Argument Structure, Valence, and Binding

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Abstract

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This paper develops within HPSG a model of grammar with two syntactic levels, valence lists and argument structure, at which sentences may have different representations: syntactically ergative and Western Austronesian languages are distinctive by allowing different prominence orderings between the valence lists and argument structure, while forms like passives and causatives have nested argument structure lists. While binding theory and related phenomena have traditionally been described in terms of surface grammatical relations or configurations, we demonstrate that binding theory is actually correctly described in terms of argument structure configurations. Such an approach generalizes nicely over accusative and ergative constructions, correctly predicts binding patterns with causative and passive verbs, and supports the lexicality-preserving account of passives and causatives advocated within HPSG.

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This article develops a conception of argument structure within HPSG, a lexicalist, monostratal theory of grammar (Pollard and Sag 1994).[1] Much recent work in syntactic theory has argued for the existence of a level of argument structure separate from surface valency, or the corresponding notions in other theories such as grammatical relations or S-structure configurations (among many others, Bresnan and Zaenen 1990, Grimshaw 1990, Alsina 1996).

[1]This paper is in part a development and reappraisal of a paper delivered at the Tübingen HPSG workshop in June 1995, and distributed as Manning and Sag (1995). However, it greatly changes and updates the analysis to be generally consistent with more recent work such as Abeillé et al. (to appear) and Manning et al. (in press), and introduces various new data. We thank Georgia Green, Stephen Wechsler, and the audience at Tübingen for helpful comments; and I Wayan Arka for discussion of data from Balinese. We also thank Gert Webelhuth, whose paper (Webelhuth in press) acted as something of a touchstone in the redevelopment of this analysis.

While our proposal is informed and inspired by this earlier work, the aim of this article is not simply to motivate the need for incorporating such a level into HPSG, which until fairly recently lacked such a level. Rather, we wish to develop a particular conception of a level of syntacticized argument structure, which is supported by a broad cluster of typological phenomena concerning various modules of grammar.

On our conception, argument structure is a syntactic level, wherein core arguments always outrank oblique arguments, and argument prominence effects (i.e., traditional thematic hierarchy effects) are seen only within each of the two classes of core and oblique arguments. By proposing a non-configurational binding theory defined on such a level, one can capture the interaction of syntactic and thematic prominence on binding in a constrained way. Following much recent work, we see passives and causatives as operations on argument structure. This correctly predicts that sentences containing such verb forms will have different binding behavior from sentences with the basic verb form. In particular, we propose the use of nested-list argument structure representations to capture the pervasive phenomenon whereby agents of passives and the causee of causatives regularly retain the possibility of binding "subject-oriented" reflexives. An examination of syntactically ergative and Western Austronesian languages from this typological perspective provides further arguments that the surface forms of these languages should not be generated by argument structure changing operations such as passive or antipassive, but rather that the various realization patterns simply represent different mappings between argument structure and the surface valence selection. This correctly predicts that binding behavior is largely independent of surface expression in these languages. To the extent that these arguments are accepted, the findings are of broad theoretical interest. Our approach to binding is in some ways inspired by Hellan (1988), working in GB, and a similar approach to argument structure has been extended to LFG (Manning 1996a, Arka and Wechsler 1996, Arka 1998). At a general theoretical level, this paper serves to extend the argument that many phenomena traditionally connected with surface configurations, grammatical roles or valence positions are better captured at a more abstract level of organization.

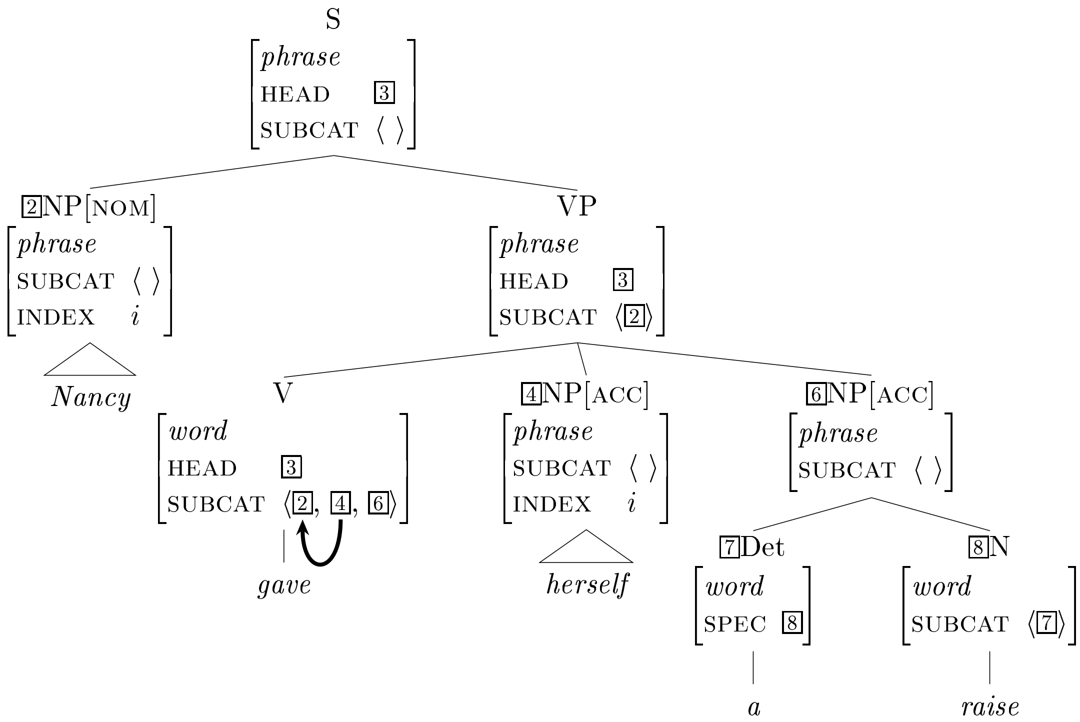
1 Rethinking the locus of binding theory

The correct locus (or loci) of binding theory has been a matter of much discussion. Theories can be seen as varying along at least two dimensions. The first is whether binding theory is configurationally determined (that is, the theory exploits the geometry of a phrase marker, appealing to such purely structural notions as c-command and government) or whether the theory depends rather on examining the relations between items selected by a predicate, such as the theory of Reinhart and Reuland (1993) (where the term *selection* is intended to cover everything from semantic dependencies to syntactic subcategorization). Pollard and Sag (1992, 1994), along with other work such as Dalrymple (1993), demonstrate that an approach to binding based on the obliqueness of dependents of a head 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. In this paper we build on those arguments and continue to develop a non-configurational binding theory.

However, here, we wish to concentrate on the second dimension, the level of grammar on which binding is defined. Attempting to roughly equate levels across different theories, suggestions have included the semantics/lexical conceptual structure (Jackendoff 1992), thematic structure (Jackendoff 1972, Wilkins 1988), argument structure/D-structure/initial grammatical relations (Perlmutter 1984, Belletti and Rizzi 1988), surface syntax/grammatical relations, logical form, linear order, pragmatics (Levinson 1991), and discourse (Kuno 1987, Iida 1992).

The data is sufficiently varied and complex that many theories end up as mixtures, variously employing a combination of elements along both dimensions (for instance, Chomsky (1986) relies purely on configurational notions for the relationship between an anaphor and its antecedent, but uses concepts from selection in the definition of the binding domain of an anaphor; Belletti and Rizzi (1988) use a combination of D-structure and S-structure binding constraints). Nevertheless, the dominant tradition within generative grammar has been to assume that the notion of surface obliqueness that identifies the subject of a clause (whether configurationally or by an ordering on dependents) is also used for the core conditions on reflexive binding. In GB (Chomsky 1981), binding theory is standardly defined on S-structure, so that in (1), *Nancy* can bind *herself* due to the c-commanding configuration that also makes *Nancy* the subject.

(1)



In the HPSG binding theory of Pollard and Sag (1992, 1994), binding possibilities reflect an obliqueness hierarchy of surface grammatical relations (in a tradition stemming from Johnson (1977)). For the sentence in (1), *Nancy* can bind *herself* because of satisfaction of the property of local o-command defined over subcategorization lists, as indicated by the arrow.[2]

[2]In the HPSG signs shown within square brackets, small boxed numbers are used to show things that are equated, so that, for example, the NP $\boxed{2}$ is token identical with the first thing on the SUBCAT list of *gave*,

However, consideration of typologically diverse languages shows that this consensus is mistaken. In this paper, we show that various phenomena that have traditionally been described in terms of surface configurations, surface grammatical relations or valence lists, are better described in terms of argument structure configurations. In particular, we present evidence that the core constraints of binding theory – both the definition of binding domains and the relationship between an anaphor and its antecedent – should rather be described in terms of argument structure configurations. As we show below, this provides arguments in favor of a lexicality-preserving argument structure-based account of causatives and passives.

