Serialization as cosubordination

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This paper treats serial predicate constructions as cases of cosubordination, in which two equal units share a number of lexical or grammatical modifiers. Using the framework of Functional Discourse Grammar, with its layered hierarchical structure, three types of serialization are identified as cosubordinate constructions involving combinations of three different layers of semantic organization. This classification correctly predictes which grammatical and lexical modifiers can be shared between serial predicates, whether or not the two predicates involved have to be adjacent or not, and whether arguments have to be shared between them.

Keywords: cosubordination, serialization, Functional Discourse Grammar, adjacency, argument sharing

1. Introduction

This paper presents a classification of serial predicate constructions using the hierarchically organized framework of Functional Discourse Grammar (FDG, Hengeveld & Mackenzie 2008). I argue that serial predicate constructions are instances of cosubordination, and that cosubordination leading to serialization can take place at three different layers recognized within the layered structure of FDG. It will be shown that the three types of serial predicate constructions differ from one another as regards (i) their interaction with different operator and modifier categories, (ii) their argument structure, and (iii) restrictions on constituent order. The paper first presents a brief outline of the relevant aspects of FDG in Section 2. Section 3 then discusses the notion of cosubordination and how it can be implemented in FDG. Against this background, Section 4 then presents the three types of serial predicate constructions and the differences between them, and situates them in the FDG model. Conclusions follow in Section 5.

2. Functional Discourse Grammar

FDG distinguishes different levels of grammatical organization: the Interpersonal (pragmatic) Level, the Representational (semantic) Level, the Morphosyntactic Level, and the Phonological Level. These are related in a top-down manner, as indicated in Figure 1. As this figure indicates, pragmatics dominate semantics, pragmatics and semantics dominate morphosyntax, and the three together dominate phonology.

Every level is internally organized in terms of hierarchies of layers, the nature of which corresponds to the level to which they pertain. For the purposes of this chapter, only the internal structure of the Representational Level is relevant. It is given in Figure 2, which also shows the hierarchical relations between layers.[1]

[1] Note that Propositional Contents correspond to Lyons' third order entities and States-of-Affairs to his second

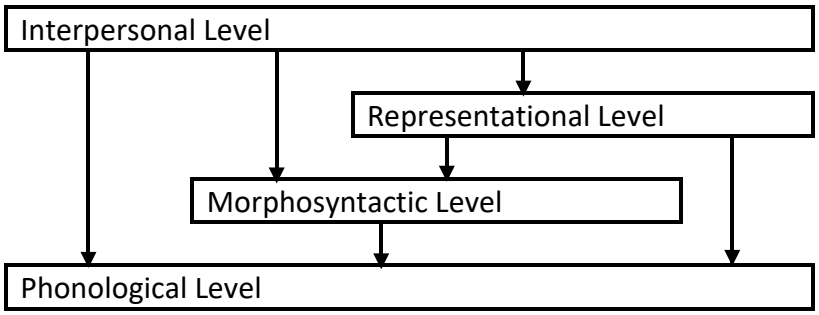

Figure 1: Levels in FDG

Scopal domination is indicated in Figure 2 by means of the symbol '>'. In what follows only the rightmost four layers, in boldface, are relevant, as serial predicate constructions will be defined below as constructions in which more than one predicate express a single State of Affairs.

Representa-tional Level	Propositional Content (p)	>	Episode (ep)	>	**State-of-Affairs (e)**	>	**Situational Property (s)**	>	**Lexical Property (f)**	>	**Lexical Primitive ($)**

Figure 2: Scope relations at the Representational Level in FDG

Every layer may be modified by (grammatical) operators or (lexical) modifiers, represented as π and σ respectively in a formula like the following, where both are given as modifying a State of Affairs (e):[2]

(1) (π e_1: [----------] (e_1): σ (e_1))

For instance, a State of Affairs may be specified by a habitual operator or by a habitual adverb, as shown in (2):

(2) *English*
   a. She used to be playing cards.
      (hab e_i: [–she play cards–] (e_i))
   b. She usually played cards.
      (e_i: [–she play cards–] (e_i): usually (e_i))

In (2a) the auxiliary *used to* is a grammatical expression of inference represented as an operator 'hab' preceding the State of Affairs, while *usually* in (2b) is a lexical expression of habituality represented in its lexical form as a modifier following the State of Affairs. Similar examples could be given for every layer.

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order entities. The layers listed here cannot be compared directly to those used in Role and Reference Grammar, as in the latter theory layers are defined in syntactic terms, whereas they are defined in semantic terms in FDG. In the Cartographic approach within Generative Syntax, layers are likewise defined syntactically.

[2] The position of operators and modifiers is dictated by convention. Examples of operators and modifiers of other layers may be found in Hengeveld & Mackenzie (2008).

In Table 1 the layers from Figure 2 relevant to this article are listed, a definition is provided, and the operators and modifiers relevant at each layer as detected in earlier research are given. Definitions are mainly taken from Hengeveld and Mackenzie (2008), operator categories are discussed in Hengeveld and Fischer (2018), and modifier categories in Hengeveld (2023).

