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# Implicational hierarchies in the cross-linguistic coding of subordination

## 1 Introduction

(1) Cristofaro 2003: a cross-linguistic study of subordination systems in eighy languages (see appendix), aiming to uncover the mechanisms underlying the association between particular morphosyntactic structures and particular conceptual situations in the expression of subordination.

(2) Previous work on complex sentences has revealed the existence of implicational hierarchies concerning the coding of particular types of subordination relation, namely

- Keenan & Comrie's (1977) Accessibility Hierarchy for relativization ((3))
- Givón's (1980) Binding Hierarchy for complementation (figure 1)
- Hengeveld's (1998) hierarchy for adverbial clauses ((4))

However, it turns out that these hierarchies can be integrated into overall implicational hierarchies encompassing relativization, complementation, and adverbial sentences at a single stroke.

(3) Subject > Direct Object > Indirect Object > Oblique > Possessor > Object of comparison Keenan and Comrie 1977: 650

(4) Purpose > Anteriority > Simultaneity > Cause (adapted from Hengeveld 1998: 380

(5) Types of subordination relation taken into account (the dependent event is in square brackets):

- Complement relations (Noonan 1985): modal predicates ('You must [go]', 'He can [swim]'); phasal predicates ('He began [to work]'); manipulative predicates ('They made me [accept that job]', 'They ordered him [to go]'); desiderative predicates ('He wanted me [to read his draft]'); sensory perception predicates ('I saw him [walking in the street]'); knowledge predicates ('She knows [he will not do that]'); propositional attitude predicates ('She thinks [he will not do that]'); utterance predicates ('He said [she would be late]');



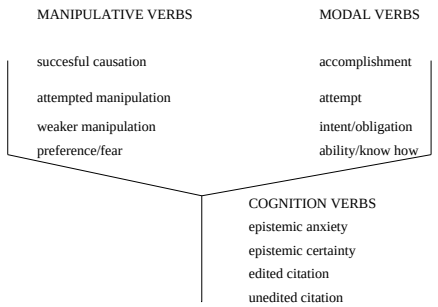


Figure 1: The Binding Hierarchy for complementation (Givón 1990: 537)

- Adverbial relations (Kortmann 1997, Thompson and Longacre 1985): purpose ('We went to the market [to buy fresh vegetables]'); temporal posteriority ('before': 'I will write him before [he leaves]'); temporal anteriority ('after': 'This happened after [you left]'); temporal overlap ('when': 'When [I went there], there was nobody around"), reality condition ('If [we go to the market too late], there will be not many stands left'); reason ('I am working on this paper because [the deadline is in one week]');
- Relative relations (restrictive relativization on referential heads): relativization of subject ('The man [who is sitting in that office] is a linguist'), direct object ('The man [we met last night] is a linguist'), indirect object ('The people [he sent his letter to] didn't write back'), and oblique ('The woman [I will share my office with] is a friend of mine').

Walbiri

(6) *ŋatjulu-ḷu ɸṇa yankiri pantu-ṵu, kutja-lpa ŋapa*
I-ERG AUX emu spear-PAST COMP-AUX water
*ŋa-ṇu*
drink-PAST
'I speared the emu which was / while it was drinking water' (Hale 1976: 78)

Mandarin Chinese

(7) *tā hē le jiǔ, jiu shuí zháo le*
3SG drink PFV wine then sleep succeed CRS
'After s/he drank the wine, she went to sleep'

Mandarin Chinese

(8) *Nǐ guì-xialai [qiú Zháng-san]*
you kneel.down beg Zhang-san
'You knelt down in order to beg Zhang-san / You knelt down and begged Zhang-san' (Li and Thompson 1973: 98)

Burushaski

(9) *Má-a gutʻaš-o dú-čú-n já-a*
you-ERG corpse:PL 3HM.PL.OBJ-bring-CP 1-GEN
*díš-ulo bése yáar-e*
place-INESS why down-LOC
*ó-čá-an?*
3HM.PL.OBJ-do(DUR)-AUX-HM.PL.SUBJ
'Why do you bury your corpses on my land, after bringing them? / Why do you bring your corpses and bury them on my land?' (Tikkanen 1995: 509, quoted from Lorimer 1935: 112)

