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A TYPOLOGY OF SYNTACTIC RELATIONS IN CLAUSE LINKAGE

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1. Discussions of clause linkage, regardless of whether they are in the framework of traditional, structural, or generative grammar, assume a contrast between two syntactic linkage relations, coordination and subordination.¹ Complex sentences are analyzed as being composed of clauses joined in one or the other of these relations. Lyons (1968) summarizes this opposition as follows:

Complex sentences are divided into: (a) those in which the constituent clauses are grammatically co-ordinate, no one being dependent on the others, but all being... added together in sequence, with or without the so-called co-ordinating conjunctions...; and (b) those in which one of the clauses ('the main clause') is 'modified' by one or more subordinate clauses grammatically dependent upon it and generally introduced...by a subordinating conjunction. Subordinate clauses are subdivided by function as nominal, adjectival, adverbial, etc.; and further as temporal, conditional, relative, etc. (178)

There appear to be two primary components to this distinction. First, in a coordinate relationship each clause in the linkage is independent of the others in form, so that each can stand on its own as a complete sentence. In subordination, on the other hand, only one of the clauses is in a fully independent form; the other occurs in a form which precludes its occurrence as a complete sentence. This clause, the subordinate clause, is dependent upon the other, independent clause for its occurrence. There is thus a contrast in terms of dependence: no dependency relations among the clauses in a coordinate relationship, a definite dependency relation between one or more clauses and the independent clause in a subordinate relationship. Lyons characterizes dependence strictly distributionally.

The second component to this contrast is expressed in terms of clauses "being added together in sequence" versus one of the clauses being "modified" by another. One way of paraphrasing this would be to say that in subordination one of the clauses functions as a part of another, whereas in coordination each clause is complete and distinct from all others. In other words, subordination involves embedding, while coordination involves the joining of autonomous whole clauses. Very often embedding takes the form of one clause functioning as an argument of another clause. This is particularly true of nominal and adverbial clauses.

- (1) a. That Fred lost the race shocked everyone.
b. Fred quickly forgot that he had lost the race.

- c. Max put the book where no one would find it.
 d. Larry talked to Sue after they left the office.

In (1a) the subordinate clause is the subject of the main clause verb shocked, while in (1b) it is the direct object of forgot. In (1c) it serves as the 'inner' locative argument of put, and in (1d) it is a 'setting' temporal argument. In coordination there is no functioning of one clause as an argument of another. Thus the second component of the coordination-subordination opposition is embeddedness: there is no embedding relation between (or among) clauses in coordination, whereas the linked clause is embedded in the unlinked (independent) clause in subordination.

Each of these components may be expressed in terms of a feature, [\pm dependent] and [\pm embedded]. Coordination is [-dependent, -embedded], and subordination is [+dependent, +embedded]. These may appear to be redundant formulations, because it has often been assumed that dependence is equivalent to embeddedness. Moreover, most of the constructions which linguists deal with seem to fit comfortably into one type or the other, and accordingly there has been little reason to challenge the identification of the two.

2. Linguists studying the languages of Papua New Guinea were among the first to describe constructions which blur the distinction between coordination and subordination. One of the distinctive attributes of many non-Austronesian Papuan languages is clause chaining, the stringing together of a large number of clauses in texts (see Longacre 1972 for an overview). There are two primary types of clauses in these chains. The final clause in the chain has a verb which is fully finite, inflected for tense and mood (illocutionary force), and carrying affixes indicating subject and, in some languages, object. The other clauses contain verbs which are not fully finite; they are never marked for mood, and if they take tense inflection it is relative rather than absolute tense. They may carry person marking, and they very often have switch-reference indicators; these are never found on the verb in the final clause of a chain. Examples of clause chains from Chuave (Thurman 1975) and Fore (Scott 1978) are given below.

- (2) a. Yai kuba i-re kei si-re fu-m-e. (Chuave)
 man stick get-SEQ.SS dog hit-SEQ.SS go-3sg-INDIC
 'The man got a stick, hit the dog, and went away.'
 b. Yai kuba i-re kei su-n-goro fu-m-e.
 man stick get-SEQ.SS dog hit-3sg-SEQ.DS go-3sg-INDIC
 'The man got a stick, hit the dog, and it went away.'
- (3) a. Kanamagina agamagina máe'táye. (Fore)
 kana-ma-ki-na a-ka-ma-ki-na máe-'tá-y-e
 come-SEQ.SS-CONJ-3sg 3sg-see-SEQ.SS-CONJ-3sg get-PST-3sg-INDIC²
 'He came and saw it and got [it].'

- b. Kanauwá:gana namogá
 kana-uwá:-ki-na na-mu-o' -ki- 'a
 come-1sgPST.DS-CONJ-3sg 1sg-give-3sgPST.DS-CONJ-1sg
 'mae'túwe.
 máe-'tá-u-e
 get-PST-1sg-INDIC
 'I came, and he gave [it] to me, and I took [it].'

