Dissociations between Argument Structure and Grammatical Relations

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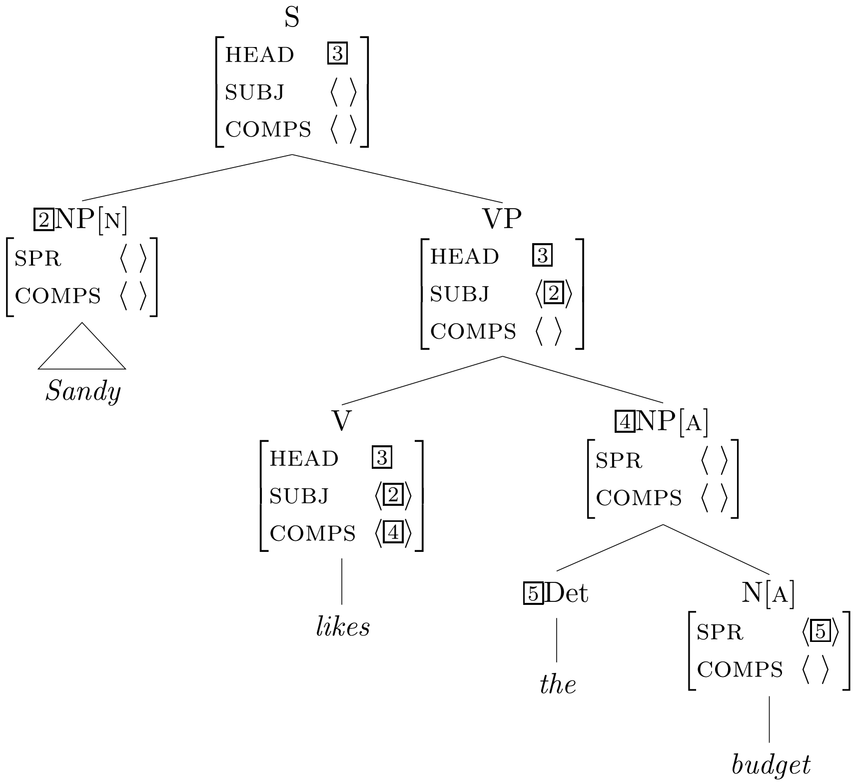
Working draft of July 1995

1 Introduction

In what are colloquially known as HPSG1 and HPSG2 (Pollard and Sag 1987, Pollard and Sag 1994:Ch. 1–8), the subcategorized arguments of a head are stored on a single ordered list, the SUBCAT list. However, Borsley (1989) argues that there are various deficiencies in this approach, and suggests that the unified list should be split into separate lists for subjects, complements, and specifiers. This proposal has been widely adopted in HPSG3 (Pollard and Sag (1994:Ch. 9)) and other recent work in HPSG. Such a move provides in HPSG an analog of the external/internal argument distinction generally adopted in GB, solves certain technical problems such as allowing prepositions to take complements rather than things identical in SUBCAT list position to subjects, and allows recogniton of the special features of subjects which have been noted in the LFG literature, where keyword grammatical relations are employed (see Pollard and Sag (1994:Ch. 9) for more detailed justification). In the HPSG3 theory, it is these *valence features* SUBJ, COMPS and SPR whose values are 'cancelled off' (in a Categorial Grammar-like manner) as a head projects a phrase. A lexical head combines with its complements and subject or specifier (if any) according to the lexically inherited specification, as shown in (1).[1]

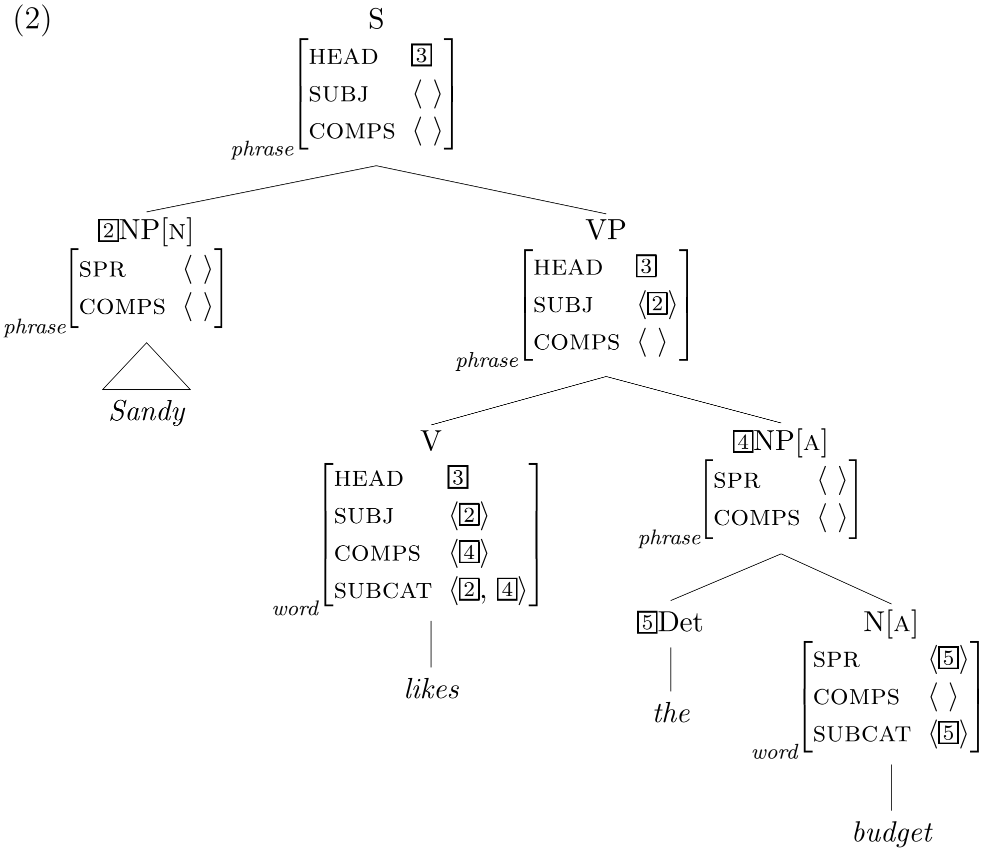
[1]This is a draft version of a paper presented at the Tübingen HPSG workshop, June 1995. We intend to make considerable revisions to this paper. Towards that end, comments are welcome.

(1)



When Borsley (1989) suggested dividing the SUBCAT list into multiple valence lists, we believe that he intended that they would replace the SUBCAT list. This is not in fact what happened. In Pollard and Sag (1994:Ch. 9), the SUBCAT list is kept as an attribute of lexical signs. Its value is the append of the SUBJ, SPR and COMPS lists, in that order. As presented there, this move seems more an expediency than a necessity: it allows the binding theory developed in HPSG2 to be retained unchanged, rather than having to redefine the binding theory over the new valence lists. The SUBCAT list might be thought of as merely summarizing the valence of a lexical sign, without having any independent life of its own. As conceived of by Pollard and Sag (1994:Ch. 9), it remains unaffected in the construction of syntactic phrases, except that, in virtue of the various identities between SUBCAT list members and members of valence lists, the SUBCAT list's members become fully specified as the valence list values are identified with actual subjects, complements and specifiers. Once a complete phrase is constructed, the lexical head's SUBCAT list is fully specified and may be used as the locus of binding theory. This is indicated in (2).

(2)



This redundancy has been broken in recent work. The *canonical* relationship between the SUBCAT list and the valence lists is still just an append relationship, but various other possibilities have been explored. As a simple example, one way of handling valence reducing processes such as free pro-drop in Japanese is by allowing a *non-canonical* relationship between the SUBCAT list and the valence lists. For instance, in (3):

(3) Naoki-ga mi-ta
Naoki-NOM see-PAST
'Naoki saw (it).'

A lexical rule of pro-drop might have produced the lexical entry for the verb shown in (4):

(4) $$\begin{bmatrix} \text{SUBJ} & \langle \boxed{1}\text{NP}[\text{NOM}] \rangle \\ \text{COMPS} & \langle\ \rangle \\ \text{SUBCAT} & \langle \boxed{1}_i, \boxed{2}\text{NP}_j \rangle \\ \text{CONT} & {}_{\textit{seeing}}\begin{bmatrix} \text{SEER} & i \\ \text{SEEN} & j \end{bmatrix} \end{bmatrix}$$

The pro-dropped object NP does not appear on the COMPS list, as it is not realized on the surface. But it still must appear on the SUBCAT list so that we can explain properties such as binding – for instance, here, we need to explain that (3) cannot mean 'Naoki saw herself'.

With this new role for the SUBCAT list – no longer used to capture surface syntactic subcategorization, but as an attribute of only lexical signs, used to explain properties such as binding and 'deep' subcategorization – the SUBCAT list has become similar to certain notions of argument structure. Thus, in recent work the SUBCAT list has been renamed as ARG-S for *argument structure*, and we will use this name henceforth. But it should be emphasized that the ARG-S list is a syntactic representation, just like its predecessor the SUBCAT list, and is not to be viewed as a partial semantic representation or some sort of substitute for one.

Pro-drop is a perhaps somewhat uninteresting example of a dissociation between the valence lists and ARG-S, but some of the work in HPSG since Pollard and Sag (1994) has centered on analyses of data that involve more interesting dissociations between valency and argument structure (Iida et al. 1994, Manning 1994, Sag and Fodor 1994, Sag and Godard 1994, Miller and Sag 1995). The existence of this new architecture takes HPSG a certain distance from the monolevel, monostratal roots of GPSG and HPSG2. The purpose of this paper is to better motivate the existence of two independent syntactic notions of valency and argument structure and to examine the kinds of dissociations that can occur, with special reference to causatives, binding and ergative languages. While doing that we will articulate some proposed argument structure representations that differ from those presented previously, and for which there is interesting empirical support.

2 Binding Theory and Passives

The HPSG binding theory is based on hierarchical argument structure rather than constituent structure. As Pollard and Sag (1992, 1994) demonstrate, this approach to binding provides an immediate solution to a variety of dilemmas facing any account of English binding stated in terms of constituency-based notions such as c-command. It maintains three binding principles, analogous to those of Chomsky (1981); they are given informally in (5):[2]

(5) HPSG Binding Theory:

Principle A. A locally a-commanded anaphor must be locally a-bound.
Principle B. A personal pronoun must be locally a-free.
Principle C. A non-pronoun must be a-free.

The effect of these principles is to require an anaphor to be coindexed with a less oblique ARG-S member, if there *is* such a less oblique coargument. Otherwise, anaphors are free (subject to various discourse and processing considerations) to be bound by appropriate elements in the discourse context.

This binding theory is adequate for English, but crosslinguistic coverage of binding phenomena requires more parametric options (Dalrymple 1993). We will introduce two other possible conditions on anaphors here. In many languages, reflexives cannot be bound by just any less oblique (local) NP, but rather their antecedence is restricted to what we might

[2]A-command, a-bound, and a-free are to be understood as the same as the notions of o-command, o-bound, and o-free from Pollard and Sag (1994), now defined on ARG-S, but the new names are hopefully more evocative of the argument structure based theory of binding we employ.

loosely call "subjects". At least to a first order approximation this is true of languages such as Japanese, Russian, Inuit, and Sanskrit.[3] Given that the binding theory in HPSG is defined on ARG-S (an assumption that we will later actively argue for), the natural explanation for such data is to suggest that in these languages, reflexives must be bound by the first element on some ARG-S list. We will formalize such a notion with the definition and principle in (6) drawn from Manning (1994).

(6) a. An **a-subject** is an entity that is first on some ARG-S list.

b. A-subject principle: Anaphors must be a-subject-bound (in some languages).

This allows us to explain why *Taroo* is not a possible binder in the Japanese example (7):

(7) Hanako-ga Taroo-ni zibun.zisin-no e-o mise-ta.
Hanako-NOM Taroo-DAT self-GEN picture-ACC show-PAST
(lit.) 'Hanako$_i$ showed Taroo$_j$ self$_{i/*j}$'s picture.'