(10) '[...] a **main clause** is the head at a particular level of organization, i.e. the clause that lends its profile to the composite structure of a multiclausal expression. A **subordinate clause** is then describable as one whose profile is overridden by that of a main clause. This way of characterizing the traditional notions is flexible (as it has to be) by virtue of not being tied to any particular structural configuration [...] In a typical complement clause construction, the two clauses combine directly and the main clause is clearly the profile determinant: *I know she left* designates the process of knowing, not of leaving. The main clause is likewise the head in combination with an adjunct; at the composite structure level, *Alarms ringing, the burglar fled* profiles the act of fleeing. In the case of relatives, e.g. *The skirt she bought was too tight*, [...] the relative clause processual profile is overridden [...] (*skirt she bought* designates the skirt), and that of the main clause prevails for the sentence overall.' (Langacker 1991: 436-7)

## 2 The cross-linguistic coding of subordination

(11) Parameters taken into account:

A: The form of the verb in the clause expressing the dependent event:

- **Balancing** (Stassen 1985: 76-8): The verb form used to express the dependent event is structurally equivalent to the ones used in independent declarative clauses ((12), (13))



- **Deranking** (Stassen 1985: 76-8): The verb form used to express the dependent event is one that cannot be used in independent declarative clauses. Deranking typically involves
  - Lack of the categorial distinctions normally allowed to verbs in the language, such as TAM and person agreement distinctions ((14)-(18))
  - Coding of these distinctions by means of special forms not used in independent clauses (subjunctives, so-called dependent moods etc.: (20))
  - Use of nominal morphology on the verb, such as case marking or adpositions ((15), (17), (18));

B. The coding of A and S arguments in the clause expressing the dependent event:

- Arguments expressed as in independent clauses;
- Arguments obligatorily omitted ((14), (16));
- Arguments expressed as possessors or obliques ((19)).

Pirahã

(12) *hi gái-sai xahóápátí ti xi aagá-hóóg-a*
3 say-NOMLZR Xahóápátí I hunger have-INGR-REMOTE
'Xahóápátí said that I have hunger' (Everett 1986: 269)

Banda Linda

(13) *ʔà wɨ́sə́ nə̀ wɨ́ ə́pā̄ āmùnjú sə́*
we know:AC it know:NEG that white:PL be:AC
*jèkòcí nē̄*
on the other side NEG
'We didn't know that the white men lived on the other side' (Cloarec-Heiss 1986: 500)

Punjabi

(14) *Mãi* **Tur** *sakdaa āā*
I walk able-PRES.M am
'I can walk' (Bhatia 1993: 263)

Huallaga Huánuco Quechua

(15) *Aywa-yka-***q-ta** *rika-shka-:*
go-IMPFV-SUB-OBJ see-PERF-1
'I saw him going' (Weber 1989: 116)

Retuarã

(16) *waʔa eʔe-***ri-ka** *ko-yapa-nu*
fish get-DVBL-NT 3:F:SG-want-PRES
'She wants to get fish' (Strom 1992: 160)

Krongo

(17) *n-átàasà àʔàŋ ùʔùŋ* **k-áaláaná** *àʔàŋ*
1/2-IMPF-want I you LOC-INF:teach I
*kí-nìinò*
LOC-language
'I want you to teach me Krongo' (Reh 1985: 337)

Maŋarayi

(18) *jir-***wañjin-gana** *ja-wu-ɭa-wuy+ma*
stand-NOMLZR-ABL 3-3:PL-be.tired
'They're tired from standing' (Merlan 1982: 12)

West Greenlandic

(19) *ikninn-gum-mi-***nik** *tuqut-si-***nir-a**
friend-his:REFLX-INSTR kill-1/2:TRANS-NOMLZR-his
*tusar-para*
hear-1:SG-3:SG-IND
'I heard of his killing his friend' (Fortescue 1984: 45)

Abkhaz

(20) *d-anə́-y-***ba** *à-šta-ʃa-aʃx' də-cá-***yt'**
her-when-he-see.NON-FINAOR it-after he-go-FINAOR
'After he saw her, he went' (Hewitt 1987: 151)

(21) The Subordination Deranking Hierarchy (cf. table 1):

Phasals, Modals > Desideratives, Manipulatives, Purpose > Perception > Before, After, When, S relativization, A relativization > Reality condition, Reason, O relativization > Knowledge, Propositional attitude, Utterance, Indirect object relativization, Oblique relativization

- If a deranked verb form is used for any relation type on the hierarchy, then deranked forms are used for all relation types to the left.



- The Subordination Deranking Hierarchy reflects the distribution of individual phenomena involved in deranking such as lack of TAM distinctions, lack of person agreement distinctions, and case marking/ adpositions on the verb. The distribution of each of these phenomena is described by implicational hierarchies similar to the Subordination Deranking Hierarchy ((22)-(24)).
- The distribution of special TAM forms appears to basically reflect the Subordination Deranking Hierarchy, though no specific hierarchy could be established for this phenomenon because of poor data.

