

MORPHOLOGICALLY COMPLEX PREDICATES IN JAPANESE AND WHAT THEY TELL US ABOUT GRAMMAR ARCHITECTURE

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Abstract

In this paper we take a fresh look at an old problem, the syntax and semantics of Japanese causatives. We demonstrate some seldom-noted similarities causatives bear to other Japanese morphologically complex predicates and argue why these similarities are important. Following a survey and critique of past analyses, we conclude that the principle of compositionality is at the root of the deficiencies of these analyses. We thus propose a modified, slightly non-compositional version of Manning *et al.*'s (1999) analysis, similar in spirit to Minimal Recursion Semantics (Copestake *et al.* 1995, 1999). We conclude with some discussion of possible replacements for compositionality.

1 Introduction

Complex predicates in general and Japanese complex predicates in particular have always “fallen between the cracks” of linguistic analysis. Sentences containing them are

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more than simple sentences and less than complex sentences, exhibiting properties of both. In the Japanese case, any analysis of complex predicates must touch on a very broad spectrum of the grammar of Japanese, from morphology and phonology to syntax and semantics. Each of these modules of the grammar has its own perspective on the properties of complex predicates, and difficulties arise when these perspectives conflict.

In this paper we will examine a number of the properties of Japanese complex predicates, with an eye towards isolating and remedying these inter-module conflicts. In doing so we will pay special attention to module interface issues, eventually calling into question the principle of compositionality. In fact, we view this paper as being less about Japanese complex predicates than about grammar architecture. That is, we will ultimately be concerned with macro-level issues of how a grammar should be organized. Japanese complex predicates are in effect used as a case study to motivate discussion of these larger goals.

Along the way to discussing grammar architecture we will also present a new analysis of the Japanese causative construction, one of the most-debated constructions in the Japanese syntax and semantics literature. For this reason we will concentrate on the causative and past analyses of it in sections 2 and 3. We will move on to presenting data from a number of other morphologically complex predicates (MCPs) in section 4. A novelty of our approach to the causative is that we explicitly recognize that it is simply one of a number of MCPs which share a range of unusual properties, and not the lone misfit it has been almost universally portrayed as. Section 5 shows how, in one way or another, the principle of compositionality has been a factor in the failings of previous approaches to the causative. Section 6, then, presents an analysis which demonstrates how the admission of a small amount of non-compositionality allows for a much more straightforward treatment of the causative and the other MCPs. We consider possible replacements for compositionality in section 7, proposing a new principle of “Naturalness” as a constraint on the global structure of a grammar. Finally, section 8 offers some closing thoughts and further comments on the principle of Naturalness.

Our approach owes a special debt to Manning *et al.*'s (1999) treatment of the causative. Not only do we appropriate much of their analysis wholesale in constructing our own analysis, we share their view of the importance of the Lexical Integrity Hypothesis (LIH). The LIH is Bresnan & Mchombo's (1995) formal expression of the old idea that morphological processes and syntactic processes should be strictly separated. The LIH requires that morphological processes deal only with units below the word level (i.e., morphemes), while syntactic processes deal only with whole words and have no access to smaller units of meaning. This creates a very restricted interface between morphology and syntax, in effect a sort of filter through which only entire, isolated words can pass in either direction. We will be in the position to provide some arguments for the LIH in sections 5.1 and 7.2, but until that point we ask the reader to bear with our insistence on preserving the LIH.

2 The Japanese causative construction

We start our discussion by introducing the Japanese causative construction. The proper analysis of the Japanese causative has long been a thorn in the side of syntacticians due to properties it has which, when viewed from the standpoint of more commonplace constructions, appear to be mutually inconsistent. The basic tension is between properties which make causative predicates appear lexical and properties which make them appear non-lexical. Most analyses, including the one we will eventually propose, have latched onto one or the other groups of properties as somehow more basic, then attempted to explain the other properties via special mechanisms.

2.1 Basic data

In each of the following examples we give a sentence involving a monomorphemic intransitive, transitive or ditransitive predicate, then two sentences involving the causative version of that same predicate with the causer “Hanako”. There are in Japanese two different particles, *-o* and *-ni*, which can be used to mark the causee in a causative construction. However, as (2b) and (3b) demonstrate, when the verb is (di)transitive, the accusative particle *-o* is not available as an option. This phenomenon is known as the “double *-o* constraint” and is attributed to Harada (1973).²

- (1) a. Taroo-ga it-ta
 Taroo-NOM go-PAST
 ‘Taroo went.’
- b. Hanako-ga Taroo-o ik-ase-ta
 Hanako-NOM Taroo-ACC go-CAUSE-PAST
 ‘Hanako made Taroo go.’
- c. Hanako-ga Taroo-ni ik-ase-ta
 Hanako-NOM Taroo-DAT go-CAUSE-PAST
 ‘Hanako made Taroo go.’
- (2) a. Taroo-ga miruku-o non-da
 Taroo-NOM milk-ACC drink-PAST
 ‘Taroo drank milk.’

²The choice between *-o* and *-ni* in those sentences which allow it is not arbitrary. It is often claimed (Matsumoto (1996), Uda (1994), Shibatani (1973)) that *-o*-marked causees are interpreted as being coerced in an adversarial way to do something, while this sense is often absent from sentences with *-ni*-marked causees. Matsumoto (1996) claims a four-way distinction defined by the use of *-o* versus *-ni* and a “coercive” versus a “permissive” interpretation.

- b. *Hanako-ga Taroo-o miruku-o nom-ase-ta
 Hanako-NOM Taroo-ACC milk-ACC drink-CAUSE-PAST
 ‘Hanako made Taroo drink milk.’
- c. Hanako-ga Taroo-ni miruku-o nom-ase-ta
 Hanako-NOM Taroo-DAT milk-ACC drink-CAUSE-PAST
 ‘Hanako made Taroo drink milk.’
- (3) a. Taroo-ga Ken-ni hon-o age-ta
 Taroo-NOM Ken-DAT book-ACC give-PAST
 ‘Taroo gave a book to Ken.’
- b. *Hanako-ga Taroo-o Ken-ni hon-o age-sase-ta
 Hanako-NOM Taroo-ACC Ken-DAT book-ACC give-CAUSE-PAST
 ‘Hanako made Taroo give a book to Ken.’
- c. Hanako-ga Taroo-ni Ken-ni hon-o age-sase-ta
 Hanako-NOM Taroo-DAT Ken-DAT book-ACC give-CAUSE-PAST
 ‘Hanako made Taroo give a book to Ken.’

As these sentences show, causative predicates are created through suffixation of the morpheme *-(s)ase* to a verb stem. There is in general no restriction on what verbs can be made into causatives.

Having seen the basic form causative sentences take, we now turn to various properties of the causative. These properties fall naturally into two groups: those which are most directly compatible with an analysis in which causatives are treated as lexical items, and those which *prima facie* support treating the causative morpheme *-(s)ase* and the verb stem as separate syntactic elements. Later we will see how these two groups of seemingly contradictory properties give rise to two diametrically opposed groups of analyses.

2.2 Properties which make the causative look lexical

There are good reasons for believing that causative predicates are lexical and not composed of two separate words. Manning *et al.* (1999) (henceforth MSI) present a barrage of arguments (both their own and those of previous researchers) which argue for the lexical status of causatives. The strongest of these are repeated here, along with those of some other researchers. While not every argument is unassailable, the sheer bulk of the evidence points convincingly towards the lexical status of the causative.

2.2.1 Allomorphy

There are at least two morphological reasons for believing that causative predicates are lexical. The first of these is the fact that the causative suffix *-(s)ase* has two different manifestations, the distribution of which is conditioned by the end of the preceding verb stem. This strongly suggests that *-(s)ase* is a morpheme with two allomorphs, meaning that it is a true affix and that therefore the entire verb stem+*(s)ase* complex is a single lexical unit. The following examples demonstrate this distribution.

- (4) a. *tabe-sase-ru*
eat-CAUSE-NPAST
- b. *ki-sase-ru*
wear-CAUSE-NPAST
- c. *ake-sase-ru*
open-CAUSE-NPAST
- (5) a. *nom-ase-ru*
drink-CAUSE-NPAST
- b. *kak-ase-ru*
write-CAUSE-NPAST
- c. *waraw-ase-ru*
laugh-CAUSE-NPAST

As these examples show, *-(s)ase* appears as *-sase* after vowel-final stems and *-ase* after consonant-final stems.

2.2.2 Reduplication

Reduplication of verb stems is commonly used in Japanese to denote repetition of an action or action taken to an extreme degree. Crucially, verb stem+*(s)ase* complexes can be reduplicated, while *-(s)ase* alone cannot.

- (6) a. *gohan-o tabe tabe*
rice-ACC eat eat
'*eating rice repeatedly*'

- b. ?gohan-o tabe-sase tabe-sase
 rice-ACC eat-CAUSE eat-CAUSE
 ‘causing someone to eat rice repeatedly’
- c. *gohan-o tabe-sase sase
 rice-ACC eat-CAUSE CAUSE

MSI take this to show that *tabe-sase* must be formed in the lexicon, since reduplication is a lexical process.

2.2.3 Subject honorification

Japanese has a construction in which a verb may be converted into a new verb, the subject of which is interpreted as being deserving of respect or honor. These honorific forms are infelicitous when used to describe the actions of a person socially equal or inferior to the speaker. Thus we have sentences such as those in (7).

- (7) a. Sensei-ga imooto-ni purezento-o o-okuri-ni naru
 teacher-NOM (my) younger sister-DAT present-ACC send (HON)
 ‘The teacher will (honorably) send (my) younger sister a present’
- b. #Imooto-ga sensei-ni purezento-o o-okuri-ni naru
 (my) younger sister-NOM teacher-DAT present-ACC send (HON)
 ‘(My) younger sister will (honorably) send the teacher a present’

Crucially, the affixal wrapper (*g*)*o*-[]-*ni naru* cannot be used to make *-(s)ase* alone into an honorific form.

- (8) a. Sensei-ga imooto-ni hon-o o-yom-ase-ni naru
 teacher-NOM (my) younger sister-DAT book-ACC read-CAUSE (HON)
 ‘The teacher will make (my) younger sister read a book’
- b. *Sensei-ga imooto-ni hon-o yomi o-sase-ni naru³

MSI take this as evidence that causative predicates are formed lexically and can therefore not be split apart by syntactic processes like subject honorification. Interestingly, Gunji (1999) takes data from subject honorification and reaches quite different conclusions, as will be shown later.

³The form *yomi* is a nominalized form of *yom*- ‘to read’. The sequence *yom o-sase-ni naru* would be ruled out on phonological grounds, as *yom* is not a possible Japanese word.

2.2.4 The potential

One way in which Japanese expresses modal possibility (*can do X, be able to do X*) is through a verbal suffix, *-(rar)e*.⁴ The compound formed by suffixation of *-(rar)e* to the verb stem is referred to as the *potential form*. Potentials have the peculiar property of in many cases allowing the obligatorily *-o*-marked direct object of their base verbs to be marked with either *-o* or *-ga*, the particle normally reserved for subjects.⁵ This is shown in (9).

- (9) a. Imooto-wa miruku-o/*-ga nom-u
 sister-TOP milk-ACC/*-NOM drink-NPAST
 '(My) younger sister drinks/will drink milk.'
- b. Imooto-wa miruku-o/-ga nom-e-ru
 sister-TOP milk-ACC/-NOM drink-POT-NPAST
 '(My) younger sister can drink milk.'

As shown in (10), potential forms of causatives also have this property, arguing that the causative is already a contiguous lexical item by the time the potential morpheme *-(rar)e* is introduced.

- (10) a. Okaasan-wa imooto-ni miruku-o/*-ga nom-ase-ru
 mother-TOP sister-DAT milk-ACC/*-NOM drink-CAUSE-NPAST
 '(My) mother makes/will make (my) younger sister drink milk.'
- b. Okaasan-wa imooto-ni miruku-o/-ga nom-ase-rare-ru
 mother-TOP sister-DAT milk-ACC/-NOM drink-CAUSE-POT-NPAST
 '(My) mother can make (my) younger sister drink milk.'

If *-(s)ase* were an independent verb which simply selected a clausal complement, then it would be difficult to explain how the marking possibilities of one of the arguments inside that complement could be modified by *-(rar)e*, which would have to be analyzed as either a suffix on *-(s)ase* or a higher-up independent verb.⁶

⁴There are several common regional/speech register-related variants. *-(rar)e* is the standard form most often used in the media. There is a separate periphrastic construction, *...koto-ga dekiru*, which does not involve derivational morphology and which may generally be used interchangeably with the potential form described here.

⁵Although certain "double *-ga*" verbs take *-ga*-marked objects lexically, e.g., *John-ga furansugo-ga/*-o wakaruru* 'John understands French'. Note that the periphrastic potential *...koto-ga dekiru* does not license this case-marking alternation.

⁶The technology of argument attraction (Hinrichs & Nakazawa (1989), Kathol (1995), etc.) would permit such an analysis, however. The arguments of the verb stem would simply become arguments of *-(s)ase*, where they would be accessible to the influence of *-(rar)e*. Gunji (1999) introduces argument attraction for certain cases of scrambling, but does not give an analysis of the potential or its case-marking possibilities. MSI also use a form of argument attraction, but at the lexical formation level and not at the syntactic level.

2.2.5 Question-answer pairs

MSI present further evidence for the lexicality of the causative from the domain of question-answer pairs. In general, questions in Japanese can be answered either by a form of *hai/ie* ‘yes/no’ or by repeating the verb of the question in either affirmative or negative form.⁷ Furthermore, in exchanges such as ((11),(12)), in which the questions are of biclausal structures, only the matrix verbs are repeated in the answers.

- (11) a. A: [Taroo-ga ik-u yoo ni] shi-ta ka?
 Taroo-NOM go-NPAST (COMP) do-PAST QUES
 ‘Have (you) arranged for Taroo to go?’
- b. B: Shi-ta (yo)
 do-PAST EMPH
 ‘Yes, I have’ lit. ‘Did.’
- (12) a. A: [Taroo-ga it-te kure-ru yoo ni] tanon-da ka?
 Taroo-NOM [go-GER give-NPAST (COMP)] ask-PAST QUES
 ‘Have (you) asked Taroo to go?’
- b. B: Tanon-da (yo)
 ask-PAST EMPH
 ‘Yes, I have’ lit. ‘Asked.’

We may then ask what happens in the case of a causative. It turns out that the entire causative predicate, and not only *-(s)ase*, must be repeated in order to give a felicitous answer.

