Valency versus binding: On the distinctness of argument structure

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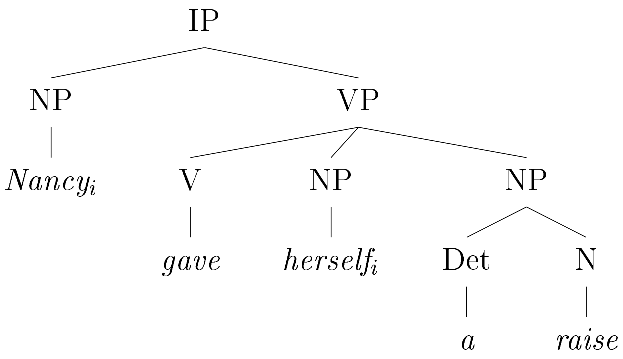
This paper argues for the use of two levels in syntactic description, grammatical relations and argument structure, at which sentences may have different representations: the prominence ranking may differ, as in syntactically ergative and Western Austronesian languages, and the argument structure may be more nested, as in passives or causatives. We begin with binding theory.[1]

1 Rethinking binding theory

Most theories of binding in most syntactic frameworks assume that the same notion of surface obliqueness that identifies the subject of a clause is also used for obliqueness conditions on reflexive binding. For instance, 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 of the sentence.

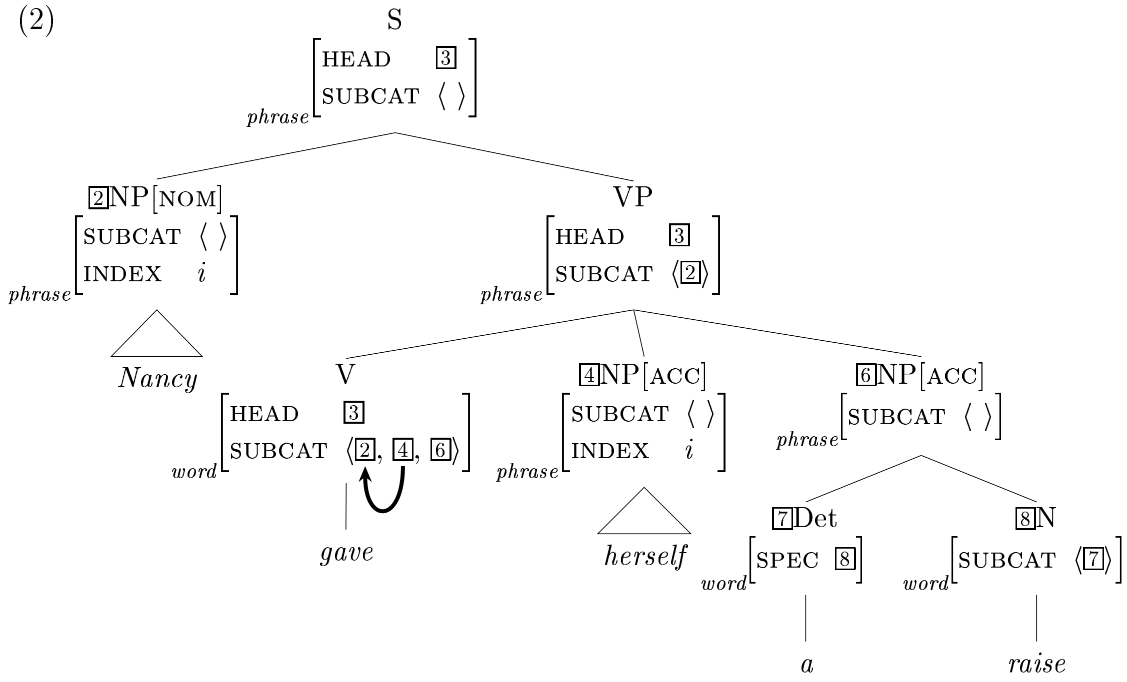
(1)



[1]This paper is an unrevised draft of the paper I presented at the Colloque de Syntaxe et Sémantique de Paris. I thank people at the conference for their comments. Further comments are also welcome. Some of the ideas here are explored in more detail in my dissertation and other papers available at http://www.lcl.cmu.edu/manning/papers/.

In the HPSG binding theory of Pollard and Sag (1992, 1994), binding possibilities are explicitly stated to reflect an obliqueness hierarchy of surface grammatical relations. For the sentence in (1), *Nancy* can bind *herself* because of satisfaction of the property of local o-command defined over subategorization lists, as indicated by the arrow in (2).

(2)



However, consideration of typologically diverse languages shows that this design decision in the architecture of Universal Grammar is mistaken. In the next sections, I show that various phenomena, in particular binding theory, that have traditionally been described in terms of surface configurations, surface grammatical relations or valence lists, are actually correctly described in terms of argument structure configurations. Later, this provides arguments in favor of a lexicality-preserving argument structure-based account of causatives, passives, and antipassives.

Western Austronesian Languages

Western Austronesian languages appear to be unique in allowing various relationships between argument structure and valence list configuration, mediated by so-called voice morphology. The best known case of this is Tagalog (Schachter 1976, Schachter 1977, Guilfoyle et al. 1992, Kroeger 1993), but I will examine some evidence from Toba Batak (Schachter 1984) and Balinese (Artawa and Blake nd). These languages have a more rigid configurational surface structure than Tagalog, and hence more clearly show the independence of binding from surface structure command relationships.

