# Argument structure as a locus for binding theory

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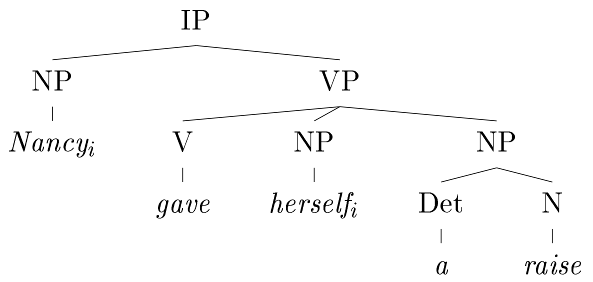
## 1 Locating binding relationships

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 (where by *selection* I am intending to cover everything from semantic dependencies to syntactic subcategorization). The second is 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 (Manning 1994, Belletti and Rizzi 1988, Perlmutter 1984), surface syntax/grammatical relations, logical form, linear order, pragmatics (Levinson 1991), and discourse (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).

LFG has always rejected a configurational account of binding. For instance, Simpson (1991) argues that a configurational theory of binding in Warlpiri cannot be maintained, among other reasons because finite clauses lack a VP. The suggestion is rather that binding can be accounted for at the level of grammatical relations, by noting that subjects can bind objects. I accept the arguments of Bresnan (lectures, 1985–93), Wilkins (1988), Dalrymple (1993) and Pollard and Sag (1994) in favour of a theory of binding based on selection rather than on configurations, but I will have little more to say on this matter (since I have nothing in particular new to add).

Instead, I want to concentrate on the second dimension. 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 LGB (Chomsky 1981), binding theory is 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 HPSG2 (Pollard and Sag 1994), binding possibilities are (largely) not configurationally determined, but they reflect an obliqueness hierarchy on surface grammatical relations which again licenses subjects to bind objects. And in LFG, binding has been done with respect to f-structure. Bresnan (lectures) defines binding domains in terms of a nucleus that corresponds to a level of f-structure, and Dalrymple (1993) emphasizes f-structure constraints on binding domains.

However, I wish to argue in this paper that consideration of typologically diverse languages shows that this design decision in the architecture of Universal Grammar is mistaken. After outlining my approach to argument structure, I briefly present four situations in which there are mismatches between argument structure and grammatical relations and argue from that 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. I then outline what an argument-structure-based account of binding looks like, before concluding with some discussion about how far this account can be pushed – about what other factors influence binding possibilities.

## 2 Argument structure versus grammatical relations

Manning (1994) argues 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 provides two notions of subjecthood: grammatical subject (gr-subject) and argument structure subject (a-subject). The former notion of grammatical subject is essentially Dixon's pivot, the notion of final 1 in RG or subject in LFG. However, not all of syntax is structured around the hierarchy of grammatical relations. I propose that in all languages there is a principled 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 the hierarchy of grammatical relations, and the more semantic properties of binding, control and imperative addressee, which are sensitive to prominence at a level of argument structure. The class of most prominent arguments at argument structure is similar to Dixon's (1994) use of the term 'subject', and Jespersen's logical subject. However, these groupings are 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*. All logical subjects are a-subjects, but the compound argument structures that result from derivational operations, like passive and causative, yield additional a-subjects. There are two principles governing the obliqueness ordering of arguments within a single level of argument structure. First, *direct arguments* (otherwise known as *terms* or *core roles*) precede *obliques*. This separate ordering of terms and obliques has been motivated by Hellan (1988). Within each grouping, 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.