1.1 HPSG Binding Theory

Central to Head-driven Phrase Structure Grammar (HPSG), as a lexicalist theory of grammar, is the idea that words determine the properties of phrases, not only in terms of features like category and agreement, but also in terms of the patterns of arguments that appear. In Pollard and Sag (1987) and Pollard and Sag (1994:Ch. 1–8), this is done via the SUBCAT list, a single ordered list describing the subcategorized arguments of a head. Thinking from the perspective of the lexicon, this list represents the arguments, that is, the argument structure of the head. However, simultaneously this list expresses the realized surface arguments of the clause, which one can think of as the array of surface grammatical relations with which the head appears. This is because the theory of HPSG includes the SUBCAT principle, which requires that the elements of SUBCAT lists must be 'cancelled off' (in a Categorial Grammar-like manner) as a head projects a phrase, along the lines indicated in (1).

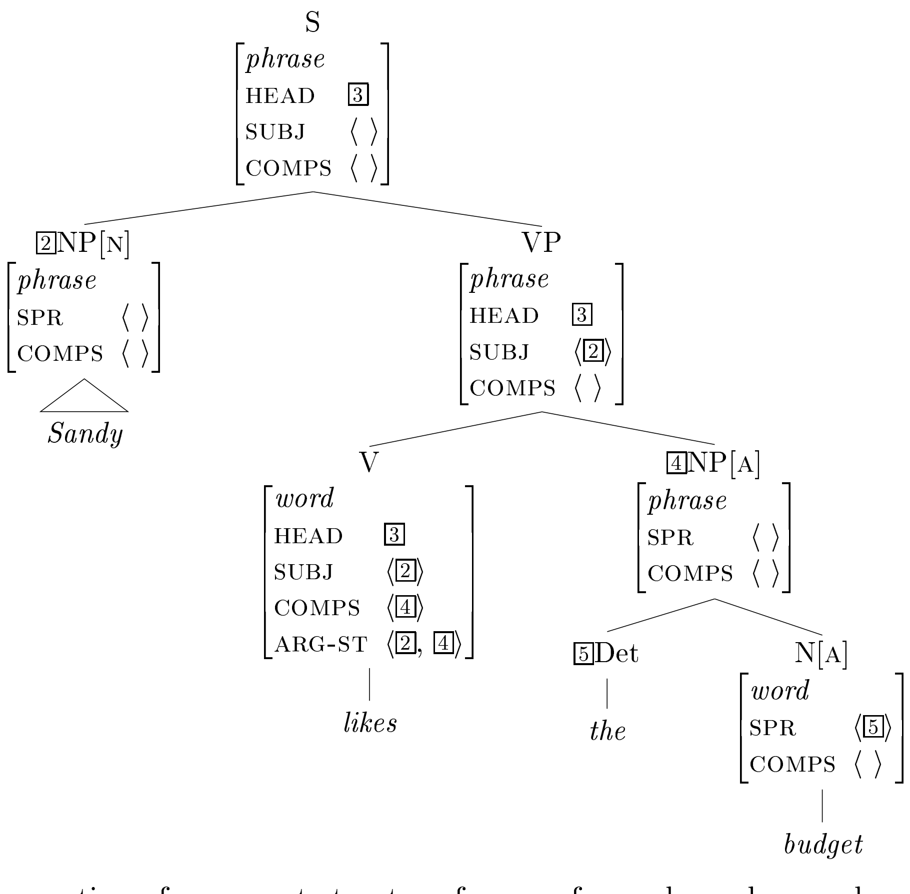
Borsley (1989) argues that there are various deficiencies in the SUBCAT-list approach to surface valency in HPSG, and suggests splitting the SUBCAT list into separate lists for subjects, complements, and specifiers. Such a move provides in HPSG an analog of the external/internal argument distinction 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 recognition of the special features of subjects which have been noted in the LFG literature, where keyword grammatical relations are used (see Borsley (1989) and Pollard and Sag (1994:Ch. 9) for more detailed justification of the approach). In this model, it is these *valence features*, SUBJ, COMPS and SPR, whose values are 'cancelled off' as a head projects a phrase. However, independent of this different representation of surface valence, if the lexical argument structure of a word and the surface array of grammatical relations it appears with are equated, the theory still embodies the claim (consistent with work in GPSG and early LFG) that grammatical theory requires only analyses at the level of surface grammatical relations. There are a number of reasons to believe that such a conception cannot be maintained, and this paper presents a perspective on the role of a level of argument structure (ARG-ST) within HPSG.

When Borsley (1989) suggested dividing the SUBCAT list into multiple valence lists, we

and HEAD features are shared between the verb and the S node. In the NP *a raise*, we show the determiner on the SUBCAT list of the noun. This was standard in HPSG of this vintage, where the determiner was analyzed as a subcategorized argument of a noun phrase head on a par with more contentful arguments, such as complements. The fact that the more recent model of HPSG that we introduce below allows these types of selection to be better teased apart is another advantage in introducing a level of argument structure.

believe that he intended that they would replace the SUBCAT list, but Pollard and Sag (1994:Ch. 9) actually keep SUBCAT as an attribute of lexical signs, whose 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 since it allowed the existing HPSG binding theory to be retained unchanged. The SUBCAT list merely summarizes the valence of a lexical sign, without having any independent life of its own. However, if we consider the above distinction between surface valency and underlying argument structure, we see that the remaining role for the SUBCAT list is to express the arguments of a lexical sign, and hence it is natural to rename this attribute as argument structure (ARG-ST). The ARG-ST remains unaffected in the construction of syntactic phrases, except that, in virtue of the various identities between ARG-ST list members and members of valence lists, the ARG-ST list's members become specified as the valence list values are identified with actual subjects, complements and specifiers. Under this model, a lexical head combines with its complements and subject or specifier (if any) according to the lexically inherited specification, as in (2), with subcategorization for arguments checked by a suitably generalized Valence Principle. Once a complete phrase is constructed, the lexical head's ARG-ST list is fully specified, as indicated in (2), and may be used as the locus of binding theory.[3]

(2)



The separation of argument structure from surface valency has made possible a number of interesting new analytic possibilities in HPSG, and has been widely used in recent work (Sag

[3]Here and elsewhere we abstract from the detailed geometry of the HPSG sign, as described in Pollard and Sag (1994), and show just attributes and values of immediate relevance.

and Fodor 1994, Sag and Godard 1994, Manning 1996b, Miller and Sag 1997, Manning et al. in press, Abeillé et al. to appear, Bouma et al. 1998, Wechsler and Arka to appear). Our concern here is to take a broader perspective on the status of argument structure, with particular reference to binding theory. This architecture predicts that in cases of dissociations between argument structure and surface valence, it is the argument structure configuration that predict binding possibilities. In this paper we want to argue that a variety of typological evidence confirms this prediction, and to develop a theory in which the key principles of binding theory are stated on a level of syntacticized argument structure.

The HPSG binding theory of Pollard and Sag (1994) maintains three binding principles, analogous to those of Chomsky (1981); they are given informally in (3):[4]

(3) 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.

These principles require an anaphor to be coindexed with a less oblique ARG-ST member, if there *is* such a less oblique coargument. Otherwise, anaphors are exempt and free to be bound by appropriate elements in the discourse context, subject to various discourse and processing considerations (Pollard and Sag 1992, Pollard and Sag 1994).

This binding theory is adequate for English, but crosslinguistic coverage of binding phenomena requires more parametric options (Dalrymple 1993). Firstly, while classical reflexives are clause bounded, many languages allow long-distance reflexives. For example, both the Inuit lexical reflexive *immi* and the reflexive pronominal endings on verbs, and the Japanese reflexive *zibun* can be bound by any a-commanding a-subject. Such long-distance anaphors might be said to obey Principle Z (Xue et al. 1994):[5]

(4) Principle Z. A locally a-commanded long-distance anaphor must be a-bound.

Secondly, in many languages, reflexives cannot be bound by just any less oblique (local) NP, but rather their antecedence is restricted to what we might loosely call "subjects". At least to a first approximation this is true of languages such as Japanese, Russian, Serbo-Croatian, Inuit, and Sanskrit. Given that the binding theory in HPSG is defined on ARG-ST (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-ST list. We will formalize such a notion with the definition and principle in (5), drawn from Manning (1996b).

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

[4] A-command, a-bound, and a-free are the same notions as o-command, o-bound, and o-free from Pollard and Sag (1994), now defined on ARG-ST, but the new names are meant to evoke the argument structure based theory of binding we employ.

[5] Reinhart and Reuland (1993:658) suggest that morphologically complex anaphors "are universally local, whereas the long-distance type is universally simplex." While this interesting observation holds over a range of European languages, it does not appear universal – for instance, Marathi has long and short distance reflexives (Dalrymple 1993), which do not differ in morphological complexity – and so we do not attempt to build any such predictions into our theory.

b. A-subject-oriented anaphors must be a-bound by an a-subject.

The class of a-subjects overlaps, but differs from, other notions in common use: external arguments are a-subjects, but since the a-subject is simply the most prominent argument of the predicate, an a-subject can be an internal argument, as in the case of unaccusative verbs. The concept of a-subject is thus similar to the logical subject (Jespersen 1924), and again all logical subjects are a-subjects, but we argue immediately below that the compound argument structures that occur as a result of passives and causatives yield lexical forms with nested argument structures and thus multiple a-subjects, whereas for Jespersen only the agent argument of a passive is the logical subject.