Balinese and Toba Batak have a distinction between active voice (*mang-*) and objective voice (*di-*) forms of verbs, illustrated for Toba Batak in (3):

(3) a. **TB** 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 (3a) has the logical subject of the clause appear in the final subject position while the objective voice (3b), which tends to be used in unmarked contexts, has what we might term the Undergoer (Foley and Van Valin 1984) or the logical object (Mohanan 1990) appear in the final subject position. Schachter (1984) provides evidence that both arguments in both voices in (3) are terms (or core roles, as opposed to obliques and adjuncts). Neither can be deleted in either construction and the undergoer-subject pattern is unmarked; see also the similar and more extensive arguments in Kroeger (1993) for Tagalog. Thus the correct analysis is not to view one of (3a) or (3b) as a passive or antipassive (as has often been done in the generative literature). Further evidence for this in Balinese comes from the fact that there is a separate passive construction[2] – see (4) – which contrasts with the voice variation in (3) in that the agent is marked with a preposition, and is optional:

(4) **Ba** padi-ne ka-ambil (teken Made)
rice-def pass-take (with Made)
'The rice has been taken (by Made).'

In both Balinese and Toba Batak there is strong evidence that a verb and the following NP of a transitive clause form a constituent, that we will call a VP, regardless of the verbal voice chosen. For Toba Batak, Emmorey (1984) shows that the pitch accent of a sentence (denoted by '*' in (5)) occurs on the last stressed syllable of the predicate, where the first following NP of a transitive clause counts as part of the predicate regardless of the verbal voice chosen:

(5) a. **TB** [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.'

Similarly, an adverb cannot appear in the middle of the VP between the verb and the NP, though adverbs can generally occur between major constituents, as indicated in (6).

(6) a. [Verb NP] NP Adv

b. [Verb NP] Adv NP

[2]Perhaps borrowed from Javanese.

c. *[Verb Adv NP] NP

d. Adv [Verb NP] NP

Example (7) shows that VPs can be coordinated regardless of the voice chosen:

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

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

Thus the NP inside the verb phrase – the one immediately following the verb – will be analyzed as a complement. The other NP is clearly external to the VP, and it behaves similarly to the *ang*-marked NP in Tagalog. In Toba Batak, this NP may optionally be fronted before the verb in questions or as a topic, while the VP-internal NP may not be. Further, as in Tagalog, in both languages relativization is restricted to this NP (see (8–9) for Balinese), and following the Keenan-Comrie (1977) hierarchy, if only one NP can be relativized on, then that NP is the subject.

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

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

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

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

In Balinese, the word order is different and the external NP normally precedes the verb phrase rather than following it. We note that auxiliaries appear between this NP and the verb, and that this different word order clearly shows that the single argument of intransitive verbs also occupies this VP-external position. In both languages it is this argument which is the unexpressed argument of controlled complements and purpose clauses, regardless of the verbal voice chosen, as shown in (10).[3]

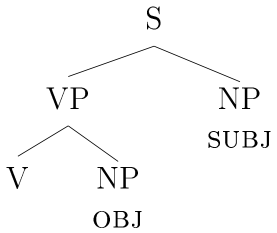
[3]See Artawa and Blake (nd:26) for the corresponding data from Balinese. This data thus contrasts with the most common pattern of control in Tagalog where it is always the agent/a-subject that is controlled (Schachter 1977). However, as Kroeger (1993) shows, cases of non-volitive control in Tagalog *do* select the subject as the controllee, and cross-linguistically it seems that both of these possibilities for identification of the controllee occur.

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

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

All this evidence argues that this external NP should be regarded as a subject, motivating the phrase structure shown in (11).

(11) **TB**



However, despite this clear evidence for phrase structure and grammatical relations, binding possibilities are insensitive to this structure. Reflexivization shows that an agent can bind a theme (and not vice versa) regardless of the verbal voice of the sentence (Sugamoto 1984). See (12–13) for Toba Batak and (14) for Balinese. Although *John* does not c-command the reflexive in (13b), binding constraints are blind to this surface constituency.

(12) a. **TB** [$_{VP}$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$_i$.'

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

b. [$_{VP}$Di-ida si John] diri-na
OV-saw PM John self-his
'John$_i$ saw himself$_i$.'

(14) **Ba** awak cai-ne [$_{VP}$pedihang cai]
self 2SG-POSS OV.blame 2SG
'You blamed yourself.'

Inuit

But this problem – where binding possibilities do not track other subjecthood tests is not confined to Austronesian. A similar split in properties occurs in various ergative languages – in fact, I argue that such a split occurs in all syntactically ergative languages. Ergative languages are ones that show a coding scheme where the patient-like argument of a transitive verb (the O role) is coded like the single argument of an intransitive verb (the S role), and differently from the agent-like argument of a transitive verb (the A role), see (15).

(15)

Nominative {	A (agent-like of tv)	Ergative
	S (argument of iv)	} Absolutive
Accusative	O (patient-like of tv)	

For example Woodbury (1977) and Bittner (1994) show that there is a split in properties for Inuit, as indicated in (16).[4]

(16)

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

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.[5] (17a–b) show relativization of O and S NPs in West Greenlandic, while (17c) shows that relativization of an A NP is impossible.

(17) 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'

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

[4]Notwithstanding that the Eskimo languages have been widely regarded as only morphologically ergative, e.g., by Anderson (1976), Johnson (1980), Marantz (1984), Givón (1984).

[5]Relative clauses in Inuit are actually participial nominalizations, but I am essentially accepting a functional definition of what a relative clause is, following Comrie (1981:136).

Thirdly, the absolutive NP has special interpretive properties, which the traditional literature has interpreted as definiteness, or specificity, and which Bittner (1987) 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 (18a) differs from the intransitivized variant in (18b) because of a presupposition of specificity or givenness associated with the absolutive NP in (18a).