A second parametrization of the binding theory is that while classical reflexives are clause bounded, many languages allow long distance reflexives. In particular, the pronoun *zibun* in Japanese and both the lexical reflexive *immi* and the reflexive pronominal endings on verbs in Inuit can be bound by any a-commanding a-subject. Such long distance anaphors might be said to obey Principle Z (Xue et al. 1994).

Now consider the interaction of passive and subject-oriented reflexives. If our theory of passive was that drawn from HPSG1 – a lexical rule that cyclically permuted the SUBCAT, now ARG-S, list as in (8):

(8)
$$_{\textit{active-stem}}\begin{bmatrix}\textsc{subcat} & \langle \boxed{1}_i, \boxed{2} \rangle \oplus \mathrm{L} \\ \textsc{cont} & \boxed{3}\end{bmatrix} \rightarrow {}_{\textit{passive-stem}}\begin{bmatrix}\textsc{subcat} & \langle \boxed{2} \rangle \oplus \mathrm{L}\ (\ \oplus \langle \mathrm{PP}[by]_i \rangle\ ) \\ \textsc{cont} & \boxed{3}\end{bmatrix}$$

then our prediction is clear: the only possible binder of subject-oriented reflexives, the a-subject, is now the NP that is the subject of the passive ($\boxed{2}$). However, in many languages, this is not in fact the case. Perlmutter (1984) observed this for the case of Russian. While in (9a), the reflexive *sebe* must be bound by the subject, in the passive (9b), the antecedent can be either the surface subject or the agent argument (sometimes known as the logical subject, following Jespersen (1924)).

(9) a. Boris mne rasskazal anekdot o sebe
Boris.NOM me.DAT told joke about self
'Boris$_i$ told me a joke about himself$_i$.'

b. Èta kniga byla kuplena Borisom dlja sebja
this book.NOM was bought Boris.INSTR for self
'This book was bought by Boris$_i$ for himself$_i$.'

[3] Although we acknowledge that there are complications in the Japanese data, and some or all of binding in Japanese may be pragmatically determined, as emphasized by Iida (1992).

Perlmutter argued from these data that the passive must have a complex representation of some sort (which was lacking within then current versions of the theory of passive of 'surfacy' frameworks like LFG). In particular, Perlmutter used these examples to argue within Relational Grammar (RG) that both the logical subject and surface subject of a passive must both be a 1 at some level: the logical subject is the initial 1, but on a later stratum it is put *en chômage* and the surface subject becomes the final 1.

In essence we accept this argument, and suggest that we want a representation for passives (at least in languages like Russian) where both the surface subject and the logical subject qualify as a-subjects. However, we would propose that such an analysis does not require multiple strata of grammatical relations, as in RG, but can more restrictively be captured by suggesting that the derivational morphology component builds signs with nested argument structures.[4] Indeed, below we will present arguments from ergative languages that such an alternative analysis in terms of argument structure rather than grammatical relations is not only possible but necessary.

The way to account for such data is to suggest that adding passive derivational morphology to a stem yields a form with a nested argument structure, and hence two a-subjects. We will suppose that the universal characterization of passive is as in (10):[5]

(10)
$$ {}_{\textit{passive-stem}}\left[\begin{array}{ll} \text{ARG-S} & \langle \boxed{2} \rangle \oplus \text{L} \ (\oplus \langle \boxed{3}_i \rangle \ ) \\ \text{CONT} & \boxed{4} \\ \text{STEM} & {}_{\textit{transitive-stem}}\left[\begin{array}{ll} \text{ARG-S} & \langle \boxed{1}_i, \boxed{2} \rangle \oplus \text{L} \\ \text{CONT} & \boxed{4} \end{array}\right] \end{array}\right] $$

The passive verb of (9b) will then be:

(11)
$$ {}_{\textit{passive-part}}\left[\begin{array}{ll} \text{ARG-S} & \langle \ \boxed{2}\text{NP}[\textit{nom}], \boxed{5}\text{PP}, \boxed{3}\text{NP}[\textit{instr}]_i \ \rangle \\ \text{CONT} & \boxed{4} \ {}_{\textit{buying}}\left[\begin{array}{ll} \text{BUYER} & \boxed{1} \\ \text{BOUGHT} & \boxed{2} \\ \text{BENEFICIARY} & \boxed{5} \end{array}\right] \\ \text{STEM} & {}_{\textit{transitive-stem}}\left[\begin{array}{ll} \text{ARG-S} & \langle \ \boxed{1}_i, \boxed{2}, \boxed{5} \ \rangle \\ \text{CONT} & \boxed{4} \end{array}\right] \end{array}\right] $$

In (11), the reflexive beneficiary $\boxed{5}$ is on both the superordinate and subordinate ARG-S lists. This raises an important issue for the binding theory that does not arise in Pollard and Sag's (1992, 1994) account of binding in English, namely how to construe binding principles in cases of argument sharing. Suppose we interpret 'locally a-bound' existentially as 'locally a-bound in some argument structure'. This means that if the beneficiary $\boxed{5}$ is an anaphor,

[4]For a similar argument, cf. Grimshaw (1990:167–173).

[5]Note that this passive is intrinsically promotional; some have argued that the universal rule of passive should only mention subject demotion, to account for certain passive-like structures where nothing is promoted such as in Lithuanian, but we would provide a different (though related) derivational sort for such cases.

then Principle A and the a-subject principle can be satisfied by $\boxed{5}$ being coindexed with either $\boxed{1}$ or $\boxed{2}$, both of which are local a-commanders and a-subjects. This is exactly the result we want to explain the Russian data above. Note that our theory predicts that the surface subject is another possible binder of the anaphor in (9b), but this is being ruled out due to its being an inanimate NP. Some further examples of passives from diverse languages that support this analysis appear in (12):[6]

(12) a. Naja Tobiasi-mit uqaluttuun-niqar-p-u-q taa-ssu-ma
Naja.ABS Tobias-ABL tell-PASS-IND-INTR-3SG [DEM-SG-ERG
itigartis-sima-ga-a-ni
turn.down-PRF-PRT.TR-3SG-4SG]
'Naja$_j$ was told by Tobias$_i$ that he$_k$ had turned self$_{i/j}$ down.' (West Greenlandic Inuit)

b. sarpas tenātmanā svālayaṃ nītaḥ
snake.NOM he.INSTR self.INSTR self.house.ACC brought.PASS.PART.NOM
'The snake was brought by him$_i$ himself to self$_i$'s house.' (Sanskrit: logical subject binder)

c. anṛtaṃ tu vadan daṇḍyaḥ svavittasyāṃśam
untruth.NOM but telling.NOM fine.GER.NOM self.property.GEN part.ACC
'But a perjurer$_i$ is to be fined one eighth (*lit.* part) of self$_i$'s property.' (Sanskrit: surface subject binder)

And, indeed, further evidence for this proposal can be found from the behavior of certain adverbial clauses that are also sensitive to a-subjects. Thus, while the unexpressed subject of a Japanese *-nagara* 'while' clause is generally described as necessarily being the 'subject' of the main clause as in (13):

(13) Yamada-san-wa hataraki-nagara daigaku-o sotsugyoo si-masi-ta
Yamada-HON-TOP work-while university-ACC graduate do-POL-PAST
'Mr. Yamada worked his way through college (lit. Mr. Yamada graduated while working).'

the controller of the subject of a *-nagara* clause can actually be another a-subject, such as the logical subject of a passive, as is shown in (14):

(14) Hanako-ga Taroo-ni aruki-nagara aisatu s-are-ta
Hanako-NOM Taroo-by walk-while greet do-PASS-PAST
'Hanako$_i$ was greeted by Taroo$_j$, while (she$_i$/he$_j$ was) walking.'

Similarly, in Inuit, the a-subject of an infinitival clause (whether expressed or not), must be identical to the a-subject of a higher clause (Inuit allows long distance binding of these infinitival a-subjects in parallel with the behavior of reflexives). One possibility is coreference with the logical subject of a passive. For instance, in (15), the a-subject of 'prevent' is coreferent with the logical subject of 'tie up':

[6] In the Inuit examples, the reflexive pronominal agreement marker is glossed as '4th person', its traditional name.

(15) uumasuq pikin-naviir-lu-gu qilirsur-niqar-p-u-q
animal$_j$ kick.about-prevent-INF-3SG tie.up-PASS-IND-ITR-3SG
'The animal was tied up (by somebody$_i$), pro$_i$ preventing it from kicking about.'

Thus the data from passives that we have examined argue for three things: (i) that there must be a new more articulated argument structure for passives along the lines that we have proposed; (ii) that passive must operate on argument structure and not the valence lists; and (iii) that binding possibilities are sensitive to this argument structure, and not to surface phrase structure or surface valence patterns.

3 Syntactically ergative and Western Austronesian languages

The HPSG architecture predicts that, in cases of dissociations between argument structure and surface valency, binding possibilities and related phenomena should depend solely on the argument structure configurations and be independent of valency. This prediction is startlingly confirmed by the behavior of syntactically ergative and Western Austronesian languages. This is examined in more detail in Manning (1994), but will be illustrated briefly here, with an eye to the development of an HPSG analysis.

Western Austronesian languages appear to be unique in allowing various relationships between argument structure and valence list configuration, mediated by so-called voice morphology. The best known case of this is perhaps Tagalog (Schachter 1976, Schachter 1977, Kroeger 1993), but here we will present some evidence from Toba Batak (Schachter 1984) and Balinese (Artawa and Blake nd). These languages have a more rigid configurational surface structure than Tagalog, and hence stress some of the points to be made more clearly. In particular, they clearly show the independence of binding from surface structure command relationships.

3.1 Toba Batak

Toba Batak has a distinction between active voice (*mang-*) and objective voice (*di-*) forms of verbs:

(16) a. Mang-ida si Ria si Torus
AV-see PM Ria PM Torus
'Torus sees/saw Ria.'

b. Di-ida si Torus si Ria
OV-see PM Torus PM Ria
'Torus sees/saw Ria.'

The active voice (16a) has the logical subject of the clause appear in the final subject position while the objective voice (16b), which tends to be used in unmarked contexts, has what we might term the Undergoer (Foley and Van Valin 1984), the proto-patient (Dowty 1991) or the logical object (Mohanan 1990) of the clause appear in the final subject position. Schachter (1984) provides evidence that both arguments in both voices in (16) are terms (or core roles, as opposed to obliques and adjuncts); see also the similar and more extensive arguments in Kroeger (1993) for Tagalog. Thus the correct analysis is not to view one of (16a) or (16b) as a passive or antipassive (as has often been done in the generative literature), but rather as exhibiting different relationships between argument structure and surface valence. In Toba Batak there is strong evidence that a verb and the following NP of a transitive clause form a constituent, that we will call a VP, regardless of the verbal voice chosen. Emmorey (1984) shows that the pitch accent of a sentence (denoted '$*$' below) occurs on the last stressed syllable of the predicate, where the first following NP of a transitive clause counts as part of the predicate regardless of the verbal voice chosen:

(17) a. [Muúli] anggína
marry brother.his
'His brother gets married.'

b. [Mang-aléan éme] halak án tu malim án
AV-give rice man to priest
'The man gives rice to the priest.'

c. [Di-bóto málim] na manúhor éme pangula í
OV-know priest buy rice farmer
'The priest knows that the farmer buys rice.'

An adverb cannot appear in the middle of the VP between the verb and the NP, though adverbs can generally occur between other major constituents. VPs can be coordinated regardless of the voice chosen:

(18) a. Man-uhor baoang jala mang-olompa mangga halak an
[AV-buy onions] and [AV-cook mangoes] man
'The man buys onions and cooks mangoes.'

b. Di-tuhor si Ore jala di-lompa si Ruli mangga
[OV-buy PM Ore] and [OV-buy PM Ruli] mangoes
'Ore buys and Ruli cooks mangoes.'

