new analytical device being advocated. This means that, as it is, Cipollone's (2001) analysis is no better than other previous proposals. In order to overcome this shortcoming, I will propose below a novel treatment of quantifier scope, which crucially makes use of the new aspect of Cipollone's system where semantic representations are partially transparent. The proposed analysis captures the parallelism of the behaviors adverbs and quantifiers uniformly and straightforwardly.

3.3.1 Cipollone's (2001) analysis of adverb scope ambiguity in the causative construction

Within theories of semantics that adhere to strict compositionality, the information of how the meaning of a phrase is built up is not accessible for further manipulation. The idea Cipollone (2001) proposes is to slightly loosen this requirement.[16] By doing so, it becomes possible to let an adverb modifying a complex semantic representation of a causative verb to take scope inside it, giving rise to the narrow scope reading.

Cipollone (2001) technically works out the approach sketched above in HPSG by encoding lambda abstraction in terms of typed feature structures. The CONT value of a phrase is specified as a list of *psoa-abstract*s, representing a chain of lambda abstraction. An object of type *psoa-abstract* is specified for two features LAMBDA and PSOA as shown in (14) and represents a lambda-abstracted formula in which the variable bound by the lambda operator is specified as the value of the LAMBDA feature. If the value of the LAMBDA feature is specified as *none*, there is no variable binding.[17]

(14)
$$\begin{bmatrix} \textit{psoa-abstract} & \\ \text{LAMBDA} & \textit{var}(\textit{psoa}) \vee \textit{none} \\ \text{PSOA} & \textit{psoa} \end{bmatrix}$$

The value of the CONT feature of the causative verb *hasir-ase* 'cause to run' will look like the following in this setup:[18]

(15)
$$\left\langle \begin{bmatrix} \text{LAMBDA } \boxed{2} & \\ \text{PSOA} \mid \text{NCL} & \begin{bmatrix} \textit{cause-rel} \\ \text{CAUSER } j \\ \text{CAUSEE } m \\ \text{EFFECT } \boxed{2} \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{LAMBDA } \textit{none} & \\ \text{PSOA} \mid \text{NCL} & \begin{bmatrix} \textit{run-rel} \\ \text{RUNNER } m \end{bmatrix} \end{bmatrix} \right\rangle$$

The order of the elements of the list is crucial in this formulation. The complete semantic interpretation for a sentence is obtained by applying β-reduction to the semantic representation of the top S node, where, for any given two consecutive elements, the right-hand side element is given as an argument to the left-hand side element that serves as a functor.

Cipollone (2001) proposes the following general schema for adverbs in his setup:

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[16] As Cipollone (2001) argues at length, the abandonment of compositionality in its strictest sense is not so much a big deal as it might appear. It is also important to recognize that the approach of Cipollone is not a whole-sale abandonment of compositionality, but a rather modest one. That is, it is significantly conservative in that there is no room for building up the meaning of a phrase from elements that are not lexically anchored.

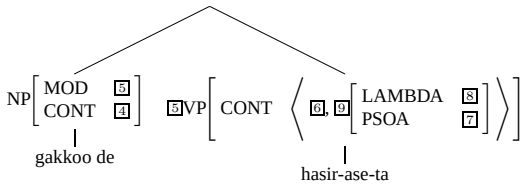
[17] *var*(*psoa*) is a notation for a variable over objects of type *psoa*.

[18] The partially transparent semantic representation like this is obtained in Cipollone's analysis by means of minimally revising MSI's lexical rule for causative compound verb formation. For the exact formulation of the relevant rule, the reader is referred to Cipollone (2001).

(16)
$$\left[\begin{array}{ll} \text{MOD} & \left[\text{CONT } \boxed{1} \oplus \left\langle \left[\begin{array}{ll}\text{LAMBDA} & \boxed{2}\\ \text{PSOA} & \boxed{3}\end{array}\right] \right\rangle \oplus \boxed{4}\right] \\ \text{CONT} & \boxed{1} \oplus \left\langle \left[\begin{array}{ll}\text{LAMBDA} & \boxed{2}\\ \text{PSOA} & \phi(\boxed{3})\end{array}\right] \right\rangle \oplus \boxed{4} \end{array}\right]$$

This says that the semantic contribution of the adverb can be incorporated into any of the elements (each corresponding to the semantic contribution of a component of the complex predicate) of the chain of lambda expressions specified as the value of the CONT feature of the head.[19] Cipollone gives the following representation for the narrow scope reading for the sentence *Gakkoo de hasir-ase-ta* '(I) made him run at school' as an illustration of how his analysis works.