My conception of argument structure is as a syntactic level, as in Bresnan and Zaenen (1990), not as a purely semantic level, as will be discussed below. The basic argument structure for a verb is an ordered list of the verb's arguments, with terms set off from obliques by a vertical bar. Given the two levels of argument structure and grammatical relations, we need to determine two mappings. For *argument projection* from a verb's meaning to its argument structure, it is here sufficient to note that agents and experiencers become a-subjects (see Dowty (1991) for such a theory). Three possibilities for the *linking* between argument structure and grammatical relations are observed crosslinguistically.[1] Many languages are syntactically accusative, always

[1]The term 'linking theory' 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)), but I believe that ergative syntactic phenomena show quite clearly that one should employ an intermediate level of argument structure, as suggested here.

using a 'straight through' mapping in which the two levels are aligned (2a). But some languages always use an inverse mapping for transitive verbs, giving syntactic ergativity, as in (2b).[2] 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. But, 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. I turn now to examine syntactically ergative and Western Austronesian languages for evidence about the locus of binding theory.

(2) a.

| **f-structure** | | **a-structure** | |
|---|---|---|---|
| SUBJ | ⟵ | a-subject (agent) | Syntactic Accusativity |
| OBJ | ⟵ | patient | |

b.

| **f-structure** | **a-structure** | |
|---|---|---|
| SUBJ | a-subject (agent) | Syntactic Ergativity – Inverse Grammatical Relations analysis |
| OBJ | patient | |

## 3 The argument from Western Austronesian languages

Western Austronesian languages appear to be unique in allowing various relationships between argument structure and grammatical relations, mediated by so-called voice morphology. The best known case is Tagalog (Schachter 1977, Kroeger 1993), and another well-studied cases is Cebuano (Bell 1976). I will briefly present evidence from Toba Batak (Schachter 1984). Arka and Wechsler (1996) provide a more detailed examination of Balinese that I think supports and expands the arguments that I present here. Balinese and Toba Batak have a more rigid configurational surface structure than Tagalog, and hence more clearly show 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, illustrated 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 appear in the final subject position. Schachter (1984) provides evidence that both arguments in both voices in (3) are terms. Neither can be deleted in either construction and the undergoer-subject pattern is unmarked. 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).[3]

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. The pitch accent of a

[2] I am unaware of any syntactically ergative languages that have ditransitive verbs (where all three arguments are terms). This may be for principled reasons (while languages allow multiple objects, there can only be one pivot), but at any rate the question of how the mapping would look in such cases appears not to arise.

[3] Further evidence for this in Balinese comes from the fact that there is a separate passive construction which contrasts with the 'voice' variation in (3) in that the agent is marked with a preposition, and is optional.

sentence 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. 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. Example (4) shows that VPs can be coordinated regardless of the voice chosen:

(4) 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.'

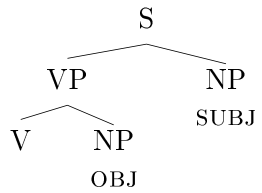
Thus the NP following the verb in transitive clauses will be analyzed as a complement. The other NP is clearly external to the VP, and it behaves similarly to the *ang*-marked NP in Tagalog. In Toba Batak, this NP may optionally be fronted before the verb in questions or as a topic, while the VP-internal NP may not be. As in Tagalog, in both languages relativization is restricted to this NP, and following the Keenan-Comrie (1977) hierarchy, if only one NP can be relativized on, then that NP is the subject. Further, it is this argument which is the unexpressed argument of controlled complements and purpose clauses, regardless of the verbal voice chosen:[4]

(5) 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.'

Kroeger (1993), following a long tradition (including Blake, Bloomfield, McKaughan, and Bell) argues persuasively that the *ang*-marked nominal in Tagalog (sometimes called the topic) should be analyzed as the subject at f-structure. Western Austronesian languages are then unusual in allowing various arguments of the verb to become the subject without passivization or antipassivization occurring. Rather, both the agent and patient of a basic transitive verb are terms in all 'voices'. My starting point is to accept this analysis, and to suggest that the evidence from Toba Batak supports a similar analysis. All the evidence argues that the external NP should be regarded as a subject, motivating the descriptive phrase structure shown in (6).

(6) **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. Although *John* does not c-command the reflexive in (8b), binding constraints are blind to this surface constituency.

[4]See Artawa and Blake (1994:26) 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.

(7) a. **TB** [$_{VP}$Mang-ida diri-na] si John
AV-saw self-his PM John
'John$_i$ saw himself$_i$.'