An analysis of these sentences in terms of the definitions of coordination and subordination given above yields interesting results. With respect to dependence, the non-final clauses are dependent upon the final clauses in two interrelated ways. In terms of Lyons' distributional definition, they are dependent because they cannot constitute a complete sentence, while the final clauses can. That is, in Chuave yai kuba ire 'the man got a stick and' does not count as a complete sentence the way fume 'he went away' does; similarly in Fore, kanauwá:gana 'I came and he' is not a complete sentence the way máe'táye 'he got it' is. This distributional dependence is a function of a second type of dependence. As noted above, the verbs in the non-final clauses are not fully finite; in both languages they lack mood marking, and in Fore tense is only possible in a non-final clause with different-subject marking. The non-final clauses are thus dependent upon the final clauses for the expression of tense, mood, or an argument. This type of dependence will be called 'grammatical category' [GC] dependence; the linked clause depends upon the main clause for the expression of grammatical categories which are part of its interpretation, e.g. the past tense and indicative mood of the first two clauses in (3a). The non-final clauses accordingly exhibit both GC and distributional dependence upon the final clauses. It should be noted that GC dependence does not universally entail distributional dependence, as will be seen below.

The other feature distinguishing coordination from subordination is embeddedness. If 'embedded' is understood to mean 'functions as an argument of,' then there are no grounds for claiming that the non-final clauses are embedded in the final clause. They express neither an argument like subject or object nor any kind of adverbial notion; they are not structurally or semantically parallel to the embedded clauses in (1). Even on the much weaker concept of 'functions as a part of,' no real case can be made that the non-final clauses are part of the final clause. Rather, it seems clear that the relationships among the clauses with respect to embedding are the same as those of the clauses in their English translations; they are "added together in sequence." It is reasonable to conclude, then, that there is no embedding relation between the non-final and final clauses in these clause chains.

If clause chains in Chuave and Fore are characterized by dependence but not embedding between non-final and final clauses (i.e. they are [+dependent, -embedded]), then they cannot be considered instances of either coordination or subordination. Indeed, many

Papuanists, e.g. Longacre (1972, 1983), Thurman (1975), Olson (1981), Franklin (1983), and Haiman (1983), have argued that the non-final clauses in this construction are not subordinate clauses in the commonly accepted (Indo-European-based) sense of the term. Sentences like (2) and (3) are often described as being "coordinate but dependent," e.g. Haiman (1983:122). These constructions offer strong evidence that dependence is not equivalent to embeddedness; rather, they are distinct parameters in defining syntactic relations in clause linkage.

Coordinate dependent constructions are not restricted to Papuan languages. The following examples are from Swahili (Hinnebusch 1979) and Jacalteco (Craig 1977).

- (4) a. Ni-li-fika nyumbani, na ni-li-lima shamba kidogo,
 lsg-PST-arrive home and lsg-PST-cultivate a.little
 na ni-li-la.
 and lsg-PST-eat
 'I arrived home, and I cultivated the shamba a little, and I ate.'
- b. Ni-li-fika nyumbani, ni-ka-lima shamba kidogo,
 lsg-PST-arrive home lsg-SEQ-cultivate a.little
 ni-ka-la.
 lsg-SEQ-eat
 'I arrived home, cultivated the shamba a little, and then ate.'
- (5) a. X- \emptyset -to ix ma λ atic'a x- \emptyset -ul ix.
 PST-3ABS-go CL/she never PST-3ABS-come CL/she
 'She went, and she never came back.'
- b. X- \emptyset -w-iche-coj an x- \emptyset -s-lah-ni naj.
 PST-3ABS-lsgERG-begin-SUFF lp PST-3ABS-3ERG-finish-SUFF CL/he
 'I started it, and he finished it.'
- (6) a. X- \emptyset -tzebi naj x- \emptyset -'el-tij naj.
 NPST-3ABS-laugh CL/he PST-3ABS-come-out CL/he
 'He came out laughing.'
- b. Ch-in xubli an x- \emptyset -(h)in-tx'ah-ni xil
 NPST-lsgABS whistle lp PST-3ABS-lsgERG-wash-SUFF CL
 kape an.
 clothes lp
 'I washed the clothes whistling.'

The Swahili sentence in (4a) is a typical example of coordination; each clause occurs in a fully independent form, and they are "added together in sequence." In (4b), however, the tense slot in the non-initial verbs is filled by *-ka-*, which Hinnebusch (1979) calls a "consecutive marker"; it indicates that the events described by the verbs occurred sequentially, with the tense reference of the whole sentence indicated on the first verb only. The clauses in (4b) are in the same non-embedding relationship to each other as the clauses in (4a), but the non-initial clauses cannot occur as independent sentences, unlike their counterparts in (4a). They are

thus dependent upon the initial clause, both distributionally and for the interpretation of tense (i.e. GC dependence).