Thus the first NP of transitive clauses will be analyzed as being on the COMPS list and will combine with the verb by Schema 2 as a head-complement phrase. Conversely, the final NP in the examples above will be analyzed as a VP-external subject which behaves similarly to the *ang*-marked NP in Tagalog. Evidence for this is that this NP may optionally be fronted before the verb in questions or as a topic, while the VP-internal NP may not be. Further, as in Tagalog, relativization is restricted to this NP, and following the Keenan-Comrie (1977) hierarchy, if only one NP can be relativized on, then that NP is the subject. Moreover it is this VP-external subject NP that must be the controllee, regardless of the verbal voice:[7]

[7] This data thus contrasts with the most common pattern of control in Tagalog where it is always the agent/a-subject that is controlled (Schachter 1977). However, as Kroeger (1993) shows, cases of non-volitive control in Tagalog *do* select the subject as the controllee, and cross-linguistically it seems that both of these possibilities for identification of the controllee occur. As observed in Manning (1994), the Tagalog volitive control pattern poses a challenge for the locality principles standardly assumed in HPSG, but we will not pause to consider this issue further here.

(19) a. Mang-elek si Bill si John man-uhor biang __
AV-persuade PM Bill PM John AV-buy dog
'John is persuading Bill to buy a dog.'

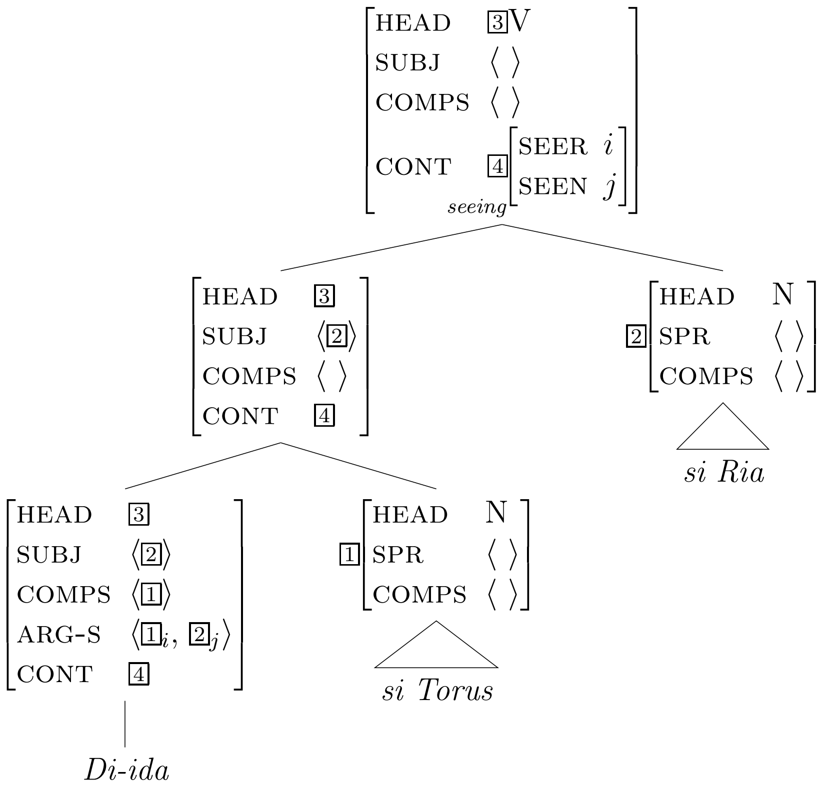
b. Mang-elek si Bill si John di-pareso doktor __
AV-persuade PM Bill PM John OV-examine doctor
'John is persuading Bill to be examined by a doctor.'

This suggests that the lexical entries for the verbs in (16a) and (16b) are (20a) and (20b) respectively, and the analysis of (16b) is as in (21).

(20) a.
$$\begin{bmatrix} \text{PHON} & \langle \text{mang-ida} \rangle \\ \text{SUBJ} & \langle \boxed{1} \rangle \\ \text{COMPS} & \langle \boxed{2} \rangle \\ \text{ARG-S} & \langle \boxed{1}\text{NP}_i, \boxed{2}\text{NP}_j \rangle \\ \text{CONT} & {}_{\textit{seeing}}\begin{bmatrix} \text{SEER} & i \\ \text{SEEN} & j \end{bmatrix} \end{bmatrix}$$

b.
$$\begin{bmatrix} \text{PHON} & \langle \text{di-ida} \rangle \\ \text{SUBJ} & \langle \boxed{2} \rangle \\ \text{COMPS} & \langle \boxed{1} \rangle \\ \text{ARG-S} & \langle \boxed{1}\text{NP}_i, \boxed{2}\text{NP}_j \rangle \\ \text{CONT} & {}_{\textit{seeing}}\begin{bmatrix} \text{SEER} & i \\ \text{SEEN} & j \end{bmatrix} \end{bmatrix}$$

(21)



However, despite this clear evidence for phrase structure and grammatical relations, the binding theory is insensitive to this structure. Reflexivization shows that an a-subject can bind a non-a-subject (and not vice versa) regardless of the verbal voice of the sentence (Sugamoto 1984):

(22) a. Mang-ida diri-na si John
AV-saw self-his PM John
'John$_i$ saw himself$_i$.'

b. *Mang-ida si John diri-na
AV-saw PM John self-his
*'Himself$_i$ saw John$_i$.'

(23) a. *Di-ida diri-na si John
OV-saw self-his PM John
*'Himself$_i$ saw John$_i$.'

b. Di-ida si John diri-na
OV-saw PM John self-his
'John$_i$ saw himself$_i$.'

To account for these reflexivization patterns using a surface structure based notion of command would mean suggesting that the phrase structure of the sentences in (22) and (23) were radically different, despite all the evidence we outlined above indicating that the phrase structure is the same despite the changing verbal voice. But these facts just fall out of the HPSG theory of binding that we have been considering. For instance, although *John* does not c-command the reflexive in (23b), it nevertheless a-commands the reflexive – the structure of this example is identical to (21).

Schachter (1984) and Sugamoto (1984) suggest that binding possibilities are defined by the thematic hierarchy. However, whereas most thematic hierarchies place recipient above theme (Kiparsky 1987, Bresnan and Kanerva 1989), they note that a patient argument can bind an oblique recipient in Toba Batak. They take this as evidence that Toba Batak has the language-particular thematic hierarchy shown in (24):

(24) Agent > Patient > Dative

However, this seems most unlikely. Many theories would rule out language-particular thematic hierarchies in principle, and at any rate, evidence from various other Austronesian languages suggests that in this language family, too, goals/recipients outrank themes.[8] Rather, we take this as strong evidence that binding is defined not on the thematic hierarchy, but rather on the independent syntactic level of argument structure. These facts follow a common pattern, namely that, at the level of a-structure, terms can bind obliques because they are less oblique at a-structure, regardless of their semantic role.[9] Thus these data provide startling support for defining binding theory on a level of argument structure that is distinct from both surface phrase structure or valence lists, and distinct from notions like a thematic hierarchy.[10]

3.2 Balinese

The evidence from Balinese is similar, and serves mainly to confirm the patterns noted above. Again there are two basic patterns for transitive verbs, as in (25). Balinese differs from Toba Batak in that the unmarked word order is for the subject to precede the VP, although the subject may also appear postposed, giving the unmarked Toba Batak ordering.

(25) a. Putu [alih tiang] metengang
Putu OV.look.for 1SG at.night
'I look for Putu at night.'

b. Tiang [ng-alih Putu] metengang
1SG AV.look.for Putu at.night
'I look for Putu at night.'

Again, evidence for the indicated VP constituent comes from intonation, the positioning of auxiliaries between the subject and the verb, and from the possible positions of adverbs. The adverb in (25) can be moved to the positions of (26a) or (26b) but not (26c):

[8] For instance Bell (1976:157) for Cebuano, Forsberg (1992:55f) for Tboli. Some other Austronesian sources give thematic hierarchies like the one in the text for Toba Batak, but all cases we know of result from what we regard as the same misinterpretation of evidence from binding.

[9] One should be able to differentiate between these two hypotheses in Toba Batak by looking at binding in the Dative Shift Construction (Schachter 1984:136) (which places recipients into a core role). But the appropriate data are not available to us.

[10] For general evidence against the use of thematic hierarchies, see also Davis (1995) and Davis and Koenig (1995).

(26) a. Adv NP [Verb NP]

b. NP Adv [Verb NP]

c. *NP [Verb Adv NP]

Again both NPs above appear to be terms: neither can be deleted in either construction and the undergoer-subject pattern is unmarked. Thus there do not appear to be operations of passive or antipassive involved here. Further evidence for this comes from the fact that Balinese does have a passive construction (perhaps borrowed from Javanese) which contrasts with (25a) in that the agent is marked with a preposition, and is optional:

(27) padi-ne ka-ambil (teken Made)
rice-DEF PASS-take (with Made)
'The rice has been taken (by Made).'

Again there is clear evidence that the preverbal NP is the grammatical subject. The single argument of intransitive verbs normally also appears before the verb. Only this argument can be relativized as is shown in (28–29):

(28) a. tiang ane __ gugut cicing
1SG REL SUBJ OV.bite dog
'I am the one the dog bites.'

b. *cicing ane tiang gugut
dog REL 1SG OV.bite COMPLEMENT

(29) a. cicing-e ane __ ngugut tiang
dog-DEF REL SUBJ AV.bite 1SG
'The dog is the one who bit me.'

b. *tiang ane cicing-e ngugut
1SG REL dog-DEF AV.bite COMPLEMENT

And parallel to the data from Toba Batak, it is the subject which is the unexpressed argument of controlled complements and purpose clauses, regardless of the verbal voice chosen (Artawa and Blake nd:26).

Nevertheless, again we find that it is argument structure prominence that determines binding possibilities, so a grammatical subject can be bound by a complement, as shown in (30):

(30) awak cai-ne pedihang cai
self 2SG-POSS OV.blame 2SG
'You blamed yourself.'

is handled not by a (destructive) lexical rule, but rather by a structure building operation. There are still two possible analyses, depending on whether the structure building is handled solely within the type system, or whether we have schemas that build up the structure of morphological words. These two approaches seem equivalent for current purposes, but we will use the former, Riehemann (1993) style, except when discussing the analysis of Iida et al. (1994), which used the latter.

Within a theory of a hierarchical lexicon as presented in HPSG (Pollard and Sag 1987, Riehemann 1993), we can seek to explain both the commonality of sorts like intransitive verbs and transitive verbs across all languages and the systematic linking differences between syntactically ergative and accusative languages through the use of multiple inheritance. That is, in a syntactically accusative language, a transitive verb will say both that it is transitive, and that it obeys an accusative linking pattern, and so on. A partial presentation of some necessary sorts is presented in (31). Note in particular that sorts like *intrans-stem* and *trans-stem* only specify the ARG-S list of their sort, and say nothing about the valence lists. The 'mapping' to valence lists (to use a procedural metaphor) is handled by separate language particular sorts that cross-classify with the arity or polyadicity sorts (like intransitive and transitive).[11]

(31) a. $$\textit{verb-stem} \rightarrow \begin{bmatrix} \textsc{cat} & \mathrm{V} \\ \textsc{spr} & \langle\,\rangle \end{bmatrix}$$

b. $$\textit{subj-verb-stem} \rightarrow \textit{verb-stem} \wedge \begin{bmatrix} \textsc{subj} & \langle\boxed{1}\rangle \end{bmatrix}$$

c. $$\textit{intrans-stem} \rightarrow \textit{subj-verb-stem} \wedge \begin{bmatrix} \textsc{arg-s} & \langle \mathrm{NP}[\textit{core}]\rangle \oplus \textit{list(non-core-np)} \end{bmatrix}$$

d. $$\textit{trans-stem} \rightarrow \textit{subj-verb-stem} \wedge \begin{bmatrix} \textsc{arg-s} & \langle \mathrm{NP}[\textit{core}], \mathrm{NP}[\textit{core}], \ldots\rangle \end{bmatrix}$$

e. $$\textit{acc-canon-stem} \rightarrow \begin{bmatrix} \textsc{subj} & \boxed{1} \\ \textsc{spr} & \boxed{2} \\ \textsc{comps} & \boxed{3} \oplus \mathrm{L} \\ \textsc{arg-s} & \boxed{1} \oplus \boxed{2} \oplus \boxed{3} \end{bmatrix}$$

f. $$\textit{erg-canon-stem} \rightarrow \begin{bmatrix} \textit{intrans-stem} & \\ \textsc{subj} & \boxed{1} \\ \textsc{spr} & \boxed{2} \\ \textsc{comps} & \boxed{3} \oplus \mathrm{L} \\ \textsc{arg-s} & \boxed{1} \oplus \boxed{2} \oplus \boxed{3} \end{bmatrix} \bigvee \begin{bmatrix} \textit{trans-stem} & \\ \textsc{subj} & \boxed{1} \\ \textsc{spr} & \boxed{2} \\ \textsc{comps} & \langle\boxed{4}\rangle \oplus \boxed{3} \oplus \mathrm{L} \\ \textsc{arg-s} & \langle\boxed{4}\rangle \oplus \boxed{1} \oplus \boxed{2} \oplus \boxed{3} \end{bmatrix}$$

[11] In most languages, all verbs have a subject, and so the language would make all verbs *subj-verb-stem*, but we allow for subjectless verbs in the initial verb type. The disjunction in (31f) appears necessary. In syntactically ergative languages, with intransitive verbs, the first argument on the ARG-S list becomes the subject, whereas with transitive verbs, it is the second argument on the ARG-S list that becomes the subject.