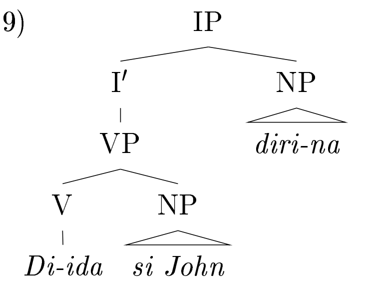
b. *Mang-ida si John diri-na
AV-saw PM John self-his
*'Himself$_i$ saw John$_i$.'

(8) 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$_i$.'

If we propose the LFG c-, f-, and a-structures in (9) for the Toba Batak sentence (8b), then it seems that we should do binding off a-structure (at least in Toba Batak), without referring to the surface structure or surface grammatical relations.

(9)




$$_{f\text{-}s}\begin{bmatrix} \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{`self'} \end{bmatrix} \\ \text{PRED} & \text{`see'} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{`John'} \\ \text{MARK} & \text{PN} \end{bmatrix} \end{bmatrix} \qquad _{a\text{-}s}\text{see}\langle\text{John, self}\rangle$$

## 4 The argument from syntactically ergative languages: Inuit

The situation where binding possibilities do not track other subjecthood tests is not confined to Austronesian, but also occurs in various ergative languages – in fact, I argue that such a split occurs in all syntactically ergative languages (Manning 1994). Ergative languages (Dixon 1994) 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). For example Woodbury (1977) and Bittner (1994) show that there is a split in properties for Inuit, as indicated in (10).

(10)

| **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.[5] (11a–b) show relativization of O and S NPs in West Greenlandic, while (11c) shows that relativization of an A NP is impossible.

[5]Relative clauses in Inuit are actually participial nominalizations, but I am essentially accepting a functional definition of what a relative clause is.

(11) 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'

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 (12a) differs from the intransitivized variant in (12b) because of a presupposition of specificity associated with the absolutive NP in (12a).

(12) 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, (13) shows that a possessive reflexive can be bound by an 'Actor', an A or S NP (13a–b), but not by an O NP (13c).[6] 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. Therefore, if syntactically ergative languages exist, as argued in Dixon (1994) and Manning (1994), we have to accept that binding in such languages is again not defined on surface phrase structure or grammatical relations, but rather on a level of argument structure or perhaps thematic relations.

(13) 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$_i$.'

## 5 The argument from causatives

Further evidence for locating binding constraints on argument structure rather than surface grammatical relations in a framework like LFG or HPSG comes from consideration of the interaction between binding and causatives (Marantz 1984, Baker 1988). While on the surface

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

various tests indicate that many causatives are a single clause, various other phenomena, in particular binding, have been used to argue that these structures are really underlyingly biclausal. Consider, as an example, causative morphology in Inuit:[7]

(14) 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 (14) behaves on the surface as 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).[8] 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 relatives: relativization is clausebound, but the lower object of these complex verb forms can be relativized on (Johnson 1980:23).

On the other hand, binding evidence seems to suggest we might be dealing with a biclausal structure. Inuit reflexives are 'subject' oriented, but nevertheless both the causer and the causee behave as 'subjects' for the purposes of anteceding reflexives; see (15a) and (16). Further, (15) shows how the binding behavior of causatives (15a) differs from that of otherwise similar lexical roots (15b). This pattern is widespread crosslinguistically. In general, the causee retains the ability to bind what have been referred to as subject-oriented reflexives (what I would regard as a-subject-oriented reflexives).

(15) 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$_{i/*j}$.'

(16) 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.'

Mohanan (1988) and subsequent work (Alsina 1993, Andrews and Manning 1993, Andrews 1996, Butt 1993) argue that that this conflicting evidence can be accounted for by a mismatch between f-structure and a-structure: these verbs will have grammatical relations much like any other predicate, but the causative verb will have a nested argument structure, so that both the causer and the causee will be a-subjects. 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. For such cases, the argument structures in (17) are proposed, where the second argument of the causative predicate fuses with the theme of a transitive base predicate.