A restriction to a-subject binding in (West Greenlandic) Inuit, which is not present in English, allows us to explain the contrast between (6a) and (6b). Obliqueness according to the principles in (3) correctly predicts that *Chris* is a possible binder of the reflexive in (6a). However, in Inuit the reflexives are a-subject oriented, and so the NP *Kaali* is not a possible binder of the reflexive in example (6b) because it is not an a-subject.

(6) a. Kim$_i$ explained Chris$_j$ to herself$_{i/j}$.

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

1.2 The interaction of binding and passive

Now consider the interaction of passive and subject-oriented reflexives. In a theory that provides just surface notions of valency (or grammatical relations) the prediction is clear: the only possible binder of subject-oriented reflexives, the a-subject, should be the subject of a passive verb. For instance, this would be the case under the theory of passive used in Pollard and Sag (1987) – a lexical rule that cyclically permuted the SUBCAT, now ARG-ST, list as in (7):[6]

(7) $$\begin{bmatrix} \textit{active-verb} & \\ \text{ARG-ST} & \langle \boxed{1}_i, \boxed{2}, \ldots \rangle \\ \text{CONT} & \boxed{3} \end{bmatrix} \rightarrow \begin{bmatrix} \textit{passive-verb} & \\ \text{ARG-ST} & \langle \boxed{2}, \ldots \rangle \ (\oplus \langle \text{PP}[\textit{by}]_i \rangle \ ) \\ \text{CONT} & \boxed{3} \end{bmatrix}$$

Assuming that binding is restricted to a-subjects, the only possible binder would be 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 (8a), the reflexive *sebe* must be bound by the subject, in the passive (8b), the antecedent can be either the surface subject or the agent argument (that is, the logical subject).

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

[6] We use $\oplus$ to indicate list concatenation or append, and parentheses to indicate optionality.

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$_i$.'

Perlmutter argued from these data that the passive must have a complex representation of some sort. 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 (roughly, subject) at some level: the logical subject is the initial 1, while the surface subject is 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. Rather, following Grimshaw (1990:167–173) we would suggest these facts can more restrictively be captured by proposing that the lexicon builds signs with nested argument structures. 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 binding behavior of such passives argues that passive verbs have a nested argument structure, and hence two a-subjects. We propose that the passive verb of (8b) has the lexemic form shown in (9):[7]

(9)
$$\begin{bmatrix} \textit{pass-v-lxm} & \\ \textsc{arg-st} & \langle\ \boxed{2}\text{NP}[\textit{nom}]_j,\ \langle \boxed{1}\text{NP}[\textit{instr}]_i,\ \text{PRO}_j,\ \boxed{5}\text{PP}_k \rangle\ \rangle \\ \textsc{cont} & \begin{bmatrix} \textit{buying} & \\ \textsc{actor} & i \\ \textsc{undergoer} & j \\ \textsc{beneficiary} & k \end{bmatrix} \end{bmatrix}$$

A passive lexeme's ARG-ST value is a list consisting of the second (undergoer) argument of the corresponding active verb's argument structure, followed by a list that is the same as the ARG-ST value of the active verb, except that the second element has been replaced by a PRO placeholder. These placeholder elements in ARG-ST lists are used to mark positions

[7]The terms 'actor' and 'undergoer' in the CONT(ENT) are to be understood essentially as in Foley and Van Valin (1984). In HPSG, the value of the CONTENT attribute is a representation of the semantics of the sentence. While in simple cases this may look rather like the argument structure, it is distinguished in many ways including: (i) ARG-ST is a syntactic level, where things like expletive core arguments are represented, while CONTENT only contains semantic arguments; (ii) CONTENT also represents semantic phenomena like quantification, whereas ARG-ST does not; (iii) CONTENT provides a fine-grained semantic classification, whereas ARG-ST does not; and (iv) passivization rearranges core arguments, and so affects ARG-ST, but it does not change the meaning and so the CONTENT remains unchanged, as in (9). See Davis (1996) for a development within HPSG of the theory of semantic types and attributes that we are assuming here, and Pollard and Sag (1994) for general background on the role of CONTENT in HPSG. Finally, the HPSG type system distinguishes between things of type *word* which are a particular pairing between a form and a meaning, and things of type *lexeme*, which are abstract proto-words, which give rise to actual words when suitably inflected. The discussion in the text thus assumes that passive is derivational, although nothing in particular depends on this assumption.

coindexed with an element higher in the ARG-ST, and are needed for binding, as we will see below. The passive's ARG-ST value is thus a 'nested' list (a list that contains another list as a member), a fact that will play a crucial role in our account of constraints on binding.

In (9), the reflexive beneficiary $\boxed{5}$ is inside the nested ARG-ST list. This means that it is a-bound by two a-subjects. If the beneficiary $\boxed{5}$ is a long distance a-subject-oriented anaphor, then Principle Z and the a-subject principle can be satisfied by $\boxed{5}$ being coindexed with either $\boxed{1}$ or $\boxed{2}$, both of which are a-commanders and a-subjects. This is exactly the result we want to explain the Russian data above.[8]

The theory of the lexicon in HPSG seeks to systematically capture the productivity of the lexicon by describing the general productive relationships which build morphologically complex words. Various ways have been suggested for licensing the derived types that correspond to morphologically complex words, such as the one we need for the passive lexeme. While any of them could be used to produce a similar analysis to the one presented here, we will develop our account in terms of a theory of derivational types, which specify a declarative relationship between a SOURCE stem and a RESULT stem (which is morphologically 'derived' from it). Such an approach is closely related to the hierarchy of lexical rules proposed by Copestake (1992) (see also Meurers (1995)). It has the advantages of allowing inheritance within the hierarchical lexicon of HPSG to extend over both stem and word types and derivational types (as in the approach of Riehemann (1993, in press)), while preserving the locality of information and lexical integrity of words within the syntax that is well-captured within the lexical rules approach. Thus we will suppose that the characterization of passive in languages like Russian is captured by the derivational type in (10):[9]

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[8]Note that our theory predicts that the surface subject is another possible binder of the anaphor in (7b), but this is being ruled out due to its being an inanimate NP (such animacy restrictions are modeled using the CONTEXT attribute in HPSG, as described in Pollard and Sag (1994)). In practice, the agent binding is harder to get when an animate subject is available (Klenin 1974, Bailyn 1986, Rappaport 1986). Although sentence (i) is quite awkward in Russian, the natural binder of the reflexive is the grammatical subject:

(i) ?Ivan byl sproshen Borisom o sebe
Ivan.NOM was asked Boris.INSTR about self
'Ivan$_i$ was asked by Boris$_j$ about himself$_{i/??j}$.'

Our account gives no particular explanation of this, but one could easily imagine one in terms of discourse structure and prominence. Calling the Russian reflexive long distance is also a simplification, but it does have an extended domain of binding through infinitival clauses (Rappaport 1986), which is sufficient to account for the phenomena discussed here.

[9]This passive is intrinsically promotional; some have argued that the universal rule of passive should only mention subject demotion, to account for passive-like structures where nothing is promoted, such as in Lithuanian, but we would provide a different (though related) type for such cases. On the other hand, note that representations of the passive involving merely demotion of the agent (Bresnan and Zaenen 1990, Grimshaw 1990) have no natural way of capturing the continued a-subject prominence of the subject that is well captured on our approach.

(10)
$$\begin{bmatrix} \textit{passive-drv} & \\ \text{RESULT} & \begin{bmatrix} \textit{pass-v-lxm} & \\ \text{ARG-ST} & \langle \boxed{2}_j, \langle \boxed{1}, \text{PRO}_j \rangle \oplus \boxed{3} \rangle \\ \text{CONT} & \boxed{4} \end{bmatrix} \\ \text{SOURCE} & \begin{bmatrix} \textit{trans-v-lxm} & \\ \text{ARG-ST} & \langle \boxed{1}, \boxed{2} \rangle \oplus \boxed{3} \\ \text{CONT} & \boxed{4} \end{bmatrix} \end{bmatrix}$$

Such a derivational type is to be read as saying that basic and other derived lexemes of the SOURCE type license additional lexemes of the RESULT type. In particular, if the source is the regular active verb of *buying*, this type will license a passive lexeme with a nested argument structure, as shown in (9).

Similar data that supports this kind of representation of passives occurs in many languages; a passive from the syntactically ergative language West Greenlandic Inuit is shown in (11a), and Sanskrit examples of logical and surface subject binding appear in (11b–c).[10] In both languages, either the agent or the patient of a passive verb is a possible binder of a reflexive. Other data that support this analysis from languages such as Hindi and Japanese is discussed by Manning (1996b:57,124–127).

(11) 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.'

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.'

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.'

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 (12):

(12) Yamada-san-wa hataraki-nagara daigaku-o sotsugyō 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).'

