Dissociations between Argument Structure and Grammatical Relations

Christopher Manning and Ivan Sag

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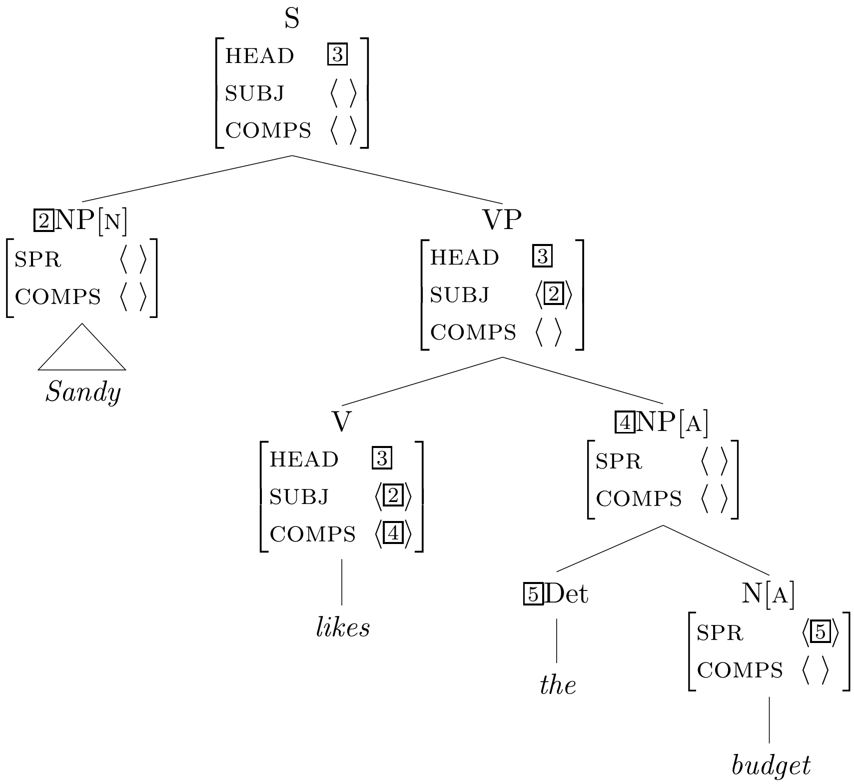
1 Introduction

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]

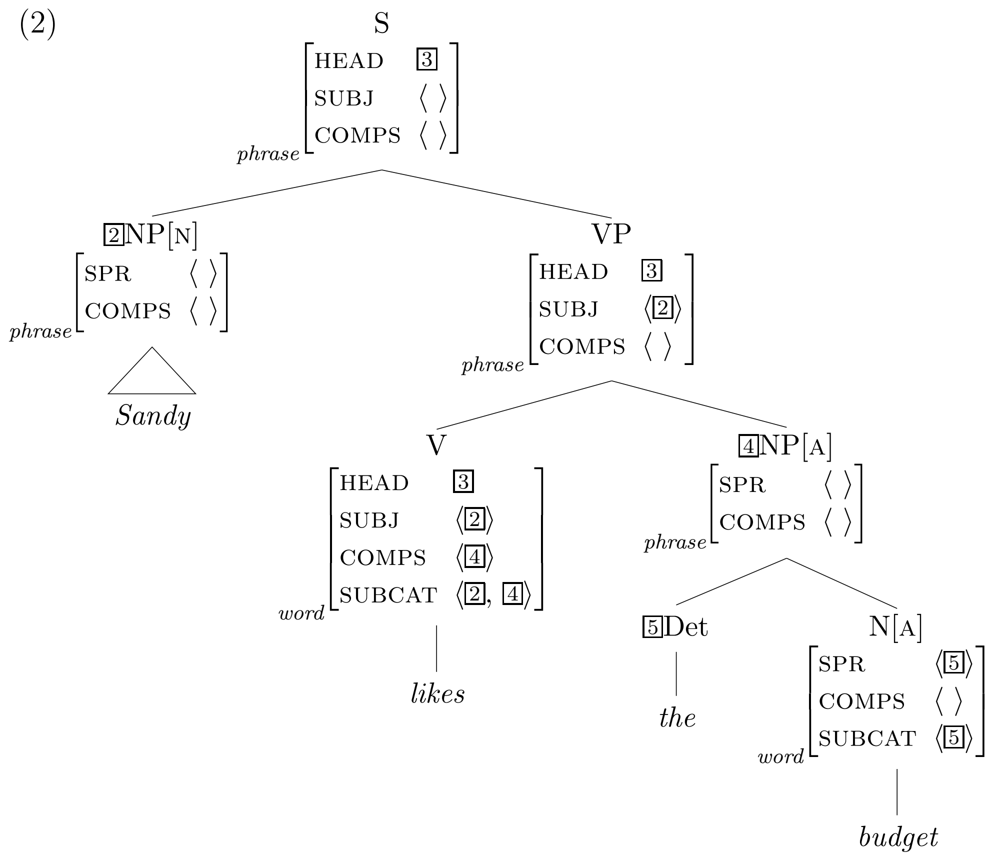
[1]This is a draft version of a paper presented at the Tübingen HPSG workshop, June 1995. We intend to make considerable revisions to this paper. Towards that end, comments are welcome.