Before, we suggested that a *canonical* stem is one where the valence lists 'add up' to the ARG-S. In (31e–f), we introduce a slight generalization of this notion, which has become important in recent work on the treatment of causatives and light verbs, since we will need this generalization in the next section. Under this new conception, a *canonical* stem is basically as before, except that it might have extra things at the end of the COMPS list that are not on the ARG-S list. These things will arise via inheritance of complements from a subpart of the current stem.

A verb in a particular language will then inherit its subcategorization sort, and a language type particular linking sort. So, for an accusative language like English, a transitive verb would have a type like (32a), for a syntactically ergative language like Dyirbal there would be a transitive verb type like (32b), while a Western Austronesian language like Toba Batak would allow both these constructions via a transitive verb type like (32c).

(32) a. *eng-trans-stem* $\rightarrow$ *trans-stem* $\wedge$ *acc-canon-stem*

b. *dyi-trans-stem* $\rightarrow$ *trans-stem* $\wedge$ *erg-canon-stem*

c. *tob-trans-stem* $\rightarrow$ *trans-stem* $\wedge$ (*acc-canon-stem* $\vee$ *erg-canon-stem*)

The sort in (32c) (along with verb-particular information) will then license the two Toba Batak signs that were shown in (20).

Thus this section shows that not all languages make exclusive use of a *canonical* relationship between valence lists and ARG-S in basic lexical forms, if such is to be understood as the ARG-S list being the append of the SUBJS, SPR, and COMPS list, *in that order*. Rather, in Western Austronesian languages, another ordering is possible, indeed is unmarked (in terms of both frequency of occurence and the verbal morphology). In this pattern, the ARG-S of a transitive verb is built by appending ⟨COMPS FIRST⟩, SUBJ, and ⟨COMPS REST⟩. For most Western Austronesian languages, other mappings are also possible, such as where an instrument or location is promoted to the subject position, but we will not examine these patterns here. In other languages, the syntactically ergative languages, the unmarked relationship in Philippine languages is the only relationship possible for expressing transitive verbs (Dixon 1994, Manning 1994). These languages, which we will discuss a little more below, and the Western Austronesian languages provide strong support for two independent syntactic levels, realized in HPSG3 by the valence lists and ARG-S, and provide crucial evidence for the argument structure based theory of binding that HPSG provides.

4 Causatives

There is now a large literature on causative morphology (e.g, Marantz (1984), Baker (1988)) and the related causative light verbs found in certain language families such as Romance (Rizzi 1982, Aissen and Perlmutter 1983). The essence of the problem that these constructions pose is that on the surface various tests indicate that we are dealing with a single clause, but various other syntactic tests have been used to argue that these structures are really underlyingly biclausal.

Consider, as an example, causative morphology in Inuit.[12] Causatives of an intransitive and a transitive verb are shown in (33):

(33) a. Aani-p miiqqa-t qasu-nirar-p-a-i
Aani-ERG children-PL.ABS be.tired-say-IND-TR-3SG.3PL
'Aani said that the children were tired.'

b. Hansi-p miiqqat uan-nut paari-tip-pai
Hansi-ERG children.PL.ABS me-TERM look.after-CAUS-IND.TR.3SG.3PL
'Hansi had me look after the children.'

A sentence like (33b) behaves on the surface like a single clause. The causative verb form is a surface word (Sadock 1980). The verb agrees with the lower object using the regular patterns of object agreement (which would be quite mysterious if we were dealing with embedded clauses).[13] The case marking pattern allows only one each of the core cases ergative and absolutive, as in a single clause. The unmarked word order is as shown: the causee follows the lower object, as oblique NPs regularly follow core roles within a single clause, rather than preceding it as if it were a subject. Additionally, there is evidence from (participial) relatives: relativization is clausebound, but the lower object of these complex verb forms can be relativized on (Johnson 1980:23). On the other hand, there is evidence that we might be dealing with a biclausal structure. For instance, both the causer and the causee behave as 'subjects' for the purposes of anteceding reflexives, and controlling infinitival clauses. For instance, (34) shows how the binding behavior of causatives (34a) differs from that of otherwise similar lexical roots (34b):

(34) a. Kaali-p Pavia immi-nit angi-nir-u-sinnaa-nngin-nirar-p-a-a
Kaali-ERG Pavia.ABS self-ABL big-CMP-BE-can-NEG-say-IND-TR-3SG.3SG
'Kaali$_i$ said that Pavia$_j$ couldn't be taller than self$_{i/j}$.'

b. Juuna-p Kaali immi-nik uqaluttuup-p-a-a
Juuna-ERG Kaali.ABS self-INSTR tell-IND-TR-3SG.3SG
'Juuna$_i$ told Kaali$_j$ about self$_{i/*j}$.'

A common form of analysis postulates an underlying structure that is biclausal, and then uses some mechanism of incorporation or restructuring to produce the monoclausal surface forms. Such transformational analyses are unavailable within a lexicalist framework like HPSG, but fortunately, more careful analysis suggests that such derivational analyses are not required. The essence of the transformational analysis is that the *causee* of a causative (the one who is caused to act) is a subject at some level. But here we will argue that although the causee has the properties of an a-subject, it never has the properties of a subject in terms

[12]In Inuit, "causative" morphology includes not only verbs of causing and allowing, but other verbs of thinking and saying, which behave identically. Thus we will freely illustrate with verbs from a wider semantic field than pure causatives.

[13]We use the following pretheoretical terminology for this discussion (from Marantz (1984)): the one who is the agent of the causing event is the *causer*; the one who is caused to act, and who is also the actor of the stem is called the *causee*; and in cases of causativization applying to transitive stems, the direct object of the stem to which causative is applied is termed the *lower object*.

of grammatical relations or valence list positions. This suggests that causatives can be accounted for by a mismatch between valence and argument structure: these verbs will have valence patterns much like any other predicate, but the causative verb will carry information about multiple ARG-S lists, so that both the causer and the causee will be a-subjects.

4.1 Japanese causatives

An analysis of this sort was presented within the framework of HPSG for Japanese causatives by Iida et al. (1994). Here we will review the essence of this analysis. Centrally, the account wanted to explain how causatives behave as a single clause on the surface, as is shown by subject honorification, word order, the Double-o constraint (Poser 1989) and nominalization, while appearing in some sense biclausal with respect to phenomena such as adjunct scoping and binding theory.

Iida et al. (1994) suggest that basic lexical entries of verbs can give rise to further forms through the application of derivational morphology.[14] Thus the Japanese causative yields a new lexical form. Its relationship to the stem's sign can be expressed as in (35).

(35) a. *-(s)ase* is suffixed in the PHONOLOGY,

b. the stem's CONTENT is embedded as the third argument of the derivational form's CONTENT, which is a ternary *cause* predicate,

c. the SUBJ in the stem's lexical entry is replaced with a new complement (marked dative, or optionally accusative with intransitive stems), and a new SUBJ, the causer, is introduced.

This process will thus derive causative verbs with complex word structure, as illustrated in (36) for the causative of the simple transitive verb *tazune* ('visit'):

[14] Iida et al. (1994) took no particular stand on whether this was by means of lexical rules as in Pollard and Sag (1987) or through the sort system as in Riehemann (1993) or through schemas that build up complex morphological forms, but they presented their analysis in terms of the last mechanism, and we will reproduce it in that form here.

(36)

$$
\begin{array}{c}
\text{V} \\
\left[\begin{array}{ll}
\textsc{phon} & \langle \text{tazune+sase} \rangle \\
\textsc{subj} & \langle \boxed{1}\text{NP}[\textsc{nom}]_i \rangle \\
\textsc{comps} & \langle \boxed{2}\text{NP}[\textsc{dat}]_j,\ \boxed{3}\text{NP}[\textsc{acc}]_k \rangle \\
\textsc{arg-s} & \langle \boxed{1}, \boxed{2}, \boxed{3} \rangle \\
\textsc{content} & \mathit{cause}_3(i,\ j,\ \mathit{visit}(j,\ k))
\end{array}\right]
\end{array}
$$

$$
\begin{array}{cc}
\begin{array}{c}
\text{V} \\
\left[\begin{array}{ll}
\textsc{phon} & \langle \text{tazune} \rangle \\
\textsc{subj} & \langle \boxed{4}\text{NP}[\textsc{nom}]_j \rangle \\
\textsc{comps} & \langle \boxed{3} \rangle \\
\textsc{arg-s} & \langle \boxed{4}, \boxed{3} \rangle \\
\textsc{content} & \mathit{visit}(j,\ k)
\end{array}\right] \\
| \\
\mathit{tazune}
\end{array}
&
\mathit{\text{-}sase}
\end{array}
$$

Note that here the 'lower object' NP (tagged $\boxed{3}$) is present on both the lower and higher COMPS lists. The subject of the lower list is however distinct from, but coindexed with, the dative NP on the higher list. This coindexing has the effect of identifying this element on the upstairs ARG-S list semantically with the subject argument of the lower verb stem. Following this version of a causativization rule, the value of the ARG-S list still bears the append relation to the form's SUBJ and COMPS value, but below we will explore how causatives in some languages differ and appear to require the more general notion of *canonical* that we introduced above.

4.1.1 Adverb scope

Let us now see how this analysis can be applied first to adjunct scoping, and then to issues in the binding theory. The central puzzle of adverbs within a lexical theory is to produce an account of how adverbs can take scope over either the entire causative event or over just the event described by the verb stem. In the analysis of Iida et al. (1994), the mechanism used for adverb scoping provides an account of not only simple adverbs, but also of the behavior of *-nagara* 'while' clauses, and *-te* phrases which they argue to be adverbial in nature (and not to represent conjoined phrases). The analysis entails that adverbs may be added to valence lists freely and hence, given suitable assumptions about scrambling, freely ordered among the other complements (see Iida et al. (1994) for justification).

The essence of the proposal is a lexical rule that adds an adjunct onto a verb's COMPS list, following Miller (1991) and other work. This rule is quite in the spirit of the Type-Raising rule of categorial grammar.[15] So consider the conjunctive adverbial in (37).

[15]It's a bit more complicated than standard type-raising, as it is done before other arguments are discharged, but all uses of the rule remain theorems of the Lambek calculus.

(37) Ken-wa Naomi-ni [hurui kutu-o sute-te] atarasii kutu-o kaw-ase-ta.
Ken-TOP Naomi-DAT old shoes-ACC throw new shoes-ACC buy-CAUS-PAST
'Ken made Naomi throw away her old shoes and buy new ones.'

The Type-Raising lexical rule will change the verb's lexical entry as in (38).