(17)
$$\text{VP}\left[\text{CONT } \boxed{4}\left\langle \boxed{6}\left[\begin{array}{ll}\text{LAMBDA} & \boxed{3}\\ \text{PSOA} \mid \text{NUC} & \left[\begin{array}{ll}\textit{cause-rel}\\ \text{CAUSER} & \boxed{1}\\ \text{CAUSEE} & \boxed{2}\\ \text{EFFECT} & \boxed{3}\end{array}\right]\end{array}\right], \left[\begin{array}{ll}\text{LAMBDA} & \boxed{8}\textit{none}\\ \text{PSOA} \mid \text{NUC} & \left[\begin{array}{ll}\textbf{\textit{location-rel}}\\ \text{LOCATION } \textit{school}\\ \text{EVENT } \boxed{7}\left[\text{NUC}\left[\begin{array}{ll}\textit{run-rel}\\ \text{RUNNER} & \boxed{2}\end{array}\right]\right]\end{array}\right]\end{array}\right]\right\rangle\right]$$



The locative adverbial phrase *gakkoo de* 'at school', which syntactically combines with the whole causative verb *hasir-ase* 'cause to run', 'discharges' its semantic contribution onto the second element 9 of the list-valued semantic representation of the complex predicate, which corresponds to the meaning of the verb root, thereby satisfying the general schema for adverbs given in (16). Thus, in this case, the CONT value of the projected VP represents the narrow scope reading for the adverbial phrase.

3.3.2 Getting the quantifier scope mechanism right

Cipollone's (2001) analysis of quantifier scope overgenerates the narrow scope readings for type III compound verbs and LVC since the relevant mechanism is just a borrowing from MSI's analysis. In order to overcome this problem, I propose here a radical departure from the lexical treatment of quantifier scope of MSI and return to a somewhat more conservative syntactic account of quantifier scope, which crucially makes use of the partially transparent semantic representations made available in Cipollone's (2001) approach. The advantage of this modification becomes clear in the next section where it is argued that the parallelism of

[19] ϕ is a function that takes a feature structure of the sort *psoa* (i.e. an object roughly corresponding to a propositional denotation) and gives back as value the result of applying the relevant meaning of the modifier to that *psoa*.

adverb scope and quantifier scope naturally falls out under the proposed analysis by virtue of the fact that the form of the semantic representation is crucially made responsible for controlling the scope interpretation possibilities for both adverbs and quantifiers.

The analysis of quantifier scope I propose here is essentially a mirror image of the analysis of adverb scope proposed by Cipollone (2001): quantifiers are allowed to freely pick up any portion of the complex semantic representation to scope over, just as adverbs are allowed to do so. This can technically be achieved by formulating the following Quantifier Scope Principle:

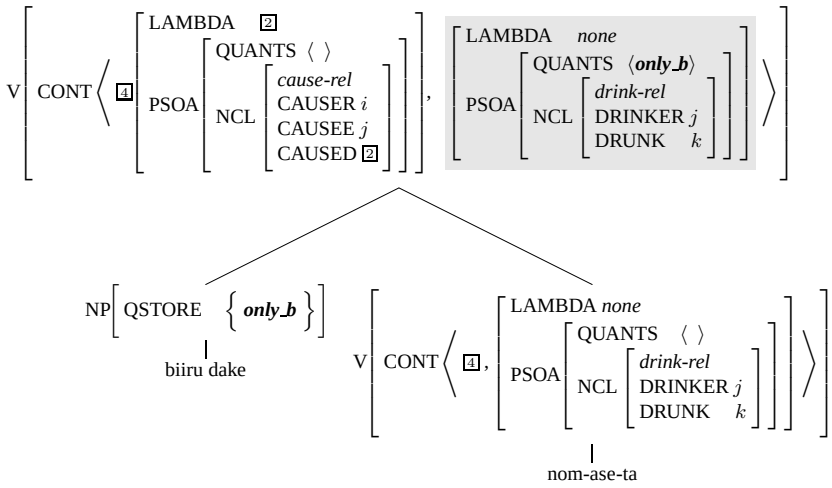
(18) Quantifier Scope Principle

$$\left[\text{CONT } \boxed{1} \oplus \left\langle \left[\text{PSOA} \left[\begin{array}{ll}\text{QUANTS} & \langle \boxed{5} \rangle \oplus \boxed{2} \\ \text{NCL} & \boxed{3}\end{array}\right]\right] \right\rangle \oplus \boxed{4} \right]$$

$$\rightarrow \text{H}\left[\text{CONT } \boxed{1} \oplus \left\langle \left[\text{PSOA} \left[\begin{array}{ll}\text{QUANTS} & \boxed{2} \\ \text{NCL} & \boxed{3}\end{array}\right]\right] \right\rangle \oplus \boxed{4} \right], \left[\text{QSTORE} \quad \left\{ \boxed{5} \right\}\right]$$

I assume that all local trees where the type of the CONT value of the head daughter is a list of *psoa-abstract*s (i.e. projections of categories with predicative meanings including at least verbs, adjectives and verbal nouns but not ordinary referential nouns) must conform to this principle. A sample analysis for the narrow scope interpretation for sentence (6) is given in (19).

(19) Narrow scope reading for (6)



In this tree, at the node where the quantifier combines with the head verbal projection, the quantifier gets retrieved by the second element of the list-valued semantic representation of the head, which corresponds to the meaning of the verb root. In this way, sublexical scope of quantifiers is licensed. Notice that the present analysis crucially makes use of the fact that the internal semantic structure is made visible to phrases attaching from outside in the case of the causative construction.

The quantifier scope mechanism now works in a way that resembles the adverb scope mechanism much more closely than was the case in Cipollone's (2001) original account. What is noteworthy is that the structure of the semantic representation of the head plays a crucial role in determining the possible scope interpretations in both cases. Thus, the present analysis straightforwardly predicts the parallelism between the patterns of adverb scope and quantifier scope with respect to different types of complex predicates, as we will see in the next section.

3.3.3 Solving the problem of light verbs: lexically triggered opacity of semantic structures

Given that not all complex predicates in Japanese allow for scope ambiguity of adverbs and quantifiers, it is apparent that the kind of transparent semantic representation Cipollone (2001) proposes for causatives and some other complex predicates in Japanese should be available only for a certain subset of complex predicates.

The unavailability of scope ambiguity for type III compound verbs can be accounted for by stipulating the output of the lexical rules for this type of compound verbs to have semantic representations that are not transparent unlike their counterparts that allow for scope ambiguity.[20] By ensuing this, it is guaranteed that there is only one way for adverbs and quantifiers combining with them to determine their scope, that is, to take scope over the whole complex predicate, since there is only one element in the CONT value of the head daughter.

For LVC, the relevant stipulation can be introduced in the lexical entry for the LV. That is, the lexical entry for the LV should be specified in such a way that its semantic representation does not make the part coming from the embedded VN visible to elements syntactically combining with it at higher nodes. Thus, the lexical entry for the verb *mitome* 'permit' will be something like the following.[21]

(20) Lexical entry for *mitomeru* 'permit':