(17) a. CAUSE⟨—, —, look.after⟨—, —⟩⟩

[7] In Inuit, "causative" morphology includes not only verbs of causing and allowing, but other verbs of thinking and saying, which behave identically.

[8] 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*.

b. CAUSE⟨—, —, cry⟨—⟩⟩

Inuit binding possibilities are complicated by the existence of coterm binding constraints,[9] but note that the data in examples (15a) and (16) are now immediately explained if we say that binding is sensitive to a-structure not grammatical relations. In the a-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.[10] On the other hand, not being subjects, Inuit causees are not accessible to relativization.

Causatives also provide clear evidence that binding domains are sensitive to argument structure. For instance, Manning et al. (forthcoming) show that the Japanese causative is monoclausal in terms of grammatical relations. However, the obviation condition on a pronominal lower object is not that it must be unbound within the clause. Rather it must only be free of the causee. This makes sense if the obviation condition is stated over argument structure, but not if it is stated over f-structure. A similar argument can be made from Chi-Mwi:ni: Marantz (1984) shows that when the Chi-Mwi:ni reflexive (which is not long distance) appears in the lower object position, then it can only be bound by the causee, and not by the causer.

Data of this kind show conclusively that an argument structure based approach to constraints on binding is necessary in *any* monostratal theory of syntax that recognizes complex predicates formed from embedded argument structures (such as much recent work in LFG, including Alsina (1993), Andrews and Manning (1993) and Butt (1993)). The need for major revisions to the binding theory that was caused by the introduction of complex predicates has so far not been sufficiently appreciated.

## 6 The argument from passives

Now consider passives. If binding theory were defined over surface grammatical relations, or even if our theory of passive were that of Bresnan and Zaenen (1990), or Grimshaw (1990) in which the passive argument structure is the same as for the active verb, except that the logical subject (or external argument) has been suppressed, as in (18), then our prediction is that only the subject of the passive should be a possible binder of subject-oriented reflexives.

(18) buy-for⟨—, —, —⟩
|
∅

However, in many languages, this prediction is wrong. Perlmutter (1984) observed this for Russian (and see Manning (1994) for examples from other languages such as Inuit and Sanskrit). While in (19a), the reflexive *sebe* must be bound by the subject (which is the a-subject), in the passive (19b), the antecedent can be either the surface subject or the agent argument (i.e., the logical subject).

(19) 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$_i$.'

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

[10] Examples of this latter sort are given by Fortescue (1984:144) and Bittner (1994) 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 (18a).

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 at some level. 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, 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 structures (cf. Grimshaw (1990:167–173)). Passive agents retain a-subject properties: they remain a possible controller of reflexives, despite being an oblique grammatical relation in a subordinate structural position. (Our theory predicts that the surface subject is another possible binder of the anaphor in (19b), but this is ruled out due to its being an inanimate NP.)

I propose that passive modifies the argument structure of the basic root, creating the nested argument structure shown in (20).[11] The single nominal argument of the higher argument structure list is identified with the patient of the embedded stem's argument structure. Again, the f-structure does not support the correct definition of possible antecedence, but the a-structure does.

(20)
$$_{f\text{-}s}\begin{bmatrix} \text{PRED} & \text{be bought} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{book} \\ \text{SPEC} & \text{this} \end{bmatrix} \\ \text{OBL}_{ag} & \begin{bmatrix} \text{PRED} & \text{Boris} \end{bmatrix} \\ \text{OBL}_{ben} & \begin{bmatrix} \text{PRED} & \text{self} \end{bmatrix} \end{bmatrix} \qquad {}_{a\text{-}s}\text{PASS}\langle \text{book, buy-for}\langle \text{Boris, —, self} \rangle\rangle$$

Thus these data argue for three things: (i) that there must be a new more articulated argument structure for passives along the lines I 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.