(38) *tabe* ⇒ *tabe*

$$\begin{bmatrix} \text{ARG-S} & \langle \text{NP[N]}_j,\ \text{NP[A]}_k \rangle \\ \text{CONTENT} & \textit{eat(j,k)} \end{bmatrix} \Rightarrow \begin{bmatrix} \text{ARG-S} & \langle \text{NP[N]}_j,\ \text{NP[A]}_k,\ \text{ADV} \rangle \\ \text{CONTENT} & \text{ADV}'(\textit{eat(j,k)}) \end{bmatrix}$$

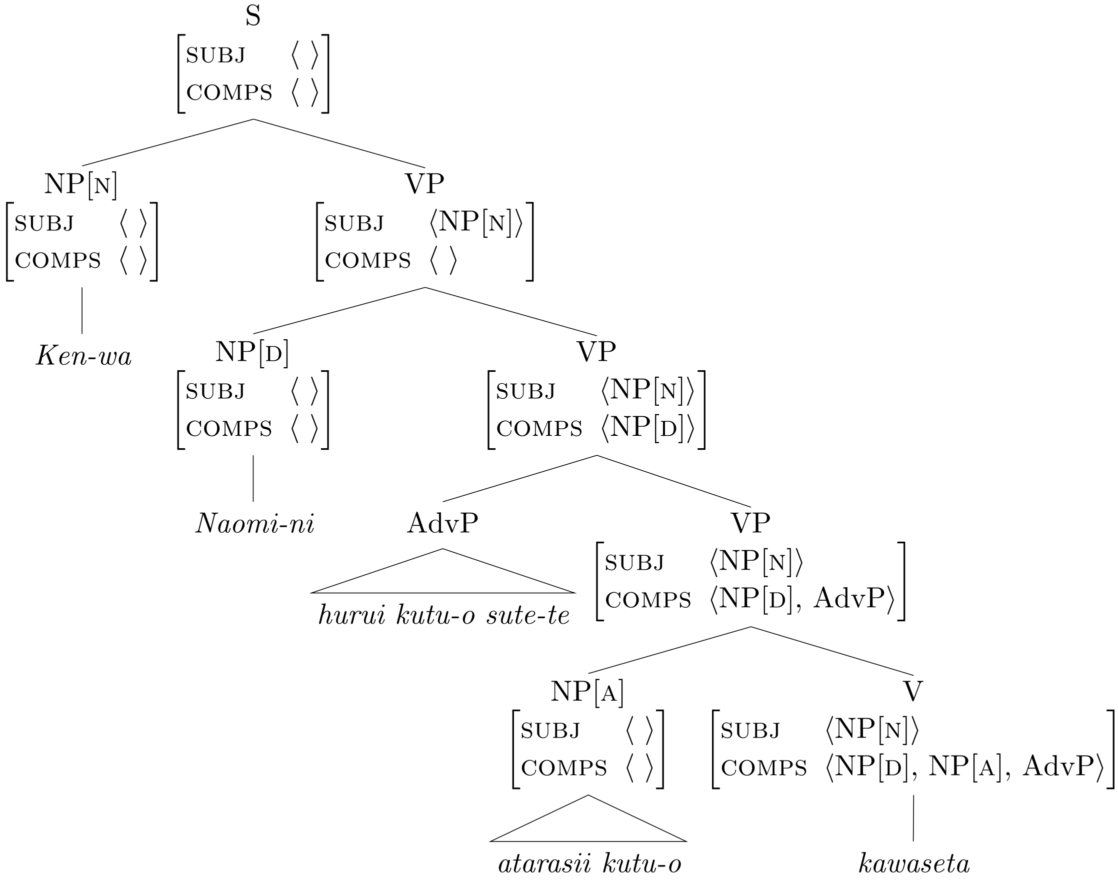
This then gives us the causative shown in (39):

(39) *tabe-sase*

$$\begin{bmatrix} \text{ARG-S} & \langle \text{NP[N]}_i,\text{NP[D]}_j,\text{NP[A]}_k,\text{ADV} \rangle \\ \text{CONTENT} & \textit{cause}_3(\textit{i,j},\text{ADV}'(\textit{eat(j,k)})) \end{bmatrix}$$

which licenses the structure in (40) for the sentence (37).

(40)



Note that the adverbial phrase in this example appears higher in the tree than the causative verb, but nonetheless modifies only the verbal stem *kaw*. Given that the modification relations are fixed by the lexical entries and the phrases they project, the same interpretation results from a different scrambled ordering such as (41):

(41) Ken wa Naomi ni atarasii kutu o [hurui kutu o sute-te] kaw-ase-ta.
Ken TOP Naomi DAT new shoes ACC old shoes ACC throw buy-CAUS-PAST
'Ken made Naomi throw away old shoes and buy new shoes.'

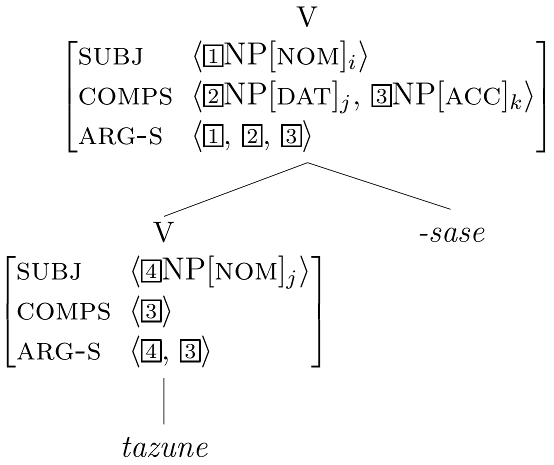
4.1.2 Reflexives

Perhaps the best candidate for a true anaphor in Japanese is the expression *zibun-zisin* which appears to obey Principle A in multiclausal structures (Kitagawa 1986). Additionally, recall that in Japanese only a-subjects are possible binders. Also, (42) shows that the basic prediction of the HPSG binding theory, that anaphors with no local a-commander are exempt from Principle A, is also confirmed for Japanese.

(42) Zibun-zisin$_i$-ga hihan.s.are.ta koto-ga Taroo$_i$-o nayamaete-iru.
self-NOM was.criticized COMP-NOM Taroo-ACC bother-PROG
(lit.) 'The fact that self was criticized bothers Taroo.'

We may now examine the predictions made by our lexical analysis of causatives. One key aspect of the analysis is that all members of the COMPS list of the lower verb are also on the causative verb's COMPS list. Further, the ARG-S list of the causative verb is the `append` of that verb's SUBJ and COMPS values, as illustrated in (43).

(43)



In (43), the lower object $\boxed{3}$ is on both the superordinate and subordinate ARG-S lists. Recall that in cases of argument sharing like this that the binding principles are construed existentially. We interpret locally a-bound as 'locally a-bound in some argument structure'. This means that if the object $\boxed{3}$ is in fact the anaphor *zibun-zisin*, then Principle A can be satisfied by $\boxed{3}$ being coindexed with either $\boxed{1}$ or $\boxed{4}$, both of which are local a-commanders and a-subjects. This is exactly the right result, as pointed out by Kitagawa (1986) who observes the ambiguity of (44):

(44) Taroo$_i$ ga Ziroo$_j$ ni aete zibun-zisin$_{i/j}$ o hihans-ase-ta.
Taroo NOM Ziroo DAT purposefully self ACC criticize-CAUS-PAST
'Taroo purposefully made Ziroo criticize himself.' (Kitagawa 1986:(92))

4.1.3 Pronouns

Now let us consider the pronominal coreference facts shown in (45):

(45) Taroo$_i$-wa Ziroo$_j$-ni $\emptyset_{i/*j}$ bengos-ase-ta.
Taroo-TOP Ziroo-DAT defend-CAUS-PAST
'Taroo$_i$ made Ziroo$_j$ defend him$_{i/*j}$.'

The zero pronoun, or the alleged pronoun *kare*,[16] in the lower object position allows the surface subject, but not the lower subject (the causee), as its antecedent.

Again, the observed facts follow immediately from an existential interpretation of the binding theory – pronouns must be locally a-free in *some* argument structure. Considering again (43), we see that coindexation of the subject and the lower object is possible, because there remains an ARG-S list, the lower one, with an a-commander on which the lower object is a-free. However, the lower object cannot be coindexed with the causee, because the causee shares an index with the lower subject, hence indexing the lower object in this way would leave no argument structure where that pronominal was locally a-free, in violation of Principle B. Hence, simply by imposing an existential interpretation (one which alters none of the binding theory's predictions for English), Principle B rules out coreference between the lower object and the causee, but nothing blocks coreference between the lower object and the causer because the surface subject isn't on the lower ARG-S list.

4.2 Extending the account to quantifier scope

There is a problem about quantifier scope similar to that posed by the interaction of adverbs and causatives. In certain languages, a quantified NP functioning as the lower object of a lexical causative can take intermediate scope, i.e. can take scope over the verb stem, but be outscoped by the causative operator. This is illustrated for the Japanese example in (46).

(46) Tanaka-sensei-ga gakusei-ni sansatu hon-o yomaseta
Prof. Tanaka-NOM student-DAT three book-ACC read-CAUS-PAST
'Prof. Tanaka made the student read three books.'

The semantic embedding ('cause-to-read') is presumably lexically encoded, i.e. given as part of the lexical entry of the causative verb. Thus the problem posed by such examples is basically the problem of how to assign 'word-internal' scope to a quantified NP that appears external to the lexical causative. In order to deal with this matter, which Iida et al. did not address, we must first enter a slight digressions about the treatment of quantifier scope in HPSG.

The theory of quantifier scope presented in Pollard and Sag (1994: Ch.8) is based on the technique of quantifier storage pioneered by Robin Cooper (see Cooper 1983). Cooper storage is a method allowing a variable to go proxy for a quantifier's contribution to the interpretation of a sentence, while the quantifier which binds that variable is placed in a 'store'. Stored quantifiers are gathered up from the daughters of a phrase and passed up to successively higher levels of structure until an appropriate scope assignment locus, e.g. a

[16] See Iida et al. (1994) for discussion of why *kare* probably should not be treated as a pronoun.

clause, is reached. Then quantifier(s) may then be retrieved from storage and integrated into the interpretation, receiving a wide scope interpretation. On Pollard and Sag's version of Cooper's theory, all quantifiers 'start out' in storage, and retrieval is allowed freely at higher levels of structure (subject to various constraints). This means that the scope assigned to a quantifier can in principle be any semantic domain that contains the content corresponding to the clause the quantified NP occurs in.

The theory presented by Pollard and Sag has at least one serious defect (exactly the same defect as Montague's (1974) 'proper' treatment, incidentally), which is its failure to provide for the possibility that in raising constructions, a quantifier may have scope corresponding to a lower syntactic position. As is well known, a sentence like (47), for example, allows a 'de dicto' reading where the matrix subject takes narrow scope with respect to *seems*:

(47) A unicorn seems to be approaching.
'It seems that there is a unicorn approaching'

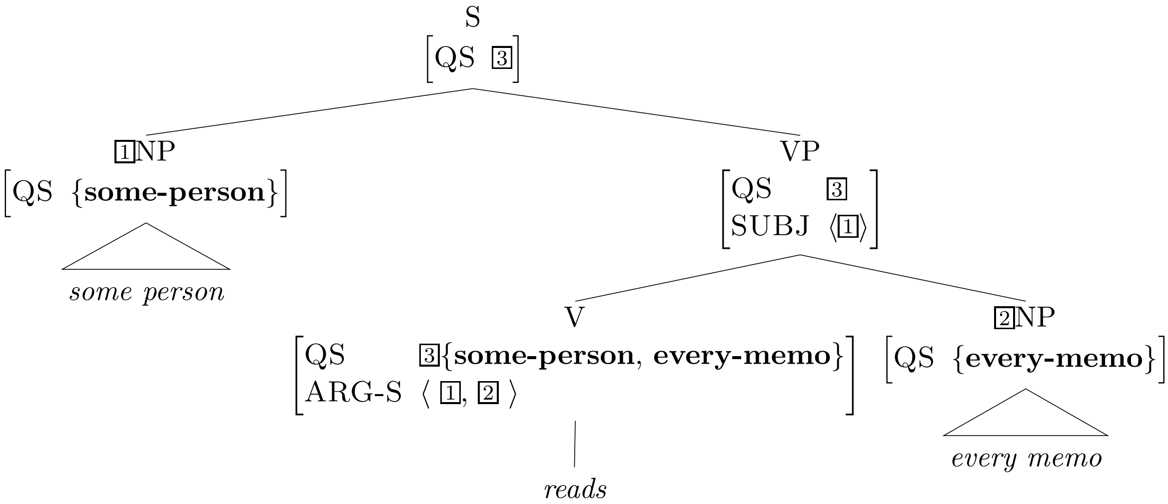
In recent work, however, Pollard and Yoo (this conference) suggest a solution to this problem. First, they propose to make Q-STORE (QS) a feature of *local* objects, rather than a feature of the highest level (the *sign*), as Pollard and Sag proposed. This revision has the consequence that within raising and extraction constructions, the stored quantifiers are identified. That is, the QS value of the subject of *seems* in a cascaded raising structure like (47) is also the QS value of the (unexpressed) subject of *to*, the QS value of the subject of *be*, and that of the subject of *approaching*. Thus if the NP *a unicorn* in (47) has an existential quantifier in its QS, so does the SUBJ value of the lowest verb in (47) – the one that assigns a semantic role to the index bound by that quantifier.