- (13) a. A: Taroo-o ik-ase-ta ka?
 Taroo-ACC go-CAUSE-PAST QUES
 ‘Have (you) caused Taroo to go?’
- b. B: ik-ase-ta (yo)
 go-CAUSE-PAST EMPH
 ‘Yes, I have’ lit. ‘Caused to go.’
- c. B: *(S)ase-ta (yo)
 CAUSE-PAST EMPH

⁷There is no all purpose auxiliary like the English *did*, *do* and *will* in *I did/do/will (not)*.

If *-(s)ase* were a matrix verb selecting a clause, then we would expect it to be a possible answer. The fact that it is not implies either that *-(s)ase* is not a clause-selecting verb or that it is an unusual clause-selecting verb which patterns differently from other such verbs with respect to question-answer pairs. The first explanation seems more straightforward and natural.

2.2.6 Blocking by lexical causatives

Miyagawa (1980, 1989) presents a unique argument that causative predicates are lexically-formed. Miyagawa's point of departure is the large number of lexical causatives in Japanese; that is, verbs with causative meanings which have clearly not undergone any derivational processes (except, possibly, diachronically). Examples are *koros-u* 'to kill', *ake-ru* 'to open (something)' and *nuras-u* 'to make wet'. The existence of these lexical causatives can either block the formation of morphologically complex causatives with putatively identical meanings or, more often, forces these complex causatives to take on specialized interpretations. For example, *sin-ase-ru* 'to cause to/let die' cannot be used to describe an act of direct murder as *koros-u* can, but can only be used when indirectly causing death or when failing to intervene as someone is dying. Similarly, *ak-ase-ru* 'to cause (something) to/let (something) open' cannot be used to describe the act of opening a door, but only acts such as watching idly as a door blows open without attempting to close it again.

On the assumption that such semantic blocking and meaning shift can only happen in the lexicon, Miyagawa argues that the interaction between lexical and complex causatives demonstrates the wordhood of causative predicates. As MSI note, however, it is not completely clear that this assumption is correct, and so the fascinating data Miyagawa presents must be treated warily.

2.3 Properties which make the causative look non-lexical

We now turn to those properties of the causative which have led many researchers to believe, despite the weight of evidence presented in the previous section and the intuition of most Japanese speakers, that it is in fact best analysed as composed of two syntactically separate predicates. It is worth noting that this group of properties is of a more semantic nature, while those of the previous section were largely syntactic and morphological.

2.3.1 Adjunct scope

Possibly the most problematic data for a lexical view of the causative comes from adjunct and quantifier scoping. We deal first with adjuncts.

When modifying causatives adjuncts can, in a general and productive way, take

semantic scope over either the predicate expressed by the verb stem or the entire causative predicate.⁸ In syntactic terms, given standard assumptions, adjuncts can take scope over individual morphemes in a complex verb. This is demonstrated in example (14).

- (14) a. Suzuki-sensei-ga Taroo-ni gakkoo-de hashir-ase-ta
 Suzuki-teacher-NOM Taroo-DAT school-LOC run-CAUSE-PAST
Wide scope: *'At school, Suzuki-sensei made Taroo run'*
Narrow scope: *'Suzuki-sensei made Taroo [run at school]'*
- b. Hanako-ga Taroo-ni hooki-de yuka-o hak-ase-ta
 Hanako-NOM Taroo-DAT broom-INSTR floor-ACC sweep-CAUSE-PAST
Wide scope: *'With/using a broom, Hanako made Taroo sweep the floor (by hitting him with it, etc.)'*
Narrow scope: *'Hanako made Taroo [sweep the floor with a broom]'*

This is entirely unexpected given the data seen in the last section. Since adjuncts are normally assumed to take scope at syntactic nodes, an analysis of these sentences would appear to need to split the verb stem and *-(s)ase* into two separate syntactic entities. In other words, these data seem to demand a non-lexical analysis.

2.3.2 Quantifier scope

Parallel to the adjunct data, we also find that quantifiers can take scope over both the complex predicate as a whole and just the verbal stem in causatives.

- (15) a. Sensei-ga gakusei-ni san-satsu-no hon-o yom-ase-ta
 teacher-NOM students-DAT three-volumes-GEN book-ACC read-CAUSE-PAST
Wide scope: *'There were three books that the teacher made the students read'*
Narrow scope: *'The teacher caused there to be three books that the students read'*
- b. watashi-wa nanninka-no tomodachi-o suupaa-ni ik-ase-ru
 I-TOP a few people-GEN friends-ACC grocery store-to go-CAUSE-NPAST
Wide scope: *'There are several (particular) friends who I will make go to the grocery store'*
Narrow scope: *'I will make several friends go to the grocery store'*

Again, since quantifiers are normally assumed to take scope over syntactic nodes, these data are highly problematic for a lexical view of the causative.

⁸Matsumoto (1996) notes that with some kinds of causatives (i.e., permissive vs. coercive causatives) and under some interpretations verb-stem scope is not possible. This, however, does not change the fact that it is *often* possible.

2.3.3 *Jibun* binding

Jibun ‘self’ has a complex and not fully understood set of conditions as to what can serve as its antecedent. Subjects, however, can virtually always serve as antecedents, while non-subject antecedents are rare. As shown in (16), *jibun* can bind to either causers *or* causees in causative constructions.

- (16) a. Hanako_i-ga Taroo_j-ni jibun_{i/j}-no shashin-o mi-sase-ta
 Hanako-NOM Taroo-DAT self-GEN photo-ACC see-CAUSE-PAST
 ‘Hanako_i made Taroo_j see her_i/his_j picture.’
- b. Hanako_i-ga Taroo_j-ni jibun_{i/*j}-no shashin-o mise-ta
 Hanako-NOM Taroo-DAT self-GEN photo-ACC show-PAST
 ‘Hanako_i showed Taroo_j her_i/*his_j picture.’

Note that (16b) differs only from (16a) in employing the lexical causative *mise-ru* ‘to show’ rather than the morphologically complex causative *mi-sase-ru* ‘to cause to see’. The meanings are thus almost identical, yet the binding patterns differ.

This data makes both causers and causees in morphologically complex causative constructions look like subjects at some level, suggesting a biclausal structure with the causer as the higher subject and the causee as the subject of the embedded clause. While the vagueness of *jibun*’s binding conditions renders this argument less forceful than the preceding ones, it is still a phenomenon which is difficult to explain if the causative verb is treated as syntactically indistinguishable from a standard monomorphemic verb in which such binding ambiguities are absent.

2.3.4 Subject honorification

Gunji (1999) presents an intriguing argument for the non-lexicity of the causative by reference to subject honorification. Gunji examines causatives formed from the honorific forms of verbs. (Note that this is different from MSI, who consider the honorific forms of causatives). Gunji notes that, as seen in (17), it is the causee and not the causer who is interpreted as being honored in these sentences.

- (17) a. Ken-ga Suzuki-sensei-o o-aruki-ni nar-ase-ta
 Ken-NOM Suzuki-teacher-ACC HON-walk-HON-CAUSE-PAST
 ‘Ken made Prof. Suzuki (honorably) walk.’
- b. #Suzuki-sensei-ga Ken-o o-aruki-ni nar-ase-ta
 Suzuki-teacher-NOM Ken-ACC HON-walk-HON-CAUSE-PAST
 #‘Prof. Suzuki made Ken (honorably) walk.’

In order to preserve the otherwise solid generalization that verbs enclosed by the *(g)o-[]-ni nar-* wrapper mark the subject as honored, it is necessary to consider the causee to be in some sense a subject. Gunji, assuming that in the HPSG framework to be a subject means to be an initial element on a *SUBCAT* list, concludes that there are two *SUBCAT* lists involved, one for the honorific verb stem and one for *-(s)ase* .

3 Past analyses of the causative

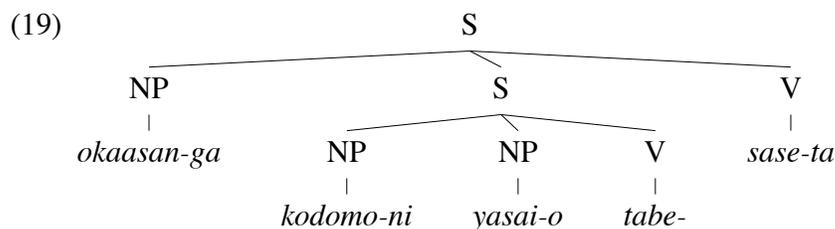
The fact that causative predicates look in some ways lexical and in other ways non-lexical has given rise to two major camps of analyses, those that take the sentential structure of causatives to be monoclausal and those that assume it is biclausal. There is in addition a third camp of analyses which are in some sense mono-/bi-clausal hybrids. In this section, we present a representative sample of past analyses, each of which will be found to be unsatisfactory in some way. In section 5, we will present some comparative analysis of the problems these analyses face. By isolating the common difficulties with past approaches we hope to find a way to cut the Gordian knot and thereby break through to a new, more satisfying approach.

3.1 Biclausal analyses

The majority of past generative analyses of the Japanese causative have been biclausal in nature. That is, most have latched onto the evidence suggesting that the causative is non-lexical, while downplaying the conflicting evidence. As a result, such analyses have worked from the assumption that *-(s)ase* is an independent syntactic entity which takes as a complement a sentence headed by the verb stem.

The classic examples of the biclausal approach are Kuroda (1965, 1981), Kuno (1973) and Shibatani (1973). The particular differences between these analyses and the dozens of similar analyses they have engendered are not relevant for our purposes, and are in any case slight. What is important is the general form these analyses take. A typical causative sentence such as (18) would under these approaches be given a syntactic structure similar to that in (19).

- (18) okaasan-ga kodomo-ni yasai-o tabe-sase-ta
 mother-NOM child-DAT vegetables-ACC eat-CAUSE-PAST
'The mother made the child eat the vegetables'



The various approaches might differ over fine syntactic points such as whether or not the clauses should have VP nodes, but such disagreements are not important to the current discussion. All biclausal approaches take *-(s)ase* to be a verb in its own right, and this is where the issue lies.

The general problem with the biclausal approach is that it is overly simplistic in ignoring or marginalizing the significant evidence for the lexical status of the causative. It exploits the convenient fact that Japanese is syntactically a head-final language, meaning that general principles would force *-(s)ase*, if construed as an independent verb, to immediately follow the verb stem in all cases. This fact, however, is neither evidence for nor against the biclausal approach.

In order to establish the biclausal approach as correct, one would have to either (a) argue quite convincingly that *-(s)ase* is a lexical item despite the evidence against its being so; or (b) explicitly reject the Lexical Integrity Hypothesis (LIH) as an appropriate constraint on grammar architecture. No analysis has done either of these. The closest has been Kuroda's (1981) weak claim that *-(s)ase* is not a bound morpheme at all. He bases this claim on the existence of the well-formed causative verb *sase-ru* 'to cause to do'. However, as pointed out in Kitagawa (1986) and Miyagawa (1989), this word is really nothing more than the causative form of the irregular verb *su-ru* 'to do'. It is thus a standard morphologically complex verb, analyzed as *s-ase-ru*. As further support for this, note that *su-ru* also takes the irregular stem *s-* in the passive form *s-are-ru* 'to be done', formed from the passive morpheme *-(r)are*.

In summary, it is safe to view the classical biclausal analyses as first attempts at wrestling with the odd properties of the Japanese causative. They were made in a time when grammar writers allowed themselves much less technical machinery, meaning that they had no real choice but to use clausal distinctions to capture scope facts. As we will see, the addition of more flexible grammar technology will allow our theories to be faithful to more of the empirical facts.

3.2 Monoclausal analyses

The common thread binding the group of monoclausal analyses together is the assumption that predicates such as *tabe-sase-ru* 'to cause to eat' are formed in the lexicon and that the body of data pointing to the biclausal analysis, to the extent that it is acknowledged,

is to be explained via other special mechanisms.

3.2.1 Miyagawa (1980, 1989)

The main substance of Miyagawa's arguments were presented above under "Blocking by lexical causatives" in section 2.2.6. Unfortunately, while he argues strongly for a lexical treatment of the causative, he does not attempt to provide an explanation for any of the major pieces of evidence in support of the biclausal analysis. He in fact hardly even mentions this evidence. His analysis must therefore be regarded as highly incomplete at best.

3.2.2 Manning, Sag & Iida (1999)

MSI present a monoclausal analysis, couched in HPSG, which makes use of a mixed bag of tricks in covering those phenomena which would seem to discredit a monoclausal approach. Their philosophical stance is nicely summed up in the following quote:

"Although an analysis of causatives in terms of complex syntactic structures has frequently been adopted in an attempt to simplify the mapping to semantic structure, we believe that motivating syntactic structure based on perceived semantics is questionable because in general a syntax/semantics homomorphism cannot be maintained without vitiating syntactic theory (Miller 1991)."

They are also rigidly committed to preserving the LIH. Since MSI's approach is the closest to the one we will eventually propose, we will present it in relative detail. This is as much to be sure the parts we will adopt are adequately explained as it is to highlight the parts we will later argue against.

MSI introduce or borrow a range of formal grammatical devices in constructing their analysis of the causative. We will look at each of these in turn. Note that, because they are presenting an essentially monoclausal analysis, they do not need to do anything special to handle the evidence for the lexicality of the causative. It is the evidence for non-lexicality that they must deal with. Their challenges specifically include (a) word-internal adjunct scope; (b) word-internal quantifier scope; (c) *jibun* binding; and (d) subject honorification. They treat only the first three in their paper, as they do not mention Gunji's (1999) subject honorification argument (presented here in section 2.3.4). We first present their method of forming causative predicates and then move on to show how they tackle (a-c) above.

MSI state that their basic analysis of Japanese causatives is compatible with a lexical-rule treatment, but that they instead choose to implement it in the 'type-based' approach to morphology developed in Riehemann (1993, 1995). Because nothing hinges on

the particulars of this rather complex type-based approach and because it can be readily translated into a lexical rule approach, we will present it in that form.⁹

MSI in effect use a lexical rule of the following form:

(20) **Causative Formation Lexical Rule (CFLR):**

$$\left[\begin{array}{l} \text{HEAD } verb \\ \text{PHON } \boxed{1} \\ \text{CONTENT } \boxed{2} \\ \text{QSTORE } \boxed{3} \\ \text{ARG-ST } \boxed{4} \langle \text{PRO}_j | \boxed{5} \rangle \end{array} \right] \Rightarrow \left[\begin{array}{l} \text{PHON } \text{causative-morph}(\boxed{1}) \\ \text{SUBJ } \langle \boxed{6} \text{NP}_i \rangle \\ \text{COMPS } \langle \boxed{7} \text{NP}_j | \boxed{5} \rangle \\ \text{ARG-ST } \langle \boxed{6}, \boxed{7}, \boxed{4} \text{list} \rangle \\ \text{NEW-QSTORE } \boxed{3} \\ \text{CONTENT|NUC } \left[\begin{array}{l} \text{cause-rel} \\ \text{ACTOR } i \\ \text{UNDERGOER } j \\ \text{EFFECT } \boxed{2} \end{array} \right] \end{array} \right]$$

There are two unusual points to note about this lexical rule.¹⁰ The first is the element ‘PRO’ on the ARG-ST list of the left hand side. According to MSI, this PRO “designates a special type of element that is associated with the subject of the basic stem [and is] coindexed with some member of the (outer) ARG-ST list in accordance with fundamentally semantic principles similar to those outlined for English control constructions in Sag and Pollard (1991)”. PRO, then, is the SYNSEM value of a kind of NP which does not surface syntactically but is coindexed with a surfacing element which controls it in some way.