## 7 An argument-structure-based binding theory

The evidence that we have examined strongly supports a binding theory based on hierarchical argument structure rather than surface constituency/grammatical relations. In (21), I outline informally the essence of an argument-structure-based theory of binding:[12]

(21) 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.

[11] Essentially the same representation for the passive is proposed by Pinker (1989:239). Note that this passive is intrinsically promotional; some have argued that the universal rule of passive should only mention subject demotion, to account for certain passive-like structures where nothing is promoted such as in Lithuanian, but I would treat this as a different (though related) valence-changing operation.

[12] An argument $\alpha$ a-commands an argument $\beta$ iff $\alpha$ does not include $\beta$ and every a-structure that contains all instances of $\alpha$ contains all instances of $\beta$. This wording allows for cases where $\beta$ appears in multiple places in the argument structure, due to the fusion that occurs in passives and causatives. In general when arguments are unified, it seems that only the highest instance of a group of unified items counts as visible. This same issue turns up in functional uncertainty (Manning 1994). A-bound and a-free are then defined in the obvious way. A question arises as to whether the argument structure of different predicates should be connected together using a configurational structure (as was done in Pollard and Sag (1994)) or whether one builds up a larger relational a-structure for a whole sentence, as I did in Manning (1994). I tend to prefer the latter, although the evidence I present does not distinguish between these two approaches.

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 a-structure member, if there *is* such a less oblique coargument (Pollard and Sag 1994).

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. Given that 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 (22) drawn from Manning (1994).

(22) a. An **a-subject** is an entity that is least oblique at some level of a-structure.

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

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. Finally in some languages, including Inuit, binding is also sensitive to the term/non-term distinction (Hellan 1988).

## 8 Coverage and Comparisons

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 (1994) 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, Arka and Wechsler (1996) do provide the crucial corresponding evidence for Balinese. As (23) shows, a goal that is a term can bind a theme (23a), but a theme can bind an oblique goal (23b).

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

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. As another example, 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. But as observed in Manning (1994), this is predicted by the argument structure representations and binding theory that I have 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 is above the agent (24a). Indeed, the patient a-commands the agent in a passive, correctly licensing the binding shown in (24b).

(24) a. $_{a\text{-}s}$PASS⟨hansi, beat⟨wife, —, self⟩⟩

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.'

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:

(25) a. ?*John pleases himself.

b. John likes himself.

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

b. ?*Bill talked about Mary to herself.

(27) a. ?Bill showed Mary herself (in the mirror).

b. *Bill showed Mary to herself (in the mirror).

The introduction of the term/oblique distinction, however, allows us to also handle examples such as the following which go against a straight thematic hierarchy constraint:

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

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

If passive is an argument structure changing operation as I have argued, then the existence of sentences such as (29a) necessitates that expletives should appear in argument structures (29b). Some advocates of more 'semantic' argument structures (e.g., Alsina (1993)) do not wish this, but I see no problem here, and I am perfectly happy to advocate that argument structure is a syntactic level, and not some sort of convenient subset of semantic representation. See Bresnan and Zaenen (1990:53) for independent evidence from resultatives that nonthematic arguments interact with the rest of argument structure.

(29) a. There are believed to be key issues that are still unresolved.

b. ${}_{a\text{-}s}$PASS⟨there, believe⟨∅, —, XCOMP⟩⟩

Given this syntactic approach to argument structure, sentences that involve the interaction of raising and binding are unproblematic. A sentence like (30a) will be well-formed because *seem* will have the argument structure shown in (30b)

(30) a. The children seem to each other to be badly dressed.

b. ${}_{a\text{-}s}$seem⟨children| each-other⟩

I am not wishing to argue that all constraints on binding can be reduced to argument-structure configurations. I assume that there are linear precedence constraints on binding which have no relation to argument structure – for instance, Arka and Wechsler (1996) document a role for linear order in Balinese. However, it is good to examine further how much of binding this account extends to. A classic argument against the sufficiency of surface configurational/grammatical relations accounts of binding has been the existence of backwards binding with experiencer predicates such as (31a) from Italian or (31b) from English:

(31) a. I propri$_i$ sostenitori preoccupano Gianni$_i$.
His own supporters worry Gianni.

b. Each other$_i$'s remarks annoyed John and Mary.