(18) 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 a surface grammatical relations, but rather sensitive to a notion of 'Actor'. (19) shows that a possessive reflexive can be bound by an A or S NP (19a–b), but not by an O NP (19c):[6]

(19) 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-jaŋa (Inuktitut)
mother-4SG.ERG Piita.ABS love-3SG.3SG
'His$_i$ mother loves Piita$_i$.'

In cases of control, the controllee NP is again the A or S and not the O; see (20).

(20) a. Miiqqat __ Juuna ikiu-ssa-llu-gu] niriursui-pp-u-t
children.ABS [ERG Juuna.ABS help-FUT-INF-3SG] promise-IND-INTR-3PL
'The children promised to help Juuna.'

b. Miiqqat __ qiti-ssa-llu-tik niriursui-pp-u-t
children [ABS dance-FUT-INF-4PL] promise-IND-INTR-3PL
'The children promised to dance.'

To account for the reflexivization patterns in Toba Batak, Balinese, and Inuit using a surface structure based notion of command seems wrong. For Toba Batak and Balinese it would mean suggesting that the sentences in (12) and (13) have radically different phrase structures, despite all the evidence we outlined above indicating that the sentences all have the marked surface VP constituent despite the changing verbal voice. For Inuit, it would

[6]In Inuit, possessor agreement is suffixed to nouns. A separate set of reflexive agreement affixes are customarily referred to as the 4th person.

mean ignoring the evidence that suggests that the absolutive NP has the syntactic and interpretive properties of a subject. Rather, these observations appear to support the thesis, attributed to Ken Hale, that in all languages, in the basic verbal voice, an agent can bind a theme reflexive and not the other way round. At any rate, syntactically ergative and Western Austronesian languages show clearly that the relevant notion is not surface command relationships or surface grammatical relations, but something else.

Argument structure versus grammatical relations

What is the correct way to handle these phenomena? For Tagalog, Schachter (1977) and Guilfoyle et al. (1992) both argue for splitting the notion of subject into two.[7] Their proposals differ in that Schachter abandons subject and uses the notions Topic and Actor, while Guilfoyle et al. (1992) employ VP internal subjects and analyze the two notions of subject as representing the positions [Spec, IP] and [Spec, VP].

I want to propose that syntax should make a clean distinction between two levels: a level of surface grammatical relations and a level of syntactic argument structure, both of which have separate prominence rankings. This captures the essence of the above analyses by providing two notions of subjecthood: grammatical subject (gr-subject) and argument structure subject (a-subject). The former notion of grammatical subject is similar to the notion of subject in traditional grammar, but it is more clearly seen in Dixon's usage of pivot, the notion of final 1 in RG or subject in LFG.[8] I accept the extensive arguments of Kroeger (1993) that the correct analysis of Tagalog is that the Philippinists' Topic is actually the grammatical subject – the privileged term in a system of surface grammatical relations. This distinguished is the target of possessor ascension, only it can launch floated quantifiers, or be the target of raising, relativization (Keenan and Comrie 1977) or conjunction reduction constructions.[9] These are properties of grammatical subjects. It need not be a topic – studies by Cooreman et al. (1984) show that it does not possess the high degree of salience and continuity normally taken as defining properties of discourse topics. Moreover, there is a separate topicalization construction in Tagalog, which can apply both to the distinguished NP and to other NPs (Kroeger 1993). Similar arguments can be made for Toba Batak, Balinese and Inuit, as we have seen, and I would therefore like to conclude that what I have been calling the external NP or the absolutive NP is the grammatical subject in these languages.

However, we have seen that that not all of syntax is structured around the hierarchy of grammatical relations. I wish to propose that in all languages there is a principled division

[7]Schachter was not the first to distinguish these two notions of subjecthood, although pre-generative work did not generally distinguish surface grammatical relations independent of morphological form. Allen (1964:337) wrote: "Discussions of this type often distinguish between a grammatical and a semantic subject. The former is formally definable and usually refers to the noun or pronoun which is in a particular (e.g. 'nominative') case and/or in concord with the verb or with a particular verbal element. The latter (also variously described as 'real' or 'psychological') generally remains undefined and intuitive, since situational or logical correlates such as 'actor' or 'topic' break down in a number of instances."

[8]In GB, the configurational positions of NPs at s-structure are basically equivalent to grammatical relations.

[9]Once conjunction reduction is properly distinguished from cases of zero anaphora; see Kroeger (1993).

between purely syntactic processes, such as constraints on relativization, topicalization, focusing or questioning, specificity or wide scope, coreferential omission in coordination, etc., which are universally sensitive to the hierarchy of grammatical relations, and the more semantic properties of binding, control and imperative addressee – what Kiparsky (1987) calls construal processes – which are sensitive to prominence at a level of argument structure.

Careful examination of Inuit, Tagalog, Dyirbal, and Mayan and other syntactically ergative languages shows that constraints on imperative addressees, antecedence of anaphors, and the controller of certain adverbial clauses are universally sensitive to argument structure, at which the 'actor' is most prominent. This is the evidence that has often wrongly been taken to suggest that all ergative languages are syntactically accusative (Johnson 1977, Bobaljik 1992), but as we have seen these phenomena are not sensitive to surface configurations at all.

The class of most prominent arguments at argument structure is similar to Dixon's (1979) use of the term 'subject', Schachter's notion of Actor, and Jespersen's notion of logical subject. However, this is not exactly the category we need, but rather the class of all arguments that are first on some level of argument structure – what I will call *a-subjects*. While all logical subjects are a-subjects, we will see below that the compound argument structures that result from derivational operations, like passive and causative, yield additional a-subjects. This explains why causees and passive agents can bind reflexives in many languages. The other half of 'subjecthood' in Inuit and other languages is thus not properly described by the grouping A and S, but by the larger set of all a-subjects.