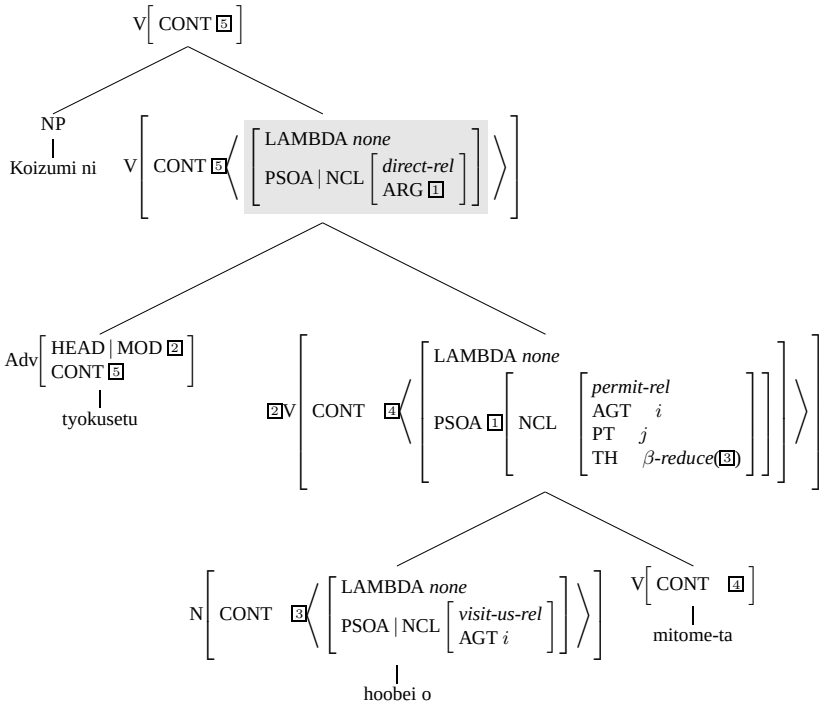
$$\left[\begin{array}{l}
\text{CAT}\left[\begin{array}{l}
\text{HEAD } \textit{verb} \\
\text{VAL}\left[\begin{array}{ll}
\text{SUBJ} & \langle \text{NP}_i \rangle \\
\text{COMPS} & \langle \text{NP}_j \rangle \oplus \boxed{2} \oplus \left\langle \text{N}\left[\begin{array}{l}\text{CAT}\left[\begin{array}{l}\text{HEAD} \mid \text{CASE } \textit{acc} \\ \text{VAL}\left[\begin{array}{l}\text{SUBJ } \langle \text{NP}_j \rangle \\ \text{COMPS } \boxed{2}\end{array}\right]\end{array}\right] \\ \text{CONT } \boxed{3}\end{array}\right] \right\rangle
\end{array}\right]
\end{array}\right] \\
\text{CONT}\left\langle\left[\begin{array}{ll}
\text{LAMBDA} & \textit{none} \\
\text{PSOA} \mid \text{NCL} & \left[\begin{array}{ll}\textit{permit-rel} & \\ \text{AGT} & i \\ \text{PT} & j \\ \text{TH} & \beta\textit{-reduce}(\boxed{3})\end{array}\right]
\end{array}\right]\right\rangle
\end{array}\right]$$

[20] For details, see Kubota (2005).

[21] β*-reduce* is a function that takes an unreduced 'lambda term' (list of *psoa-abstract*s in the current setup) and gives back a fully 'β-reduced' counterpart of that term (which is a nested single *psoa-abstract*). A formal definition of this function is given in Kubota (2005).

What is crucial in this lexical entry is that the CONT value is specified as a singleton list, which has the effect of concealing the internal structure of this complex predicate meaning to phrases attaching from outside. Thus, once the lexical entry for the LV is given as in (20), the unavailability of the narrow scope reading for adverbs and quantifiers appearing outside the projection of the VN is straightforwardly predicted. Sentence (3b) can be analyzed as in (21). In this sentence, the scope of the adverb *tyokusetu* 'directly' is determined in reference to the CONT value of the projection of the LV *mitome* 'permit'. The adverb can pick up any portion of this list-valued semantic representation of the head daughter to take scope over. However, since the list in question is rendered singleton by virtue of the lexical specification of the LV (20), there is only one option available here for this adverb to determine its scope: to take scope over the whole complex predicate.

(21) Tree for (3b)



The present account also correctly predicts the fact that when an adjunct appears within the projection of the VN, bearing the genitive case marker, it can only be interpreted as modifying the embedded VN. That is, in a tree in which an adjunct combines with the embedded VN rather than the embedding LV as in (21), that adjunct scopes directly over the VN and the result is fed into the THEME slot of the semantic representation of the higher LV, giving us the desired narrow scope reading.