[10] In the Inuit examples, the reflexive pronominal agreement marker is glossed as '4th person', its traditional name. See Manning (1996b) for justification of the syntactic ergativity of Inuit.

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 (13) (Shibatani 1988):

(13) Hanako-ga Tarō-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). The possibilities include coreference with the logical subject of a passive. For instance, in (14), the a-subject of 'prevent' is coreferent with the logical subject of 'tie up' (Bittner 1994:178):

(14) 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.'

In our account of binding in passive clauses, we have argued 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 be stated so as to realign argument structure, not just valence lists; and (iii) that binding possibilities are sensitive to this argument structure, and not to surface phrase structure or surface valence patterns. The data to which we turn now provides remarkable support for this conception of binding theory over various alternatives which might appear possible at this point.

2 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 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 (1996b) and in Wechsler and Arka (to appear), but will be illustrated briefly here, with an eye to the development of an HPSG analysis. These languages thus provide strong support for two independent syntactic levels, realized in HPSG by the valence lists and ARG-ST.

2.1 Western Austronesian languages

Western Austronesian languages allow various relationships between argument structure and valence list configuration, mediated by so-called voice morphology.[11] The best known case of this is perhaps Tagalog (Schachter 1976, Schachter 1977, Kroeger 1993), but here we will

[11] We use the term 'Western Austronesian' slightly loosely to describe those Western Malayo-Polynesian languages with the kind of properties discussed. This class includes many but not all languages of the Philippines and Indonesia.

present some evidence from the Indonesian language Toba Batak (Schachter 1984), which has a more rigid configurational surface structure than Tagalog, and hence demonstrates some points more clearly. In particular, it clearly shows the independence of binding from surface structure command relationships.

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

(15) 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 (15a) has the logical subject of the clause in the clause final subject position, while the objective voice (15b), which tends to be used in unmarked contexts, has the Undergoer – or logical object (Mohanan 1990) – in subject position. Schachter (1984) provides evidence that both arguments in both voices in (15) are 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 (15a) or (15b) as a passive or antipassive (as has often been done in the generative literature). Rather the two forms simply exhibit two alternate possible 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, which 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 VP, where the NP following the verb in a transitive clause counts as part of the VP regardless of the verbal voice chosen (16b–c), but an intransitive subject does not (16a).

(16) 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:

(17) 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-cook 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 as a head-complement phrase. Conversely, the final NP in the examples in (15–16) will be analyzed as a VP-external subject. This NP behaves similarly to the *ang*-marked NP in Tagalog. It 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, then that NP is the subject. Moreover, in control constructions, it is this VP-external subject NP that must be the (unrealized) controllee of the subordinate clause, regardless of the verbal voice:

(18) 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.'

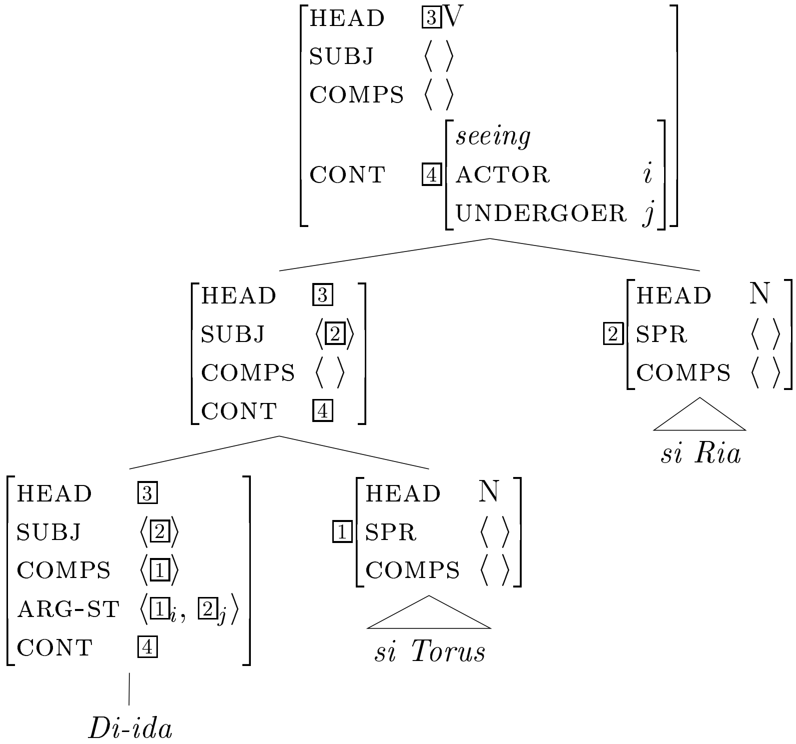
b. Mang-elek si Bill si John [di-pareso doktor __]
AV-persuade PM Bill PM John OV-examine doctor
'John is persuading Bill to have a doctor examine him.'

This suggests that the lexical entries for the verbs in (15a) and (15b) are (19a) and (19b) respectively, and the analysis of (15b) is as in (20). Both verbs have the same argument structure, and both are transitive, but they differ in the choice of which argument becomes the surface subject, and which becomes a complement.

(19) a.
$$\begin{bmatrix} \text{PHON} & \langle \text{mang-ida} \rangle \\ \text{SUBJ} & \langle \boxed{1} \rangle \\ \text{COMPS} & \langle \boxed{2} \rangle \\ \text{ARG-ST} & \langle \boxed{1}\text{NP}_i,\ \boxed{2}\text{NP}_j \rangle \\ \text{CONT} & \begin{bmatrix} \textit{seeing} & \\ \text{ACTOR} & i \\ \text{UNDERGOER} & j \end{bmatrix} \end{bmatrix}$$

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

(20)



However, despite the clear evidence for phrase structure and grammatical relations, reflexive binding 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):

(21) 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$_i$.'

(22) 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 structures of the sentences in (21) and (22) are radically different. But all available evidence indicates that the phrase structure is the same despite the changing verbal voice. Similarly these facts cannot follow from obliqueness defined on the level of grammatical relations, because in (22b) we have an object binding a subject. On the other hand, 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 (22b), it nevertheless a-commands the reflexive – the structure of this example is identical to (20). 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.[12]

2.2 Syntactically ergative languages

The situation where binding possibilities do not track other subjecthood tests is not confined to Austronesian languages, but also occurs in syntactically ergative languages. Syntactically ergative languages are ones where the patient-like argument of a transitive verb (the O argument) forms a class with the single argument of intransitive verbs (S), acting as the 'pivot' for surface syntactic processes, while the agent-like argument of a transitive verb (A) lacks this behavior (Dixon 1994). Manning (1996b) argues that there is typological support for a division between purely syntactic processes, such as constraints on relativization, topicalization, questioning, specificity or wide scope, omission in coordination, etc., which are universally sensitive to surface valence, and the more semantic properties of binding, control and imperative addressee, which are sensitive to prominence at a level of argument structure. An example of a syntactically ergative language is Inuit, where Woodbury (1977) and Bittner (1994) show that there is a split in properties as indicated in (23):

(23)	**Absolutive marked NP**	**Actor**
	Subcategorized element of every clause	Reflexive binding
	Relativization	Equi target
	Specific/Wide Scope	Imperative addressee
	-niq nominalizations	Derivational morphology
	Agreement	Controller/controllee of adverbial clauses

The absolutive NP has subject properties. All verbs subcategorize for an absolutive argument (although it may not appear overtly because of free pro-drop). Relative clauses are restricted so that the relativized role must be the absolutive within the relative clause.[13] (24a–b) show relativization of O and S NPs in West Greenlandic, while (24c) shows that relativization of an A NP is impossible.

(24) a. nanuq Piita-p tuqu-ta-a
polar.bear Piita-ERG kill-TR.PART-3SG
'a polar bear killed by Piita'

b. miiraq kamat-tu-q
child.ABS angry-REL.INTR-SG
'the child that is angry'

[12]Much more extensive data, analysis and discussion of other Indonesian languages, which supports the approach presented here, is available for Balinese (Arka and Wechsler 1996, Wechsler and Arka to appear, Arka 1998) and Indonesian (Arka and Manning 1998).

[13]Relative clauses in Inuit are actually participial nominalizations, but we are here essentially accepting a functional definition of what a relative clause is.

c. *angut aallaat tigu-sima-sa-a
man.ABS gun.ABS take-PRF-REL.TR-3SG.SG
*'the man who took the gun'

Thirdly, the absolutive NP has special interpretive properties, which the traditional literature has interpreted as definiteness, or specificity, and which Bittner (1994) accounts for in terms of scope. Either of these interpretations are among the subject properties gathered by Keenan (1976). The Central Arctic Eskimo sentence in (25a) differs from the intransitivized variant in (25b) because of a presupposition of specificity associated with the absolutive NP in (25a).

(25) a. Jaani-up tuktu taku-vaa
Jaani-ERG caribou.ABS see-IND.TR.3SG.3SG
'Jaani sees the caribou.'

b. Jaani tuktu-mik taku-vuq
Jaani.ABS tuktu-MOD see-IND.INTR.3SG
'Jaani sees a caribou.'