The examples in (5) and (6) from Jacaltec illustrate this contrast as well. Jacaltec lacks a conjunction analogous to English and or Swahili na, and consequently clauses in a coordinate relationship are simply juxtaposed, as in (5). Each clause is fully inflected and could occur as an independent sentence in its own right. Although this pair of examples does not show it, there are no restrictions on clauses in this construction in terms of tense or mood (see Craig 1977). The examples in (6) appear to be formally identical to those in (5), in that both clauses are fully inflected for tense and person. There are, however, a number of significant differences between the two sets of sentences. In (6) the verb in the first clause must be in the neutral non-past tense form, and the two clauses must have the same subject. The tense interpretation for the whole sentence is a function of the tense inflection of the verb in the second clause; there is therefore GC dependence between the clauses. It is clear that the relationship between the two clauses in (6) is the same as that in (5) with respect to the embedding parameter, and consequently the construction in (6) constitutes another example of a coordinate but dependent linkage. This one differs from those in Chuave, Fore, and Swahili in a significant respect, however. In those three languages the linked clauses exhibit both distributional and GC dependence. The linked clauses in (6), on the other hand, are only GC dependent and not distributionally dependent upon the independent clause; they can occur as independent sentences, albeit with a difference tense interpretation, i.e. ʔtzebi naj would mean 'he laughs', and chin xubli an would mean 'I whistle'. These Jacaltec examples show that distributional dependence and GC dependence are in fact independent in principle, even though the latter usually results in the former.

3. The coordinate but dependent linkages in Chuave, Fore, Swahili, and Jacaltec demonstrate that dependence is not equivalent to embeddedness, and these constructions fall between coordination and subordination, as traditionally defined. A reevaluation of this opposition is therefore in order. In section 1 these two notions were characterized in terms of two features, [\pm dependent] and [\pm embedded]. Since [α dependent] does not entail [α embedded], as (2)-(6) show, these two features yield four possibilities.

- | | |
|--------------------------------|---------------|
| (7) a. [-dependent, -embedded] | Coordination |
| b. [+dependent, +embedded] | Subordination |
| c. [+dependent, -embedded] | ?? |
| d. [-dependent, +embedded] | ?? |

Combination (7c) characterizes the coordinate but dependent linkage relation illustrated above. This relation was originally proposed on the basis of an analysis of Barai, a Papuan language, in Olson (1981), and it was labelled COSUBORDINATION. This term will be

adopted here. The fourth combination, (7d), defines a potential relation in which a clause functions as part of another clause but is fully independent of it. Parentheticals appear to have this status, but as McCawley (1982) shows, they are not really a constituent of the clause in which they occur. Another possible candidate is direct discourse complements, since they are part of but in all respects independent of the main clause.³ Nothing more will be said about this fourth potential linkage relation, as further research is necessary in order to establish conclusively if it does in fact exist. Thus at least three of the four possible linkage relations defined in terms of embeddedness and dependence occur and are unambiguously attested in human languages: coordination, subordination, and cosubordination.

Cosubordination is distinguished from coordination in terms of dependence; they are both [-embedded]. This dependence may either be distributional, in terms of shared grammatical categories, or both. In Chuave, Fore, and Swahili both distributional and GC dependence are involved, while with respect to Jacaltec only GC dependence is found in (6). Tonkawa (Hoijer 1949) offers a minimal pair of sentences contrasting coordination and cosubordination.

- (8) a. Tekeke[?]e:k š[?]a:pa-w [?]e:-ta ke-yaše-w!
 in.that.brush hide-IMP and-SS lsg-watch-IMP
 'Hide in that brush and watch me!'
 b. Tekeke[?]e:k š[?]a:pa-ta ke-yaše-w!
 in.that.brush hide-SS lsg-watch-IMP
 'Hide in that brush and watch me!'

In (8a) the verb in each clause has mood inflection, and the two are joined by [?]e:-ta 'and then (same subject)'; this is a clear example of coordination. In (8b), on the other hand, the verb in the first clause lacks mood inflection, and in its place the same-subject suffix -ta appears. Hoijer characterizes the difference between these two constructions as follows: "The difference between such a construction as [(8b)] and the construction in [(8a)] lies solely in the fact that the subsidiary verb expression tekeke[?]e:k š[?]a:pa-ta cannot be used independently while the two constructions united by [?]e:ta in [(8a)] can both occur independently" (1949:40). The initial clause in (8b) exhibits both distributional and GC dependence on the second clause, and hence (8b) is a prototypical example of cosubordination.

Cosubordination differs from subordination in terms of embeddedness; they are both [+dependent], although the nature of the dependence is not identical in the two relations. Chuave presents a minimal pair differing in terms of subordination versus cosubordination.