The quantifier scope data is also straightforwardly accounted for. The impossibility of the narrow scope reading for a quantifier appearing outside the projection of the VN falls out as a consequence of the semantic opacity of raising and control

LVs; in this case, the quantifier cannot 'look into' the semantic representation of the complex predicate composed of the VN and LV to pick up a subportion of it to scope over, just as an adverb cannot do so. Thus, if a quantifier is transferred to the higher verb and appears in the higher verbal projection as in (4b), it obligatorily takes wide scope, to the desired effect.

Finally, one can easily confirm that the present analysis also makes a correct prediction for sentences like (4a), in which the quantifier appears within the projection of the VN. Essentially, the account is parallel to the case of an adjunct appearing inside the projection of the VN. The local tree at which the quantifier combines with the projection of the VN has to satisfy the Quantifier Scope Principle, which has the effect of fixing the scope of the quantifier immediately above the VN (thus, below the LV).

4 Conclusion

The present paper discussed the scope interpretation of adverbs and quantifiers in different types of complex predicates in Japanese. In particular, we made a detailed comparison of LVC and the causative construction. From this comparison (together with the discussion of different types of compound verbs in Japanese), an empirical observation emerged that the availability of scope ambiguity with respect to a particular type of complex predicate for these elements always coincides with each other. Based on this generalization, I proposed an extension of a novel approach to syntax-semantics interface in HPSG by Cipollone (2001), which exploits the idea of introducing slight noncompositionality in semantics, and argued that it is empirically superior to (conservative extensions to) earlier approaches to complex predicates in HPSG (Manning et al. 1999) and LFG (Matsumoto 1996).

Finally, it should be noted that I am not arguing against the general approach of these earlier lexicalist analyses of complex predicates in Japanese. On the contrary, the present account is an attempt to advance this line of research one step further by overcoming an inadequacy of previous proposals and giving a more coherent treatment of the patterns observed in the language. Within the past decade or so, a number of loosely related approaches to underspecified semantics have been proposed in the literature of HPSG and LFG (most notably, Minimal Recursion Semantics (MRS) (Copestake et al. to appear)). Given that there is a certain similarly of these approach to the one adopted in this paper, it is quite likely that the problems of Manning et al.'s (1999) analysis I have pointed out above can be resolved by adopting MRS (or whichever of these similar approaches) and reformulating relevant scoping mechanisms in their analysis along the lines of the present proposal. Conducting this kind of radical reformulation, however, entails an abandonment of a fundamental assumption of MSI's analysis, which is that the apparent biclausality phenomena can be accommodated by resolving all scoping relations explicitly in the lexicon. Thus, once one introduces an approach like MRS to MSI's setup, that would virtually result in a recast of the present proposal in a slightly different

setup. I have no objection to such a reformulation, but, at the same time, I do not find any convincing evidence for an advantage of such an approach over the one proposed in the present paper.

References

Bouma, Gosse, Malouf, Rob and Sag, Ivan A. 2001. Satisfying Constraints on Extraction and Adjunction. *Natural Language and Linguistic Theory* 19(1), 1–65.

Cipollone, Domenic. 2001. Morphologically Complex Predicates in Japanese and What They Tell Us About Grammar Architecture. In Michael W. Daniels, David Dowty, Anna Feldman and Vanessa Metcalf (eds.), *Ohio State University Working Papers in Linguistics*, volume 56, pages 1–52, Department of Linguistics, The Ohio State University.

Copestake, Ann, Flickinger, Dan, Sag, Ivan A. and Pollard, Carl. to appear. Minimal Recursion Semantics: An Introduction http://lingo.stanford.edu/sag/papers/copestake.pdf.

Cresswell, Max J. 1985. *Structured Meanings*. Cambridge, Massachusetts: The MIT Press.

Grimshaw, Jane and Mester, Armin. 1988. Light Verbs and θ-marking. *Linguistic Inquiry* 19, 205–232.