But other processes seem oblivious to surface grammatical relations. In particular, (26) shows that a possessive reflexive can be bound by an 'Actor', an A or S NP (26a–b), but not by an O NP (26c). These observations appear to support the thesis, attributed to Ken Hale in Miller (1988), that in all languages, in the basic verbal voice, an agent can bind a theme reflexive and not the other way round. This provides another point in the typological space where binding is not defined on surface phrase structure or grammatical relations.

(26) a. ataata-ni Juuna-p tatig(i-v)-a-a
father-4SG.SG Juuna-ERG trust-IND-TR-3SG.3SG
'Juuna$_i$ trusts his$_i$ father.'

b. Arnaq iglu-mi-nut tikit-tuq (Qairnirmiut)
woman.ABS house-4SG-DAT arrive-PART.INTR.3SG
'The woman$_i$ arrived at her$_i$ house.'

c. *Anaana-mi Piita nagligi-janga (Inuktitut)
mother-4SG.ERG Piita.ABS love-3SG.3SG
'His$_i$ mother loves Piita$_i$.'

2.3 Different linking patterns through cross-classifying types

Following Kroeger (1993), we argue that Western Austronesian languages and syntactically ergative languages are unusual in allowing different mappings between argument structure and valence lists. That is, unlike many generative analyses, we reject the idea that different Austronesian 'voices' or syntactic ergativity arises from argument structure changing operations such as passive or antipassive. Rather, the argument structure remains unchanged, and there is just a different linking of arguments onto valence list positions. For example, (19a) represents an accusative pattern where the first argument on the ARG-ST list (the actor) becomes the SUBJ, while (19b) represents an ergative pattern where the second argument on a transitive ARG-ST list (the undergoer) becomes the SUBJ.

We can seek to explain both the commonality of types like intransitive verbs and transitive verbs across all languages and the systematic linking differences between syntactically ergative and accusative languages and realization patterns through the use of multiple inheritance within a hierarchical lexicon (Pollard and Sag 1987, Riehemann 1993). Following Wechsler (1995) and Davis (1996), we assume that much of the information in the lexical description of a *lexeme* type – in particular information about the linking of ARG-ST members to semantic roles – is predictable on semantic grounds, and largely though not completely consistent across languages. A lexemic description thus need include little more than a specification of phonology, grammatical category, and meaning. We assume that a theory such as that of Davis (1996) (or other work such as Dowty (1991)) will handle the projection of arguments from the meaning (CONTENT) into the argument structure. As a consequence of such a theory, thematically more prominent arguments typically become core arguments and precede thematically less prominent arguments at argument structure, but we will say nothing further about this topic here. We will just assume that the lexicon makes available types that express verbs with different numbers of arguments. A partial presentation of some necessary types for defining verb transitivity appears in (27). Note in particular that types like *intrans-v-lxm* and *trans-v-lxm* only specify the ARG-ST list of their type, and say nothing about the valence lists.[14]

(27) a. *verb-lxm*: $\begin{bmatrix} \text{CAT} & \text{V} \\ \text{SPR} & \langle\ \rangle \end{bmatrix}$

b. *subj-v-lxm*: *verb-lxm* $\wedge \begin{bmatrix} \text{SUBJ} & \langle\ [\ ]\ \rangle \end{bmatrix}$

c. *intrans-v-lxm* : *subj-v-lxm* $\wedge \begin{bmatrix} \text{ARG-ST}\ \langle \text{NP}[\textit{core}] \rangle \oplus \textit{list}(\textit{obl-np}) \end{bmatrix}$

d. *trans-v-lxm* : *subj-v-lxm* $\wedge \begin{bmatrix} \text{ARG-ST} & \langle \text{NP}[\textit{core}], \text{NP}[\textit{core}], \ldots \rangle \end{bmatrix}$

The transitivity types make no mention of how the contents of the valence lists SUBJ and COMPS relate to the contents of the ARG-ST list. This job is left to a dimension of lexical structure that we will term *realization*. For example, in a syntactically accusative language, a transitive verb will say both that it is transitive, and that it obeys an accusative realization pattern, and so on. Before, we suggested that the normal, or *canonical*, relationship between the valence lists and argument structure is that the valence lists 'add up' to the ARG-ST. But we have now seen that not all languages consistently maintain the relationship whereby the ARG-ST list is the append of the SUBJ, SPR, and COMPS lists, *in that order*. Rather, in Western Austronesian languages, another ordering is possible, indeed is unmarked (in terms of both frequency of occurrence and the verbal morphology). In this pattern, it is the second core argument of the ARG-ST of a transitive verb that becomes the SUBJ. In syntactically

[14]We assume a division among the arguments of a verb into *core* and *oblique* arguments (Kroeger 1993, Manning 1996b). In most languages, all verbs have a subject, and so the language would make all verbs *subj-v-lxm*, but we allow for subjectless verbs in the initial verb type.

ergative languages, the unmarked relationship in Western Austronesian languages is the only relationship possible for expressing transitive verbs (Dixon 1994, Manning 1996b).

We wish to maintain the initial intuition, but also to allow for both these different realization patterns and for recent work on the treatment of causatives and light verbs. We will therefore introduce a generalization of the notion of 'adding up', whereby the SUBJ and COMPS lists are allowed to add up in certain constrained ways to a list that is the compression of the argument structure, that is, what it 'flattens out' to once we promote the members of its embedded lists to be on a par with the other list members, eliminating embedded PROs in the process. See Manning et al. (in press) for further discussion and exemplification.[15]

Some necessary realization types that describe possible mappings of this sort between argument structure and the valence lists are presented in (28). These types will cross-classify with the arity or polyadicity types.[16]

(28) a. *acc-canon-lxm*: $\begin{bmatrix} \text{SUBJ} & \boxed{1} \\ \text{COMPS} & \mathsf{compression}(\boxed{2}) \\ \text{ARG-ST} & \boxed{1} \oplus \boxed{2} \end{bmatrix}$

b. *erg-canon-lxm*: *erg-canon-intrans-lxm* $\vee$ *erg-canon-trans-lxm*

c. *erg-canon-intrans-lxm:* $\begin{bmatrix} \textit{intrans-v-lxm} & \\ \text{SUBJ} & \boxed{1} \\ \text{COMPS} & \mathsf{compression}(\boxed{2}) \\ \text{ARG-ST} & \boxed{1} \oplus \boxed{2} \end{bmatrix}$

d. *erg-canon-trans-lxm:* $\begin{bmatrix} \textit{trans-v-lxm} & \\ \text{SUBJ} & \boxed{1} \\ \text{COMPS} & \mathsf{compression}(\langle\boxed{4}\rangle \oplus \boxed{2}) \\ \text{ARG-ST} & \langle\boxed{4}\rangle \oplus \boxed{1} \oplus \boxed{2} \end{bmatrix}$

A verb in a particular language will then inherit its subcategorization type, and one of the types in (28). For an accusative language like English, a transitive verb would have a type like (29a), for a syntactically ergative language like Inuit, there would be a transitive verb type like (29b), while a Western Austronesian language like Toba Batak would allow

[15] compression can be defined as follows ('$\leftarrow$' designates 'only if'):

(i) $\mathsf{compression}(\langle\ \rangle) = \langle\ \rangle$.

(ii) $\mathsf{compression}(\langle PRO|Y\rangle) = Z \ \leftarrow\ \mathsf{compression}(Y) = Z$.

(iii) $\mathsf{compression}(\langle X|Y\rangle) = \langle X|Z\rangle \ \leftarrow\ X$ is a *synsem*, $\mathsf{compression}(Y) = Z$.

(iv) $\mathsf{compression}(\langle X|Y\rangle) = Z \ \leftarrow\ X$ is a *list*, $\mathsf{compression}(X) = X'$, $\mathsf{compression}(Y) = Y'$, $\mathsf{append}(X', Y') = Z$.

[16] The disjunction in (28b) appears necessary. In syntactically ergative languages, with intransitive verbs, the first argument on the ARG-ST list becomes the subject, whereas with transitive verbs, it is the second argument on the ARG-ST list that becomes the subject.

both these constructions via a transitive verb type like (29c). The type in (29c) (along with verb-particular information) will then license the two Toba Batak signs that were shown in (19).

(29) a. *eng-trans-v-lxm*: *trans-v-lxm* ∧ *acc-canon-lxm*

b. *inuit-trans-v-lxm*: *trans-v-lxm* ∧ *erg-canon-lxm*

c. *toba-trans-v-lxm*: *trans-v-lxm* ∧ (*acc-canon-lxm* ∨ *erg-canon-lxm*)

2.4 Predictions of the theory

A central prediction of our theory is that at argument structure, core arguments (or terms) a-command oblique arguments. This is true of basic argument structures because of the constraints in (27), and this property is maintained in derived argument structures such as passives because they only promote the prominence of core arguments. Within each of these groupings, arguments will be ordered due to role prominence, roughly in accord with traditional thematic hierarchies, and will thus the ordering will differ little across languages. This overall shape of the theory thus corresponds to proposals by Hellan (1988), adopted by Dalrymple (1993:172–177) that core arguments a-command obliques and within each of the groupings of core arguments and obliques, a-command reflects argument prominence.