- (9) a. Yai kei su-n-g-a fu-m-e.
 man dog hit-3sg-DEP-NONSIM go-3sg-INDIC
 'After the man hit the dog, he went away.'

- b. Yai kei si-re fu-m-e.
 man dog hit-SEQ.SS go-3sg-INDIC
 'The man hit the dog and went away.'

The initial clauses in these two sentences are both dependent upon the final clause for their occurrence, but they contrast in a number of important ways. The verb in the linked clause in (9a) carries subject inflection but no switch-reference marking; the converse is true of the verb in the linked clause in (9b). In addition, the verb in the linked clause in (9a) is marked as subordinate by *-g-* and carries an indicator of the temporal relation of its clause to the main clause. These differences correlate with the distinction between subordination, as in (9a), and cosubordination, as in (9b). Thurman (1975,1978) treats sentences like (9a) as true subordinate clauses, unlike (9b) which he argues is not subordinate. This agrees with the analysis presented here. The nature of the dependence is somewhat different in the two constructions. There is distributional dependence in both, but there is much greater GC dependence in (9b) than (9a). As is well known, subordinate clauses can never be interpreted as having distinct mood (illocutionary force) from the main clause. In languages like Chuave or Fore in which mood is explicitly marked on the verb in an independent sentence, subordinate clauses normally lack mood marking altogether. Since subordinate clauses represent presupposed or background information, their contents cannot be asserted or questioned; hence they are by definition independent of the illocutionary force of the main clause. Accordingly, their formal lack of mood marking does not reflect the kind of GC dependence illustrated in e.g. the Tonkawa construction (8b) in which the first clause depends upon the second for the expression of the mood which it carries. This lack of mood marking in subordination is, rather, simply the absence of an otherwise required affix, the semantic content of which is not applicable to the clause. Consequently, it could be argued that there is no real GC dependence in (9a), since the grammatical category under consideration (mood) is not actually part of the interpretation of the subordinate clause. This contrasts sharply with GC dependence in cosubordination, which may involve tense, evidential marking, mood, and person marking, all of which are part of the interpretation of the linked clause, as in (8b) and (9b). Haiman (1983) argues that independence of the contents of the linked clause from that of the main clause is the defining characteristic of subordination; on this view, (9a) but not (9b) would be considered to be subordination, the same conclusion reached above. Thus while the linked clause is dependent upon the main clause in both cosubordination and subordination, the nature of this dependence is different in the two constructions; in addition, the linked clause is embedded in the main clause in subordination but not in cosubordination.

The examples examined thus far involve comparisons between two of the three linkage relations. Many languages, if not most, exhibit

all three. Two languages with a three-way contrast will be presented here, Jacaltec and Kewa, a Papuan language (Franklin 1971, 1983). Coordination in Jacaltec was illustrated in (5) and cosubordination in (6); examples of subordination are given in (10).

- (10) a. X- \emptyset -'ayc'ay naj bay x- \emptyset -(y)-il naj no'
 PST-3ABS-fall CL/he where PST-3ABS-3ERG-see CL/he CL/the
 cheh.
 horse
 'He fell where he saw the horse.'
 b. X- \emptyset -aw-abe tato ch-in to-j hecal an.
 PST-3ABS-2sgERG-hear that NPST-1sgABS go-FUT tomorrow 1p
 'You heard that I will go tomorrow.'

The subordinate clause in (10a) is adverbial, that in (10b) an object complement; both are clearly embedded in the main clause, just like the examples in (1). They are distributionally but not GC dependent upon the main clauses, as in the Chuave example in (9a). The three-way contrast in Kewa is presented in (11).

- (11) a. Roto-mé tá-a pae ake-me tá-a pae?
 stick-AG hit-3sgPST or what-AG hit-3sgPST or
 'A stick hit [him], or what was it that hit [him]?'
 b. Épo lá-ri épa-wa.
 whistle say-SIM.SS come-1sgPST
 'I whistled while I came.'
 c. Épo lá-lo-pulu irikai épa-lia.
 whistle say-1sgPRES-CAUSAL dog come-3sgFUT
 'I am whistling so that the dog will come,' or
 'Because I am whistling, the dog will come.'

Example (11a) is a coordinate construction, in which each of the clauses has independent mood, the first being an assertion, the second a question. (11b) exemplifies a short clause chain analogous to (2) and (3); the linkage is cosubordinate, with the initial clause being both distributionally and GC dependent upon the final clause. The final sentence, (11c), illustrates subordination; the initial clause is distributionally but not GC dependent upon the main clause. Kewa, like Jacaltec, exhibits a three-way contrast in syntactic linkage relations, thereby showing that a binary opposition between coordination and subordination cannot adequately capture the facts of clause linkage in human language.