But such examples could perhaps be assimilated to an argument-structure-based theory of binding once we notice that they have the argument structure shown in (32). Some suggestions for this kind of treatment appear in Grimshaw (1990).

(32) $_{a\text{-}s}$worry⟨*exp*, *th*⟩

Indeed, it is worth noting that various of the examples that Iida (1992) uses to argue against a syntactic account of *zibun* binding in Japanese are examples of this sort, and therefore perhaps not so problematic for a syntactic account of binding after all. Nevertheless, I do not believe that all of binding can be incorporated in this way. As has been widely discussed, there are various cases of binding that are logophoric or reflect discourse point-of-view. These firmly appear to have no possible syntactic account. For instance, examine the Lezgian example in (33).

(33)

| | | | | | | |
|---|---|---|---|---|---|---|
| I | xür-er.i-n | q'üzü-bur.u-n | gaf-ar-aj, | čeb | inriq$^h$ | Dağustan.d-aj |
| these | village-PL-GEN | old-SBST.PL-GEN | word-PL-INEL | selves | here | Daghestan-INEL |

| | |
|---|---|
| ata-j-bur | ja |
| come-AOP-SBST.PL | COP |

'According to the old people$_i$ of these villages, they$_i$ came here from Daghestan.'

## 9 Against a disjunctive account

I have presented evidence arguing for an argument-structure-based account of binding. An alternative is to argue that anaphors can variously be sensitive to grammatical relations and thematic structure; some may be sensitive to logical subjects, some to grammatical subjects, and yet others to both. In this section, I want to briefly suggest why I think that approach is to be dispreferred.

We would like to have a strong universal theory of binding, and so it is an a priori unwelcome position to have to concede that binding can be influenced by various levels seemingly at random from language to language. Is it just a random fact that anaphors in Tagalog fairly closely track thematic roles, while in other languages the correlation is less obvious? I would wish to argue that such facts are not coincidences but follows from the different operations on argument structure that various languages possess. There is much evidence in many languages that in general all a-subjects are possible binders of suitable 'subject' oriented reflexives (e.g., Sanskrit (Kiparsky 1987) Cebuano (Bell 1976:77), Turkish (Kiparsky 1987), Lithuanian (Kiparsky 1987), Chi-Mwi:ni (Marantz 1984:271), Chamorro (Baker 1988:212), and one reflexive (*swataah*) in Marathi (Joshi 1993:133–135)).[13]

However, there are some languages where a causee or the logical subject of passives does not have all the binding capabilities of other subjects. For example, K. P. Mohanan (1981) (see also Marantz (1984:278)) describes Malayalam as such a language. In cases like this I would like to suggest that binding is most likely restricted to a-subjects that are also terms. Alsina (1993:266–269) describes a similar conjunction of conditions as determining the binding of the Catalan reflexive phrase *per si sol* 'on one's own'. This reflexive can be bound by either a grammatical subject (which is also an a-subject) or a causee expressed as a term, but it cannot be bound by either the logical subject of a passive or an oblique causee. Such a binding condition is well-captured at argument structure, given that it marks the term/oblique distinction, as I

[13]Some earlier work regarded only grammatical subjects as possible antecedents of *swataah*, but Joshi shows logical subjects are also possible antecedents.

have argued. I know of only one reported case of an anaphor that can be bound by a logical subject but not by a grammatical subject and that is the Marathi anaphor *aapaṇ* (Dalrymple 1993:11–13, Joshi 1993:125–133). Such a case seems very marked, and could perhaps be specified at argument structure as something that is a a-subject but not a term. But overall, the great bulk of data points at a uniform argument-structure-based account.