It has seemed appealing to many people to attribute part or all of binding to the thematic hierarchy (Jackendoff 1972, Wilkins 1988). For instance, Andrews (1985) suggests a thematic hierarchy account of binding in Tagalog, and Schachter (1984) also suggests an (unusual) thematic hierarchy to explain binding in Toba Batak. Manning (1996b) argued that such an account is unlikely to be correct for Toba Batak, and that rather an argument-structure-based theory which recognizes a term/non-term distinction is required, but, the crucial evidence was not available to show this decisively. However, recent work on Balinese (which corresponds to the Toba Batak data above in almost all relevant respects except word order) provides the crucial corresponding evidence for Balinese (Arka and Wechsler 1996, Wechsler and Arka to appear, Arka 1998). As (30) shows, a term goal can bind a term theme (30a), and an oblique goal can bind an oblique theme (30b), while an oblique theme cannot bind an oblique goal (30c).

(30) a. Iang ngedengin I Wayan awakne
1SG AV.show I Wayan self
'I showed I Wayan$_i$ himself$_i$.'

b. Tiang matakon teken anake ento unduk awakne
1SG AV.ask to person that about self
'I asked (to) the person$_i$ about him/herself$_i$.'

c. *Tiang matakon teken awakne unduk anake ento
1SG AV.ask to self about person that
*'I aked (to) him/herself$_i$ about the person$_i$.'

This is in accord with the predictions of a commonly-assumed thematic hierarchy (agent > goal > theme). However, when one argument is a core argument, and the other one is an oblique, this term prominence takes precedence. We find that an oblique goal cannot bind a term theme (31a). Rather, a term theme can bind an oblique goal (31b).

(31) a. Nyoman nakonang awakne teken ia
Nyoman AV.ask self to 3SG
'Nyoman$_i$ asked (to) him/her$_j$ (about) self$_{i/*j}$.'

b. Iang ngedengang I Wayan sig awakne
1SG AV.show I Wayan to self
'I showed I Wayan$_i$ to himself$_i$.'

Data such as these show that a purely thematic account of binding cannot be maintained.[17]

The most obvious objection to a thematic account of binding is that valence changing operations affect binding possibilities. While an agent can normally bind a theme, the oblique agent of a passive cannot bind a theme subject. But as observed in Manning (1996b), this is predicted by the argument structure representations and binding theory developed above. The agent cannot bind the surface subject of a passive, because it does not a-command it, since the higher location of the patient $\boxed{2}$ is above the agent $\boxed{1}$ in an argument structure like (32a). Indeed, the patient a-commands the agent in a passive, correctly licensing the binding shown in the West Greenlandic Inuit passive (32b). While this binding possibility has sometimes been questioned for English, we follow Pollard and Sag (1994) in arguing that it is basically possible, as in (32c), but often awkward due to various discourse and pragmatic effects.

(32) a. $\left[\text{ARG-ST} \quad \langle \boxed{2}_i, \langle \boxed{1}, \text{PRO}_i \rangle \rangle\right]$

b. Hansi nulia-mi-nit unatar-niqar-puq
Hansi.ABS wife-4SG-ABL beat-PASS-IND.INTR.3SG
'Hansi$_i$ was beaten by his$_i$ wife.'

c. The barber$_i$ was shaved by himself$_i$.

However, following the insights of Hellan (1988), note that an argument-structure-based account allows one to maintain the strengths of a thematic approach to binding, while avoiding its problems. Such an account naturally explains apparent thematic conditions on binding in English, such as Jackendoff (1972) suggested to explain the following data:

(33) a. Bill talked to Mary about herself.

b. ?*Bill talked about Mary to herself.

The introduction of the core/oblique distinction, however, allows us to also handle examples such as the following which go against a thematic hierarchy account. Here a theme which is a core argument can bind an oblique goal argument:

[17]For general evidence against the use of thematic hierarchies, see also Davis (1996) and Davis and Koenig (1996).

(34) a. Mary explained John$_i$ to himself$_i$.

b. John introduced Bob$_i$ to himself$_i$.

Given our approach to passive, nonthematic arguments have to appear in the argument structure, so as to allow the passivization of sentences with nonthematic objects such as in (35). This is one sense in which our argument structure is clearly a syntactic level.

(35) There are believed to be several problems with this approach.

Under this assumption, sentences that involve the interaction of raising and binding, as in (36) are unproblematic. A sentence like (36a) is well-formed because *believe* will have the argument structure schematically shown in (37).

(36) a. John believes himself to be a descendent of Beethoven.

b. The women appeared to each other to be successful.

(37) $\left[\text{ARG-ST} \quad \langle \text{John}_i, \text{himself}_i, \text{VP} \rangle\right]$

In contrast, such examples are highly problematic for either an approach where binding is done on conceptual structure (Jackendoff 1992) or thematic roles, since *himself* is not a conceptual/thematic argument of *believe*. See also Bresnan and Zaenen (1990:53) for independent evidence from resultatives that nonthematic arguments interact with the rest of argument structure.

3 Morphological Causatives

The central problem posed for grammatical theory by constructions involving morphological causatives 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.[18] Causatives of an intransitive and a transitive verb are shown in (38):

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

b. Aani-p miiqqa-t Juuna-mut paari-tip-pai
Aani-ERG child-PL.ABS Juuna-TERM look.after-CAUS-3SG.3PL
'Aani had Juuna look after the children.'

[18] 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. The Inuit *terminalis* case, glossed TERM, in which the causee of a transitive verb appears, could reasonably be termed a dative case, given its other uses (goals, benefactives, direction towards, ...), but, in Inuit, it clearly marks obliques and not core arguments.

A sentence like (38b) 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 (*miiqqat* 'children') using the regular patterns of object agreement (which would be quite mysterious if we were dealing with embedded clauses).[19] 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, whereas, if it were a subject, we would rather expect it to precede the lower object. Additionally, there is evidence from (participial) relatives: relativization is clausebound, but the lower object of these complex verb forms can be relativized (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. In contrast with the lexical root with three arguments shown in (39a), the causative example in (39b) allows the oblique reflexive to be bound by *either* the ergative or the absolutive argument:

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

b. 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$_{i/j}$.'

A common form of analysis postulates an underlying structure that is biclausal, and then uses some mechanism of incorporation or reanalysis to produce the monoclausal surface form. Such transformational analyses are unavailable within a lexicalist framework like HPSG, but fortunately, more careful analysis suggests that such derivational analyses are not required (see Manning et al. (in press) for extensive discussion of this question with respect to Japanese causatives). The essence of the transformational analysis is that the *causee* of a causative is a subject at some level. But we argue that although the causee has the properties of an a-subject, it never has the properties of a subject in terms of grammatical relations or valence list positions. The split of properties in causatives is never random: phenomena such as honorification, anaphor and pronominal binding, control of arguments in adverbial clauses, and quantifier 'floating' typically behave as they would if causatives were syntactically complex, embedding constructions; whereas surface matters of case marking, agreement and word order phenomena, and tests such as raising, all point to the analysis of causative verbs as single lexical items heading a single clause. This suggests that causatives can be accounted for by a mismatch between valence and argument structure, as in Alsina (1992): these verbs will have valence patterns much like any other predicate, but the causative verb will again have a nested ARG-ST list, so that both the causer and the causee qualify as a-subjects.

[19] We use the following pretheoretical terminology (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 when causativizing transitive stems, the direct object of the stem being causativized is the *lower object*.

An analysis of this sort is presented within the framework of HPSG for Japanese causatives by Iida et al. (1994) and Manning et al. (in press). Manning et al. propose the following lexical entry for the Japanese causative formed by suffixing *-sase* (we modify their presentation simply to collapse part of the hierarchy of types presented there into a single derivational type):

(40) *caus-drv-1*:

$$
\begin{bmatrix}
\text{RESULT} & \begin{bmatrix} \textit{caus-lxm-1} & \\ \text{PHON} & \mathrm{F}_{sase}(\boxed{1}) \\ \text{ARG-ST} & \langle\ \mathrm{NP}_i,\ \mathrm{NP}_j,\ \boxed{4}\langle \mathrm{PRO}_j,\ \ldots \rangle\ \rangle \\ \text{CONT} & \begin{bmatrix} \textit{cause-rel} & \\ \text{ACTOR} & i \\ \text{UNDERGOER} & j \\ \text{EFFECT} & \boxed{3} \end{bmatrix} \end{bmatrix} \\
\text{SOURCE} & \begin{bmatrix} \textit{verb-lxm} & \\ \text{PHON} & \boxed{1} \\ \text{ARG-ST} & \boxed{4} \\ \text{CONT} & \boxed{3} \end{bmatrix}
\end{bmatrix}
$$

As with the passive, the causative derivational type licenses the construction of causative lexemes, based on other lexemes made available by the lexicon. This type will thus license causative verbs with nested argument structure lists. Manning et al. (in press) show how such a proposal for the Japanese causative morpheme straightforwardly explains the possibilities for adverbs and quantifiers to take a scope intermediate between the predicate of the stem and the causative predicate, and for anaphors to be bound by the causee as well as the causer, while a pronoun in the lower object position must be free of just the causee. Although complex words of Japanese preserve their lexical integrity (in the sense of Bresnan and Mchombo (1995)), it is explained how they appear biclausal in just certain respects in the syntax.