The second feature of (20) which deserves mention is the nested ARG-ST list on the right hand side of the rule. This is, in fact, the core of MSI’s treatment of the *jibun*-binding facts, our (c) above. Since in their system binding operates by reference to ARG-ST lists, giving causatives nested ARG-ST lists in effect makes them biclausal for the purposes

⁹In their system there is a hierarchy of types from which particular words (multiply) inherit. For instance, the base form of the verb *buy* inherits from types *stem*, *verb-stem*, *strict-transitive*, *active-stem*, and *undergoer-stem*. Each type carries with it its own set of constraints. The conjunction of these five types gives us the core of the familiar lexical entry for *buy*:

$$\left[\begin{array}{l} \textit{strict-trans} \\ \text{HEAD } verb \\ \text{SUBJ } \langle \boxed{1} \rangle \\ \text{COMPS } \langle \boxed{2} \rangle \\ \text{ARG-ST } \langle \boxed{1} \text{NP}_i, \boxed{2} \text{NP}_j \rangle \\ \text{CONTENT|NUC } \left[\begin{array}{l} \textit{buy-rel} \\ \text{ACTOR } i \\ \text{UNDERGOER } j \end{array} \right] \end{array} \right]$$

¹⁰Actually, three. The NEW-QSTORE feature will be discussed later.

of binding. The biclausality, however, is isolated to the ARG-ST list and does not affect the whole of the grammar. Note that, although they do not specifically mention it, this embedded ARG-ST might also be used to address problem (d) above. That is, Gunji’s subject honorification argument could be avoided if, instead of taking subjects to be initial SUBCAT elements, they were taken to be initial ARG-ST elements. In a causative both the causer and the causee would then qualify as subjects, and thus potential honorees. We will not attempt to work out the details of such an analysis here, however.

Now that we have seen how MSI deal with (c), we move on to (a), word-internal adjunct scope. Following Miller (1991) and van Noord & Bouma (1994), among others, word-internal adjunct scope is handled in MSI via (the equivalent of) an adjunct addition lexical rule (AALR) which generates “pre-scoped” verbs. Crucially, the application of the AALR is not ordered with respect to the application of the CFLR. One may, for instance, apply the CFLR first and then the AALR second, producing a causative which will later be modified by an adjunct interpreted with wide scope. Alternatively, simply switching the order of application gives the adjunct narrow scope. The AALR might be formulated as follows:

(21) **Adjunct Addition Lexical Rule (AALR):**¹¹

$$\left[\begin{array}{l} \text{HEAD } verb \\ \text{CONTENT } \boxed{1} \\ \text{ARG-ST } \boxed{2} \end{array} \right] \Rightarrow \left[\begin{array}{l} \text{CONTENT } \boxed{3} \left[\text{NUC} | \text{ARG } \boxed{1} \right] \\ \text{ARG-ST } \boxed{2} \circ \langle \text{ADV } \left[\text{CONT } \boxed{3} \right] \rangle \end{array} \right]$$

The crucial thing to note here is that the pre-scoped lexical items created by this rule actually *subcategorize for* adverbs in precisely the same way that they do for objects and other arguments. This is so because in their system a further constraint effectively splits the ARG-ST list into SUBJ and COMPS valence lists, meaning that this adverb will end up on the COMPS list as an argument.¹²

There are serious questions as to whether this unorthodox treatment of adjuncts can be as easily and safely adopted as MSI imply it can be. We will defer addressing such questions until section 5.2, however, where they will be dealt with in detail. For the time being, it will suffice to note our general skepticism towards the approach. There are simply too many reasons to keep a syntactic distinction between adjuncts and arguments to justify casually conflating them for the sake of one particular Japanese verbal construction.

¹¹‘ \circ ’ denotes list concatenation.

¹²In MSI’s type-based morphology the type *stem*, of which all verbs are subtypes, is subject to this constraint:

$$stem \Rightarrow \left[\begin{array}{l} \text{SUBJ } \boxed{1} \\ \text{COMPS } \text{compression}(\boxed{2}) \\ \text{ARG-ST } \boxed{1} \circ \boxed{2} \end{array} \right]$$

compression() is a bracket-erasing function which takes a possibly-embedded ARG-ST list and outputs a flat list with the same members except any occurrences of PRO, which are deleted. They also state that “an independent constraint guarantees that a stem’s SUBJ value is a singleton list”.

Finally, we present an overview of MSI’s treatment of problem (b) above, that of word-internal quantifier scope. MSI adopt a version of Pollard & Yoo’s (1998) theory of quantifier scope, which is in turn based on the technique of “Cooper storage” introduced in Cooper (1983). The reader is referred to Pollard & Yoo (1998) for the full complexities of this theory, but in essence Pollard & Yoo propose a refined version of Cooper storage in which stored quantifiers are inherited from head daughters only, rather than from all daughters as in previous approaches. They also move the $Q(\text{QUANTIFIER})\text{-STORE}$ feature to SYNSEM|LOCAL from SYNSEM|NONLOCAL , its location in Pollard & Sag (1994). This move solves a number of serious problems in Pollard & Sag’s analysis related to the interaction of quantifiers with raising and extraction.

Pollard & Yoo’s theory, however, has one shortcoming: it allows quantifier retrieval to occur at too many nodes, resulting in spurious analyses for many sentences. These spurious analyses spring up in cases where there are multiple verbally-headed phrasal nodes which may serve as retrieval sites, but where the choice among these nodes does not result in scope differences. MSI propose to repair this flaw while at the same time allowing for word-internal quantifier scope by lexicalizing quantifier scoping. That is, all quantifiers in their system are retrieved at lexical heads and not at phrasal nodes. This move eliminates the non-determinism of the retrieval process (aside from the inherent non-determinism of choosing a particular quantifier scoping).

MSI implement their lexical quantifier retrieval in such a way that it interacts with the CFLR to allow word-internal quantifier scope with causatives. This is accomplished by using a verbal head’s ARG-ST list as a sort of intermediary between the two processes. Quantifier retrieval is technically formulated as a constraint on type *stem* of the following form:

(22) **Quantifier Amalgamation Constraint:**¹³

$$stem \Rightarrow \left[\begin{array}{l} \text{ARG-ST} \quad [1] \\ \text{QSTORE} \quad \text{merge-quants}(\text{toplevel}([1]) \uplus [2] \ominus [3]) \\ \text{NEW-QSTORE} \quad [2] \\ \text{CONTENT} \quad \left[\text{QUANTS} \quad \text{order}([3]) \right] \end{array} \right]$$

¹³Notation:

- $\text{toplevel}()$ is a function that takes a possibly-embedded ARG-ST list and returns all unembedded elements.
- $\text{merge-quants}()$ is a function that takes a list of *synsem* values and returns the union of their CONTENT|QUANTS values.
- \uplus behaves like normal set union if its arguments are disjunct sets, and is undefined otherwise.
- \ominus is set difference.
- $\text{order}()$ takes a set and nondeterministically returns a list which is an ordering of that set.

This complicated-looking constraint says something rather simple: a *stem* (which may or may not be embedded within a larger complex, as the base verb of a causative is) may choose to retrieve any number of quantifiers from the top level of its own ARG-ST list, as well as any quantifiers passed up from any *stems* below it via the NEW-QSTORE feature.¹⁴ The unretrieved quantifiers are left in QSTORE to be passed up the tree.

We are now in a position to explain the precise role of NEW-QSTORE, first introduced in the CFLR. Before a causative is built, the base stem retrieves zero or more of the quantifiers contributed by its arguments and leaves the rest in its QSTORE set. The CFLR, then, passes these “leftovers” up to the newly-produced causative form, making them available in its NEW-QSTORE. In this respect NEW-QSTORE is a highly restricted form of Pollard & Yoo’s (1998) RETRIEVED feature, which has otherwise disappeared from MSI’s theory of quantifier scope.¹⁵

MSI’s theory thus answers all of the challenges for a monoclausal analysis while still remaining monoclausal. It accomplishes this mostly via ARG-ST gymnastics; i.e., it refashions the ARG-ST list into a mini-biclausal structure and uses it as the relevant level of representation for dealing with phenomena which make the causative look non-lexical.

We will adopt most of MSI’s analysis as is when presenting our own analysis in section 6. However, as mentioned above, we take issue with their treatment of adjuncts and so will eventually propose a modification of their theory. We realize it might be felt after reading up to this point that the introduction of so much new theoretical machinery is ill-justified if done solely for the purpose of treating the causative. Section 4 will show, however, that this machinery is in fact needed in order to capture a much wider range of data. The empirical motivation for MSI’s modifications will thus be strengthened considerably.

3.3 Hybrid analyses

There are a number of analyses which posit syntactic ambiguity for the causative, or else different layers of analysis in which the causative is sometimes a single word, sometimes not. We will refer to these collectively as “hybrid” analyses.

3.3.1 Kitagawa (1986)

Kitagawa (1986) proposes a transformational account in which affix raising is used to account for the dual nature of the causative. Specifically, the verb stem and *-(s)ase* begin at D-structure as a complex V^0 constituent and remain so at S-structure. This move captures

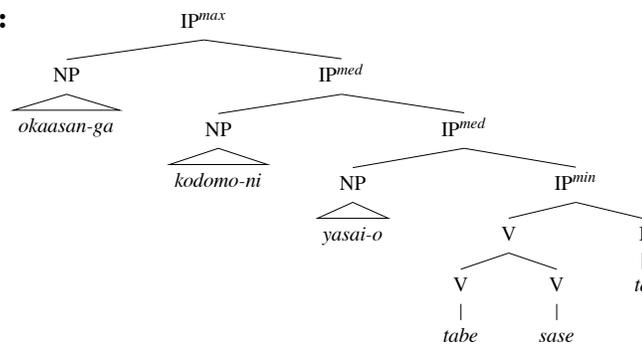
¹⁴Only the top level of the ARG-ST list is used because any embedded lists will correspond to arguments of lower *stems*, and these stems will have already had their chances to retrieve quantifiers.

¹⁵NEW-QSTORE is attributed to Przepiórkowski (1997).

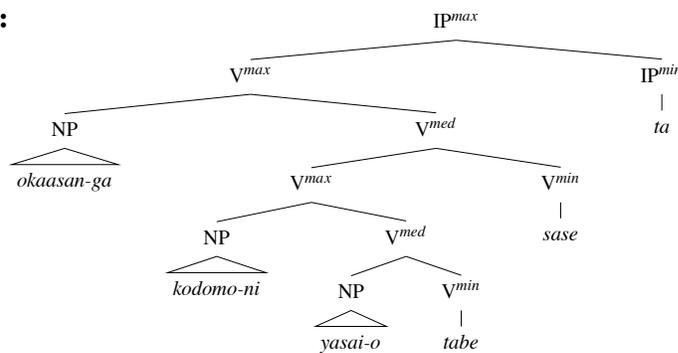
the lexical-like properties of the causative. The non-lexical-like properties are analyzed by having *-(s)ase* undergo affix movement on the way to LF, meaning that the causative is effectively biclausal at that level of representation. Sentence (18), repeated as (23) below, then has the S-structure and LF representations in (24).

- (23) *okaasan-ga kodomo-ni yasai-o tabe-sase-ta*
 mother-NOM child-DAT vegetables-ACC eat-CAUSE-PAST
'The mother made the child eat the vegetables'

(24) a. **S-structure:**



b. **LF:**



It initially appears that this approach offers a solution to the dilemma posed by the causative (at least within its set of theoretical assumptions), but a closer look reveals problems. Note that this approach effectively merges both syntax and (at least verbal) morphology into one structure. While this alone would not result in an abandonment of the Lexical Integrity Hypothesis if some sort of boundary were maintained between the two parts of the tree, further note that to derive the LF in (24b) *-(s)ase* would have to move out of the V domain and further up the tree. In doing so, it effectively crosses the morphology-syntax boundary. This movement, then, is a classic example of syntactic interference in the domain of morphology. This undesirable feature is enough to lead us to search for a more satisfactory resolution of the causative's conflicting properties.

3.3.2 Uda (1994)

Uda's (1994) HPSG study of Japanese complex predicates looks at causatives in terms of (a) coercive vs. permissive interpretation and (b) *-o*-marking vs. *-ni*-marking of the causee. It has usually been claimed in the past (Kuno (1973), Shibatani (1973)) that these two dimensions are one and the same, with *-o*-causatives being interpreted as coercive and *-ni*-causatives being interpreted as permissive. Uda, however, presents evidence to the contrary, arriving at an analysis which posits traditionally monoclausal structures for *-o*-causatives and traditionally biclausal structures for *-ni*-causatives. Specifically, causative verbs which take *-o*-marked causees are derived by a lexical rule, while a version of *-(s)ase* which can only take *-ni*-marked causees exists as an independent lexical item to be used in biclausal structures.

Uda's approach appears to be adequate for the data she considers, but she does not address any of the main problems under consideration here.¹⁶ From our perspective, in fact, her analysis seems to adopt the worst of both worlds, giving some causatives a monoclausal analysis which cannot handle the difficult adjunct and quantifier scope data, as well as violating the Lexical Integrity Hypothesis with other causatives by treating some occurrences of *-(s)ase* as an independent word. Her willingness to explore a merger of two long-competing camps of analyses is commendable, but unfortunately, the results are not compelling.

3.3.3 Gunji (1999)

Gunji's (1999) analysis of the causative employs a linearization scheme (Dowty (1996), Reape (1996), Kathol (1995)), with the attendant separation of the grammar into tectogrammatical and phenogrammatical levels. He acknowledges the significant morphophonological evidence arguing for the lexical status of the causative, while also claiming that the data demand a biclausal treatment to effectively capture all the observed patterns. He adopts a linearization analysis in order to be able to incorporate both views simultaneously. Specifically, he treats the monoclausal-like features in the phenogrammar, while handling the biclausal-like features in the tectogrammar.