An account employing a disjunction, saying that a reflexive may be bound by either a logical subject or a surface subject, would have major disadvantages. It does not account for why the logical subject cannot bind (an anaphor inside) the theme of the passive as in (34). Some ad hoc condition would be needed to rule out this case, but it follows automatically on my account.

(34) *ataata-ni Juuna-mit tatigi-niqar-p-u-q
father-4SG.SG Juuna-ABL trust-PASS-IND-INTR-3SG
*'His$_i$ father is trusted by Juuna$_i$.'

Further evidence against a disjunctive account comes from looking at pronominal items that are subject to obviation conditions. In a simple clause, an obviative form must be disjoint from the local a-subject, which is the A or S, but in a passive clause, such a form need only be disjoint from the oblique agent a-subject, since this is the minimal a-commanding a-subject, and can be coreferent with the S NP. Consider the Inuit sentences in (35) from Bittner (1994):

(35) a. umiarsuarmiu-t akunnirit sisamat sini-riir-m-ata itir-p-u-t
sailor-PL.ABS [hours four sleep-PERF-PSUB-3PL] wake.up-IND-INTR-3PL
'The sailors$_j$, after they$_{*j/k}$ had slept for four hours, woke up.'

b. umiarsuarmiu-t akunnirit sisamat sini-riir-m-ata Juuna-p
sailor-PL.ABS [hours four sleep-PERF-PSUB-3PL] Juuna-ERG
itirsar-p-a-i
wake.up-IND-TR-3SG.3PL
'Juuna$_i$ woke up the sailors$_j$, after they$_{*i/j/k}$ had slept for four hours.'

c. umiarsuarmiu-t akunnirit sisamat sini-riir-m-ata
sailor-PL.ABS [hours four sleep-PERF-PSUB-3PL]
itirsar-niqar-p-u-t
wake.up-PASS-IND-INTR-3PL
'The sailors$_j$ were woken up (by somebody$_i$), after they$_{*i/j/k}$ had slept for four hours.'

For a morphologically simple verb, (35a) shows that the third person suffix on the dependent verb indicates that this verb's subject must be disjoint from the absolutive a-subject of the matrix verb, despite this being pragmatically odd. The same disjoint from minimal accessible a-subject reading occurs in (35b) – there must be non-coreference with the ergative NP, but coreference can occur with the absolutive NP or any other salient individual. The a-structure of (35b) is shown in (36a):

(36) a. wake.up⟨Juuna, sailors, after⟨sleep⟨pro, four.hours⟩⟩⟩

b. PASS⟨sailors, wake.up⟨PRO(arb), —, after⟨sleep⟨pro, four.hours⟩⟩⟩⟩

The important contrast is then to compare the matrix passive (35c) with (35a). In (35c) the a-structure of which is indicated in (36b), the dependent verb's subject may be coreferent with the absolutive surface subject of the matrix verb, since the obviative ending only requires its referent to be free of the immediately superior a-subject, which is the suppressed agent of the passive, A-SB$_2$ (at least on one attachment possibility for the adjunct). Coreference with the higher S (or another individual) is freely permitted. This follows if the third person marker indicates that the argument is free of the minimal a-subject, as on the nested argument structure account. It does not follow under a disjunctive theory of possible binders.

If one accepts the above arguments that the central restrictions on binding possibilities should be based on hierarchical argument structures, there seems no independent need to ever propose thematic or surface syntactic constraints on binding. Hence I would propose that they are eliminable. Indeed, one might observe that in a syntactically accusative language, lots of the things that have traditionally been attributed to surface grammatical relations can equally be attributed to argument structure. In particular, while I think all languages show evidence of a term/oblique distinction, it seems that only some languages distinguish a pivot. Traditionally, binding has been one of the main motivations for placing an obliqueness ordering on grammatical relations in all languages. If that motivation is removed, and all other syntactic process are neutral or distinguish only terms vs. obliques in a language, then we may want to say simply that there is no delineation of grammatical relations beyond that level (as in Foley and Van Valin (1984)). Such a move might lessen any feeling of redundancy between having levels of both grammatical relations and argument structure.

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