It is now well known that not all causative constructions behave identically (Marantz 1984, Baker 1988). Morphological 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, Rosen 1989). Our overall proposal is that there are a number of causative sorts, from which languages will choose one, or sometimes more than one (as in the case of French, which in addition to control *faire* causatives has two types of composition *faire*, *faire à* and *faire par* which differ in whether the causee is realized as a core argument or as an oblique (Kayne 1975, Abeillé et al. to appear). An analysis of the Romance causative data is beyond the scope of this article, but in this section we will examine some of the parametric differences in the behavior of causatives, and how they might be accounted for within an HPSG analysis.[20]

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)). In this and the following subsection, we will illustrate how this kind of variation can be played out using the kind of hierarchy of types that we have proposed.

Consider the case of Chi-Mwi:ni (Marantz 1984, Baker 1988). Chi-Mwi:ni has a monoclausal morphological causative, as evidenced by surface word order and grammatical relations (see Baker (1988) and Alsina (1997) for much further discussion of Bantu causatives). In Chi-Mwi:ni (and in various other Bantu languages, and in Chamorro), the causee always becomes the direct object:

(41) 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.'

This suggests that the causee should be first on the COMPS list, and hence second on the ARG-ST list of the causative verb, as in (42).

(42) $\begin{bmatrix} \text{SUBJ} & \langle \boxed{1}_i \rangle \\ \text{COMPS} & \langle \boxed{2}_j, \boxed{3}_k \rangle \\ \text{ARG-ST} & \langle \boxed{1}\text{NP}_i, \boxed{2}\text{NP}_j, \langle \text{PRO}_j, \boxed{3}\text{NP}_k \rangle \ \rangle \end{bmatrix}$

Passivization of the Chi-Mwi:ni causative in (42a) can yield only one result: the causee, not the lower object, becomes the subject. The contrast between (43a) and *(43b) illustrates this point:

(43) 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

[20]In the subtypes of causatives that we briefly examine here, the causee always retains some binding properties. That is not true in all languages, for instance Malayalam (Mohanan 1982). For such languages, we would suggest a causative type that produced a flat argument structure list, so that the argument structure would look no different to those of the lexical causatives that appear in many languages (words like English transitive *open* or Japanese *miseru* 'show'), and the correct binding properties would follow immediately.

This is a direct consequence of what has been presented so far. The causative lexeme is built with exactly the same derivational type that was used earlier for Japanese (modulo the difference in phonological realization, which we will henceforth omit):

(44) *caus-drv-1*:
$$\left[\begin{array}{ll} \text{RESULT} & \left[\begin{array}{ll} \textit{caus-lxm-1} & \\ \text{ARG-ST} & \langle\ \text{NP}_i,\ \text{NP}_j,\ \boxed{4}\langle \text{PRO}_j,\ \ldots\rangle\ \rangle \\ \text{CONT} & \left[\begin{array}{ll} \textit{cause-rel} & \\ \text{ACTOR} & i \\ \text{UNDERGOER} & j \\ \text{EFFECT} & \boxed{3} \end{array}\right] \end{array}\right] \\ \text{SOURCE} & \left[\begin{array}{ll} \textit{verb-lxm} & \\ \text{PHON} & \boxed{1} \\ \text{ARG-ST} & \boxed{4} \\ \text{CONT} & \boxed{3} \end{array}\right] \end{array}\right]$$

This derivational type does not specify the contents of the valence lists, so that we can combine it with appropriate realization types for different languages, which will yield varying mappings between ARG-ST and the valence lists. If we combine the *caus-lxm-1* type with the type for *acc-canon-lxm* which we introduced earlier, this gives the following lexical entry for causative stems in certain accusative languages:

(45)
$$\left[\begin{array}{ll} \textit{acc-caus-lxm-1} & \\ \text{SUBJ} & \langle\boxed{1}\rangle \\ \text{COMPS} & \langle\boxed{2}\rangle \oplus \boxed{8} \\ \text{ARG-ST} & \langle\boxed{1}_i,\ \boxed{2}_j,\ \langle\text{PRO}_j\rangle \oplus \boxed{8}\rangle \\ \text{CONT} & \left[\begin{array}{ll} \textit{cause-rel} & \\ \text{ACTOR} & i \\ \text{UNDERGOER} & j \\ \text{EFFECT} & \boxed{5} \end{array}\right] \end{array}\right]$$

The basic lexeme for the verb *write* will then be as in (46a), which will license via the above causative derivational type the causative lexeme given in (46b), which will finally allow creation of the passive of the causative via the passive derivational type given in (10) to yield the final lexeme shown in (46c):

(46) a.
$$\left[\begin{array}{ll} \textit{trans-verb-lxm} & \\ \text{SUBJ} & \langle\boxed{2}\rangle \\ \text{COMPS} & \langle\boxed{3}\rangle \\ \text{ARG-ST} & \langle\boxed{2}_j,\ \boxed{3}_k\rangle \\ \text{CONT} & \boxed{5}\left[\begin{array}{ll} \textit{write-rel} & \\ \text{ACTOR} & j \\ \text{UNDERGOER} & k \end{array}\right] \end{array}\right]$$

b.
$$\left[\begin{array}{ll} \textit{acc-caus-lxm-1} & \\ \textsc{subj} & \langle \boxed{1} \rangle \\ \textsc{comps} & \langle \boxed{2}, \boxed{3} \rangle \\ \textsc{arg-st} & \langle \boxed{1}_i, \boxed{2}_j, \langle \mathrm{PRO}_j, \boxed{3}_k \rangle \rangle \\ \textsc{cont} & \boxed{4}\left[\begin{array}{ll} \textit{cause-rel} & \\ \textsc{actor} & i \\ \textsc{undergoer} & j \\ \textsc{effect} & \boxed{5} \end{array}\right] \end{array}\right]$$

c.
$$\left[\begin{array}{ll} \textit{pass-v-lxm} & \\ \textsc{subj} & \langle \boxed{2} \rangle \\ \textsc{comps} & \langle \boxed{3}, \boxed{7}\mathrm{PP}[\textit{na}]_i \rangle \\ \textsc{arg-st} & \langle \boxed{2}_j, \langle \boxed{1}_i, \mathrm{PRO}_j, \langle \mathrm{PRO}_j, \boxed{3}_k \rangle \rangle \rangle \\ \textsc{cont} & \boxed{4} \end{array}\right]$$

The causative structure which we have presented for Chi-Mwi:ni is identical to our analysis of Japanese (Manning et al. in press). However, the language differs independently in possessing a regular (short distance) reflexive pronoun that obeys Principle A. This predicts that a reflexive lower object ($\boxed{3}$ in (46b) above) should be able to be bound only by PRO_j (which is coindexed with the causee). This is because $\boxed{3}$ appears only on the embedded argument structure list, and must be bound on that list. On the other hand, the reflexive causee is on the upper list and should be able to be bound only by the subject $\boxed{1}$. This is precisely what we find:

(47) a. 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.'

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

c. 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.'

The use of nested argument structures in our theory can thus explain the complex binding phenomena which emerges with causatives.

3.2 Turkish and Inuit

In contrast to Japanese or Chi-Mwi:ni, when a transitive verb is causativized in Turkish or Inuit, 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 the lower object 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 derivational type will be as in (48), where the PRO on the embedded argument list is coindexed with the causee.

(48) a. *caus-drv-2*: *caus-drv-2-intrans* ∨ *caus-drv-2-trans*

b. *caus-drv-2-intrans*:

$$\left[\begin{array}{ll} \text{RESULT} & \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{caus-lxm-2}} \\ \text{ARG-ST} & \langle \boxed{1}_i, \boxed{2}_j, \boxed{6}\langle \text{PRO}_j \rangle\rangle \\ \text{CONT} & \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{cause-rel}} \\ \text{ACTOR} & i \\ \text{UNDERGOER} & j \\ \text{EFFECT} & \boxed{5} \end{array}\right] \end{array}\right] \\ \text{SOURCE} & \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{intr-stem}} \\ \text{ARG-ST} & \boxed{6} \\ \text{CONT} & \boxed{5} \end{array}\right] \end{array}\right]$$

c. *caus-drv-2-trans*:

$$\left[\begin{array}{ll} \text{RESULT} & \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{caus-lxm-2}} \\ \text{ARG-ST} & \langle \boxed{1}_i, \boxed{2}_k, \boxed{6}\langle \boxed{4}_j, \text{PRO}_k, \ldots \rangle\rangle \\ \text{CONT} & \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{cause-rel}} \\ \text{ACTOR} & i \\ \text{UNDERGOER} & j \\ \text{EFFECT} & \boxed{5} \end{array}\right] \end{array}\right] \\ \text{SOURCE} & \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{trans-stem}} \\ \text{ARG-ST} & \boxed{6} \\ \text{CONT} & \boxed{5} \end{array}\right] \end{array}\right]$$

For a transitive verb in Turkish, this restriction will be combined with information from the type *acc-canon-lxm* yielding the type in (49). With this type, 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 (50) (Aissen 1979).