Accordingly, any theory of universal grammar which aspires to descriptive adequacy will have to take cosubordination into account. This does not, however, entail any expansion or elaboration of the primitive components of the theory of clause linkage. If, as argued in section 1, the primitive features defining coordination and subordination are dependence and embeddedness, which is the long-standing, traditional view, then cosubordination can be derived from them in a principled way, as in (7). The recognition of co-

subordination as a possible syntactic linkage relation in universal grammar does not, therefore, require an entirely new conception of the other two relations based on a different set of primitives.

These three linkage relations may be ranked with respect to each other in terms of the tightness of the resulting syntactic link between clauses. This is represented in Figure 1.

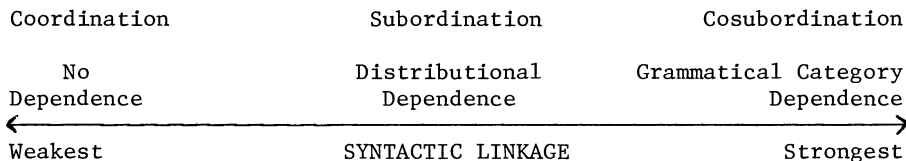


Figure 1

Coordination is manifestly the loosest linkage type, since each clause is independent of the others and no clause functions as an argument or part of any other. Subordination involves a tighter bond between clauses than coordination, because the subordinate clause is distributionally dependent upon the main clause; it is not normally GC dependent, however. The strongest syntactic link is cosubordination, as the linked clause is typically both distributionally and GC dependent upon the main clause. Since GC dependence usually entails distributional dependence, but not vice versa (Jacaltec is an exception), it follows that GC dependence is the stronger of the two types of dependence. This is consonant with the status of cosubordination as the tightest linkage type, because it necessarily involves GC dependence. Thus the features which define these linkage relations also provide a means for ranking them in terms of the strength or tightness of the linkage.

4. All of the examples discussed so far have involved the joining of whole clauses. However, these same relations are found in complex constructions consisting of sub-clausal units. There appear to be two major types of sub-clausal linking: between reduced clauses consisting of a verb and its primary arguments, usually subject and direct object, and between verbs. Gerunds are reduced clauses of this type in English. Barai (Olson 1981) provides an interesting example of a language in which all three types of linkage occur between reduced clauses. A couple of points about Barai grammar need to be made clear. First, when whole clauses are joined, conjunctions are always used; this is illustrated in (12).

- (12) a. Na ij-ia mani-ga-ro a ume ij-ia fi. Coordi-
 lsg DEF-LOC stand-CONJ-DS 2sg ground DEF-LOC sit nation
 'I stood there, but you sat there on the ground.'
- b. Ve da-mo bu-ka subi. Cosubordi-
 rain fall-CAUSAL.DS 3pl-INTNS run.away nation
 'Rain fell, and so they really ran away.'

- c. Na rua-ema ij-ia na m-a-e. Subordi-
 lsg come-PST DEF-TEMP lsg give-2sg-PST nation
 'After I came, I gave it to you.'

When reduced clauses are linked, they are simply juxtaposed without any kind of conjunctive element. Second, in non-subordinate linkages the verb in the linked clause cannot be inflected independently for tense or mood; there can be only one indication of these notions in the entire sentence. Third, there is a set of what Olson (1981) calls "mode particles," whose distribution is an indicator of GC dependence between the reduced clauses.

- (13) a. Na e ije k-ia, bu-me va-e.
 lsg person DEF say-3pl 3pl-CASUAL go-PST
 'I spoke to the people, and they just went.'
 b. Na-me e ije k-ia, bu va-e.
 lsg-CASUAL person DEF say-3pl 3pl go-PST
 'I just spoke to the people, and they went.'
- (14) a. Na-ka k-ia e ije va-e.
 lsg-INTNS say-3pl person DEF go-PST
 'I really made the people go.'
 b. *Na k-ia e ije bu-ka va-e.⁴
 lsg say-3pl person DEF 3pl-INTNS go-PST
 'I made the people really go.'
- (15) a. Juare ij-ia a-ka ni ije g-a-ne!
 garden DEF-LOC 2sg-INTNS IMP 3sg look-3sg-IMP
 'Look at it (there) in the garden!!'
 b. Juare ij-ia a-ka ni [mave n-one sak-a-mo]
 garden DEF-LOC 2sg-INTNS IMP pig lsg-POSS bite-3sg-HAB
 g-a-ne!
 look-2sg-IMP
 'In the garden, really look out: my pig bites!'