(22) Lack of TAM distinctions:

Phasals, Modals > Desideratives, Manipulatives, Purpose > Perception > Before, After, When, A relativization, S relativization > Reason, O relativization > Reality condition > Knowledge, Propositional attitude, Utterance, Indirect object relativization, Oblique relativization

(23) Lack of person agreement distinctions:

Modals, Phasals > Desideratives, Manipulatives, Purpose, S relativization, A relativization > Perception > Before, When, After, Reason, O relativization, Utterance, Propositional attitude, Knowledge, Reality condition, Indirect object relativization, Oblique relativization

(24) Case marking/ adpositions on the dependent verb:

Modals, Phasals, Purpose, Desideratives, Manipulatives, Perception, Before, After, When, Reason > Knowledge, Utterance, Propositional attitude, Reality condition, A relativization, S relativization, O relativization, Indirect object relativization, Oblique relativization

(25) The Subordination Argument Hierarchy (cf. table 2):

Modals, Phasals, A relativization, S relativization >

Desideratives, Manipulatives, Purpose, >

Perception >

Before, When, After, Reason, Utterance, Propositional attitude, Knowledge, Reality condition

- If a construction where A or S arguments cannot be expressed overtly is used for any relation type on this hierarchy, then a construction where A or S arguments cannot be expressed overtly is used for all relation types to the left.

- Coding of arguments as possessors also appears to reflect the Subordination Argument Hierarchy, though no specific hierarchy could be established for this phenomenon because of poor data.

## 3 Subordination hierarchies and functional motivations

(26) Information recoverability:

- Phenomena such as lack of TAM and person agreement distinctions and lack of overtly expressed arguments lead to nonspecification of information about the dependent event, such as time reference, aspect and actuality value, participants.
- Some subordination relations entail predetermination of the semantic features of the dependent event (table 3).
- If morphosyntactic phenomena involving non-specification of information take place for a relation type where the relevant semantic features of the dependent event are not predetermined, then they take place for all the relation types where the relevant semantic features are predetermined.
- This reflects a principle of syntagmatic economy (Haiman 1983, 1985) whereby information that is recoverable from the context is not specified.

(27) Semantic integration between events and syntactic integration between clauses:

- Semantic integration between events (cf. Givón 1980 and 1990: chap. 13): two events are interconnected, i.e. the boundaries between the two are eroded to some extent (table 4). Semantic integration obtains for example when the two events are part of the same event frame (phasal predicates: starting, continuing or finishing an action are actually part of that action), are linked by a direct causation relationship (manipulative predicates such as 'make'), or one of the two cannot take place independently of the other (for example, an act of sensory perception cannot take place independently of the perceived event).
- If the morphosyntactic phenomena taken into account take place for relation types involving no semantic integration, then they occur for relation types involving semantic integration. If they occur for relation types involving lower semantic integration, then they occur for relation types involving higher semantic integration.



| Subordination relation | Language | | | | | |
|---|---|---|---|---|---|---|
| | Tamil | Tümpisa Shoshone (Panamint) | Lezgian | Punjabi | Lango | Banda Linda |
| Mod. | D | D | D | D | D | B |
| Phas. | | | D | D | D | B |
| Des. | D | | D | D | D | B |
| Man. | D | D | D | D | D | B |
| Purp. | D | D | D | D | D | B |
| Perc. | D | D | D | | B | B |
| Bef. | D | | D | D | B | B |
| Aft. | D | D | D | D | B | B |
| A rel. | D | D | D | D/B | B | B |
| S rel. | D | D | D | D/B | B | B |
| When | D | D | D | D/B | B | B |
| R. c. | D | D | D | B | B | B |
| O rel. | D | D | D | D/B | B | B |
| Ind. o rel. | D | D | D | B | B | B |
| Obl. rel. | D | D | D | B | B | B |
| Reas. | D | D | D/B | D/B | B | B |
| Know. | D | B | D/B | B | B | B |
| Prop. a. | D | B | D/B | B | B | B |
| Utt. | B | B | | B | B | B |

B = balancing; D = deranking; D/B = either deranking or balancing; blank = no informaiton available