Halvorsen, Per-Kristian and Kaplan, Ronald M. 1995. Projections and Semantic Description in Lexical-Functional Grammar. In Mary Dalrymple, Ronald Kaplan, John T. Maxwell III and Annie Zaenen (eds.), *Formal Issues in Lexical-Functional Grammar*, pages 279–292, Stanford: CSLI Publications.

Hinrichs, Erhard W. and Nakazawa, Tsuneko. 1994. Linearizing AUXs in German Verbal Complexes. In John Nerbonne, Klaus Netter and Carl J. Pollard (eds.), *German in Head-Driven Phrase Structure Grammar*, CSLI Lecture Notes, No. 46, pages 11–38, Stanford: CSLI Publications.

Iida, Masayo. 1987. Case-Assignment by Nominals in Japanese. In Masayo Iida, Stephen Wechsler and Draga Zec (eds.), *Working Papers in Grammatical Theory and Discourse Structure*, CSLI Lecture Notes, No. 11, pages 93–138, Stanford: CSLI Publications.

Kageyama, Taro. 1993. *Bunpoo to Go-keisei (Grammar and Word Formation)*. Tokyo: Hituzi Syobo.

Kaplan, Ronald and Zaenen, Annie. 1989. Long-distance Dependencies, Constituent Structure, and Functional Uncertainty. In Mark Baltin and Anthony

Kroch (eds.), *Alternative Conceptions of Phrase Structure*, pages 17–42, Chicago: The University of Chicago Press.

Kitagawa, Yoshihisa. 1994. *Subjects in Japanese and English*. Outstanding Dissertations in Linguistics, New York and London: Garland Publishing.

Kubota, Yusuke. 2005. Light Verbs and the Scope Interpretation of Complex Predicates in Japanese, MS. The Ohio State University.

Kuno, Susumu. 1973. *The Structure of the Japanese Language*. Cambridge, Massachusetts: The MIT Press.

Kuroda, S.-Y. 1965. *Generative Grammatical Studies in the Japanese Language*. Ph. D.thesis, MIT.

Manning, Christopher D., Sag, Ivan A. and Iida, Masayo. 1999. The Lexical Integrity of Japanese Causatives. In Robert Levine and Georgia Green (eds.), *Studies in Contemporary Phrase Structure Grammar*, pages 39–79, Cambridge and New York: Cambridge University Press.

Matsumoto, Yo. 1996. *Complex Predicates in Japanese*. Stanford/Tokyo: CSLI Publications/Kurosio Publishers.

Pollard, Carl J. and Yoo, Eun Jung. 1998. A Unified Theory of Scope for Quantifiers and *Wh*-Phrases. *Journal of Linguistics* 34, 415–445.

Ryu, Byong-Rae. 1993. Structure Sharing and Argument Transfer: An HPSG Approach to Verbal Noun Constructions. SfS-Report 04-93, Department of Linguistics, The University of Tübingen, Tübingen.

Shibatani, Masayoshi. 1976. Causativization. In Masayoshi Shibatani (ed.), *Japanese Generative Grammar*, volume 5 of *Syntax and Semantics*, pages 239–294, New York and Tokyo: Academic Press.

van Noord, Gertjan and Bouma, Gosse. 1994. The Scope of Adjuncts and the Processing of Lexical Rules. In *Proceedings of COLING 94*, pages 250–256, Kyoto.

Yokota, Kenji. 1999. Light Verb Constructions in Japanese and Functional Uncertainty. In Miriam Butt and Tracy Holloway King (eds.), *Proceedings of the LFG99 Conference*, Stanford: CSLI Publications.

Yumoto, Yoko. 2002. Goi-gainen Koozoo no Kumikae o Tomonau Toogo-teki Hukugoo-go (Syntactic Compounds Involving Restructuring of Lexical Conceptual Structures). In Takane Ito (ed.), *Bunpoo-riron: Rekisikon to Toogo (Grammatical Theory: Lexicon and Syntax)*, volume 1 of *Gengo-kagaku (Language Sciences)*, pages 61–90, Tokyo: University of Tokyo Press.