My analysis differs markedly from work such as Dixon (1972), Marantz (1984) and Dowty (1991:582) which regards a canonical syntactically ergative language as one in which everything works on an ergative-absolutive basis. The above data show that syntactically ergative languages appear ergative only with regard to operations that are sensitive to grammatical relations.

My conception of argument structure is as a syntactic level (as in Bresnan and Zaenen (1990)), not as a purely semantic level.[10] Argument structure is thus in some ways similar to VP-internal relationships in recent versions of GB and Minimalist work. The basic argument structure for a verb is an ordered list of the verb's arguments, as in (21).

(21) a. yawn $\langle \boxed{1} \rangle$ $\boxed{1}$*John yawned.*

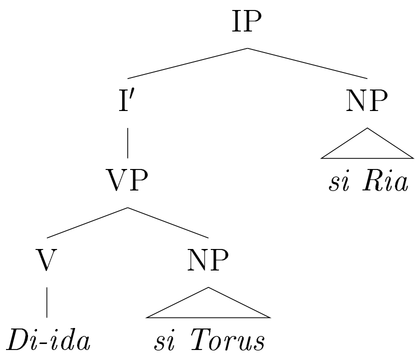
b. finish $\langle \boxed{1}, \boxed{2} \rangle$ $\boxed{1}$*Sarah finished* $\boxed{2}$*her book.*

c. present $\langle \boxed{1}, \boxed{2} | \boxed{3} \rangle$ $\boxed{1}$*Judith presented* $\boxed{2}$*an award to* $\boxed{3}$*Cynthia.*

Thus the analysis I am suggesting would propose the c-, f-, and a-structures in (22) for an LFG analysis of the Toba Batak sentence (3b). The corresponding HPSG analysis would propose the lexical entries in (23a) and (23b) for the verbs in (3a) and (3b) respectively, and the analysis of (24) for (3b).

[10]This is because working out the consequences of these proposals for languages with expletives would appear to require representing the expletives at argument structure, which is precisely what some advocates of more 'semantic' argument structures (e.g., Alsina (1993)) do not wish to do. See Bresnan and Zaenen (1990:53) for independent evidence from resultatives that nonthematic arguments interact with the rest of argument structure.

(22) a.



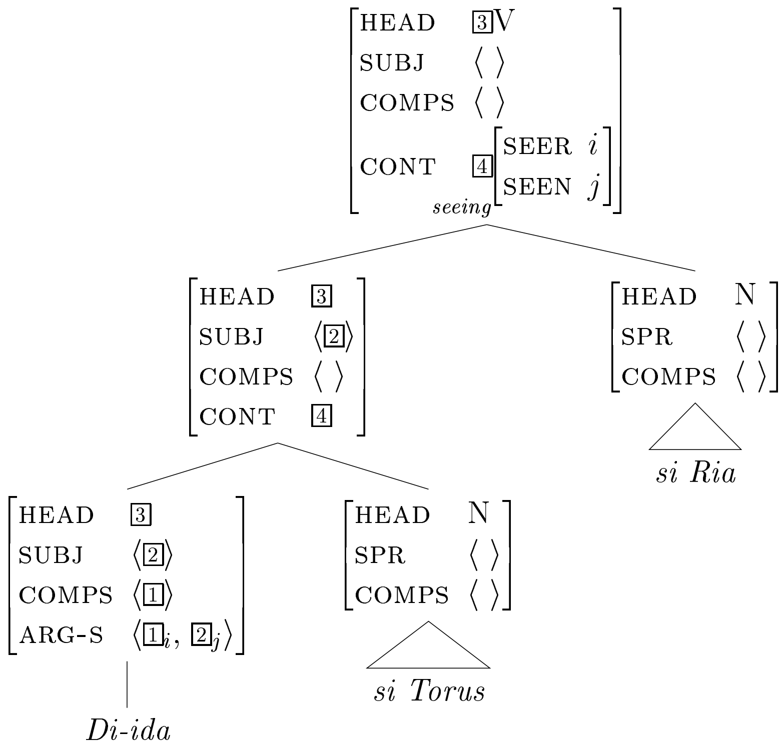
b. $$\underset{f\text{-}s}{}\left[\begin{array}{ll} \textsc{subj} & \left[\begin{array}{ll} \textsc{pred} & \text{`Ria'} \\ \textsc{mark} & \textsc{pn} \end{array}\right] \\ \textsc{pred} & \text{`see'} \\ \textsc{obj} & \left[\begin{array}{ll} \textsc{pred} & \text{`Torus'} \\ \textsc{mark} & \textsc{pn} \end{array}\right] \end{array}\right]$$

c. $_{a\text{-}s}\text{see}\langle\text{Torus, Ria}\rangle$

(23) a. $$\left[\begin{array}{ll} \textsc{phon} & \langle\text{mang-ida}\rangle \\ \textsc{subj} & \langle\boxed{1}\rangle \\ \textsc{comps} & \langle\boxed{2}\rangle \\ \textsc{arg-s} & \langle\boxed{1}\text{NP}_i,\ \boxed{2}\text{NP}_j\rangle \\ \textsc{cont} & {}_{seeing}\left[\begin{array}{ll} \textsc{seer} & i \\ \textsc{seen} & j \end{array}\right] \end{array}\right]$$

b. $$\left[\begin{array}{ll} \textsc{phon} & \langle\text{di-ida}\rangle \\ \textsc{subj} & \langle\boxed{2}\rangle \\ \textsc{comps} & \langle\boxed{1}\rangle \\ \textsc{arg-s} & \langle\boxed{1}\text{NP}_i,\ \boxed{2}\text{NP}_j\rangle \\ \textsc{cont} & {}_{seeing}\left[\begin{array}{ll} \textsc{seer} & i \\ \textsc{seen} & j \end{array}\right] \end{array}\right]$$