The linking of reduced clauses in (13)-(15) is paratactic, whereas the joining of whole clauses, as in (12), always involves hypotaxis. The sentences in (13) consist of two reduced clauses, each of which is fully inflected for its arguments and can take a mode particle, in this case me 'casual'. The comma between them marks a slight pause. The linkage is coordinate. In (14), on the other hand, there is no pause between the units, and the first clause lacks a full complement of independent arguments. Moreover, only one mode particle is allowed in the whole construction, and its scope must be over the whole sentence, hence the ungrammaticality of (14b). Each unit is GC dependent upon the other; the first lacks a (pro)-nominal argument, e ije 'the people' or bu 'they/them', which appears in the second unit, and the second derives its mode interpretation from the mode particle in the first. The first unit is not an argument of the second, and vice versa, and accordingly (14) is

an example of cosubordination. The second sentence in (15) illustrates the embedding of a reduced clause as the object of a verb. The embedded clause is reduced in so far as it cannot have a mode particle, it cannot have any locative or temporal adverbial modifiers, and it has only very restricted tense possibilities. Unlike (14a), the scope of the mode particle in the main clause does not include the embedded clause; (15b) does not mean '...really look out: my pig really bites.' Hence mave no-one sak-a-mo is distributionally but not GC dependent upon the main clause. This is a clear case of subordination. Thus all three linkage relations can be found between reduced clauses, as well as whole clauses, in Barai.

It is also possible to link verbs together to form a complex predicate, and two of these three linkage relations can be found in this type of construction. The type which is not found is subordination, since it is impossible for one verb to function as part of another verb. Verbs may only be added together in sequence, but it is possible for there to be dependencies among them. Serial-verb constructions provide the clearest examples of this type of construction. In Barai, aspectual markers and the negative naebe constitute the relevant grammatical categories for determining dependence in these constructions.

- (16) a. Fu fase fi isoe.
 3sg letter sit write
 'He sat writing a letter.'
- b. Fu fase naebe fi isoe.
 3sg letter NEG sit write
 'He did not sit writing a letter.'
- c. *Fu fase fi naebe isoe.
 3sg letter sit NEG write
 'He sat not writing a letter.'

Fi isoe 'sit write' forms in essence a complex predicate in these sentences, and consequently any modifier must have both verbs in its scope, as in (16b). It is impossible to modify (negate) one but not the other, as (16c) shows. Since these verbs necessarily share a modifier, this is a form of GC dependence, and hence the linkage between them is cosubordinate. There are serial constructions in Barai in which this form of GC dependence is lacking.

- (17) a. Fu vazai ufu numu akoe.
 3sg grass cut pile throw.away
 'He cut, piled, [and] threw away the grass.'
- b. Fu vazai ufu furi numu akoe.
 3sg grass cut CMPL pile throw.away
 'He finished cutting, piled, [and] threw away the grass.'

The verbs in this construction can be modified independently of each other; in (17b) the scope of the completed aspect marker,

furi 'finish', is only over ufu 'cut'. Here there is no GC dependence among the verbs, since each can be modified independently of the others, and consequently the linkage relation in (17) is coordination. Thus at the level of linking verbs, coordination and cosubordination are distinguished in terms of whether modifiers such as aspect have scope over individual verbs or over the whole complex predicate.

The linkage of subclausal units, both reduced clauses as in (13)-(15) and verbs in (16)-(17), is not limited to Papuan languages and in fact is found, to a greater or lesser extent, in all languages. English infinitival complements, gerunds, and participial complements (e.g. John sat playing the guitar) are all examples of the linking of sub-clausal units. It appears, then, that in order to describe fully the syntactic relationship between two clauses in a complex construction, it is necessary to ascertain not only the nature of the linkage relationship, e.g. coordination, but also the nature of the units being joined.

In Olson (1981), Foley & Olson (in press), and Foley & Van Valin (1984) a conception of clause structure is proposed which analyzes the clause into units which correspond to those discussed above with respect to sub-clausal linkage. On this view, the clause consists of three main levels: the NUCLEUS, which contains the predicate, the CORE, which consists of the primary arguments of the nucleus, normally the subject and (direct) object, and the PERIPHERY, which contains the oblique arguments plus temporal and locative setting elements.⁵ Modifying each level of the clause is a set of operators, e.g. aspect, modality (i.e. deontic modals), tense, status (i.e. epistemic modals), and illocutionary force; there are specific operators for each level. These will not be justified here; cf. the references given above. It is important to note, however, that both the levels of clause structure and their operators can be motivated and justified entirely on the basis of simple sentences without reference to complex sentences. The layered structure of the clause with operators can be represented as in Figure 2.⁶ The peripheral operators are ordered in terms of their scope; status is the innermost and illocutionary force the outermost with scope over all of the others. The grammatical categories in terms of which GC dependence was characterized in sections 2-4 are in fact the morphological exponents of these operators and of core arguments in a clause.