The linearization approach to grammar architecture holds that there are two largely independent levels of syntactic representation—the *tectogrammar*, in which constituency information is captured (typically by means of some form of phrase structure grammar), and the *phenogrammar*, in which linear ordering constraints are captured. This is a more radical loosening of the relation between syntactic structure and linear order than, for example, the traditional notion of separating ID (immediate dominance) constraints from LP (linear precedence) constraints. Unlike ID/LP grammars, the linearization approach does

¹⁶She does mention adjunct scope briefly, but restricts her discussion to the interpretation of subject-oriented adverbs like *wazato* 'purposefully'. Such phenomena bear more in common with *jibun*-binding than with our core word-internal adjunct scope phenomena.

not require that words which form a constituent at the tectogrammatical level be contiguous at the phenogrammatical level. In fact, a linearization grammar could provide for a very constrained tectogrammar and a completely unconstrained phenogrammar, resulting in a language for which any permutation of the words in a given sentence would be given the same syntactic structure. (This may even be correct or close to correct for languages like Warlpiri).

In Gunji's system *-(s)ase* is an independent lexical item which selects a verb stem and inherits all of its arguments. The particular method of selection, however, is unconventional: selection occurs via the `SYNSEM|VALENCE|ADJACENT` feature, rather than the `SUBCAT` feature (which is still present, also located under `SYNSEM|VALENCE`). He then provides two new universal principles, the Adjacent Feature Principle and the Morphophonological Principle, which together ensure that selection via the `ADJACENT` feature results in a close morphophonological bond between selector and selectee. These principles act to fuse *-(s)ase* to its argument, making the internal structure of the complex predicate impenetrable at the phenogrammatical level. Crucially, however, *-(s)ase* and the verb stem remain separate at the tectogrammatical level, making word-internal adjunct/quantifier scope possible. Since both *-(s)ase* and the verb stem maintain separate `SUBCAT` lists, an account of the *jibun*-binding and subject honorification data is also straightforward.

By taking this approach, Gunji can be seen as effectively doing in HPSG what Kitagawa (1986) did in transformational grammar. Both treat the causative by appealing to two different levels of syntactic representation, and to accomplish this both need to “merge” morphology into the syntax. The argument in the previous section against Kitagawa's approach, then, also applies to Gunji—both abandon the LIH and propose ad hoc systems of morphology in order to capture the properties of the causative. Gunji goes even further—confronted with purported evidence for both the monoclausality and biclausality of causatives, he simply adopts enough extra grammar technology to simultaneously permit both styles of analysis in virtually unmodified forms.

The linearization approach is motivated by the need to account for discontinuous constituency, *not* by the need to account for unusual interactions between morphology, syntax and semantics. Gunji has shown that adding linearization machinery to his JPSG system can do the job of accounting adequately for the causative. What he has not done is provide justification for the blurring of the boundaries between the various subparts of the grammar his move engenders. Simply because the structure of Gunji's theory allows internal morphological information to be easily accessed by the syntax and semantics does not mean that it *should* be.

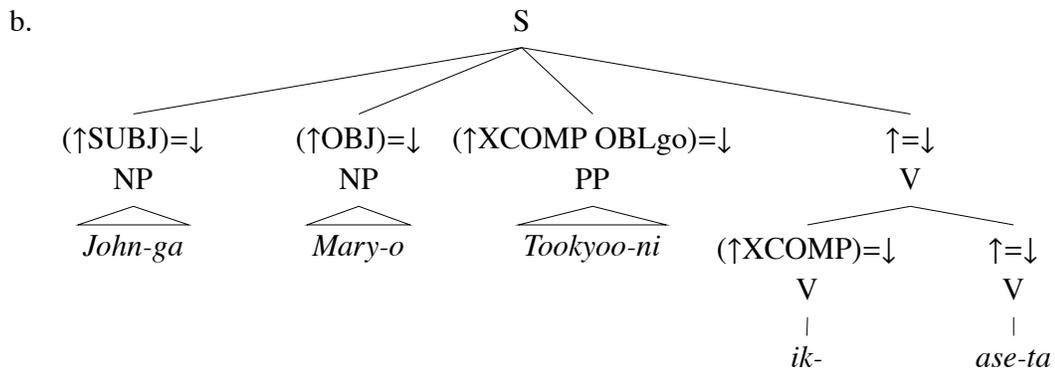
3.3.4 Matsumoto (1996)

Matsumoto (1996) is a study, couched in LFG, of the notion of wordhood. Matsumoto considers four levels of representation; (lexical-)semantic structure, argument (a-)structure, functional (f-)structure and constituent (c-)structure. His main claim is that each of these

levels provides its own criteria for wordhood, and that a given construction may qualify as a word at constituent structure, for instance, while failing to be one at functional structure. In this way wordhood is claimed to be a more complex and multi-layered notion than has been generally assumed.

He considers a wide range of Japanese verbal constructions, categorizing each as words or non-words at the various levels of representation. Causatives are split into two groups, with those that are interpreted permissively given “biclausal” (“non-word”) f-structures and those which are interpreted coercively given “monoclausal” (“word”) f-structures. It is not clear, however, what c-structures he assumes for causatives, as he only gives an example of the c-structure of a permissive causative, shown in (25).

- (25) a. John-ga Mary-o Tookyoo-ni ik-ase-ta
 John-NOM Mary-ACC Tokyo-to go-CAUS-NPAST
 ‘John let Mary go to Tokyo’



Matsumoto does not concern himself directly with question of reconciling the clear morphophonological integrity of the causative with its syntactic/semantic properties, as this is not directly relevant to his specific task of testing different kinds of syntactic wordhood. His work is therefore not immediately comparable to the other theories we have considered. We introduce his approach, however, because we will be coming back to it later in this paper. In particular, Matsumoto’s treatment not only of the causative, but also of a large range of other Japanese complex predicates is similar in spirit to what we will present in section 4. The analysis we propose in section 6.1 also bears some similarities to his approach.

3.4 General commentary on past analyses

The various shortcomings of these analyses might be forgivable to greater or lesser degrees if it were assumed that the Japanese causative is simply a fringe construction which is outside the bounds of what one normally has to deal with in a syntactic/semantic theory.

That is, if the causative could be likened to a highly idiosyncratic structure like an idiom, which nearly everyone agrees needs special treatment. But this is not the case. The causative, it turns out, is simply one of a number of morphologically complex predicates in Japanese which share many of the same unusual properties. What has been missing from analyses of the causative up to this point is a perspective which places the causative in the context of these other morphologically complex predicates (MCPs). The next section aims to do just this.

4 Other MCPs

Japanese is typically classified as an agglutinative language, and nowhere in the grammar is this more evident than in the verbal system. While there is no verbal agreement with either subjects or objects, there are a number of derivational and inflectional morphemes which may be added to verb stems, nearly all in the form of suffixes.¹⁷ In this section we present a number of complex predicates formed by the addition of derivational suffixes. Note that to be a complex predicate in our terminology requires the presence of two semantic predicates, one taking the other as an argument. Therefore, not all verbs arrived at by suffixation are MCPs.¹⁸

Our purpose here is to remove as much as possible of the aura of mystery surrounding the Japanese causative. While some unusual features of the causative, namely the *jibun*-binding and subject honorification facts, do appear to be unique to that construction, the more troubling and initially surprising adjunct and quantifier scope facts are not. In fact, word-internal scope of adjuncts and quantifiers will be shown to be in many cases the default state of affairs with MCPs rather than an exotic option available only in special cases.

We are not the first to notice many of the following facts. In particular, Matsumoto (1996) presented the adjunct scope and some of the quantifier scope properties of a large range of MCPs in his study of the notion of wordhood. We believe we are the first, however, to recognize the significance of this data to the resolution of the decades-old debate over the causative, as well as to a number of fundamental questions about what architectural assumptions grammar writers can and should make.¹⁹

¹⁷Like many other agglutinative languages, Japanese is head-final syntactically, but head-initial morphologically.

¹⁸Some examples of verb forms which are morphologically complex but not MCPs include: the reciprocal (e.g., *tasuke-aw-* ‘to help each other’ from *tasuke-* ‘to help’), the provisional (e.g., *ik-eba* ‘provided (I) go’ from *ik-* ‘to go’), and the conditional (e.g., *owat-tara* ‘if/when (I) finish’ from *owar-* ‘to finish’).

¹⁹There are some similarities between our claim that the Japanese causative is best viewed as just one of a number of other MCPs and the extensive theory of predicates in Ackerman & Webelhuth (1998). Ackerman & Webelhuth provide a wide range of cross-linguistic evidence to support their claim that the notion of “predicate” deserves to be recognized as a theoretical entity. They exert the majority of their effort in showing how such a uniform cross-linguistic generalization can be maintained in the face of the enormous variety particular languages exhibit in the syntactic, semantic and morphological expression of predicates. They concentrate their attention especially on complex predicates, which they take to include not only semantically

We will not present individual arguments for the lexical status of each of the following MCPs. It will suffice to note that all involve bound morphemes, some with multiple allomorphs.²⁰

4.1 The potential: *-(rar)e*

The potential construction was introduced in section 2.2.4 when it was noted that the case-marking alternation it licenses for the base verb's object may be used to argue for the lexicality of the causative. We now show that the potential also shares two surprising features of the causative: it allows both adjuncts and quantifiers to take word-internal scope over the base verb.

Adjunct scope:

- (26) a. Hanako-ga piano-o hontoo-ni hik-e-ru
 Hanako-NOM piano-ACC truly play-POT-NPAST
Wide scope: *'Hanako truly can play the piano'*
truly'(possible'(play'(Hanako', piano')))
- b. Hanako-ga piano-o joozu-ni hik-e-ru
 Hanako-NOM piano-ACC skillfully play-POT-NPAST
Narrow scope: *'Hanako can play the piano skillfully'*
possible'(skillfully'(play'(Hanako', piano')))

complex predicates as in the present paper, but also otherwise simple predicates marked for tense, mood, aspect, etc.

The similarity to the present approach arises from the fact that Ackerman & Webelhuth concentrate their attention on complex predicates (including the causative) and build a general theory which handles all predicates in a uniform manner. The difference is that they have far loftier goals than we do—rather than build a grand unified theory of predicates, or even a theory of Japanese predicates, we are simply trying to provide an analysis which acknowledges and accounts for several phenomena related to the class of Japanese MCPs. Note also that Ackerman & Webelhuth do not deal with our core topic, the problem of word-internal adjunct and quantifier scope, in Japanese or any other language.

²⁰Prima facie counterexamples are *niku-* 'hard to', *yasu-* 'easy to' and *na-* 'not', which can stand on their own. However, all have different meanings as independent words, making this argument untenable. *niku-* means 'hateful', *yasu-* means 'inexpensive' and *na-* means 'to not exist', (i.e., it is the irregular negative form of the verb *ar-* 'to exist'). There is no doubt a diachronic link between these meanings and the morphemes' MCP meanings, but they must be regarded as synchronically distinct.

Quantifier scope:

- (27) a. watashi-wa [san-satsu-no hon]_{NP-O} yom-e-ru
 I-TOP [3-volumes-GEN book]-ACC read-POT-NPAST
Wide scope: ‘There are three (particular) books which I can read (...the rest I cannot.)’
 $\exists x|_{book'(x)}[possible'(read'(I, x))]$
Narrow scope: ‘I can (generally) read three books (...before starting to get sleepy.)’
 $possible'(\exists x|_{book'(x)}[read'(I, x)])$

Quantifiers in Japanese can in many cases be “floated”, or liberated from the NPs they would normally be associated with and allowed to scramble among other sentential constituents. It is a fascinating fact that such floating generally results in sentences which have *only* narrow scope. This is shown in (28).

- (28) a. [hon]_{NP-O} san-satsu yom-e-ru
 [book]-ACC 3-volumes read-POT-NPAST
 b. san-satsu [hon]_{NP-O} yom-e-ru
 3-volumes [book]-ACC read-POT-NPAST
 c. $possible'(\exists x|_{book'(x)}[read'(pro, x)])$
 $*\exists x|_{book'(x)}[possible'(read'(pro, x))]$ (**wide scope impossible**)

Furthermore, although with non-floated quantifiers it is usually possible to get wide scope, narrow scope seems to be preferred in most cases.²¹ These patterns also appear to hold with the other MCPs to be presented below. As they are orthogonal to the main point we wish to make, however, we will restrict our attention in this paper to non-floated quantifiers such as those in (27).

We have shown that the potential allows word-internal scope of adjuncts and quantifiers just as the causative does, but what about the *jibun* binding and subject honorification facts presented in 2.3.3 and 2.3.4? It turns out that these arguments have no analogues involving the potential since it does not introduce a new argument comparable to the causee in a causative construction. We will find the same to be true for all of the MCPs to follow. Still, to the extent that they are comparable, the potential and the other MCPs introduced here appear to behave identically to the causative.

²¹It is not entirely clear to me why this is the case, but it would seem to be the result of a conventional implicature related to the extensive use of demonstratives in normal conversation. Japanese maintains three distance distinctions in its demonstratives for deictic purposes, and furthermore uses these same demonstratives pervasively to maintain discourse structure. It would therefore be unusual to encounter a wide-scope usage of a quantifier without an accompanying demonstrative (e.g., to talk about particular books one would normally say something like ‘these three books’ or ‘those three books’). The absence of a demonstrative, as in the examples above, may bias the listener towards the narrow-scope interpretation.

4.2 The desiderative: *-ta*

We now move on to another MCP, the desiderative, expressed by suffixation of the morpheme *-ta*. The desiderative is the equivalent of the English *I want to X*, where *X* is the state of affairs expressed by the base verb plus its arguments. Unlike the other morphemes considered so far, *-ta* attaches to a verb stem to form an *adjectival* rather than a new verb stem as with *-(s)ase* and *-(rar)e*. However, this difference in syntactic category is negligible because Japanese adjectivals have “built-in” copulas and can be employed in just the same way verbs are. Examples of typical desiderative sentences are given in (29). Note that ‘RYK’ in the glosses refers to the *ren’yookei* inflection of the verb. The RYK form is infinitival and frequently serves as the stem for derivational morphemes. It can also stand on its own to represent a kind of “coordination” of verbally-headed constituents.²²

- (29) a. *watashi-wa hashir-i-ta-i*
 I-TOP run-RYK-DESID-NPAST
 ‘*I want to run*’
- b. *watashi-wa kono hon-o/-ga yom-i-ta-i*
 I-TOP this book-ACC/-NOM read-RYK-DESID-NPAST
 ‘*I want to read this book*’

There is another case alternation to note here: for transitive verbs *-ta* licenses the base verb’s accusative-marked direct object to be optionally marked with *-ga*, just as we saw with the potential.