Pollard and Yoo propose to change the way storage works, so that unscoped quantifiers are passed up to the mother in a headed structure not from all the daughters, but only from the semantic head daughter. To achieve this, they let the QS value of a verb V be the set union of the QS values of V's ARG-S members (at least those ARG-S members that are assigned a role in the CONTENT value of V). This is illustrated in (48).

(48) $\begin{bmatrix} \text{ARG-S} & \langle\ [\text{QS } \Sigma_1],...,[\text{QS } \Sigma_n]\ \rangle \\ \text{QS} & \Sigma_1 \cup\ \ldots\ \ldots\ \cup \Sigma_n \end{bmatrix}$

On this approach, the QS of the verb in (49) is nonempty and may be passed up the tree from head-daughter to mother as sketched in (49).

(49)



Let us ignore adjuncts for present purposes; the syntactic head and semantic head will be the same in a structure like (49). Stored quantifiers may be retrieved at the S-level, of course, and this is done in accordance with the constraint sketched in (50):[17]

(50)

$$\begin{bmatrix} \text{QUANTS} & \boxed{1} \oplus \boxed{2} \\ \text{NUCLEUS} & \boxed{5} \\ \text{QSTORE} & \boxed{4} \; -! \; \boxed{2} \\ \text{RETRIEVED} & \text{order}(\boxed{2}) \end{bmatrix}$$

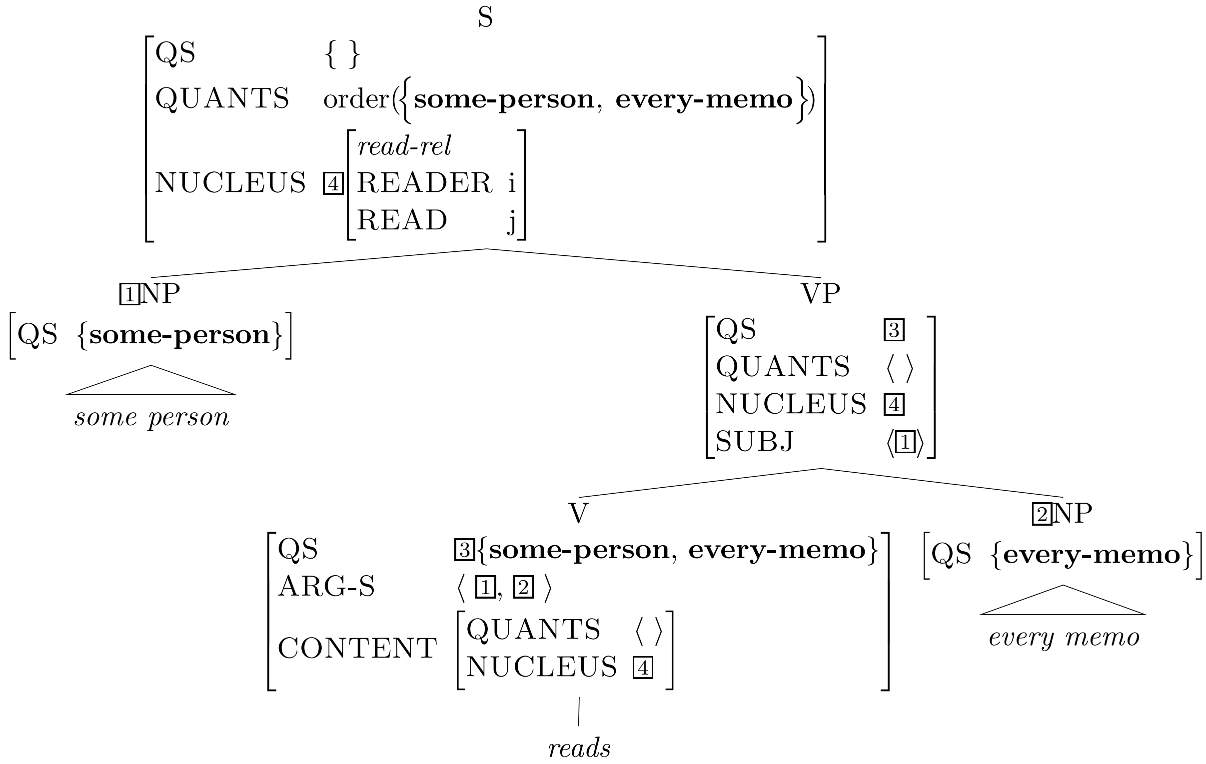
SEM-HD

$$\begin{bmatrix} \text{QUANTS} & \boxed{1} \\ \text{NUCLEUS} & \boxed{5} \\ \text{QSTORE} & \boxed{4} \end{bmatrix}$$

If we now reconsider the tree in (49) in light of the retrieval scheme sketched in (50), we see that we now have the possibility of S-level quantifier retrieval of the sort sketched in (51):

[17]Here $-!$ designates a restricted relation of set difference that holds of a triple $(\Sigma_1, \Sigma_2, \Sigma_3)$ only if Σ_2 is a subset of Σ_1.

(51)



This account correctly allows both possible scopings for (51). It also assigns to (47) a reading where the subject has narrow scope with respect to *seems*, because QS is now part of LOCAL and hence the SUBJ value of *seems is* the SUBJ value of *to* and *be* and hence is the SUBJ value (and first ARG-S member) of *approaching*, which collects its own QSTORE value from those of its arguments. Thus the QSTORE of *approaching* in (47) contains **a-unicorn** and that quantifier can hence be retrieved from storage anywhere in the tree higher than *approaching*. This allows for the possibility of scoping **a-unicorn** inside the scope of *seems*.

A problem with this approach, however, is that it lets retrieval happen in too many places. This system (like the one in P&S-94) produces spurious analyses of every available reading. For example, allowing both S and VP retrieval in structures like (51) produces each possible scoping in three different ways (verification of this left as an exercise for the reader).

This problem is not insurmountable, however. One way of eliminating this redundancy is to let retrieval and scope assignment be entirely lexical in nature, eliminating the feature RETRIEVED. This proposal, similar in certain ways to lexical type raising, involves modifying the lexical entry for *reads* along the lines sketched in (52).

(52) $$\begin{bmatrix} \textit{word} & \\ \text{PHON} & \langle \text{reads} \rangle \\ \text{ARG-S} & \langle\ \text{NP}_i[\text{QS}\ \boxed{1}],\ \text{NP}_j[\text{QS}\ \boxed{2}]\ \rangle \\ \text{QS} & (\boxed{1} \cup \boxed{2})\ -!\ \boxed{3} \\ \text{CONTENT} & \begin{bmatrix} \text{QUANTS} & \text{order}(\boxed{3}) \\ \text{NUCLEUS} & \begin{bmatrix} \textit{read-rel} & \\ \text{READER} & \text{i} \\ \text{READ} & \text{j} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Other aspects of the Pollard/Yoo theory remain unchanged. Thus, each lexical head thus gets a chance to scope the quantifiers of its role-assigned arguments, and the quantifiers from those arguments that are not scoped remain in the verb's QSTORE to be passed up to higher levels of structure. Since there is no structure-based retrieval, a sentence like (51) has no spurious retrievals. The word *reads* simply allows the two readings (corresponding to two distinct orderings of the quantifiers on the verb's QUANTS list). And this modification of the Pollard/Yoo theory still produces the correct two readings for *A unicorn seems to be approaching* (allowing *seems* or *approaching* to assign scope to **a-unicorn**.[18]

So now, returning to causatives. it would seem natural that a language whose stems are salient enough to be involved in Binding Theory should also extend scope assignment to stems. For example, the Japanese stem *yom* ('read') has the following lexical entry that is in all relevant ways identical to that of the word *reads* given in (52):

(53) $$\begin{bmatrix} \textit{v-stem} & \\ \text{PHON} & \langle \text{yom} \rangle \\ \text{ARG-S} & \langle\ \text{NP}_j[\text{QS}\ \boxed{1}],\ \text{NP}_k[\text{QS}\ \boxed{2}]\ \rangle \\ \text{QS} & (\boxed{1} \cup \boxed{2})\ -!\ \boxed{3} \\ \text{CONTENT} & \begin{bmatrix} \text{QUANTS} & \text{order}(\boxed{3}) \\ \text{NUCLEUS} & \boxed{3}\begin{bmatrix} \textit{read-rel} & \\ \text{READER} & \text{j} \\ \text{READ} & \text{k} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

But allowing this kind of semantic content for the stem means that the object of *yom*, even when it is merged into the ARG-S list of the causative form *yomaseta* – where it will correspond to an NP external to that word – can be assigned an intermediate scope, as in (54):

[18] We must of course ensure that semantically vacuous raising verbs like *to* and *be* do not assign scope lexically. Once that is guaranteed, then we will have only one analysis for each scope, as desired.

(54)
$$\begin{bmatrix}
\textit{cause-stem} & \\
\text{PHON} & \langle \text{yomaseta} \rangle \\
\text{ARG-S} & \langle\ \text{NP}_i[\text{QS}\ \boxed{4}],\ \text{NP}_j[\text{QS}\ \boxed{5}],\ \boxed{7}\ \rangle \\
\text{QS} & (\boxed{4} \cup \boxed{5})\ -!\ \boxed{6} \\
\text{CONTENT} & \begin{bmatrix}
\text{QUANTS} & \text{order}(\boxed{6}) \\
\text{NUCLEUS} & \begin{bmatrix}
\textit{cause-rel} & \\
\text{CAUSER} & \text{i} \\
\text{CAUSEE} & \text{j} \\
\text{SOA-ARG} & \boxed{3}
\end{bmatrix}
\end{bmatrix} \\
\text{STEM} & \begin{bmatrix}
\textit{v-stem} & \\
\text{PHON} & \langle \text{tabe} \rangle \\
\text{ARG-S} & \langle\ \text{NP}_j[\text{QS}\ \{\}],\ \boxed{7}\text{NP}_k[\text{QS}\ \{\boxed{2}\}]\ \rangle \\
\text{QS} & \{\} \\
\text{CONTENT} & \begin{bmatrix}
\text{QUANTS} & \langle \boxed{2} \rangle \\
\text{NUCLEUS} & \boxed{3}\begin{bmatrix}
\textit{read-rel} & \\
\text{READER} & \text{j} \\
\text{READ} & \text{k}
\end{bmatrix}
\end{bmatrix}
\end{bmatrix}
\end{bmatrix}$$

In sum, the lexically based revision of the Pollard/Yoo theory of quantifier storage and quantifier scoping seems to fit well with the theory of Japanese causatives presented by Iida et al. Although complex words of Japanese preserve their lexical integrity (Bresnan and Mchombo 1995), NPs external to those words may still be assigned scope intermediate to the semantic elements of the causative item. This result follows once verbal stems, rather than words, are taken as the locus for quantifier retrieval. We speculate that stem-based scope assignment in the unmarked case will be correlated with stem-based binding of the sort proposed by Iida et al, but that languages that base binding on words and scope on stems (or vice versa) might well exist as a marked option.

4.3 Crosslinguistic variation in causatives

It is now well known that not all causative constructions behave identically (Marantz 1984, Baker 1988). Morphololigical and other monoclausal causatives vary with respect to binding and passivization possibilities. Some of these possibilities are related to differences in the treatment of the causee: whether it becomes the primary object, an indirect object, or some form of oblique. However, this is not the only parameter of variation – for instance, the causative case marking patterns are basically uniform across the western Romance languages, but nevertheless they differ with respect to passivization possibilities (Zubizarreta 1985). In this section we will examine some of these parametric differences and how they might be accounted for within an HPSG analysis. The basic proposal is that universally there are a number of causative sorts, from which languages will choose one (or possibly more than one).