(24)



There are two principles governing the obliqueness ordering of arguments within a single level argument structure. First, direct arguments precede obliques. This separate ordering of direct and oblique arguments has been previously motivated by Hellan (1988). Within each of these groupings, arguments are ordered according to thematic obliqueness. Thus the obliqueness hierarchy at this level has an essentially accusative character: agents outrank patients in the basic verbal voice.

Schachter (1984) and Sugamoto (1984) try to define binding possibilities solely via the thematic hierarchy, but this requires them to postulate that Toba Batak has the language-particular thematic hierarchy shown in (25):

(25) Agent > Patient > Dative

But we should be hesitant to accept language particular thematic hierarchies. Rather, I would reanalyze the data as supporting Hellan's suggestion that terms always outrank obliques, regardless of thematic role. The data would thus provide evidence that binding is defined not on the thematic hierarchy, but rather on the independent syntactic level of argument structure.[11]

Given the two levels of argument structure and grammatical relations, we need to determine two mappings. I will not discuss *argument projection* from a verb's meaning to its argument structure. See Dowty (1991) for such a theory. For this talk it is sufficient to know

[11] One should be able to differentiate between these two hypotheses in Toba Batak by looking at binding in the Dative Shift Construction (Schachter 1984:136) (which places recipients into a core role). But the appropriate data are not available to us. For general evidence against the use of thematic hierarchies, see also Davis (1995) and Davis and Koenig (1995).

that agents and experiencers normally become a-subjects. Three possibilities for the *linking* between argument structure and grammatical relations are observed crosslinguistically.[12] Many languages are syntactically accusative, always using a 'straight through' mapping in which the two levels are aligned, see (26a). But some languages always use an inverse mapping for transitive verbs, giving syntactic ergativity, as in (26b).[13] In these two language types, the mapping is invariant, and different surface realizations of arguments can occur only as a result of derivational morphology, like passive. Finally, Western Austronesian languages allow great flexibility in which argument at argument structure becomes the subject. Depending on the voice marker chosen, a variety of mappings are possible without demotion of higher arguments to oblique roles, as binding evidence clearly shows.

(26) a.

gr-structure		**a-structure**	
SUBJ	←	a-subject (agent)	Syntactic Accusativity
OBJ	←	patient	

b.

gr-structure		**a-structure**	
SUBJ	← (from patient)	a-subject (agent)	Syntactic Ergativity – Inverse Grammatical Relations analysis
OBJ	← (from a-subject)	patient	

Outline of binding theory

That at least some parts of binding may be sensitive to argument structure (or simply thematic relations) has been suggested in many places, including work by Jackendoff (1972), Wilkins (1988) and Williams (1994) on English, Sells (1988) on Albanian, Hellan (1988) on Norwegian, Grimshaw (1990) on Japanese, and Dalrymple (1993) and Joshi (1993) on Marathi. The evidence that we have examined strongly supports this still not widely accepted conclusion of a binding theory based on hierarchical argument structure rather than constituent structure.

Such an approach actually fits very naturally with, indeed falls out of, recent work in HPSG. In this work surface valence lists are distinguished from the old SUBCAT list, which is in turn reinterpreted as a level of argument structure, and renamed ARG-S (Iida et al. 1994, Manning 1994, Sag and Fodor 1994, Sag and Godard 1994, Miller and Sag 1995). Since binding theory is still defined on the SUBCAT list, now called ARG-S, an argument structure based theory of binding naturally falls out, and such an account has been worked out in some detail in Manning and Sag (1995). While less explored, such a theory is also

[12] I am using the term 'linking theory' for the mapping from argument structure to grammatical relations, but note that the term is sometimes used to refer to something more like a theory of argument projection, or a theory that maps directly from 'the semantics' to surface grammatical relations (for instance, in Alsina (1993)). I believe that the ergative syntactic phenomena that I study here show quite clearly that it is wrong to try to do linking directly between the semantics and surface grammatical relations. Rather, an independent level of argument structure is strongly motivated and the the factorization of the mapping into two parts is to be greatly preferred.

[13] I am unaware of any syntactically ergative languages that have ditransitive verbs (where all three arguments are terms), and so the interesting question of how the mapping would look in such cases appears not to arise.

necessary for LFG once a theory of complex predicates of the kind examined in Alsina (1993) is adopted.[14] In (27), I begin to outline informally the essence of an argument structure based theory of binding, including some of the parameters which differentiate binding possibilities in different languages.[15]

(27) a. Possibilities for antecedence depend on domination relations and obliqueness, both defined on argument structure.

b. Principle A. A locally a-commanded anaphor must be locally a-bound.

c. Principle B. A personal pronoun must be locally a-free.

The effect of these principles is to require an anaphor to be coindexed with a less oblique ARG-S member, if there *is* such a less oblique coargument.

This binding theory is adequate for English, but crosslinguistic coverage of binding phenomena requires more parametric options (Dalrymple 1993). In many languages, reflexives cannot be bound by just any less oblique NP, but rather their antecedence is restricted to what we might loosely call "subjects". At least to a first order approximation this is true of languages such as Japanese, Russian, Inuit, and Sanskrit.[16] Given that the binding theory is defined on argument structure, the natural constraint to suggest is that in these languages, reflexives must be bound by the first element on some argument structure list. We will formalize such a notion with the definition and principle in (28) drawn from Manning (1994).