The morpheme *-ta* is specifically restricted in most instances to expressing desires of the speaker. This is a linguistic reflection of a facet of Japanese culture: it has traditionally been socially discouraged to make direct claims about the mental states of others. Comments about others are therefore usually made in a roundabout way by saying that a person “appears to” want to do something, or “seems to” like something. Japanese thus has a separate MCP for expressing the desires of others, formed by suffixing *-tagar* ‘looks like (s)he wants to X’ to a verb stem.²³

Further note that *-ta* cannot be used in expressing a speaker’s desire that someone else perform a particular action (as in ‘*I want Mary to lend me her car*’). Such desires are instead expressed via a periphrastic construction involving an adjective (*hoshii* ‘to be

²²Alternatively we may simply analyze the desiderative as having two allomorphs, *-ta* and *-ita*, since the RYK form is identical to the verb stem in vowel-final cases and is constructed by adding *-i* to the verb stem in consonant-final cases. The traditional analysis, however, is that the verb appears in the RYK form before *-ta* and other morphemes such as *-niku* ‘hard to’, *-yasu* ‘easy to’, *-oe/owar* ‘finish’, *-naos* ‘re(do)’, *-tsuzuke* ‘continue’ and many others. It is also the form seen in verbal compounds, such as *ukemi* ‘passivity’ (from *uke-* ‘to receive (RYK)’ and *mi* ‘body’) and *torishimaru* ‘to control/direct’ (from *tori-* ‘to take (RYK)’ and *shimaru* ‘to close off’)

²³The situation is identical in Korean.

wanted') predicated of a nominalized sentence. ('*Mary's lending me her car is wanted (by me)*').

Now we may consider the interaction of the desiderative with adjuncts and quantifiers. It will come as no great surprise by now that, despite appearing to be every much a lexical item as the causative, adjuncts and quantifiers can still get word-internal scope with desideratives.

Adjunct scope:

- (30) a. watashi-wa Tookyoo-ni zettai-ni ik-i-ta-i
 I-TOP Tokyo-to absolutely go-RYK-DESID-NPAST
Wide scope: '*I absolutely want to go to Tokyo*'
absolutely'(want'(I', go'(I', Tokyo')))
- b. watashi-wa Tookyoo-ni hikooki-de ik-i-ta-i
 I-TOP Tokyo-to airplane-INST go-RYK-DESID-NPAST
Narrow scope: '*I want to go to Tokyo by airplane*'
want'(I', by'(airplane', go'(I', Tokyo')))

Quantifier scope:

- (31) a. watashi-wa [san-satsu-no hon]_{NP-O} yom-i-ta-i
 I-TOP [3-volumes-GEN book]-ACC read-RYK-DESID-NPAST
Wide scope: '*There are three (particular) books which I want to read (...but no others.)*'
 $\exists 3x|_{book'(x)}[want'(I', (read'(I', x)))]$
Narrow scope: '*I want there to be three books that I read (...I don't want to read four.)*'
want'(I', $\exists 3x|_{book'(x)}[read'(I', x)]$)

It appears that we have found yet another example of a causative-like MCP. Consequently, the initially strange properties of the causative are proving to be less and less unusual as we show how much of the grammar of Japanese they affect.

4.3 The negative: -(a)na

Sentences in Japanese are generally negated by suffixation of the negative morpheme -(a)na onto the matrix verb. The resulting MCP is categorially an adjectival like the desiderative. Typical negative sentences are shown in (32).

- (32) a. watashi-wa hashir-ana-i
 I-TOP run-NEG-NPAST
'I will not/do not run'
- b. watashi-wa kono hon-o yom-ana-i
 I-TOP this book-ACC read-NEG-NPAST
'I will not/do not read this book'

Negative MCPs straightforwardly admit word-internal adjunct and quantifier scope.

Adjunct scope:

- (33) a. Taroo-wa hon-o hotondo yom-ana-i
 Taroo-TOP books-ACC almost read-NEG-NPAST
Wide scope: *'Taroo almost never reads books'*
almost'(not'(read'(Taroo', books')))
- b. Taroo-wa hon-o hayaku yom-ana-i
 Taroo-TOP books-ACC quickly read-NEG-NPAST
Narrow scope: *'Taroo doesn't read books quickly'*
not'(quickly'(read'(Taroo', books')))

Quantifier scope:

- (34) a. watashi-wa [san-satsu-no hon]_{NP-O} yom-ana-i
 I-TOP [3-volumes-GEN book]-ACC read-NEG-NPAST
Wide scope: *'There are three (particular) books which I do not read (...I do read others.)'*
 $\exists x|_{book'(x)}[not'(read'(I', x))]$
- Narrow scope:** *'There are not three books that I (will) read (...there are only two.)'*
 $not'(\exists x|_{book'(x)}[read'(I', x)])$

On reflection it is not surprising that MCPs involving *-(a)na* are penetrable to adjunct and quantifier scope, as there are no generally equivalent syntactic constructions for expressing simple negation, and it would be shocking to find that Japanese could never get narrow scope with respect to negation.

4.4 Tough constructions: *-niku* & *-yasu*

The two most familiar “fronted” tough constructions in English, *X is hard to Y* and *X is easy to Y*, correspond in Japanese to MCPs built from the adjectival-forming suffixes *-niku* and *-yasu*. The examples in (35) are typical.

- (35) a. (watashi-ni totte) kono hon-ga yom-i-niku-i
 (I-DAT according to) this book-NOM read-RYK-HARD-NPAST
 ‘This book is hard (for me) to read’
- b. (watashi-ni totte) yakisoba-ga tsukur-i-yasu-i
 (I-DAT according to) yakisoba-NOM make-RYK-EASY-NPAST
 ‘Yakisoba is easy (for me) to make’

Along with promoting the embedded verb’s object to matrix subject, an English tough adjective also arguably contributes an optional argument (the NP complement of *for*) corresponding to the embedded verb’s subject. Such is not the case, however, in Japanese. The Japanese equivalent of the English *for* phrase²⁴ is the *-ni totte* adverbial, which is a general-purpose phrase meaning “according to” or “from the standpoint of”. Thus, Japanese tough constructions must be viewed as strictly valence-reducing and not valence-shifting predicates like English tough constructions.

Finally, we see that tough constructions, too, are penetrable to adjunct and quantifier scope.

Adjunct scope:

- (36) a. piano-ga totemo hik-i-niku-i
 piano-NOM very play-RYK-HARD-NPAST
Wide scope: ‘The piano is very hard to play’
very’(hard’(play’(pro, piano’)))
- b. piano-ga joozu-ni hik-i-niku-i
 piano-NOM skillfully play-RYK-HARD-NPAST
Narrow scope: ‘The piano is hard to play skillfully’
hard’(skillfully’(play’(pro, piano’)))

Quantifier scope:

- (37) a. [san-satsu-no hon]_{NP}-ga yom-i-niku-i
 [3-volumes-GEN book]-NOM read-RYK-HARD-NPAST
Wide scope: ‘There are 3 (particular) books which are hard to read (...others are easy.)’
 $\exists 3x|_{book'(x)}[hard'(read'(pro, x))]$
Narrow scope: ‘Three books are hard to read (...at one sitting.)’
 $hard'(\exists 3x|_{book'(x)}[read'(pro, x)])$

²⁴If *for* is really a preposition and not a complementizer!

We have now amassed a body of evidence showing just how unremarkable the adjunct and quantifier scope facts surrounding the causative are.²⁵ The scope facts were only remarkable in the way they collide with our normal assumptions about what the interfaces between semantics, syntax and morphology should be like.

5 The role of compositionality

Had we stopped at the end of section 3 and not seen the data in section 4, then we might have had to grudgingly conclude that, while the common treatment of *-(s)ase* as a separate syntactic entity is unsatisfactory, the only technically viable alternative (MSI) is problematic in other ways. We noted in section 3.2.2 that MSI's treatment of adjuncts leaves much to be desired. Impressionistically, MSI's analysis also seems to introduce too much new grammar technology to be justifiably motivated solely by the causative. Given no additional empirical data, then, it might be better to accept a violation of the LIH for one isolated construction than to radically change the grammar framework in an attempt to maintain the LIH across the board.

Section 4 demonstrates, however, that the problematic phenomena extend far beyond the causative and are in fact present in a whole class of constructions. This new information should force us to reconsider our evaluation of past analyses. In particular, it swings the pendulum away from the LIH-violating analyses and towards MSI's analysis, since the new data provides a broader motivation for their LIH-preserving technology.

In this section, we will be focusing on a factor which, upon examination, can be seen to be at the root of both the abandonment of the LIH and MSI's questionable treatment of adjuncts. This factor is the principle of compositionality. We will show that it is impossible to adopt the LIH while simultaneously assuming strict compositionality *and* maintaining a syntactic distinction between adjuncts and arguments. Only two of these three assumptions may be made at a time. MSI takes the first two, while virtually all other analyses take the last two. We hope to show that it is really the first and third which should be adopted, meaning that we will propose an analysis of MCPs which gives up strict compositionality.

5.1 Compositionality vs. Lexical Integrity

First we will consider the conflicting demands that the assumptions of strict compositionality and of the Lexical Integrity Hypothesis put on the grammar writer. We start off by noting that, given the undeniable evidence for the lexical status of the causative, it seems clear that all analyses of the causative which treat *-(s)ase* as a syntactic entity violate the LIH. This includes all the "biclausal" and "hybrid" analyses presented in section

²⁵Although we have not been able to address the *jibun* binding or subject honorification facts directly.

3.²⁶ It may or may not be the case that all of these theoreticians consciously realized that they were violating the LIH. It seems likely, however, that if any of them had been able to produce two equally successful analyses, one assuming the LIH and one violating it, s/he would have chosen the analysis with the LIH. This is so because, other things being equal, it is always advantageous to keep the “boundaries” between the subparts of the grammar as clean and restrictive as possible, and the LIH is nothing more than an enforcement of a strict boundary between syntax and morphology.

The fact that the LIH has usually not been assumed in analyses of the causative should then be seen as a red flag of sorts, warning us that something subtle is amiss. This is particularly the case since most theoreticians do not explicitly argue against the LIH, but instead quietly introduce mechanisms which permit syntactic interference in the domain of morphology.

We propose that the reason the LIH is often not a feature of analyses of the causative is that the desire to preserve strict compositionality is given higher priority. Specifically, the LIH is ruled out because of the interaction between compositionality and the traditional assumption that adjuncts syntactically combine with their arguments via adjunction structures (transformational grammar) or the adjunct-head schema (HPSG) and semantically take scope over the entire content of their syntactic arguments.

This assumption is clearly the primary reason that *-(s)ase* has usually been claimed to be a separate syntactic element in the past. Strict compositionality requires that the meaning of a syntactic node be a function solely of the (entire) meanings of its immediate subnodes. Meanings are monolithic—their inner structures are not accessible to further manipulation. The analysis of verbal adjuncts as semantic functors taking the meanings of verbal nodes is highly restricted, then, if strict compositionality is assumed. In particular, adjuncts may not “reach inside” the meaning of a syntactic node which contains multiple predicates and modify only one.

This assumption, then, clashes with the LIH because, in order to capture the MCP data, it requires that both *-(s)ase* and the verb stem each have their own syntactic nodes. A single word consisting of multiple syntactic nodes is, however, directly prohibited by the LIH.

It turns out to be not only MCPs which face this dilemma, however. Dowty (1979) presents several classes of examples from English in which there is scope ambiguity with clearly monomorphemic verbs. Examples are given in (38).

- (38) a. The Sheriff of Nottingham jailed Robin Hood for four years.
 b. John closed the door again.

²⁶This is arguable in the case of Kitagawa’s and Gunji’s analyses, as both interleave morphology and syntax. It is not clear that either truly has a division between morphology and syntax at all, and so the nature of the interface between them is cloudy.

In (38a) there are two possible interpretations, one in which the act of jailing took four years and one in which the jailing was more or less instantaneous, but Robin Hood's incarceration lasted for four years. In the latter interpretation the PP *for four years* scopes into the monomorphemic verb *jail*, giving a semantics along the lines of

(39) **CAUSE'**(*s*, **for-four-years'**(**BE-IN-JAIL'**(*r*)))

where *jail* is taken to be representable as

(40) $\lambda y.\lambda x.$ **CAUSE'**(*x*, **BE-IN-JAIL'**(*y*))

Similarly, in (38b) we have *again* taking scope inside of *close* under the reading in which the door has been closed in the past, but John has never before done the closing. Here we have something like

(41) **CAUSE'**(*j*, **again'**(**BE-CLOSED'**(*d*)))

Matsumoto (1996) acknowledges these examples but downplays them as very unusual and highly restricted, as only a small class of adverbs can get multiple scopes when modifying the verbs Dowty talks about. While Matsumoto appears to be correct in his characterization, he is nonetheless not justified in simply ignoring the phenomenon, since it is clearly not something as restricted as an idiom. Dowty's examples are productive within a certain sphere. In any case, the verbs in these examples cannot, without reverting to something like Generative Semantics, be argued in any reasonable way to be analyzable as multiple syntactic nodes. Therefore, some mechanism that does not rely on syntactic nodes as domains for adjunct/quantifier scope must in any case be devised. Through such a mechanism we could maintain the LIH in the morphologically complex cases as well.

5.2 Compositionality vs. the adjunct/argument distinction

MSI's approach is the only past analysis of the causative which avoids the problems with the LIH noted in the previous section. However, the way in which MSI maintain the LIH introduces other problems. Recall that it was the interaction of compositionality with the traditional syntactic structure for adjuncts which led to the abandonment of the LIH in other past approaches. MSI's way around this is to give a non-traditional treatment of adjuncts (the Adjunct Addition Lexical Rule (AALR) described in section 3.2.2) which allows the LIH to be preserved without clashing with compositionality. The result of this non-traditional treatment is that verbal adjuncts become syntactically indistinguishable from verbal arguments. We hope to show in this section that this is an undesirable result.

To understand MSI's motivation for treating adjuncts as complements, consider the task they faced in attempting to avoid the problems of the previous section. They are

explicitly committed to the LIH, meaning that MCPs for them are single syntactic nodes. They also assume strict compositionality, which means that adjuncts may not “reach inside” the meanings of fully-formed MCPs to get narrow scope. Their only course of action, then, is to let adjuncts get narrow scope by combining with the verb stem before *-(s)ase* and the other suffixes have been attached. This commits them to handling adjunct scope in the lexicon, via lexical rules or similar mechanisms. But a verb which has been “pre-modified” in the lexicon cannot be used in a syntactic structure without the presence of an adjunct to flesh out the placeholder contributed by the AALR. This requirement is tantamount to subcategorization. Adverbial modification, then, moves from being a syntactically optional process to being a lexically optional but syntactically obligatory process.