4.3.1 Chi-Mwi:ni

Causative structures vary as to whether passivization of the causative can lead to the causee becoming the subject, the lower object becoming the subject, or either. Given the lexical entry for a passive morpheme proposed earlier, it is predicted that the different passivization possibilities for causatives in different languages should correlate with (i) the argument structure ordering dictated by the causative morpheme in a certain language and (ii) whether (independently) passivization is restricted to a single direct object, as implied by our passive stem sign, or can promote any object NP (this is the asymmetric object parameter of Bresnan and Moshi (1990)).

Consider the case of Chi-Mwi:ni (Marantz 1984, Baker 1988). In Chi-Mwi:ni (and in certain other Bantu languages, and in Chamorro), the causee always becomes the direct object (55a), which we would represent by placing it first on the COMPS list, and second on the ARG-S list of the causative verb, as in (55b).

(55) a. Mwa:limu wa-anḍik-ish-ize wa:na xaṭi
teacher$_i$ SP.OP-write-CAUS-ASP children$_j$ letter$_k$
'The teacher made the children write a letter.'

b. $$\begin{bmatrix} \text{SUBJ} & \langle \boxed{1}_i \rangle \\ \text{COMPS} & \langle \boxed{2}_j, \boxed{3}_k \rangle \\ \text{ARG-S} & \langle \boxed{1}\text{NP}_i, \boxed{2}\text{NP}_j, \boxed{3}\text{NP}_k \rangle \end{bmatrix}$$

Passivization of the Chi-Mwi:ni causative in (55a) can yield only one result: the causee, not the lower object, becomes the subject. The contrast between (55a) and *(55b) illustrates this point, which is a direct consequence of what has been presented so far, given the interaction of the stem, causative, and passive morphemes shown in (56c).

(56) a. Wa:na wa-anḍik-ish-iz-a: xaṭi na mwa:limu
children SP-write-CAUS-PASS-ASP letter by teacher
'The children were made to write a letter by the teacher.'

b. *Xaṭi a-anḍik-ish-iz-a wa:na na mwa:limu
letter SP-write-CAUS-PASS-ASP children by teacher

c.

$$
{}_{\textit{passive-stem}}\left[\begin{array}{ll}
\text{SUBJ} & \langle \boxed{2}_j \rangle \\
\text{COMPS} & \langle \boxed{3}_k, \boxed{7}\text{PP}[na]_i \rangle \\
\text{ARG-S} & \langle \boxed{2}_j, \boxed{3}_k, \boxed{7}_i \rangle \\
\text{CONT} & \boxed{4} \\
\text{STEM} & {}_{\textit{caus-stem}}\left[\begin{array}{ll}
\text{SUBJ} & \langle \boxed{1}_i \rangle \\
\text{COMPS} & \langle \boxed{2}_j, \boxed{3}_k \rangle \\
\text{ARG-S} & \langle \boxed{1}_i, \boxed{2}_j \rangle \\
\text{CONT} & \boxed{4}\ {}_{\textit{cause-rel}}\left[\begin{array}{ll}
\text{CAUSER} & i \\
\text{CAUSEE} & j \\
\text{SOA-ARG} & \boxed{5}\ {}_{\textit{write-rel}}\left[\begin{array}{ll}
\text{WRITER} & j \\
\text{WRITTEN} & k
\end{array}\right]
\end{array}\right] \\
\text{STEM} & {}_{\textit{trans-verb}}\left[\begin{array}{ll}
\text{SUBJ} & \langle \boxed{6}_j \rangle \\
\text{COMPS} & \langle \boxed{3}_k \rangle \\
\text{ARG-S} & \langle \boxed{6}_j, \boxed{3}_k \rangle \\
\text{CONT} & \boxed{5}
\end{array}\right]
\end{array}\right]
\end{array}\right]
$$

Evidence from binding theory suggests that the causative stem sort for Chi-Mwi:ni should be slightly different from the one we postulated for Japanese, and this new entry is already incorporated into (56). In it, elements of the argument structure of the stem are not inherited by the argument structure of the causative. Rather this is an example of the more general notion of *canonical*, where complements are inherited from the stem to which causative is applied, without their being added to the argument structure of the causative stem. This is seen more clearly if we separate out the lexical entry for just the causative stem, as in (57):

(57)

$$
{}_{\textit{caus-stem-1}}\left[\begin{array}{ll}
\text{COMPS} & \langle - \rangle \oplus \text{L} \\
\text{ARG-S} & \langle \boxed{1}_i, \boxed{2}_j \rangle \\
\text{CONT} & {}_{\textit{cause-rel}}\left[\begin{array}{ll}
\text{CAUSER} & i \\
\text{CAUSEE} & j \\
\text{SOA-ARG} & \boxed{5}
\end{array}\right] \\
\text{STEM} & {}_{\textit{verb-stem}}\left[\begin{array}{ll}
\text{ARG-S} & \langle \boxed{6}_j \rangle \oplus \text{L} \\
\text{CONT} & \boxed{5}
\end{array}\right]
\end{array}\right]
$$

This lexical entry underspecifies the contents of the valence lists, so that we can combine it with appropriate sorts for different language types, which will yield varying mappings between ARG-S and the valence lists. If we combine this sort with the sort for *acc-canon-stem* which we introduced earlier, this gives the following lexical entry for causative stems in certain accusative languages:

(58)

$$\underset{acc\text{-}caus\text{-}stem\text{-}1}{\left[\begin{array}{ll} \text{SUBJ} & \langle \boxed{1} \rangle \\ \text{COMPS} & \langle \boxed{2} \rangle \oplus \text{L} \\ \text{ARG-S} & \langle \boxed{1}_i, \boxed{2}_j \rangle \\ \text{CONT} & \underset{cause\text{-}rel}{\left[\begin{array}{ll} \text{CAUSER} & i \\ \text{CAUSEE} & j \\ \text{SOA-ARG} & \boxed{5} \end{array}\right]} \\ \text{STEM} & \underset{verb\text{-}stem}{\left[\begin{array}{ll} \text{ARG-S} & \langle \boxed{6}_j \rangle \oplus \text{L} \\ \text{CONT} & \boxed{5} \end{array}\right]} \end{array}\right]}$$

Note that within this structure, the lower object (contained on the list L) only appears on the embedded argument structure list. Given that Chi-Mwi:ni has a short distance reflexive that obeys Principle A, this predicts that a reflexive lower object should be able to be bound only by $\boxed{6}$ (which is coindexed with the causee), and a reflexive causee should be able to be bound only by the subject $\boxed{1}$. This is precisely what we find:

(59) a. Mi m-p^{h}ik-ish-iz-e ru:hu-y-a cha:kuja
I SP-cook-CAUS-ASP myself food
'I made myself cook food.'

b. Mi ni-m-big-ish-iz-e mwa:na ru:hu-y-é
I SP-OP-hit-CAUS-ASP child himself
'I made the child hit himself.'

c. *Mi ni-m-big-ish-iz-e Ałi ru:hu-y-á
I SP-OP-hit-CAUS-ASP Ali myself

Although the French causatives are periphrastic, Godard and Sag (1995) propose that the argument structure relations in the sort *caus-stem-1* are also the correct ones for the French causative verb *faire*. In French, certain instances of reflexive cliticization are unexpectedly ill-formed, as illustrated by the following contrasts:

(60) a. Jean lui est fidèle.
'Jean is faithful to him/her.'

b. *Jean s'est fidèle.
'Jean is faithful to himself.'

(61) a. Il$_i$ lui$_j$ fait donner un livre aux enfants.
'He$_i$ makes the kids give him$_j$ a book.'

b. *Il$_i$ se$_i$ fait donner un livre aux enfants.
'He$_i$ makes the kids give him$_i$ a book.'

On Godard and Sag's account, there is a general condition requiring that a reflexive clitic can be realized (via the PR(onominal)AF(fixe)S feature) on a given verb only if it corresponds to a member of the argument structure of that verb. Hence the contrasts in (60) and (61) are both explained by the assumption that in the lexical entries for the copula *être* and the 'composition' form of *faire* only elements of the verb's COMPS list are shared with that of the relevant complement (the AP complement of the copula; the V[*inf*]^0 complement of the causative). The shared complements may undergo cliticization onto the verb (resulting in (60)a and (61)a) but *reflexive* cliticization would add a reflexive element to the verb's PRAFS value that is not a member of the verb's ARG-S, thus engendering a violation of the general condition on reflexive clitics, and so is blocked.

The noncanonical SUBJ/COMPS/ARG-S allignments we exploit here for the treatment of Chi-Mwi:ni lexical causatives are thus independently motivated for the analysis of periphrastic causatives in unrelated languages.[19]

4.3.2 Turkish and Inuit

In other languages, such as Inuit and Turkish, when a transitive stem is causativized, it is the lower object that becomes the surface object, while the causee is expressed either as a dative indirect object or as an oblique. Moreover, it is then this NP that is accessible to passivization. Given that we have argued that passivization is an operation on argument structure, this suggests that the second argument of the causative predicate in these languages should be coindexed with the lower object rather than the causee of the stem (when there is a lower object). That is, the causative stem lexical entry will be as in (62a). For a transitive stem in Turkish, this restriction will be combined with information from the sort *acc-canon-stem* yielding the sort in (62b). With this sort, our prediction is that passivization would make the lower object the subject in Turkish, which is exactly what we want, as is shown by the data in (63).

---

[19]Use of this noncanonical causative necessitates modification of the passive sort we gave earlier, so that it also will not lose additional complements that are not on the argument structure of the stem. A suitable reformulation (already employed above) is:

(i)
$$ {}_{\textit{passive-stem}}\begin{bmatrix} \text{ARG-S} & \langle \boxed{2} \rangle \oplus \text{L} \ (\oplus \langle \boxed{3}_i \rangle) \\ \text{CONT} & \boxed{4} \\ \text{STEM} & {}_{\textit{transitive-stem}}\begin{bmatrix} \text{ARG-S} & \langle \boxed{1}_i, \boxed{2}, \ldots \rangle \\ \text{COMPS} & \langle - \rangle \oplus \text{L} \\ \text{CONT} & \boxed{4} \end{bmatrix} \end{bmatrix} $$

Note that this sort continues to work for both syntactically ergative and syntactically accusative languages. While binding evidence seems to necessitate the kind of non-canonical lexical entries that we have proposed here, the result is clearly an undesirable complication of the passive lexical entry. We are still considering other possible approaches here, such as the use of nested argument structures, as in Manning (1994).

(62) a.

$$\textit{caus-stem-2} \rightarrow \begin{bmatrix} \text{COMPS} & \langle - \rangle \oplus \text{L} \\ \text{ARG-S} & \langle \boxed{1}_i, \boxed{2}_j \rangle \\ \text{CONT} & {}_{\textit{cause-rel}}\begin{bmatrix} \text{CAUSER} & i \\ \text{CAUSEE} & j \\ \text{SOA-ARG} & \boxed{5} \end{bmatrix} \\ \text{STEM} & {}_{\textit{intr-stem}}\begin{bmatrix} \text{ARG-S} & \langle \boxed{6}_j \rangle \oplus \text{L} \\ \text{CONT} & \boxed{5} \end{bmatrix} \end{bmatrix} \vee \begin{bmatrix} \text{COMPS} & \langle - \rangle \oplus \langle \boxed{4}_j \rangle \oplus \text{L} \\ \text{ARG-S} & \langle \boxed{1}_i, \boxed{2}_k \rangle \\ \text{CONT} & {}_{\textit{cause-rel}}\begin{bmatrix} \text{CAUSER} & i \\ \text{CAUSEE} & j \\ \text{SOA-ARG} & \boxed{5} \end{bmatrix} \\ \text{STEM} & {}_{\textit{trans-stem}}\begin{bmatrix} \text{ARG-S} & \langle \boxed{6}_j, \boxed{7}_k \rangle \oplus \text{L} \\ \text{CONT} & \boxed{5} \end{bmatrix} \end{bmatrix}$$

b.

$${}_{\textit{acc-caus-stem-2}}\begin{bmatrix} \text{SUBJ} & \langle \boxed{1}_i \rangle \\ \text{COMPS} & \langle \boxed{2}, \boxed{3}_j \rangle \oplus \text{L} \\ \text{ARG-S} & \langle \boxed{1}_i, \boxed{2} \rangle \\ \text{CONT} & {}_{\textit{cause-rel}}\begin{bmatrix} \text{CAUSER} & i \\ \text{CAUSEE} & j \\ \text{SOA-ARG} & \boxed{5} \end{bmatrix} \\ \text{STEM} & {}_{\textit{trans-stem}}\begin{bmatrix} \text{ARG-S} & \langle \boxed{6}_j, \boxed{2} \rangle \oplus \text{L} \\ \text{CONT} & \boxed{5} \end{bmatrix} \end{bmatrix}$$

(63) a. Bavul Mehmet tarafɨndan Hasan-a açtɨr-ɨl-dɨ
suitcase Mehmet by Hasan-DAT open-CAUS-PASS-PAST
'The suitcase was caused by Mehmet to be opened by Hasan.'

b. *Hasan Mehmet tarafɨndan bavul-u aç-tɨr-ɨl-dɨ
Hasan Mehmet by suitcase-ACC open-CAUS-PASS-PAST
*'Hasan was caused by Mehmet to open the suitcase.'