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

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

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'

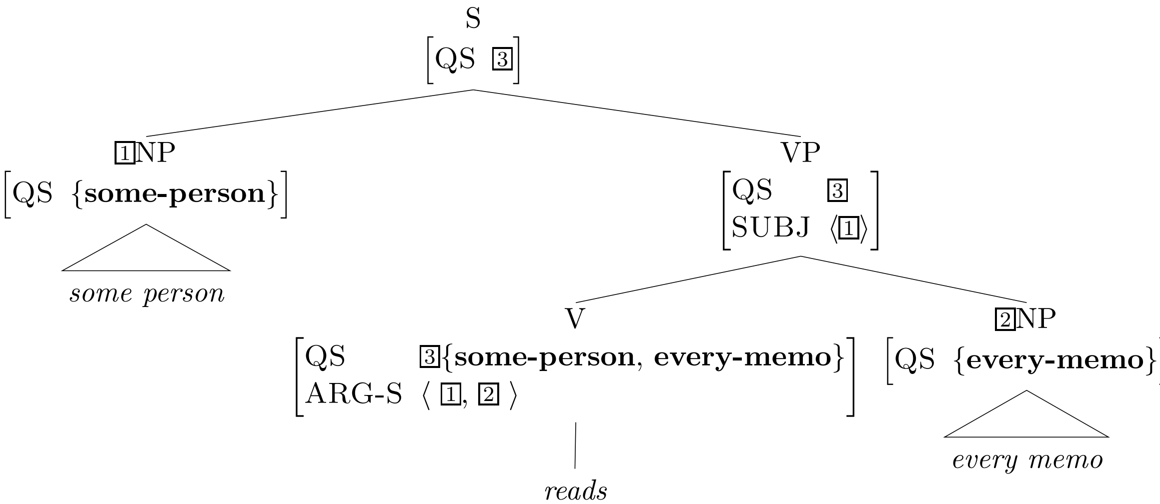
In recent work, however, Pollard and Yoo (this conference) suggest a solution to this problem. First, they propose to make Q-STORE (QS) a feature of *local* objects, rather than a feature of the highest level (the *sign*), as Pollard and Sag proposed. This revision has the consequence that within raising 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) $$\begin{bmatrix} \text{ARG-S} & \langle\ [\text{QS } \Sigma_1],...,[\text{QS } \Sigma_n]\ \rangle \\ \text{QS} & \Sigma_1 \cup\ \ldots\ \ldots\ \cup \Sigma_n \end{bmatrix}$$

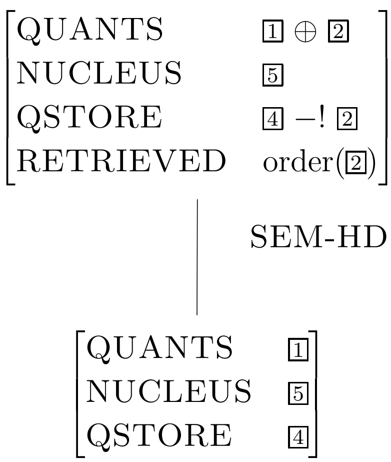
On this approach, the QS of the verb in (49) is nonempty and may be passed up the tree from head-daughter to mother as sketched in (49).