The idea of collapsing the syntactic treatments of adjuncts and arguments has gathered steam in the HPSG literature over the last half decade. The general sense seems to be that the initially rather shocking idea is actually quite intuitive and makes the analyses of a number of constructions more straightforward. MSI argues, along with Abeillé & Godard (1994), van Noord & Bouma (1994) and Kim & Sag (1995) that lexical rules such as the AALR are merely the HPSG analogues of the harmless functor/argument-reversal type-raising rules in the Lambek Calculus and other more sophisticated categorial systems. Given two adjacent categories A/B and B , for instance, such a rule might raise the argument B to the type $(A/B)\backslash A$ in order to make it into the functor. Such rules provably never alter the set of strings which can be generated by a particular categorial grammar, nor the semantics assigned to those strings.

The reality, however, is that phrase structure grammar is not as parallel to categorial grammar as proponents of the adjuncts-as-arguments approach would have us believe. There are a number of syntactic phenomena which are sensitive specifically to the distinction between adjuncts and arguments, and it is unclear how these phenomena could be captured in a framework which neutralizes this distinction. We present several cases which appear to be problematic for any adjuncts-as-arguments analysis.

5.2.1 Lasnik & Saito (1984), Fukui (1988)

One distinction between adjuncts and arguments can be seen in the behavior of the Japanese word *naze* ‘why’. First consider the following two questions.

- (42) a. Taroo-ga nani-o te-ni ire-ta no
 Taroo-NOM what-ACC obtain-PAST QUES
 ‘What did Taroo obtain _?’
- b. Taroo-ga naze sore-o te-ni ire-ta no
 Taroo-NOM why that-ACC obtain-PAST QUES
 ‘Why did Taroo obtain that (thing) _?’

These show that, unsurprisingly, Japanese allows question words to appear in simple sentences both as verbal arguments and as verbal adjuncts. The situation changes, however, when we embed the sentences in (42) inside complex NPs. Lasnik & Saito (1984) and Fukui (1988) both discuss such cases. Lasnik & Saito (1984) give the following contrast:

- (43) a. [_{NP} [_S Taroo-ga nani-o te-ni ire-ta] koto]-o sonnani okotteru no
 Taroo-NOM what-ACC obtain-PAST fact-ACC so much be angry-NPAST QUES
 Lit., ‘*What are you so angry about the fact that Taroo obtained _?*’
- b. * [_{NP} [_S Taroo-ga naze sore-o te-ni ire-ta] koto]-o sonnani okotteru no
 Taroo-NOM why that-ACC obtain-PAST fact-ACC so much be angry-NPAST QUES
 Lit., ‘*Why are you so angry about the fact that Taroo obtained that (thing) _?*’

Here we see that the argument question word *nani* ‘what’ can be accessed by a higher verb from inside a complex NP, while the adjunct *naze* cannot. In an adjuncts-as-complements analysis, it is unclear how this distinction would be captured, short of somehow tagging complements which originated as adjuncts and conditioning grammaticality in these cases on the absence of an “adjunct tag”.

5.2.2 Yamashita (1992)

Yamashita (1992) presents a set of sentences which demonstrate that extraction from relative clauses is restricted to verbal arguments in Japanese.

- (44) a. John-ga [[kodomo-ga batto-de garasu-o wat-ta] to] nagei-ta
 John-NOM child-NOM bat-INST glass-ACC broke COMP regret-PAST
 ‘*John regretted that the child broke the glass with the bat*’
- b. [[John-ga [[kodomo-ga batto-de e_i wat-ta] to] nagei-ta] garasu_i]-wa taka-katta
 John-NOM child-NOM bat-INST e_i broke COMP regret-PAST glass_i-TOP costly-PAST
 ‘*The glass that John regretted that the child broke with the bat was expensive*’
- c. [[John-ga [[e_i batto-de garasu-o wat-ta] to] nagei-ta] kodomo_i]-wa kare da
 John-NOM e_i bat-INST glass-ACC broke COMP regret-PAST child_i-TOP him COP
 ‘*He’s the child that John regretted broke the glass with the bat*’
- d. *[[John-ga [[kodomo-ga e_i garasu-o wat-ta] to] nagei-ta] batto_i]-wa kore da
 John-NOM child-NOM e_i glass-ACC broke COMP regret-PAST bat_i-TOP this COP
 ‘*This is the bat that John regretted that the child broke the glass (with)*’

In (44a), we have a biclausal sentence involving a sentential complement containing three NPs, two of which (*kodomo* ‘child’ and *garasu* ‘glass’) are arguments of the embedded verb *watta* ‘broke’ and one of which (*batto* ‘bat’) is an instrumental adjunct. (44b,c) show that the verbal arguments may be extracted and made into complex NP heads, while (44d) shows that the adjunct may not be extracted in this way. Yet it is not the case that adjuncts cannot be extracted in general, as (45) shows.

- (45) [[*kodomo-ga e_i garasu-o wat-ta*] *batto_i*]-*wa kore da*
 child-NOM e_i glass-ACC broke bat_i-TOP this COP
 ‘*This is the bat that the child broke the glass (with)*’

Again, without some syntactic distinction between the three NPs in the embedded sentence in (44a) there would seem to be no way to express this contrast.

5.2.3 Principle C sensitivity to adjunct/argument distinction

Moving to English, the syntactic distinction between adjuncts and arguments can be demonstrated by examining the properties of cataphora. In both (46) and (47) below we see that R-expressions inside verbal complements cannot be coindexed with preceding pronouns in object positions, while R-expressions inside verbal adjuncts can.

- (46) a. *You can’t tell them_i that the twins_i are being offensive.
 b. You can’t say anything to them_i without the twins_i getting offended.
- (47) a. *I told them_i about the twins’_i *birthday*.
 b. I only get them_i presents on the twins’_i *birthday*.²⁷

These data, while not from Japanese, still speak to the claim that collapsing the syntax of adjuncts and arguments does not change the expressive power of the grammar, as such a collapse seems to rob the binding theory of a distinction upon which it relies.

5.2.4 Kasper & Calcagno (1997)

Kasper & Calcagno (1997) present several criticisms of the adjuncts-as-arguments approach. Most relevant for our purposes here are two claims: (a) that parsing is complicated significantly by the addition of the AALR; and (b) that some linear order differences

²⁷Italics here represent contrastive stress.

between adjuncts and arguments are difficult or impossible to express when the syntactic distinction between them is erased.

We first consider the task of parsing a sentence using a grammar which handles all verbal adjuncts via the AALR. Assume that there are several verbal adjuncts present. In order to fit these into the parse, the modified verbs will have to undergo the AALR once for each of their associated adjuncts. But the AALR is a form of zero derivation, meaning that the phonological form of the verbs provides the parser with no information whatsoever as to how many times or even whether they have undergone the AALR. Consequently, the parser must scan the sentence searching for “leftover” constituents and trying to create places for them in the subcategorization frames of the verbs. Kasper & Calcagno note that there is in principle no bound on how far the parser might need to look. They illustrate this with the following sentence.

- (48) Mike realized the fact that the Cubs were never going to win the World Series
[at an early age].

In (48) the adjunct *at an early age* modifies the matrix verb *realized*, yet it is separated by a distance of 14 words, including two intervening verbs.

Contrast this process with the standard case in which an adjunct-head schema is used for each adjunct. Here there is no zero derivation, and so the phonological form of the words present completely determine their selectional properties (modulo lexical ambiguity). There may of course still be nondeterministic choices to be made about which of several possible verbs an adjunct should modify, but there will be no uncertainty as to the subcategorization frames of the verbs themselves.

This is not an indictment of the *feasibility* of parsing grammars containing the AALR, as the task of parsing a given sentence is clearly decidable. The issue lies in the dramatic increase in nondeterminism that the move to the AALR carries with it. From the parsing point of view, then, standard grammars are clearly preferable to grammars which merge the syntax of adjuncts and arguments.

We now move on to Kasper & Calcagno’s argument that that adjuncts-as-arguments approach does not appear to be capable of handling some issues related to linear order. They first note that in sentences such as those in (49) verbal adjuncts in English can precede the verb with precisely the same meaning as when they follow the verb (and its complements).

- (49) a. Everyone carefully painted an egg.
b. Everyone painted an egg carefully.

The adjuncts-as-arguments approach would have to devise an explanation for the fact that complements which originated as adjuncts can sometimes precede the verb, while “real”

complements never can. Alternatively, if *carefully* were to be given different syntactic analyses in these two sentences, then the fact that their meanings are identical would need to be explained.

In connection with this, Kasper & Calcagno point out that verbs such as *treat* which subcategorize lexically for adverbs present real problems for the adjuncts-as-arguments approach. Consider the sentences in (50).

- (50) a. Sandy treated/criticized her students harshly.
 b. Sandy harshly *treated/criticized her students.

The verb *treat* subcategorizes for an adverb, while *criticize* does not. In (50a), then, both *her students* and *harshly* are “real” complements of *treat*, while *harshly* is added to the *criticize*’s COMPS list by the AALR. The end result, however, is that both verbs have identical COMPS lists of the form [COMPS <NP, ADVP>]. How then, can the contrast in (50b) be explained? Even if some mechanism for allowing adverbial complements to appear before the verb were devised, there is no obvious way for the grammar to distinguish between immobile, lexically selected adverbs and mobile, AALR-added adverbs, although the next section outlines an approach which may be able to handle this data.

5.2.5 A possible counterargument

Bouma *et al.* (to appear) (BMS) propose a modification of the basic AALR approach which seems at first glance to solve the preceding problems quite nicely. Building on the now-accepted separation of selectional properties into a set of VALENCE lists and an ARG(UMENT)-ST(RUCTURE) list (for lexical items), BMS introduces a third list, DEPS, which moderates the interaction of the previous two.

The DEPS list is canonically identical to the ARG-ST list, but may contain additional elements. These additional elements are interpreted as being selected by the head in a syntactic sense but not in a lexical sense. Adjuncts, then, appear on the DEPS list of the head they semantically modify, and by general principles, also on the COMPS list. Since they are not inherent lexical arguments of the head, however, they are absent from the ARG-ST list. What this means is that adjuncts can be treated as complements while at the same time being distinguishable from “true” complements. It then becomes technically possible to address the issues raised in sections 5.2.1, 5.2.2 and 5.2.3. BMS further make a distinction in English between verbal adjuncts which follow the verb they modify and those which precede it. The former are selected under their analysis, while the latter combine via the standard adjunct-head schema. This approach, then, neatly solves the serious problems raised in section 5.2.4 as well. It would seem, then, that an adjuncts-as-arguments approach may truly be viable and that our objections are misplaced.

There is, however, at least one further argument against treating adjuncts as arguments which appears to be impossible to explain away using BMS's approach.²⁸ Take a simple sentence such as the following:

(51) Kim found a solution in exactly two hours.

Since *in exactly two hours* is a postverbal adverbial in (51), BMS treat it as a complement of the verb *found*. Consider, then, the effect of replacing the simple verb phrase with a coordination:

(52) Kim discovered the problem, found a solution and posted her results in exactly two hours.

In this case *in exactly two hours* applies not to any of the conjuncts individually, but to the entire three-part event. This sentence is not problematic for the traditional view of adjuncts—*in exactly two hours* would simply combine with the syntactic node covering the coordinate structure in just the same way as it would combine with the VP *found a solution* in (51). BMS's approach, however, breaks down in the face of VP coordinate structures such as this.

The issue is that in a coordinate VP there is no DEPS list which can host an adverbial with scope over the entire VP. In (52) each of the three verbal heads have DEPS lists, but adding an adverbial to any of them would incorrectly give the adverbial narrow scope. Even if one were to assume a right node raising structure with the adverbial complement *in exactly two hours* simultaneously satisfying the subcategorization requirements of all three verbs, the semantics would still be wrong because predicating *in exactly two hours* of all three actions individually is not the same as predicating it of their conjunction.

One might then argue that, since BMS does not eliminate the adjunct-head schema from their system, (52) might in fact be analyzable as a traditional adjunction structure despite the uncomfortable similarity to (51). But even this approach is untenable because in BMS's system only adjuncts which appear on DEPS lists are extractable, and *in exactly two hours* is extractable, as shown below.

- (53) a. In how much time did Kim discover the problem, find a solution and post her results _?
- b. It was in exactly two hours that Kim discovered the problem, found the solution and posted her results _.

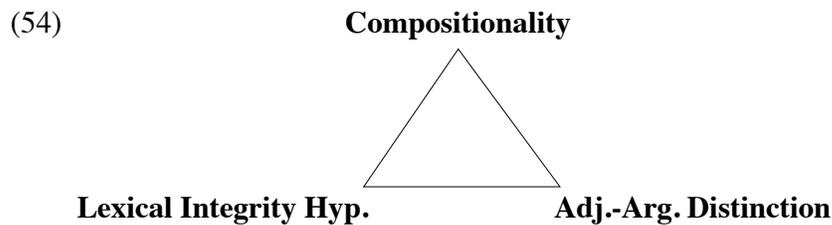
Any attempt to treat the problematic examples as adjunction structures, then, undermines their own claim that adjuncts in such structures cannot be extracted. This is a fundamental

²⁸Thanks to Bob Levine for pointing the following data out to me.

problem with BMS's approach, one that does not appear to be addressable without heavily modifying their theory, perhaps beyond recognition. We thus let our criticisms of the adjuncts-as-arguments approach stand.

5.3 A trio of mutually inconsistent assumptions

Let us now pause to take stock of what we have seen. Section 5.1 demonstrated how assuming strict compositionality and keeping a syntactic distinction between adjuncts and arguments forces one to give up the LIH when faced with data from MCPs. Section 5.2 showed that assuming strict compositionality and the LIH forces one to conflate adjuncts and arguments. Visually, then, we have a situation like that in (54).



These three assumptions are such that any two of them (any side of the triangle, so to speak) may be simultaneously adopted, but not all three. We have not yet shown that it is possible to construct an analysis which assumes the LIH and the adjunct/argument distinction but excludes compositionality. As hinted earlier, however, this sort of analysis is precisely what we will propose in section 6. Before doing so, though, we need to determine that it is actually compositionality that we wish to do away with.

We argued in the previous section that the adjunct/argument distinction is syntactically real, and that therefore MSI's AALR-based approach is unacceptable. We will be assuming in our analysis, then, the adjunct/argument distinction plus either the LIH or compositionality. We turn now to the choice between these last two. Both are constraints on the interfaces between subparts of the grammar. They are constraints of different types, however. The LIH enforces a strict boundary between syntax and morphology in order that the processes which go on in either subpart need have no relation whatsoever to those which occur in the other. Compositionality, on the other hand, enforces a lockstep coordination of syntactic and semantic processes. When viewed from this angle it is not immediately clear which is preferable, but there are several reasons to think that it is the LIH, and not compositionality, which should be maintained.