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

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

This allows us to explain binding facts such as the Japanese example (29):

(29)	Hanako-ga	Taroo-ni	zibun.zisin-no	e-o	mise-ta.
	Hanako-NOM	Taroo-DAT	self-GEN	picture-ACC	show-PAST

(lit.) 'Hanako$_i$ showed Taroo$_j$ self$_{i/*j}$'s picture.'

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

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

Finally in some languages, including Inuit, binding is also sensitive to the term/non-term distinction (see also Hellan (1988)), but I will not further dwell on this here.

[14] As argued in Manning (1994).

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

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

2 Valence changing operations

Passives

Now consider the behavior of passives. If our theory of passive was that drawn from early HPSG – a lexical rule that cyclically permutes the SUBCAT, now ARG-S, list as in (31), then our prediction is clear: the only possible binder of subject-oriented reflexives, the a-subject, should be the subject of the passive, namely $\boxed{2}$ in (31).

(31) $$_{\textit{active-stem}}\begin{bmatrix} \text{SUBCAT} & \langle \boxed{1}_i, \boxed{2} \rangle \oplus \text{L} \\ \text{CONT} & \boxed{3} \end{bmatrix} \rightarrow {}_{\textit{passive-stem}}\begin{bmatrix} \text{SUBCAT} & \langle \boxed{2} \rangle \oplus \text{L} \; (\; \oplus \; \langle \text{PP}[by]_i \rangle \;) \\ \text{CONT} & \boxed{3} \end{bmatrix}$$

Somewhat similarly, analyses such as Kiparsky (1987), Bresnan and Zaenen (1990), and Grimshaw (1990) have assumed that the argument structure of a passive verb is roughly as in (32). The argument structure is the same as for the active verb, except that the logical subject (or external argument) has been suppressed, and the next argument along becomes the subject, yielding the same prediction.

(32) buy-for⟨—, —, —⟩
$$\begin{array}{l} | \\ \emptyset \end{array}$$

However, in many languages, these predictions are wrong. Perlmutter (1984) observed this for Russian. While in (33a), the reflexive *sebe* must be bound by the subject (which is the a-subject), in the passive (33b), the antecedent can be either the surface subject or the agent argument (sometimes known as the logical subject, following Jespersen (1924)).

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

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

Perlmutter argued from these data that the passive must have a complex representation of some sort.[17] In particular, Perlmutter used these examples to argue within Relational Grammar (RG) that both the logical subject and surface subject of a passive must both be a 1 at some level: the logical subject is the initial 1, but on a later stratum it is put *en chômage* and the surface subject becomes the final 1.

In essence I 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, I would argue that such an analysis does not require multiple strata of grammatical relations, as in RG, but can more restrictively be captured by suggesting that the derivational morphology component builds complex nested argument

[17] Which was lacking within then current versions of the theory of passive of 'surfacy' frameworks like LFG.

structures.[18] Indeed, evidence from ergative languages argues that such an alternative analysis in terms of argument structure is not only possible but necessary.

I propose that passive modifies the argument structure of the basic root, creating the nested argument structure shown in (34).[19] The single nominal argument of the higher argument structure list is identified with the patient of the embedded stem's argument structure.

(34) $\textsc{pass}\langle —, \text{buy-for}\langle —, —, —\rangle\rangle$

(35) a.
$$\left[\begin{array}{ll} \textsc{pred} & \text{be bought} \\ \textsc{subj} & \left[\begin{array}{ll} \textsc{pred} & \text{book} \\ \textsc{spec} & \text{this} \end{array}\right] \\ \textsc{obl}_{\text{ag}} & \left[\begin{array}{ll} \textsc{pred} & \text{Boris} \end{array}\right] \\ \textsc{obl}_{\text{ben}} & \left[\begin{array}{ll} \textsc{pred} & \text{self} \end{array}\right] \end{array}\right]_{\textit{f-s}}$$

b. ${}_{\textit{a-s}}\textsc{pass}\langle \text{book}, \text{buy-for}\langle \text{Boris}, —, \text{self}\rangle\rangle$

Sentence (33b) will then have the LFG representation shown in (35). Alternataively, the passive verb in (33b) will have an HPSG representation as in (36). Note that repeated arguments in a nested argument structure appear only once on the valence lists, SUBJ and COMPS.

(36)
$$\left[\begin{array}{ll} \textsc{subj} & \langle \boxed{2}\text{NP}[\textsc{nom}]_j \rangle \\ \textsc{comps} & \langle \boxed{3}\text{PP}, \boxed{1}\text{NP}[\textsc{instr}]_i \rangle\rangle \\ \textsc{arg-s} & \langle \boxed{2}_j, \langle \boxed{1}_i, \boxed{2}_j, \boxed{4}_i \rangle\rangle \\ \textsc{cont} & \left[\begin{array}{ll} \textsc{buyer} & i \\ \textsc{bought} & j \\ \textsc{beneficiary} & i \end{array}\right]_{\textit{buying}} \end{array}\right]_{\textit{passive-part}}$$

In (36), the reflexive beneficiary $\boxed{4}$ is inside a nested list in the argument structure. Suppose that we interpret 'locally a-bound' as bound within the entire complex argument structure of a predicate. Then $\boxed{4}$ is locally a-bound by two a-subjects. This is exactly the result we want to explain the Russian data above. Passive agents retain a-subject properties: they remain a possible controller of reflexives, despite being an oblique grammatical relation in a subordinate structural position. Note that our theory predicts that the surface subject

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

[19] Essentially the same representation for the passive is proposed by Pinker (1989:239). Although the many differences in framework make precise comparison difficult, there is also a clear conceptual relationship with the transformational analysis of Hasegawa (1968). Note also that this passive is intrinsically promotional; some have argued that the universal rule of passive should only mention subject demotion, to account for certain passive-like structures where nothing is promoted such as in Lithuanian, but we would provide a different (though related) derivational sort for such cases.

is another possible binder of the anaphor in (33b), but this is being ruled out due to its being an inanimate NP.