Table 1: Subordination relations: balancing and deranking in different languages

| Subordination relation | Language | | | | | |
|---|---|---|---|---|---|---|
| | Kanuri | Barasano | Lango | Mandarin Chinese | Fula | Banda Linda |
| Mod. | - | - | - | - | - | + |
| Phas. | - | - | - | - | | + |
| S rel. | - | - | - | - | -/+ | + |
| A rel. | - | - | - | - | -/+ | + |
| Des. | - | | -/+ | + | -/+ | + |
| Man. | | - | + | + | + | + |
| Purp. | - | - | -/+ | + | -/+ | + |
| Perc. | - | + | + | + | + | + |
| Bef. | -/+ | + | + | + | + | + |
| Aft. | + | -/+ | + | + | + | + |
| Wh. | + | + | + | + | + | + |
| R. c. | + | + | + | + | + | + |
| Reas. | + | + | + | + | + | + |
| Know. | | + | + | + | + | + |
| Prop. a. | | + | + | + | + | + |
| Utt. | + | + | + | + | | + |

- = arguments not expressed; + = arguments expressed; -/+ = arguments either expressed or not expressed; blank = no information available

Table 2: Subordination relations: overt expression of arguments in different languages

| Relation type | Predetermination of the semantic features of the dependent event | | | |
|---|---|---|---|---|
| | Time reference | Aspect value | Actuality value | Participants |
| Mod., Phas., Man. | + | + | + | + |
| Purp., Des., Perc., Wh., Bef., Aft. | + | + | + | - |
| R.c., Reas., Know., Pr. a., Utt., Rel. | - | - | + | - |

+ = p'redetermined; - = not predetermined

Table 3: Subordination relations and predetermination of the semantic features of the dependent event



- Lack of TAM and person agreement distinctions and lack of overtly expressed arguments lead to reduced syntactic independence between clauses to the extent that a number of parameters pertaining to one of the linked clauses are not specified in this clause, and must be recovered from the other clause.
- Reduced syntactic independence between clauses iconically reflect semantic integration between events, which can be regarded as a case of reduced conceptual independence (iconicity of independence: Newmeyer 1992: 762-3)
- Semantic integration and predetermination: other things being equal, relation types involving a certain degree of semantic integration outrank those involving lower or no semantic integration with respect to the morphosyntactic phenomena leading to nonspecification of information about the dependent event. For example, phasal predicates, perception predicates and temporal relations all involve predetermination of the time reference of the dependent event, but phasal predicates involve higher semantic integration than perception predicates, and temporal relations involve no semantic integration. This is reflected by the fact that phasal predicates outrank purpose relations and the two outrank temporal relations with respect to lack of tense distinctions.

| Semantic integration | No semantic integration |
|---|---|
| Phasals > Modals > Manipulatives ('make') > Purpose, Manipulatives ('order'), Desideratives, Perception | Before, After, When, Reality Condition, Reason, Knowledge, Propositional attitude, Utterance, Relatives |

'>' = 'involves higher semantic integration than'

Table 4: Subordination relations and semantic integration

(28) The conceptual status of the dependent event:

- Langacker (1987a, 1987b, 1991: cf. (29) below) establishes a basic cognitive distinction between processes (temporal, relational entities scanned sequentially across a scan of conceived time) and things (atemporal, nonrelational entities scanned summarily). Processes are prototypically coded by verbs, while things are prototypically coded by nouns.
- However, dependent events lack an autonoumous processual profile, and are construed within the processual profile of the main event ((10), (30)).

- This may account for why the dependent verb has nominal properties (case marking/ adpositions, coding of argument as possessors): as they lack an autonomous processual profile, dependent events are scanned summarily just like things, and they are expressed in the same way as things
- This may also provide an additional motivation for lack of TAM distinctions on the dependent verb: TAM disctinctions pertain to the occurrence of events through time. If dependent events are construed as atemporal entities, TAM distinctions are missing.

(29) 'Relational predications are divided into those which profile PROCESSES vs. those which designate ATEMPORAL relations. The set of processual predications is coextensive with the class of verbs [...] I further distinguish two modes of cognitive processing: SUMMARY vs. sequential scanning. In the former, the various facets of a situation are examined in cumulative fashion [...] once the entire scene has been scanned, all facets of it are simultaneously available, and cohere as a single gestalt [...] By contrast, sequential scanning involves the successive transformation of one scene into another. The various phases of an evolving situation are examined serially, in non-cumulative fashion.' (Langacker 1987b: 71-2)

(30) Lack of independent perspective: 'By the very nature of a complement clause, the process it describes undergoes a kind of *conceptual subordination*: rather than being viewed in its own terms as an independent object of thought, it is primarily considered for the role within the superordinate relationship expressed by the main clause. Viewing the subordinate process as a main clause participant implies a conceptual distancing whereby this process is construed holistically and manipulated as a unitary entity. It therefore encourages *summary scanning* of the component states (*sequential*, state-by state scanning being more compatible with a "close-up" view.' (Langacker 1991: 440)

(31) Conceptualization of the dependent event as a thing and the case marking/ adposition hierarchy ((24)):

- The hierarchy for case marking/ adpositions on the dependent verb also reflects semantic integration: if case marking/ adpositions are used for relation types involving no semantic integration, then they are used for relation types involving semantic integration.
- Semantic integration between events presumably determines tighter integration of the dependent event into the perspective of the main one. As a result, the dependent event is easier to conceptualize as a component part of the main one and be assimilated to a thing.
- This provides a motivation for why the verb coding the dependent event is more likely to display nominal properties such as case marking/ adpositions.