An important prediction of all the causative lexical entries that we have examined is that the causee is selected as the thing that is first on the ARG-S of the stem (i.e., the a-subject of the stem), rather than as the thing that is the SUBJ of the stem (in contrast with much work in GB and other frameworks which regards the causee as the subject of the lower clause). This prediction can be tested in a syntactically ergative language (or a Western Austronesian one, if using the appropriate verbal voice). There, the two choices make different predictions: if our theory is correct, it is the a-subject of the stem that should become the causee, whereas if the other theory were correct, it is the grammatical subject which should become the causee.

An examination of the syntactically ergative language Inuit shows that the argument structure based account of causative formation is correct.[20] In a simple transitive clause such as (64a), the ergative NP is the a-subject, but it is the absolutive NP that is on the subject list, as shown in the verb lexical entry in (64b) (cf. the sort *erg-canon-stem* presented earlier).

(64) a. Juuna-p miiqqat paar(i-v)-ai
Juuna-ERG child.PL look.after-IND-TR-3SG.3PL
'Juuna is looking after the children.'

[20]See Manning (1994) for justification of the syntactic ergativity of Inuit.

b. $$\begin{bmatrix} \text{SUBJ} & \langle \boxed{2}_j \rangle \\ \text{COMPS} & \langle \boxed{1}_i \rangle \\ \text{ARG-S} & \langle \boxed{1}_i, \boxed{2}_j \rangle \\ \text{CONT} & {}_{\textit{looking-after}}\begin{bmatrix} \text{CARER} & i \\ \text{CARED-FOR} & j \end{bmatrix} \end{bmatrix}$$

The question, then, is what happens when this verb stem is causativized. Is it the a-subject or the SUBJ that becomes the causee? The causative (65) confirms our argument structure based account of monoclausal causatives by showing that it is the a-subject that becomes the causee.[21] This shows clearly that the causee derives its special properties not from being a SUBJ (which it isn't), but from being the a-subject of the stem.

(65) Aani-p miiqqa-t Juuna-mut paari-sur(i-v)-ai
Aani-ERG child-PL Juuna-TERM look.after-think-TR-3SG.3PL
'Aani thinks that Juuna is looking after the children.'

Combining the description in (63a) with the sort *erg-canon-stem* yields the description for Inuit causative stems shown in (66):

(66) $${}_{\textit{erg-caus-stem-2}}\begin{bmatrix} \text{SUBJ} & \langle \boxed{2} \rangle \\ \text{COMPS} & \langle \boxed{1}_i, \boxed{3}_j \rangle \oplus \text{L} \\ \text{ARG-S} & \langle \boxed{1}_i, \boxed{2} \rangle \\ \text{CONT} & {}_{\textit{cause-rel}}\begin{bmatrix} \text{CAUSER} & i \\ \text{CAUSEE} & j \\ \text{SOA-ARG} & \boxed{5} \end{bmatrix} \\ \text{STEM} & {}_{\textit{trans-stem}}\begin{bmatrix} \text{ARG-S} & \langle \boxed{6}_j, \boxed{2} \rangle \oplus \text{L} \\ \text{CONT} & \boxed{5} \end{bmatrix} \end{bmatrix}$$

We can test the correctness of this description by again considering passivization and binding. Example (67a) shows that the lower object becomes the a-subject of the passive-stem (and hence subject) upon passivization of a causative stem in Inuit. This is what we would expect, since the sorts that we have already introduced yield the description (67b) for the verb in (67a). Here, the lower object $\boxed{2}_k$ has become the a-subject of the passive stem's ARG-S, which in turn becomes the subject since the passive stem is intransitive.

(67) a. ammit Jaaku-mit qimmi-nut niri-tsaali-niqar-p-u-t
skin.PL.ABS Jaaku-ABL dog-PL.TERM eat-prevent-PASS-IND-INTR-3PL
lit. 'The skins$_i$ were prevented by Jaaku from the dogs eating t_i.'

[21] The Inuit *terminalis* case, in which the causee appears, can be thought of as being like a dative case.

b.

$$
{}_{\textit{passive-stem}}\begin{bmatrix}
\text{SUBJ} & \langle \boxed{2}\text{NP}[abs]_k \rangle \\
\text{COMPS} & \langle \boxed{3}\text{NP}[term]_j,\ \boxed{7}\text{NP}[abl]_i \rangle \\
\text{ARG-S} & \langle \boxed{2}_k,\ \boxed{7}_i \rangle \\
\text{CONT} & \boxed{4} \\
\text{STEM} & {}_{\textit{caus-stem-2}}\begin{bmatrix}
\text{SUBJ} & \langle \boxed{2}_k \rangle \\
\text{COMPS} & \langle \boxed{1}_i,\ \boxed{3}_j \rangle \\
\text{ARG-S} & \langle \boxed{1}_i,\ \boxed{2}_k \rangle \\
\text{CONT} & \boxed{4}\ {}_{\textit{prevent-rel}}\begin{bmatrix}
\text{PREVENTER} & i \\
\text{PREVENTEE} & j \\
\text{SOA-ARG} & \boxed{5}\ {}_{\textit{eat-rel}}\begin{bmatrix}
\text{EATER} & j \\
\text{EATEN} & k
\end{bmatrix}
\end{bmatrix} \\
\text{STEM} & {}_{\textit{erg-trans-vb}}\begin{bmatrix}
\text{SUBJ} & \langle \boxed{2}_k \rangle \\
\text{COMPS} & \langle \boxed{6}_j \rangle \\
\text{ARG-S} & \langle \boxed{6}_j,\ \boxed{2}_k \rangle \\
\text{CONT} & \boxed{5}
\end{bmatrix}
\end{bmatrix}
\end{bmatrix}
$$

Unlike some other languages, in Inuit, a stem can be passivized prior to the application of causative morphology, as in (68a). This example also falls out from the sorts that we have proposed, as is shown in (68b) (note that here causativization is applying to an intransitive stem according to the left disjunct of (62a). We have only considered passivization here, but this account can also be extended to antipassives in Inuit, along the lines sketched by Manning (1994).

(68) a. Jaaku-p ammit qimmi-nit niri-niqa-tsaali-v-a-i
Jaaku-ERG skin.PL.ABS dog-PL.ABL eat-PASS-prevent-IND-TR-3SG.3PL
'Jaaku prevented the skins from getting eaten by the dogs.'

$$
\text{b.}\quad
{}_{\textit{caus-stem-2}}\left[\begin{array}{ll}
\text{SUBJ} & \langle \boxed{2}\text{NP}[abs]_k \rangle \\
\text{COMPS} & \langle \boxed{1}\text{NP}[erg]_i,\ \boxed{7}\text{NP}[abl]_j \rangle \\
\text{ARG-S} & \langle \boxed{1}_i,\ \boxed{2}_k \rangle \\
\text{CONT} & {}_{\textit{prevent-rel}}\left[\begin{array}{ll}
\text{PREVENTER} & i \\
\text{PREVENTEE} & k \\
\text{SOA-ARG} & \boxed{5}\ {}_{\textit{eat-rel}}\left[\begin{array}{ll}
\text{EATER} & j \\
\text{EATEN} & k
\end{array}\right]
\end{array}\right] \\
\text{STEM} & {}_{\textit{passive-stem}}\left[\begin{array}{ll}
\text{SUBJ} & \langle \boxed{2}_k \rangle \\
\text{COMPS} & \langle \boxed{7}_j \rangle \\
\text{ARG-S} & \langle \boxed{8}_k,\ \boxed{7}_j \rangle \\
\text{CONT} & \boxed{5} \\
\text{STEM} & {}_{\textit{erg-trans-vb}}\left[\begin{array}{ll}
\text{SUBJ} & \langle \boxed{8}_k \rangle \\
\text{COMPS} & \langle \boxed{6}_j \rangle \\
\text{ARG-S} & \langle \boxed{6}_j,\ \boxed{8}_k \rangle \\
\text{CONT} & \boxed{5}
\end{array}\right]
\end{array}\right]
\end{array}\right]
$$

Inuit binding possibilities are complicated by the existence of coterm binding constraints (see Bittner (1994), Sadock (1994), and Manning (1994) for discussion), and we will not present a complete account here. But (69) illustrates the correctness of the most basic prediction of our argument structure based binding theory. According to (62a), both the causer and the causee qualify as a-subjects and we would expect them to be able to bind suitable reflexives. Example (69) shows that this is indeed true, even for the oblique causee that results when a transitive stem is causativized (69b).[22]

(69) a. Kaali-p Pavia immi-nit angi-nir-u-sinnaa-nngin-nirar-p-a-a
Kaali-ERG Pavia.ABS self-ABL big-CMP-BE-can-NEG-say-IND-TR-3SG.3SG
'Kaali$_i$ said that Pavia$_j$ couldn't be taller than self$_{i/j}$.'

b. Aalu-p Pavia-mut Suulut savim-mi-nik kapi-qqu-aa
Aalu-ERG Pavia-TERM Suulut.ABS knife-4SG-MOD stab-ask-IND.3SG.3SG
'Aalut$_i$ told Pavia$_j$ to stab Suulut$_k$ with his$_{i/j/*k}$ knife.'

5 Conclusion

We began this paper by reviewing Borsley's proposal to separate Pollard and Sag's SUBCAT list into SUBJ, SPR and COMPS lists and the decision by Pollard and Sag (1994: 375) to keep the SUBCAT feature around, perhaps merely as a convenience, to treat binding phenomena

[22] Examples of this latter sort are given by Fortescue (1984:144) and Bittner (1992:37) but it must be pointed out that Sadock (1994) reports that his consultants failed to accept binding by the terminalis a-subject (even though his own theory predicts it as well). This may just be because, out of context, the ergative is a much more prominent possible binder. Everyone accepts cases like (69a).

in English. In the interim, we have examined (however superficially) data from a wide range of languages whose binding patterns are quite different from those of English, or even from each other. Above all, what we have tried to show is that one can use this SUBCAT list, better termed ARGUMENT-STRUCTURE, to considerable linguistic advantage.

We have argued that HPSG must draw a fundamental distinction between argument structure and the valence features which Borsley proposed, which distinguish grammatical relations. This in turn seems to alter the character of HPSG, by providing an important second kind of organization on the dependents of lexical heads. In particular (following the reasoning laid out in slightly different terms in Manning 1994) we have argued that it is possible to give a universal characterization of binding in terms of this notion of argument structure – a characterization that in fact generalizes nicely over accusative and ergative languages.

In the process of developing this account, we have been led to a number of more specific proposals about the nature of causatives, passives and the like. A perspicuous way of formulating these proposals seems to be in terms of a small set of universally available sorts and constraints associated with them (also universal, we might hope). Although the ideas sketched here are preliminary, we hope that they can serve as a basis for subsequent HPSG research that will try to distill generalizations from seemingly diverse cross-linguistic patterns like these and to organize them into a tight system of universally available types and simple constraints. The recognition of argument structure as an independent dimension of grammatical organization seems to be an important first step to take in the realization of this goal.

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