One argument for keeping the LIH is that a grammar without the LIH allows the syntax to overlap with the morphology by, in effect, permitting some "apples" (morphemes) to be treated along with the "oranges" (whole words) while leaving other morphemes to be handled by strictly morphological processes. This kind of overlap runs counter to the original motivation for making morphology and syntax separate subparts of the grammar,

however. Word formation processes in a particular language do not in general follow the same rules that sentence formation processes in that language do. Japanese is a perfect example of this, being a strictly head-final language syntactically but a primarily head-initial language morphologically.

Note that in a grammar without compositionality there is no similar contamination of either syntax or semantics. The only apparent drawback is an unwelcomely large degree of freedom in associating syntactic structures with meanings. We may choose to impose other, less strict constraints on the syntax-semantics interface, however—giving up compositionality does not mean throwing up our hands completely. We will discuss possible alternatives to compositionality in section 7.

A second argument for the LIH over compositionality is that the LIH is grounded in directly-observable data (sequences of sounds), while compositionality is a constraint on two levels of abstraction. This is not to claim that syntax and semantics are not real in some relevant sense and that therefore compositionality is pointless. We simply note that the LIH enforces a closer tie to the empirical data than compositionality, as both the syntax and semantics offer “wobble room” which may be exploited in order to maintain a one-to-one linkup. In our current situation, in which we must give up either the LIH or compositionality, we should thus be inclined to preserve the LIH.

Finally, an argument against keeping compositionality is the fact that, as Zadrozny (1994) and Lappin & Zadrozny (2000) show, the notion of compositionality itself is formally vacuous. Zadrozny (1994) proves that, given a syntax and a semantics (a set of meanings for all syntactically valid expressions), that semantics can be encoded compositionally. Zadrozny not only demonstrates this by, e.g., giving a compositional semantics for several English idioms, but he also gives a mathematical proof of his claims. This result means that compositionality is technically not a constraint on anything, despite over a century of intuitions to the contrary.

In section 7.1 we will discuss Zadrozny’s proposal for a move from compositional semantics to what he calls “systematic” semantics. For now, however, we have enough evidence to conclude that the optimal approach for our MCP data is one which assumes the adjunct/argument distinction and the LIH but *not* compositionality. We now move on to presenting a simple example of such an approach.

6 A slightly non-compositional analysis

Our goal in this section will be to provide an example of how the MCP data can be captured by the admission of the smallest possible amount of non-compositionality. Although we are not aware of any specific problems, we are not necessarily advocating the following as the best overall analysis for Japanese. In particular, we do not consider the impact of our analysis on phenomena other than MCPs. We merely wish to demonstrate that allowing a small crack in compositionality is enough to make a straightforward and

more satisfying treatment of MCPs possible.

6.1 The analysis

As noted previously, we take Manning *et al.* (1999) as the base of our analysis. Our strategy will be to replace the AALR with a standard treatment of adjuncts, thereby reinstating the adjunct/argument distinction. Our main task is then to provide a treatment of the word-internal adjunct/quantifier scope facts which does not violate the LIH. This will be accomplished via a highly restricted form of structured meanings.²⁹ In particular, we will be exploiting the fact that β -reduction in the λ -calculus is meaning-preserving and allowing reference to both reduced and unreduced λ -expressions in the semantics. For example, then, we will distinguish CONTENT values of the form $\lambda p[cause'(x, p)](run'(y))$ from those of the form $cause'(x, run'(y))$, even though the former β -reduces to the latter. The result of this change will be that in the unreduced case the internal structure of the complex predicate's semantics will be preserved to allow for word-internal modification or quantifier retrieval. Note that only unreduced λ -expressions of the form $\lambda p[\psi(p)](\cdot)$ where p is a variable over propositions (soas) are allowed. We do not provide for arbitrary λ -expressions.

The technical details of our restricted λ -calculus are straightforward. We simply replace all CONTENT values of type *psoa* with lists of elements of a new type, *psoa-abstract*, with appropriate features as in (55).

$$(55) \left[\begin{array}{l} psoa-abstract \\ \text{LAMBDA } var(psoa) \vee none \\ \text{PSOA } psoa \end{array} \right]$$

psoa-abstracts with LAMBDA values of type *psoa* represent λ -abstracts over *psoas*, while those with LAMBDA equal to *none* are the equivalent of simple *psoas*. A list of *psoa-abstracts* is interpreted as a chain of functional application. Thus (56) is the feature-structure encoding of the λ -expression $\lambda p[not'(p)](\lambda q[cause'(j, m, q)](run'(m)))$ corresponding to the semantics of *John-wa Mary-ni hashir-ase-na-i* ‘John won’t make Mary run’.

$$(56) \left\langle \left[\begin{array}{l} \text{LAMBDA } \boxed{1} \\ \text{PSOA|NUC } \left[\begin{array}{l} not-rel \\ \text{ARG } \boxed{1} \end{array} \right] \end{array} \right], \left[\begin{array}{l} \text{LAMBDA } \boxed{2} \\ \text{PSOA|NUC } \left[\begin{array}{l} cause-rel \\ \text{CAUSER } j \\ \text{CAUSEE } \boxed{3} m \\ \text{EFFECT } \boxed{2} \end{array} \right] \end{array} \right], \left[\begin{array}{l} \text{LAMBDA } none \\ \text{PSOA|NUC } \left[\begin{array}{l} run-rel \\ \text{RUNNER } \boxed{3} \end{array} \right] \end{array} \right] \right\rangle$$

²⁹A structured meaning can be thought of as having two parts, a model-theoretic denotation and some record of how the expression in question was constructed. This is in contrast to standard Montagovian semantics, in which meanings preserve no such record. They were first explored by Lewis (1972) in the context of searching for a solution to problems arising from intensionality. See Cresswell (1985) for an overview.

The fully β -reduced expression $not'(cause'(j, m, run'(m)))$ would then be encoded as follows:

$$(57) \left\langle \left[\begin{array}{l} \text{LAMBDA } none \\ \text{PSOA|NUC} \left[\begin{array}{l} not-rel \\ \text{ARG|NUC} \left[\begin{array}{l} cause-rel \\ \text{CAUSER } j \\ \text{CAUSEE } [1]m \\ \text{EFFECT|NUC} \left[\begin{array}{l} run-rel \\ \text{RUNNER } [1] \end{array} \right] \end{array} \right] \end{array} \right] \end{array} \right] \right\rangle$$

Intermediate forms such as $\lambda p[not'(cause'(j, m, p))](run'(m))$ may also be represented in this fashion.

The utility of this encoding is that embedded *psoas* may be easily accessed for the purposes of modification. A typical modifier in this setup has the following form.

(58) **Typical modifier:**

$$\left[\begin{array}{l} \text{MOD} \left[\text{CONTENT } [1] \circ \left\langle \left[\begin{array}{l} \text{LAMBDA } [2] \\ \text{PSOA } [3] \end{array} \right] \right\rangle \circ [4] \right] \\ \text{CONTENT } [1] \circ \left\langle \left[\begin{array}{l} \text{LAMBDA } [2] \\ \text{PSOA } \text{modify } ([3]) \end{array} \right] \right\rangle \circ [4] \end{array} \right]$$

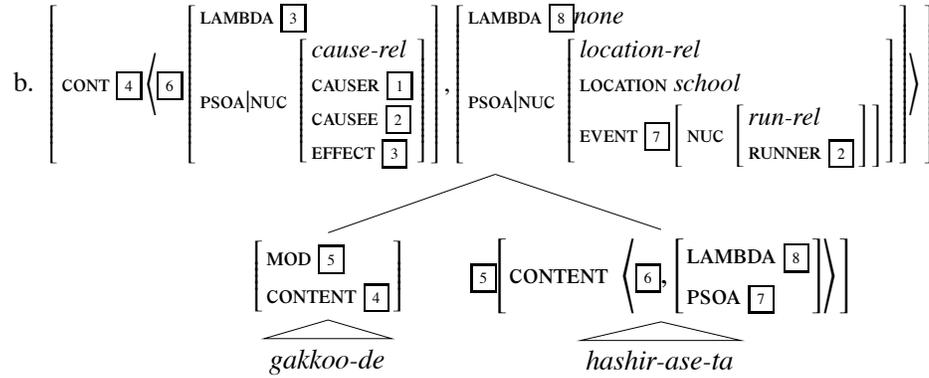
The effect of (58) is to allow the modifier to “pluck out” any *psoa* on its argument’s CONTENT list and modify it individually.

As a concrete example, take the ambiguous sentence *John-wa Mary-ni gakkoo-de hashir-ase-ta* ‘John made Mary run at school’. (59) shows the two possible CONTENT values resulting from the combination of the adjunct *gakkoo-de* with the verb *hashir-ase-ta*.

$$(59) \text{ a. } \left[\begin{array}{l} \text{CONT } [4] \left\langle \left[\begin{array}{l} \text{LAMBDA } [3] \\ \text{PSOA|NUC} \left[\begin{array}{l} location-rel \\ \text{LOCATION } school \\ \text{EVENT } [7] \text{ NUC} \left[\begin{array}{l} cause-rel \\ \text{CAUSER } [1] \\ \text{CAUSEE } [2] \\ \text{EFFECT } [3] \end{array} \right] \end{array} \right] \end{array} \right] \right\rangle, [6] \left[\begin{array}{l} \text{LAMBDA } none \\ \text{PSOA|NUC} \left[\begin{array}{l} run-rel \\ \text{RUNNER } [2] \end{array} \right] \end{array} \right] \right] \end{array} \right]$$

$$\left[\begin{array}{l} \text{MOD } [5] \\ \text{CONTENT } [4] \end{array} \right] \quad [5] \left[\text{CONTENT} \left\langle \left[\begin{array}{l} \text{LAMBDA } [3] \\ \text{PSOA } [7] \end{array} \right] \right\rangle, [6] \right]$$

gakkoo-de *hashir-ase-ta*



(59a) corresponds to the wide-scope reading, while (59b) is the word-internal, narrow-scope reading.

Note that a lexical item need not undergo any form of derivation in order to have a “penetrable” (non-singleton) CONTENT list. While MCPs will get their CONTENT values this way, monomorphemic verbs subject to word-internal scope such as Dowty’s examples from section 5.1 will have lexically-specified CONTENT lists of length two or more. The vast majority of verbs, however, will have singleton CONTENT lists.

We now consider quantifier scope. A slight modification to MSI’s system is all that is needed to adapt it to our new architecture. Recall that MSI make reference to the Quantifier Amalgamation Constraint in (60) (=22).

(60) **MSI’s Quantifier Amalgamation Constraint:**

$$\textit{stem} \Rightarrow \left[\begin{array}{l} \text{ARG-ST } \boxed{1} \\ \text{QSTORE } \text{merge-quants}(\text{toplevel}(\boxed{1})) \uplus \boxed{2} \ominus \boxed{3} \\ \text{NEW-QSTORE } \boxed{2} \\ \text{CONTENT } \left[\text{QUANTS } \text{order}(\boxed{3}) \right] \end{array} \right]$$

Because CONTENT in our system is list-valued, we must modify (60) to make it type-compatible. Two possibilities present themselves. Either we apply all the retrieved quantifiers to the first element on the CONTENT list, or we allow for non-deterministic distribution throughout the entire list. While the second option might initially sound more attractive, it is in fact unnecessary because the other mechanisms in MSI’s system already provide enough non-determinism to get all necessary interpretations. We thus take the simpler deterministic approach. This gives us the revised constraint in (61).

(61) **Revised Quantifier Amalgamation Constraint:**

$$\textit{stem} \Rightarrow \left[\begin{array}{l} \text{ARG-ST } \boxed{1} \\ \text{QSTORE } \text{merge-quants}(\text{toplevel}(\boxed{1})) \uplus \boxed{2} \ominus \boxed{3} \\ \text{NEW-QSTORE } \boxed{2} \\ \text{CONTENT } \left\langle \left[\text{PSOA|QUANTS } \text{order}(\boxed{3}) \right] \mid \boxed{4} \right\rangle \end{array} \right]$$

The last necessary modification to MSI's analysis relates to the Causative Formation Lexical Rule (CFLR).³⁰ MSI directly embed the verb stem's CONTENT under the *cause-rel* contributed by *-(s)ase*, as shown in (62) (=20).

(62) **MSI's Causative Formation Lexical Rule (CFLR):**

$$\left[\begin{array}{l} \text{HEAD } verb \\ \text{PHON } \boxed{1} \\ \text{CONTENT } \boxed{2} \\ \text{QSTORE } \boxed{3} \\ \text{ARG-ST } \boxed{4} \langle \text{PRO}_{j|} \boxed{5} \rangle \end{array} \right] \Rightarrow \left[\begin{array}{l} \text{PHON } \text{causative-morph } (\boxed{1}) \\ \text{SUBJ } \langle \boxed{6} \text{NP}_i \rangle \\ \text{COMPS } \langle \boxed{7} \text{NP}_{j|} \boxed{5} \rangle \\ \text{ARG-ST } \langle \boxed{6}, \boxed{7}, \boxed{4} \text{list} \rangle \\ \text{NEW-QSTORE } \boxed{3} \\ \text{CONTENT|NUC } \left[\begin{array}{l} \text{cause-rel} \\ \text{ACTOR } i \\ \text{UNDERGOER } j \\ \text{EFFECT } \boxed{2} \end{array} \right] \end{array} \right]$$

Our only modification is to make the CONTENT of the causative resulting from application of this rule penetrable to later modification. The revised lexical rule is as follows.

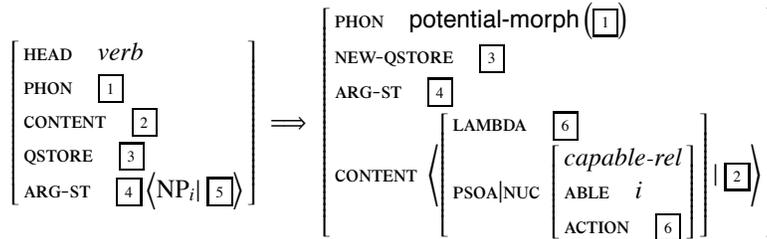
(63) **Revised Causative Formation Lexical Rule (CFLR):**

$$\left[\begin{array}{l} \text{HEAD } verb \\ \text{PHON } \boxed{1} \\ \text{CONTENT } \boxed{2} \\ \text{QSTORE } \boxed{3} \\ \text{ARG-ST } \boxed{4} \langle \text{PRO}_{j|} \boxed{5} \rangle \end{array} \right] \Rightarrow \left[\begin{array}{l} \text{PHON } \text{causative-morph } (\boxed{1}) \\ \text{SUBJ } \langle \boxed{6} \text{NP}_i \rangle \\ \text{COMPS } \langle \boxed{7} \text{NP}_{j|} \boxed{5} \rangle \\ \text{ARG-ST } \langle \boxed{6}, \boxed{7}, \boxed{4} \text{list} \rangle \\ \text{NEW-QSTORE } \boxed{3} \\ \text{CONTENT } \left\langle \begin{array}{l} \text{LAMBDA } \boxed{8} \\ \text{PSOA|NUC } \left[\begin{array}{l} \text{cause-rel} \\ \text{ACTOR } i \\ \text{UNDERGOER } j \\ \text{EFFECT } \boxed{8} \end{array} \right] \end{array} \right\rangle \boxed{2} \end{array} \right]$$

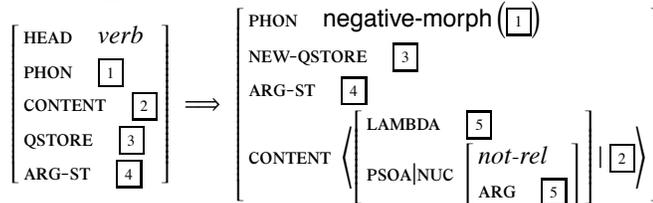
This is the full extent of the modifications needed to restore the adjunct/argument distinction to MSI's analysis. To conclude our presentation we give lexical rules for generating several of the MCPs not dealt with by MSI.