(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]

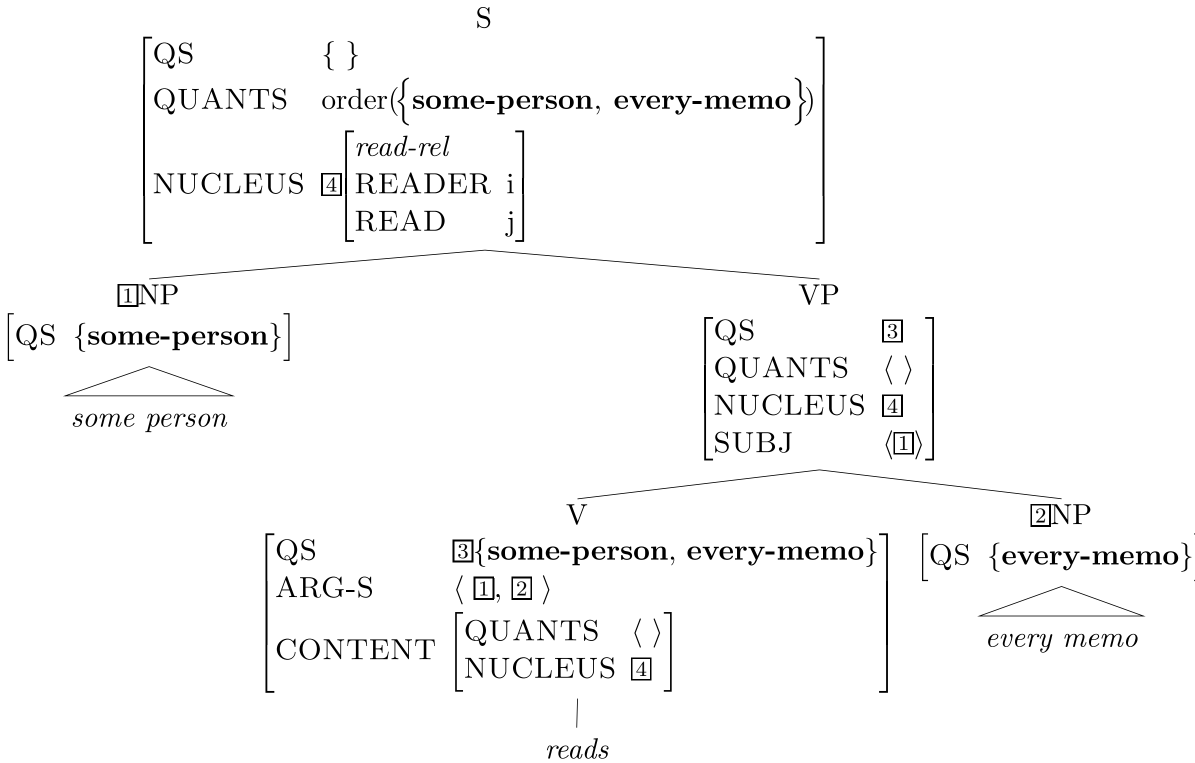
(50)



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 (Σ_1, Σ_2, Σ_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). Morphalological 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. [SUBJ ⟨$\boxed{1}_i$⟩
COMPS ⟨$\boxed{2}_j$, $\boxed{3}_k$⟩
ARG-S ⟨$\boxed{1}$NP$_i$, $\boxed{2}$NP$_j$, $\boxed{3}$NP$_k$⟩]

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.

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

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)

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

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)

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

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

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.

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

(63) a. Bavul Mehmet tarafɨndan Hasan-a aç-tɨr-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. $\left[\begin{array}{ll} \text{SUBJ} & \langle \boxed{2}_j \rangle \\ \text{COMPS} & \langle \boxed{1}_i \rangle \\ \text{ARG-S} & \langle \boxed{1}_i, \boxed{2}_j \rangle \\ \text{CONT} & \left[\begin{array}{ll} \text{CARER} & i \\ \text{CARED-FOR} & j \end{array}\right]_{\textit{looking-after}} \end{array}\right]$

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

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.

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

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.'

b.

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

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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