(49)

$$\left[\begin{array}{ll} \multicolumn{2}{l}{\textit{acc-caus-lxm-2}} \\ \text{SUBJ} & \langle \boxed{1}_i \rangle \\ \text{COMPS} & \langle \boxed{2}_k, \boxed{3}_j \rangle \\ \text{ARG-ST} & \langle \boxed{1}_i, \boxed{2}_k, \langle \boxed{3}_j, \text{PRO}_k \rangle\rangle \\ \text{CONT} & \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{cause-rel}} \\ \text{ACTOR} & i \\ \text{UNDERGOER} & j \\ \text{EFFECT} & [\;] \end{array}\right] \end{array}\right]$$

(50) a. Bavul Mehmet tarafından Hasan-a aç-tır-ıl-dı
suitcase Mehmet by Hasan-DAT open-CAUS-PASS-PAST
'The suitcase was made to be opened by Hasan by Mehmet.'

b. *Hasan Mehmet tarafından bavul-u aç-tır-ıl-dı
Hasan Mehmet by suitcase-ACC open-CAUS-PASS-PAST
*'Hasan was made to open the suitcase by Mehmet.'

An important prediction of both the causative lexical entries that we have examined is that the causee is selected as the first thing on the ARG-ST 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, where 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. Because of syntactic ergativity, in a simple transitive clause such as (51), 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 (52) (cf. the type *erg-canon-lxm* presented earlier).

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

(52)
$$\begin{bmatrix} \textsc{subj} & \langle \boxed{2}_j \rangle \\ \textsc{comps} & \langle \boxed{1}_i \rangle \\ \textsc{arg-st} & \langle \boxed{1}_i, \boxed{2}_j \rangle \\ \textsc{cont} & \begin{bmatrix} \textit{looking-after} & \\ \textsc{actor} & i \\ \textsc{undergoer} & j \end{bmatrix} \end{bmatrix}$$

But what happens when this verb stem is causativized? The causative in (53) confirms our argument structure based account of monoclausal causatives by showing that it is the a-subject that becomes the causee, not the SUBJ. 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.

(53) 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.'

Using the derivational type in (48) and inheriting from *erg-canon-lxm* yields the description for Inuit causative lexemes shown in (54):

(54)
$$\left[\begin{array}{ll} \textit{erg-caus-lxm-2} & \\ \text{SUBJ} & \langle \boxed{2} \rangle \\ \text{COMPS} & \langle \boxed{1}, \boxed{3} \rangle \\ \text{ARG-ST} & \langle \boxed{1}_i, \boxed{2}_k, \langle \boxed{3}_j, \text{PRO}_k \rangle\rangle \\ \text{CONT} & \left[\begin{array}{ll} \textit{cause-rel} & \\ \text{ACTOR} & i \\ \text{UNDERGOER} & j \\ \text{EFFECT} & [\ ] \end{array}\right] \end{array}\right]$$

We can test the correctness of this description by again considering passivization and binding. Example (55) 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 types that we have already introduced yield the description (56) for the verb in (55). Here, the lower object $\boxed{2}_k$ has become the a-subject of the passive verb's ARG-ST, which in turn becomes the subject since the passive verb is an intransitive lexeme.

(55) ammit Jaaku-mit qimmi-nut niri-tsaali-niqar-put
skin.PL.ABS Jaaku-ABL dog-PL.TERM eat-prevent-PASS-IND.3PL
'The skins$_i$ were prevented by Jaaku from the dogs eating t_i.'

(56)
$$\left[\begin{array}{ll} \textit{pass-v-lxm} & \\ \text{SUBJ} & \langle \boxed{2}\text{NP}[\textit{abs}]_k \rangle \\ \text{COMPS} & \langle \boxed{3}\text{NP}[\textit{term}]_j, \boxed{1}\text{NP}[\textit{abl}]_i \rangle \\ \text{ARG-ST} & \langle \boxed{2}_k, \langle \boxed{1}_i, \text{PRO}_k, \langle \boxed{3}_j, \text{PRO}_k \rangle\rangle\rangle \\ \text{CONT} & \left[\begin{array}{ll} \textit{prevent-rel} & \\ \text{ACTOR} & i \\ \text{UNDERGOER} & j \\ \text{EFFECT} & \left[\begin{array}{ll} \textit{eat-rel} & \\ \text{ACTOR} & j \\ \text{UNDERGOER} & k \end{array}\right] \end{array}\right] \end{array}\right]$$

In Inuit, unlike many other languages, a verb can be passivized prior to the application of causative morphology, as in (57). This example also falls out from the types that we have proposed, as is shown in (58) (note that here causativization is applying to an intransitive verb according to the left disjunct of (48a)).

(57) 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.'

(58)
$$\begin{bmatrix} \textit{caus-lxm-2} & \\ \textsc{subj} & \langle \boxed{2}\mathrm{NP}[\textit{abs}]_k \rangle \\ \textsc{comps} & \langle \boxed{1}\mathrm{NP}[\textit{erg}]_i,\ \boxed{3}\mathrm{NP}[\textit{abl}]_j \rangle \\ \textsc{arg-st} & \langle \boxed{1}_i,\ \boxed{2}_k,\ \langle \mathrm{PRO}_k,\ \langle \boxed{3}_j,\ \mathrm{PRO}_k \rangle\rangle\rangle \\ \textsc{cont} & \begin{bmatrix} \textit{prevent-rel} & \\ \textsc{actor} & i \\ \textsc{undergoer} & k \\ \textsc{effect} & \begin{bmatrix} \textit{eat-rel} & \\ \textsc{actor} & j \\ \textsc{undergoer} & k \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Inuit binding possibilities are complicated by the existence of coterm binding constraints (see Bittner (1994), Sadock (1994), and Manning (1996b)), but we will conclude by showing the basic correctness of the predictions of our argument structure based binding theory. According to (54), both the causer and the causee qualify as a-subjects and we would expect them both to be able to bind suitable reflexives. Example (59) shows that this is indeed true, even for the oblique causee that results when a transitive stem is causativized (59b).[21]

(59) 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.'

These examples thus clearly show how an argument can maintain prominence at ARG-ST – in particular, by being an a-subject – even though it is demoted to being a surface oblique. Thus the rather different interplay of passivization and binding facts found in languages like Inuit and Turkish can also be explained on our approach.[22]

[21]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. All speakers accept cases like (59a).

[22]Webelhuth (in press) presents a critique of an analysis of causatives in the manuscript Manning and Sag (1995). We feel it would be too hard on the reader to take them through that earlier analysis, Webelhuth's critique, and Webelhuth's own analysis for a thorough discussion, so we will content ourselves with a few remarks for those that may be familiar with this earlier work. Webelhuth rightly criticizes the rather unconstrained relationship between ARG-ST and the valence lists in our earlier paper. We feel that these issues are much better addressed in the current article, where the introduction of nested argument structure lists and the function compression suitably constrains the mapping between the two. However, we feel that his argument that one should not allow such relations as append or compression at all within the syntax because the result is somehow too unconstrained rather misses the mark. What is at issue is the substantive linguistic theory that is being built upon a general logic of typed feature structures. Beyond that, there are various matters of difference in the presumed typology of causatives. We find the three way (monoclausal,

4 Conclusion

In this article, we have discussed how theories of grammar that define binding on surface phrase structure configurations or surface valence lists are unable to satisfactorily account for binding patterns seen in Western Austronesian and ergative languages, or the binding patterns of 'subject-oriented' reflexives when they occur with passive or causative verbs. Following the reasoning laid out in slightly different terms in Manning (1996b), we have argued that it is possible to give a universal characterization of binding in terms of a notion of a syntactic argument structure, and that this approach generalizes nicely over accusative and ergative languages, and correctly predicts binding patterns with causative and passive verbs. This argues that HPSG must draw a fundamental distinction between argument structure and the valence features which Borsley proposed, which distinguish grammatical relations. We have examined, unfortunately superficially, a variety of data from a range of languages to try to show that one can use this ARGUMENT-STRUCTURE list to considerable linguistic advantage. 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 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 types and constraints associated with them (also universal, we might hope). Although the analyses 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.

biclausal, mixed) typology of Webelhuth's paper extremely questionable, and indeed Webelhuth appears to almost abandon it at the end, suggesting that the mixed and monoclausal types are really the same. We would furthermore disagree with classing Chi-Mwi:ni causatives as biclausal. We feel that Webelhuth is here failing to distinguish other orthogonal properties (whether reflexives are short or long distance, whether the causee or the lower object becomes the object of the causative) with the issue of clausality. However, we will not pursue these issues here, leaving the matter of building a more complete typology of causatives until another occasion.

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