Examples of passives from diverse languages that support this analysis appear in (37):[20]

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

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

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

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 (38):

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

the controller of the subject of a *-nagara* clause can actually be another a-subject, such as the logical subject of a passive, as is shown in (39):

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

Similarly, in Inuit, the a-subject of an infinitival clause (whether expressed or not), must be identical to the a-subject of a higher clause.[21] Coreference with the logical subject of a passive is a possibility, as in (40), where the a-subject of 'prevent' is coreferent with the logical subject of 'tie up':

(40) 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.'

[20]Recall that the Inuit 4th person pronominal agreement marker is a reflexive form.

[21]Inuit allows long distance binding of these infinitival a-subjects in parallel with the behavior of reflexives.

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

Causatives

Further evidence for the separation of a level of syntactic argument structure from valence comes from the consideration of causative and similar derivational morphology in both ergative and accusative languages. (Marantz 1984, Baker 1988, Rizzi 1982, Aissen and Perlmutter 1983). Causatives and other derivationally complex words do sometimes behave differently from morphologically simple words (*pace* Grimshaw and Mester (1985)). While on the surface various tests indicate that we are dealing with a single clause, various other syntactic tests have been used to argue that these structures are really underlyingly biclausal.

Consider, as an example, causative morphology in Inuit.[22] Causatives of an intransitive and a transitive verb are shown in (41):

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

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

A sentence like (41b) behaves on the surface like a single clause. The causative verb form is a surface word (Sadock 1980). The verb agrees with the lower object using the regular patterns of object agreement (which would be quite mysterious if we were dealing with embedded clauses).[23] The case marking pattern allows only one each of the core cases ergative and absolutive, as in a single clause. The unmarked word order is as shown: the causee follows the lower object, as oblique NPs regularly follow core roles within a single clause, rather than preceding it as if it were a subject. Additionally, there is evidence from (participial) relatives: relativization is clausebound, but the lower object of these complex verb forms can be relativized on (Johnson 1980:23).

On the other hand, there is evidence that we might be dealing with a biclausal structure. In many languages, the causee appears to possess 'subject' properties, such as being able to bind subject-oriented reflexives or ellipsed arguments of certain adverbial clauses. This observation has prompted many analyses to assume a biclausal source for causatives

[22]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.

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

within both transformational (e.g., Marantz (1984), Baker (1988)) and nontransformational accounts (e.g., Gunji (1987)). For instance, both the causer and the causee behave as 'subjects' for the purposes of anteceding reflexives, and controlling infinitival clauses in Inuit; see (42a) and (43). Further (42) shows how the binding behavior of causatives (42a) differs from that of otherwise similar lexical roots (42b):

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

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

(43) 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.'

A common form of analysis postulates an underlying structure that is biclausal, and then uses some mechanism of incorporation or restructuring to produce the monoclausal surface forms. Such an approach has large implications for linguistic theory: if a verb form like Inuit (43) is equivalent to processes of control and complementation in other languages, then syntactic processes must operate within words and the principle of lexicalism must be abandoned. That passive and antipassive can cooccur with such affixes, as in (44), may appear to support the syntactic analysis. However, as Smith (1982) observes, it only shows that either all derivational processes, including passivization and causativization are lexical, or else that all these processes are syntactic.

(44) 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.'

Such transformational analyses are unavailable within a lexicalist framework like HPSG or LFG, but fortunately, more careful analysis suggests that such derivational analyses are not required. The essence of the transformational analysis is that the *causee* of a causative (the one who is caused to act) is a subject at some level. But cross-linguistic investigation shows that causees never possess grammatical subject properties. Rather they have the properties of argument structure a-subjects: for example, Inuit causees may bind reflexives but are not accessible to relativization. Moreover, note that in syntactically ergative languages, it is the a-subject, and not the gr-subject of the base verb that becomes the causee. This suggests that causatives can be accounted for by a mismatch between valence and argument structure: these verbs will have valence patterns much like any other predicate, but the causative verb will have a nested argument structure, just as was proposed for passives, so that both the causer and the causee will be a-subjects.

Causative patterns vary crosslinguistically. In 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 via some more oblique role. Moreover, it is the lower object that is accessible to passivization. Following Mohanan (1988), I propose the argument structures in (45) for such causatives.[24] The first argument of CAUSE is the causer, and the second is the causee. The causee role is fused with the theme of the base predicate.

(45) a. CAUSE⟨—, —, look.after⟨—, —⟩⟩

b. CAUSE⟨—, —, cry⟨—⟩⟩

An important prediction of my analysis is that the causee is selected according to its prominence at argument structure rather than according to its grammatical relation, that is by being a subject. 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 my 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.

Examination of Inuit causatives shows that the argument structure based account of causative formation is correct. In a simple transitive clause such as (46a), 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 (46b).