³⁰We again remind the reader that MSI do not actually use lexical rules, but instead assume a complex type-driven morphology driven by multiple inheritance. Our lexical rule presentation can be straightforwardly adapted to their system.

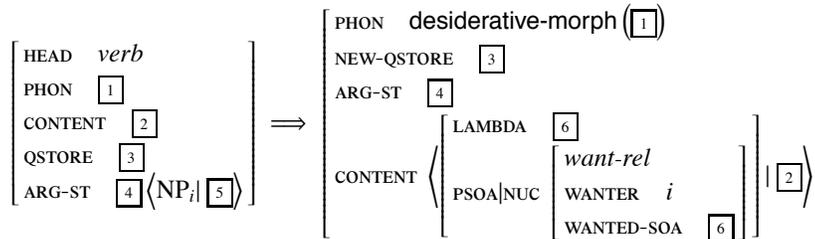
(64) **The Potential Formation Lexical Rule:**



(65) **The Negative Formation Lexical Rule:**



(66) **The Desiderative Formation Lexical Rule:**



These are nothing more than simple variants of the CFLR.

Next we consider some similarities this maximally-simple analysis bears to two other approaches to the syntax/semantics interface, one general and one specifically designed for MCPs.

6.2 Parallels to Minimal Recursion Semantics

Minimal Recursion Semantics (MRS) is a flat semantic representation developed in Copestake *et al.* (1995, 1999), primarily for use with HPSG. MRS was originally designed for practical reasons, motivated by the desire for a semantic framework with the properties of computational tractability and underspecifiability. Despite its applied origins, however, it appears to be a sufficiently expressive framework for purely theoretical work as well.

MRS is “flat” in the sense that no embedding of any kind is permitted. Instead of embedding, MRS makes use of “handles” which, as their names suggest, allow semantic elements to “grab onto” other elements. This opens the door to underspecification of scopal relations, since quantifiers, their restrictions and their nuclear scopes are all on the same

par, differentiated only by how they are threaded together via their handles. As an example, consider the following simplified minimal recursion structure for the sentence *Every dog chases some white cat*.³¹

$$(67) \left\langle \left[\begin{array}{l} \textit{every-rel} \\ \text{HNDL } \boxed{1} \textit{handle} \\ \text{BOUND-VAR } \boxed{2} \\ \text{RESTR } \boxed{3} \\ \text{BODY } \textit{handle} \end{array} \right], \left[\begin{array}{l} \textit{dog-rel} \\ \text{HNDL } \boxed{3} \\ \text{INST } \boxed{2} \end{array} \right], \left[\begin{array}{l} \textit{chase-rel} \\ \text{HNDL } \boxed{4} \\ \text{ARG1 } \boxed{2} \\ \text{ARG2 } \boxed{5} \end{array} \right], \left[\begin{array}{l} \textit{some-rel} \\ \text{HNDL } \boxed{6} \\ \text{BOUND-VAR } \boxed{5} \\ \text{RESTR } \boxed{7} \\ \text{BODY } \textit{handle} \end{array} \right], \left[\begin{array}{l} \textit{white-rel} \\ \text{HNDL } \boxed{7} \\ \text{INST } \boxed{5} \end{array} \right], \left[\begin{array}{l} \textit{cat-rel} \\ \text{HNDL } \boxed{7} \\ \text{INST } \boxed{5} \end{array} \right] \right\rangle$$

This structure simultaneously encodes both possible scopes for this sentence. This is so because the BODY features of both quantifiers are uninstantiated, meaning that (subject to some restrictions) they may be interpreted as taking any of the other handles in the list. If *every* were to be unambiguously given wide scope, then the structure in (67) would be instantiated as in (68).

$$(68) \left\langle \left[\begin{array}{l} \textit{every-rel} \\ \text{HNDL } \boxed{1} \textit{handle} \\ \text{BOUND-VAR } \boxed{2} \\ \text{RESTR } \boxed{3} \\ \text{BODY } \boxed{6} \end{array} \right], \left[\begin{array}{l} \textit{dog-rel} \\ \text{HNDL } \boxed{3} \\ \text{INST } \boxed{2} \end{array} \right], \left[\begin{array}{l} \textit{chase-rel} \\ \text{HNDL } \boxed{4} \\ \text{ARG1 } \boxed{2} \\ \text{ARG2 } \boxed{5} \end{array} \right], \left[\begin{array}{l} \textit{some-rel} \\ \text{HNDL } \boxed{6} \\ \text{BOUND-VAR } \boxed{5} \\ \text{RESTR } \boxed{7} \\ \text{BODY } \boxed{4} \end{array} \right], \left[\begin{array}{l} \textit{white-rel} \\ \text{HNDL } \boxed{7} \\ \text{INST } \boxed{5} \end{array} \right], \left[\begin{array}{l} \textit{cat-rel} \\ \text{HNDL } \boxed{7} \\ \text{INST } \boxed{5} \end{array} \right] \right\rangle$$

Our analysis of MCPs represents, in effect, a highly conservative MRS-style approach. Due to their flat structures, both approaches allow limited non-compositional access to embedded semantic material. MRS, however, is a much greater departure from conventional semantics than our approach, for several reasons. First, unlike MRS, our approach does not rule out semantic embedding. MRS is thus more extreme in *requiring* flat semantic representations. Second, relative order is crucially important in our lists, while it is irrelevant for MRS—list data structures are used only as substitutes for multisets. Also, because the order of our elements completely determines their intended interpretation, there is no need for anything corresponding to handles. Finally, our system does not permit the underspecification of scopal relations as MRS does.

Our approach is thus a less radical departure from compositional semantics than MRS, the development of which is actively progressing within the mainstream HPSG community. This suggests that many of the ideas in this paper, while rarely discussed explicitly, are not incompatible with ideas found in other current research.

6.3 Parallels to Matsumoto (1996)

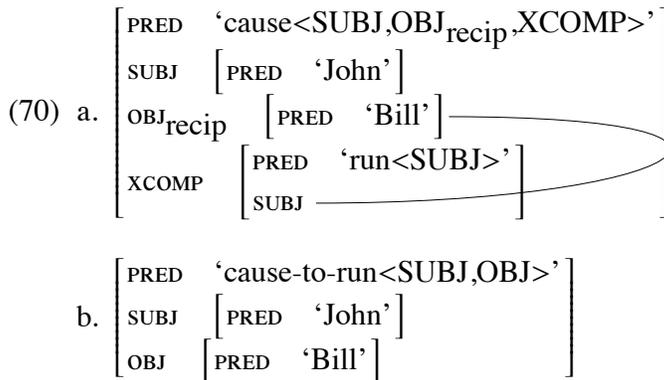
We briefly note an apparent similarity of our approach to Matsumoto’s (1996) treatment of causatives. Matsumoto groups causatives into a number of categories, among them

³¹This represents only the LZT (LISZT) value of the structure. It omits the top handle, the local top handle and the handle constraints.

“persuasive” and “coercive” causatives. He presents data which shows, among other things, that word-internal adjunct scope is much more restricted in coercive causatives than it is in persuasive causatives. In his most explicit example, for the pair of causatives in (69) he gives the f-structures in (70).

(69) a. John-wa Biru-ni hashir-ase-ta [persuasive causative]
 John-TOP Bill-DAT run-CAUSE-PAST
 ‘John made Bill run’

b. John-wa Biru-o hashir-ase-ta [coercive causative]
 John-TOP Bill-DAT run-CAUSE-PAST
 ‘John made Bill run’



To encode the fact that persuasive causatives readily allow word-internal adjunct scope, Matsumoto gives them “biclausal” f-structures, while coercive causatives get “monoclausal” f-structures in which some form of predicate fusion has occurred. This is highly reminiscent of our “penetrable” and “non-penetrable” CONTENT lists.

Although Matsumoto’s formal treatment is not spelled out in enough detail to make any sort of systematic comparison to our approach, this example does suggest that his thinking is along the same lines as ours. Thus, we see again that our style of analysis is not fully unprecedented.

7 What replaces compositionality?

We have argued that compositionality, at least in its strictest form, is an undesirable feature of any analysis of MCPs in Japanese. This claim is not made lightly. Most formal semanticists have historically been loath to so much as consider abandoning strict compositionality, the main reason being that there is no other clear candidate for a constraint on

the syntax/semantics interface. Our claim thus comes with the responsibility of offering alternatives to compositionality, since it is clearly not the case that syntax and semantics are entirely independent of each other. There must be a constraint or constraints linking them in some fashion.

While we will draw no strong conclusions in this section, we would like to present two possible alternative constraints on the syntax/semantics interface. Determining which constraint is the best is far beyond the scope of this paper.

7.1 Zadrozny's (1994) notion of "systematicity"

As mentioned in section 5.3, Zadrozny (1994) presents a proof of the formal vacuity of compositionality as a constraint on the syntax/semantics interface. That is, given any grammar and any set of meanings to be assigned to expressions generated by that grammar, a function may be constructed which assigns the meanings compositionally. This result initially appears to imply that theoreticians since Frege have been fundamentally mistaken about the need for compositionality.

It turns out, however, that compositionality becomes non-vacuous if we shift our conception of it and take a compositional analysis to be not only one which assigns unique meanings to syntactic items based solely on the arrangement and meanings of their parts, but one which in addition requires the meaning assignment function to be of a certain class F of homomorphisms from the syntax to the semantics. Zadrozny refers to homomorphisms which belong to F as *F-systematic*. This move makes it possible to distinguish between syntax/semantics pairs which have a compositional (systematic) encoding and those which do not.

While Zadrozny's work clears up the notion of compositionality, it raises the new question of what class F of homomorphisms from syntax to semantics is appropriate for human language. Zadrozny offers some speculation about possible values for F , but the question is largely left for future research.

Our analysis as it stands will fail to be *F-systematic* under any conception of F , as our syntax/semantics relation fails to be a function (and hence a homomorphism). This can be seen in cases such as the *John made Mary run at school* examples in (59). In order to make systematicity relevant to our approach, we would have to move to something like set-valued meanings, where all scoping options are simultaneously available for ambiguous expressions. In the next section, though, we present another possible approach which is compatible with our analysis.

7.2 Principle of “Naturalness”

We sketch here a methodological principle of grammar architecture we refer to as “Naturalness” which addresses the issue of replacing compositionality but is more general, touching all aspects of linguistic analysis. Naturalness is a principle of common sense which lays constraints on all inter-module interfaces within a grammar. The basic idea is that the interfaces between modules should be as straightforward and as restrictive as possible *without* being so restrictive that they require locally unmotivated distinctions to be made or locally motivated distinctions to be erased in certain areas of the grammar in order to permit particular analyses in other areas. In other words, the internal organization of a particular module of the grammar should never be made secondary to the interfaces which link that module to other modules.

To illustrate, recall from section 5.1 that most analyses of the causative are forced to treat *-(s)ase* as a lexical item because of the (usually implicit) desire to maintain compositionality and the adjunct/argument distinction. This is a non-Natural state of affairs, because a morphology-internal matter (whether or not *-(s)ase* is a bound or free morpheme) is subjugated in these analyses to the desire to maintain a compositional syntax/semantics interface. Similarly, recall from section 5.2 that MSI are forced to abandon the adjunct/argument distinction in order to maintain compositionality and the LIH. This is also non-Natural because the issue of whether or not adjuncts and arguments pattern with each other is a syntax-internal question, but the decision to conflate them is made primarily in order to maintain compositionality.

Our analysis, on the other hand, is fully Natural. By adopting the LIH we enforce a Natural relationship between the morphology and the syntax. By preserving the adjunct/argument distinction via a loosening the syntax/semantics interface we respect the syntactic nature of the distinction. The focus therefore shifts in this conception of grammar architecture from maintaining restrictive interfaces at all costs to delineating appropriate modules, working out the most appropriate internal structure for those modules, and then finally designing interfaces which are as restrictive as possible.

Note that Naturalness suffers from the same problem that Zdrozny’s “systematicity” does, in that the notion of an interface which is “as restrictive as possible” requires significant elaboration. We will, however, not address the issue here, leaving the task to future research.

8 Conclusions and further research

In this paper, we have reconsidered the decades-old debate over the proper treatment of Japanese causatives and brought new evidence to bear on the issue, namely, the existence of a much larger class of MCPs with properties like the causative. We have examined the conflicting demands placed on the grammar writer by the various possible

methodological assumptions and have taken the unprecedented and near-heretical step of coming out against compositionality. We have given an existence proof of a minimally non-compositional analysis and noted that it bears certain similarities to other current linguistic research, suggesting that it is not as radical as it might initially appear. Finally, we offered some speculation as to what grammatical constraint might replace compositionality, suggesting that the notion of Naturalness might be the answer.

The path from here, as we see it, is to seek out constructions with difficult properties like those of Japanese MCPs in other languages. (A good place to start would be the syntactically similar Korean.) Once identified, it should be determined whether architectural principles such as compositionality have colluded to produce non-Natural standard analyses of these constructions. If so, new, Natural analyses should be proposed. If enough of these problematic constructions were identified and reanalyzed, there may emerge a higher understanding of how grammars should be structured. At the very least, it would be a way of illuminating the effect of the principle of Naturalness and determining whether or not it is a worthy replacement for compositionality.

We hope to have shown here that questioning compositionality is not always a destructive activity, but may sometimes help to illuminate otherwise puzzling phenomena. The resolution to other unresolved analytical debates may lie, like this one, just over the fence that separates compositional approaches from the “forbidden” non-compositional ones. A fresh attitude towards compositionality may be all that is necessary to breathe some new life into otherwise dead areas of linguistic analysis.

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