(32) The ranking of relative relations:

- Relative relations involve no semantic integration between the linked events and no predetermination of the time reference, aspect value and participants of the dependent event. Hence one would expect to find them at the rightward end of the subordination hierarchies
- In fact, relative relations do not rank higher than relation types involving semantic integration and predetermination on the Subordination Deranking Hierarchy and related hierarchies.
- However, at least some relative relations (S, A, and O relativization) rank higher than expected on the Subordination Argument Hierarchy. This is presumably because lack of overtly expressed arguments is used in relative relations as a means to signal the role of the relativized item, particularly in A, S, and O relativization (gapping strategies).
- Different relativization types rank differently with respect to lack of TAM and person agreement distinctions, and the ranking obeys the Accessibility Hierarchy. The Accessibility Hierarchy is presumably motivated in terms of the psychological ease of comprehension of the relative clauses formed on the various syntactic roles.
- Phenomena such as lack of TAM and person agreement distinctions lead to nonspecification of information about the dependent event, and thus increase the processing load of the sentence. As a result, these phenomena tend to take place for relativization types that are easier to comprehend, as is the case with roles more accessible to relativization (for similar observations, see Lehmann 1984: 221).

(33) Concluding remarks:

- Previous work on subordination has revealed the existence of a number of implicational hierarchies concerning the coding of individual types of subordination relations.
- These hierarchies can be integrated into overall implicational hierarchies including all types of subordination relations at a single stroke. The overall implicational hierarchies are motivated in terms of the functional properties of individual subordination relation types.

# Appendix

### The language sample

Acehnese, Akan, Arabic (Gulf), Arapesh, Banda Linda, Barasano, Basque, Berbice Dutch Creole, Borana, Burushaski, Canela-Krahô, Chinese (Mandarin), Diegueño, Djapu, Egyptian (Ancient), Finnish, Fula, Gimira, Greek (Classical), Greenlandic (West), Gumbayinggir, Guugu Yimidhirr, Hixkaryana, Hittite, Hmong Njua, Ho, Hurrian, Italian, Jacaltec, Japanese, Kanuri, Karimojong, Kayardild, Khasi, Kobon, Kolokumi, Krongo, Lango, Lezgian, Limbu, Makian (West), Maŋarayi, Maori, Maricopa, Muna, Nama, Nandi, Ngbaka, Nung, Paiwan, Paumarí, Pero, Pirahã, Punjabi, Quechua (Huallaga Huánuco), Resigaro, Retuarã, Sawu, Shipibo-Conibo, Shoshone (Tümpisa Panamint), Slave, Songhay, Squamish, Sumerian, Supyire, Tagalog, Tamazight, Tamil, Tanghkul Naga, Tarascan, Tok Pisin, Turkish, Tzutujil, Ute, Vai, Vietnamese, Wargamay, Wayãpi, Yidiŋ, Yoruba.

# Abbreviations

ABL ablative

AC accomplished

Aft. after

AUX auxiliary

Bef. before

COMP complementizer

CP conjunctive participle

CRS Currently Relevant State

Des. desideratives

DUR durative

DVBL deverbalizer

ERG ergative

FINAOR finite aorist

GEN genitive

HM human

IMPF imperfect

IMPFV imperfective

IND indicative

INESS inessive

INF infinitive

INGR ingressive

INSTR instrumental

Kn. knowledge

LOC locative

M masculine

Man. manipulatives

Mod. modals

NEG negation

NOMLZR nominalizer

NON-FINAOR nonfinite aorist

NT neuter

OBJ object

PAST past

Perc. perception

PERF perfect

PFV perfective

Phas. phasals

Pr. a. propositional attitude

PRES present

Purp. purpose

R. c. reality condition

Reas. reason

REFLX reflexive

Rel. relatives



REMOTE remote

SG singular

SG singular

SUB subordinator

SUBJ subject

TRANS transitive

Utt. utterance

Wh. when

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