The linking of two clausal units may be termed a juncture, and the type of clausal unit may be stated in terms of the layered conception of the clause given in Figure 2. Junctures involving whole clauses will be labelled peripheral junctures; potential dependence with respect to the peripheral operators is an important factor in determining the type of linkage relation (or nexus type) in the juncture. In the discussion of (2)-(6) it was the shared peripheral operators of mood (illocutionary force) and tense which led to the analysis of them as coordinate but dependent, i.e. cosubordinate. The sentences in (2)-(6) and (8)-(12) are peripheral junct-

Operators:	Illocut.Force	Evidentials	Status Tense	Modality	Directionals	Aspect
Constituents:	[Oblique NPs		[S/A O		[Predicate]]]	
Levels:	PERIPHERY		CORE		NUCLEUS	

The Layered Structure of the Clause

Figure 2

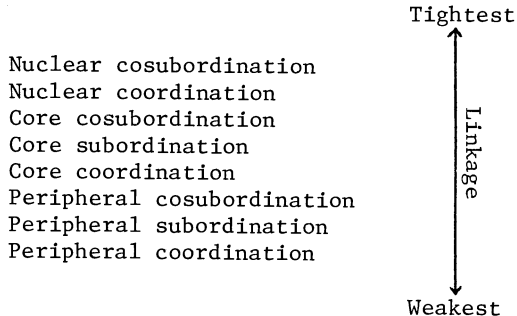
tures. The junctures with reduced clauses in (13)-(15) are core junctures; the reduced clause in each case is a core (i.e. nucleus plus core arguments). In the Barai examples in (13) and (14), the independence of the mode particles in (13) distinguishes that construction from the one in (14) in which the mode particle is shared by both cores; this contrast underlies the distinction between coordinate and cosubordinate nexus. Core junctures, like peripheral junctures, are widespread; English has a particularly rich system of core junctures, as noted above. Finally, the sentences in (16) and (17) are nuclear junctures, in that they involve the linking of clausal nuclei only. Here again the nexus types are differentiated on the basis of shared versus independent operators. The most common nuclear junctures are monoclausal analytic causative constructions like those in French, German, and Jacalteco. The multi-level notion of the clause thus permits a principled account of the units in clause linkage in human language. (See Foley & Olson, in press, and Foley & Van Valin 1984 for detailed discussion.)

5. A full account of the syntactic relations between clauses in complex sentences required specification of both the type of juncture and the nature of the linkage, or nexus, relation between the units in the juncture. With respect to nexus, it was shown above that a binary opposition of subordination versus coordination is descriptively inadequate, but that using the same primitive features underlying it, embeddedness and dependence, a third nexus relation, cosubordination, could be established which can account for the cases which are problematic in terms of either coordination or subordination. In the discussion of nexus types, it was found that all three linkage relations are realized in peripheral and core junctures, and that only two of the three, coordination and cosubordination, occur in nuclear junctures. These juncture and nexus combinations yield a total of eight syntactic clause-linkage categories, each defined in terms of the level of juncture and type of nexus involved.⁷ These categories may be ranked in terms of the tightness of the resulting linkage, generating a Syntactic Bondedness Hierarchy [SBH] of clause linkage. It was argued in section

3 that coordination is the loosest type of nexus, cosubordination the tightest, with subordination in between (see Figure 1). With respect to juncture, the more features of full, independent clauses that the linked clause has, the less tightly bound it is to the main clause. Obviously, a whole clause is more fully sentential than just a core, which is in turn more sentential than a nucleus. Accordingly, the linked unit in a peripheral juncture is less tightly linked to the main clause than in a core juncture, and likewise the linkage is looser in a core juncture than in a nuclear juncture. These relationships may be summarized as in (18).

- (18) a. Nexus: COORDINATION < SUBORDINATION < COSUBORDINATION
 b. Juncture: PERIPHERY < CORE < NUCLEUS

These juncture and nexus possibilities may be combined to yield the SBH in Figure 3.⁸



Syntactic Bondedness Hierarchy

Figure 3

This hierarchy is not an ad hoc taxonomy of clause-linkage relations. First, as pointed out above, it is derived from the two primitive notions traditionally assumed to define coordination and subordination and an independently motivated conception of clause structure and clausal operators. Second, it provides a principled account of the well-known phenomenon of tense-aspect-mood reduction on the verb in the linked clause. In a peripheral juncture, at least some and possibly all of the peripheral operators can be expressed in the linked clause, depending upon the nexus type. In core junctures, on the other hand, the linked element is a core, and consequently illocutionary force, evidentials, tense, and status cannot be indicated in it; the occurrence of the core operator(s) is again a feature of the nexus type. Finally, in a nuclear juncture there are only two possible grammatical categories which can be expressed on the linked nucleus, and then only in coordinate nexus. It is therefore possible to predict the inflectional form of the verb in the linked unit in a complex sentence within a very narrow range of variation, given a description of the

simple, independent clause and a list of the juncture-nexus combinations in a language.