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

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

The question, then, is what happens when this verb stem is causativized. The causative in (47) confirms our argument structure based account of monoclausal causatives by showing that it is the a-subject that becomes the causee.[25] This shows clearly that the causee derives its special properties not from being a grammatical subject (which it isn't), but from being the a-subject of the stem.

(47) a. Aani-p miiqqat uan-nut paari-tip-pai
Aani-ERG children.PL.ABS me-TERM look.after-CAUS-IND.TR.3SG.3PL
'Aani had me look after the children.'

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

[24]See also Alsina and Joshi (1991), Alsina (1993), and Butt (1993) for related work.

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

The HPSG representation of the verb for the causative in (47b) will be as in (48):

(48)
$$\left[\begin{array}{ll} \text{SUBJ} & \langle \boxed{2}[\text{ABS}] \rangle \\ \text{COMPS} & \langle \boxed{1}[\text{ERG}]_i,\ \boxed{3}[\text{TERM}]_j \rangle \\ \text{ARG-S} & \langle \boxed{1}_i,\ \boxed{2}_k,\ \langle \boxed{3}_j,\ \boxed{2}_k \rangle \rangle \\ \text{CONT} & {}_{\textit{cause-rel}}\left[\begin{array}{ll} \text{THINKER} & i \\ \text{THINKEE} & j \\ \text{SOA-ARG} & {}_{\textit{look-after}}\left[\begin{array}{ll} \text{LOOKER} & j \\ \text{LOOKEE} & k \end{array}\right] \end{array}\right] \end{array}\right]$$

We can test the correctness of this description by again considering passivization and binding. Example (49a) shows that the lower object becomes the a-subject of the passive-stem (and hence subject since the passive stem is intransitive) upon passivization of a causative stem in Inuit. This is what we would expect, since the argument structure composing operations that we have already introduced yield the description (49b) for the verb in (49a). Here, the lower object $\boxed{2}_k$ becomes the a-subject of the passive stem's ARG-S.

(49) 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$_k$ were prevented by Jaaku$_i$ from the dogs$_j$ eating t_i.'

b.
$$ {}_{\textit{passive-stem}}\left[\begin{array}{ll} \text{SUBJ} & \langle \boxed{2}\text{NP}[\text{ABS}]_k \rangle \\ \text{COMPS} & \langle \boxed{3}\text{NP}[\text{TERM}]_j,\ \boxed{4}\text{NP}[\text{ABL}]_i \rangle \\ \text{ARG-S} & \langle \boxed{2}_k,\ \langle \boxed{4}_i,\ \boxed{2}_k,\ \langle \boxed{3}_j,\ \boxed{2}_k \rangle \rangle \rangle \\ \text{CONT} & {}_{\textit{prevent-rel}}\left[\begin{array}{ll} \text{PREVENTER} & i \\ \text{PREVENTEE} & j \\ \text{SOA-ARG} & {}_{\textit{eat-rel}}\left[\begin{array}{ll} \text{EATER} & j \\ \text{EATEN} & k \end{array}\right] \end{array}\right] \end{array}\right]$$

Unlike some other languages, in Inuit, a stem can be passivized prior to the application of causative morphology, as in (50a). This example also falls out from argument structures that we have proposed, as is shown in (50b).[26]

(50) 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.'

[26]We have only considered passivization here, but this account can also be extended to antipassives, as well, along the lines sketched by Manning (1994).

b.

$$
{}_{\textit{caus-stem}}\left[\begin{array}{ll}
\text{SUBJ} & \langle \boxed{2}\text{NP}[\text{ABS}]_j \rangle \\
\text{COMPS} & \langle \boxed{1}\text{NP}[\text{ERG}]_i,\ \boxed{3}\text{NP}[\text{ABL}]_k \rangle \\
\text{ARG-S} & \langle \boxed{1}_i,\ \boxed{2}_j,\ \langle \boxed{2}_j,\ \langle \boxed{3}_k,\ \boxed{2}_j \rangle\rangle\rangle \\
\text{CONT} & {}_{\textit{prevent-rel}}\left[\begin{array}{ll}
\text{PREVENTER} & i \\
\text{PREVENTEE} & j \\
\text{SOA-ARG} & {}_{\textit{eat-rel}}\left[\begin{array}{ll}
\text{EATER} & k \\
\text{EATEN} & j
\end{array}\right]
\end{array}\right]
\end{array}\right]
$$

Inuit binding possibilities are complicated by the existence of coterm binding constraints,[27] and we will not present a complete account here. But the data in examples (42a) and (43) illustrate the correctness of the most basic prediction of our argument structure based binding theory. In the argument structure representation, both the causer and the causee qualify as a-subjects and we would expect them to be able to bind suitable reflexives, and this prediction is confirmed, even for the oblique causee that results when a transitive stem is causativized.[28]

Thus this section undermines much of the conceptual appeal of the approach of Baker (1988). For example, Baker took the a-subjecthood of causees to argue that they should be represented configurationally as grammatical subjects. But the fact that causees lack gr-subject properties undermines Baker's arguments for biclausal sources, allowing us to maintain lexicality preserving analyses, which more correctly predict the behavior of causatives in ergative languages. Such a lexicalist analysis works by replacing phrase structure recursion with recursion at the level of argument structure.

3 Conclusions

I conclude by reiterating the virtues of cleaning distinguishing levels of surface grammatical relations and argument structure. Such an approach allows (i) the maintainence of lexicalist analyses, (ii) a superior account of binding phenomena, (iii) a uniform analysis of syntactically ergative and Philippine languages, and (iv) a satisfactory account of valence changing morphology.

[27] See Bittner (1994), Sadock (1994), and Manning (1994) for discussion.

[28] 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 (51a).

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