The SBH is purely syntactic in nature; it says nothing about the semantic relations between clauses (e.g. causation) which the syntactic categories may instantiate. Hierarchies of interclausal semantic relations have been proposed in Silverstein (1976, 1980) and Foley & Van Valin (1984), and they complement rather than conflict with the SBH. It is beyond the scope of this discussion to go into these semantic hierarchies in detail. However, the basic insight motivating them, which Silverstein first articulated, is that there is a direct relationship between the closeness of the semantic relation between two clauses (or sub-clausal units) and the strength of the syntactic link between them: the closer the semantics, the tighter the syntax. This idea also underlies the analysis of complementation in Givón (1980). Stated in terms of the SBH and a complementary semantic hierarchy, this principle states that the higher up the semantic hierarchy a given relation is (assuming it to be organized like the SBH), the higher up the SBH the syntactic linkage category realizing it will be. It does not follow from this, however, that every language must express a given semantic relation, e.g. causation, with the same linkage category. The interaction of syntactic and semantic relations in clause linkage is just as complex as in grammatical relations, and consequently in analyzing this domain in a language one must ascertain not only what the linkage categories are but also what semantic relations they express.

The SBH interacts with a number of other intra- and interclausal phenomena. Silverstein (1976, 1980, 1981) proposes important generalizations about the interaction of the nexus relation of the linked unit and its case marking and voice possibilities. These are stated in terms of his semantic interclausal hierarchy but can easily be expressed in terms of the SBH. Languages use a variety of means for keeping track of referents in discourse, and their interplay with the clause-linkage categories of the SBH is structured in interesting ways. For example, switch-reference is found only in peripheral junctures, primarily in peripheral cosubordination; it may also occur in peripheral coordination, as in (12a) in Barai. On the other hand, the use of multiple gender distinctions, as in English, Swahili, and Yimas (Papua New Guinea), is not restricted in this way, and the gender system operates throughout core and peripheral junctures. (See Foley & Van Valin 1984 for detailed discussion.)

6. In conclusion, the Syntactic Bondedness Hierarchy in Figure 3 represents a typology of syntactic relations in clause linkage. It is derived from two primitive features defining linkage relations, embeddedness and dependence, which generate three universal linkage or nexus types, and from the layered conception of clause structure in Figure 2, which can be motivated and justified solely on the basis of the analysis of simple sentences. This hierarchy

provides a principled account of the systematic reduction of the inflectional possibilities of verbs in the linked units in complex sentences, and it is central to the analysis of a wide range of morphosyntactic phenomena, from case marking to discourse-coreference mechanisms. The SBH thus provides a new framework for the analysis of clause linkage in natural language.

FOOTNOTES

1. I would like to thank Jeri Jaeger, Johanna Nichols, and Janet Shibamoto for comments on an earlier draft. The following abbreviations are used: ABS absolutive; AG agent; CL classifier; CONJ conjunction; DEF definite; DEP dependent; DS different subject; ERG ergative; FUT future; GC grammatical category; HAB habitual; IMP imperative; INDIC indicative; INTNS intensive; LOC locative; NEG negative; NPST non-past; p person; pl plural; POSS possessive; PRES present; PST past; SBH Syntactic Bondedness Hierarchy; SEQ sequential; sg singular; SIM simultaneous; SS same subject; SUFF suffix; TEMP temporal.

2. Fore switch-reference marking is more complex than that in Chuave, because linked verbs carry affixes indicating the subject of the following clause. These 'anticipatory subject markers' are the final affix on the verb, e.g. -na in the first two clauses in (3a). See Scott (1978) for detailed discussion.

3. This possibility was suggested by Pam Munro in the discussion after the paper was presented. A number of other possibilities were suggested, e.g. syntactic amalgams (Lakoff 1976).

4. A mode particle can only be cliticized to a pronoun, and consequently a pronominal copy of the modified noun is required.

5. This conception of clause structure is neither derived from nor dependent upon constituent structure; it applies to all languages, both configurational and non-configurational. See Foley & Van Valin (1984) for detailed discussion.

6. Negation is also a clausal operator but is omitted here because it can function at all three levels.

7. The fourth linkage possibility, [-dependent, +embedded], would be restricted to peripheral junctures. It is inconceivable that it could occur in core or nuclear junctures, since it is impossible for a core or nucleus to occur in a juncture and yet be independent of the sentence in which it occurs. As noted in section 3, direct discourse complements are a promising candidate for this nexus type, and they are fully sentential and are in no way dependent upon the main clause of the sentence in which they occur. They are clearly peripheral junctures. Much more research is required on these constructions before the distribution of this potential nexus type can be definitively established.

8. This hierarchy is proposed in Olson (1981) solely on the basis of Barai data. It should be noted that Olson uses a different set of primitives to define the nexus relations. It is also postulated and justified with data from a wide range of languages in Foley &

Van Valin (1984), where it is presented as part of the theory of Role and Reference Grammar.

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