Layer	Definition	Relevant operator categories	Relevant modifier categories
Lexical Primitive ($)	the lexical item as stored in the lexicon	lexical derivation	modifiers in compounds
Lexical Property (f)	the property expressed by any lexical predicate	local negation, property quantification, directionality	degree, predicate-oriented manner
Situational Property (s)	the combination of a predicate and its arguments that characterizes a set of States-of-Affairs	participant-oriented modality, failure, qualitative aspect, participant-oriented quantification	participant-oriented manner, additional participants, event-internal quantification, direction, aspect, participant-oriented modality
State of Affairs (e)	events or states, i.e. entities that can be located in relative time and can be evaluated in terms of their reality status	event-oriented modality, non-occurrence, event perception, relative tense, event quantification, event location	event-external quantification, relative location, relative time, event-oriented modality, event perception

Table 1: Layers and operators in FDG

3. Cosubordination

The notion of cosubordination was first introduced in Olson (1981), and was made more widely known through Foley & Van Valin (1984). Olson defines cosubordination as "a part-whole equivalence relation where conjuncts of comparable status constitute the whole." (Olson 1981: 208). This differs from coordination, which is defined as "a whole-whole equivalence relation where the conjuncts are of comparable status" (Olson 1981: 208), and subordination, which is defined as "a part-whole nonequivalence relation where one conjunct is embedded as a constituent of the other" (Olson 1981: 207). The specific feature of co-subordination is that two elements are coordinated, but at the same time depend on a common element. This common element may be a shared operator or a shared modifier. The former situation is illustrated by the following examples:

(3) *Barai* (Koiarian; Olson 1981: 202, 204)
A keke-I o fu be va-e.
2.SG arrive-PST CONJ 3.SG INT go-PST
'You arrived but did he leave?'

(4) A be keke-mo fu va-e.
2.SG INT arrive-CONJ 3.SG go-PST
'Is it the case that you arrived and then he left?'

In (3), a case of coordination, the two conjuncts, connected by the conjunction *o*, are independent of one another. This independence manifests itself in the fact that the first conjunct is a declarative sentence and the second an interrogative one. In (4), a case of cosubordination, in which the bound conjunction *-mo* is used, the situation is different, as this conjunction can only be used when the two conjuncts share the same illocutionary value, in this case the interrogative one. Notice also the difference in the position of the interrogative marker *be* in these two examples. So in this case there is coordination too, but the two conjuncts are together within the scope of the interrogative.

For the role of modifiers in cosubordination, consider examples (5)-(6):

(5) He will probably arrive today and she will possibly arrive tomorrow.
(6) He will probably leave today and arrive tomorrow.

In (5), a case of coordination, each of the conjuncts has its own modal modifier, while in (6), a case of cosubordination, the modal modifier is shared between the two conjuncts. Note that here the second conjunct has to undergo conjunction reduction as well.

Cosubordination is situated in the wider domain of embedding and dependency in van der Auwera (1997), from which Table 2 is taken.

	+ Embedded	– Embedded
+ Dependent	Subordinate	**Cosubordinate**
– Dependent	Direct speech complements	Coordinate

Table 2: Embedding and dependency (van der Auwera 1997)

The distinguishing feature of cosubordinate clauses is thus that they are dependent but not embedded. This may once more be illustrated by means of a clause chaining construction such as the following:

(7) *A'ingae* (Isolate; Fischer & Hengeveld 2023)
Khasheyendekhûja ñuñasite matachija tsama undikhûpa tsa'kaenjan ku'feya.
khashe'ye=ndekhû=ja ñuña=**si**=te matachi=ja tsa=ma
elder=A.PL=CONTR make=DS=RPRT matachi=CONTR ANA=ACC.REAL
undikhû=**pa** tsa='ka=en=jan ku'fe=**'ya**
dress=SS ANA=SIM=ADVR=CONTR play=ASS
'After the elders made (the clothes) the Matachi clown would dress up and play.'

The clause chaining construction in (7) makes use of two medial clauses in a system of switch reference, with same subject (=*pa*) and different (=*si*) subject markers, indicating whether the

subject of the following clause is the same as or different from the one of the current clause. These medial clauses cannot be used in isolation, but have to be followed by a finite clause, as in (7), where the final verb is marked by means of the finite assertive clitic *='ya*. Note that the two medial clauses are not embedded, that is, they are not argument, adjunct, or relative clauses, but form part of a narrative chain of clauses. They are, however, dependent, as they cannot occur on their own.

Note that cosubordination is not limited to clauses, it can apply within noun phrases as well. This may be illustrated with the following example:

(8) *Azerbaijani* (Turkic; Wälchli 2005: 59)
[kiši]-lər və [qadin]-lar
man-PL and woman-PL
'men and women'

(9) *Azerbaijani* (Turkic; Wälchli 2005: 59)
[məqsəd və prinsip]-lər
purpose and principle-PL
'the purposes and principles'

Example (8) illustrates the regular coordination of noun phrases in Azerbaijani, with each noun phrase carrying its own plural marker. This is different in (9), in which the two noun phrases share a single plural marker. In this case the two noun phrases are dependent on the same marker and thus cosubordinated.

Given its hierarchical layered structure, co-subordination can be represented straightforwardly in FDG, as in (10). In this representation (a_1) and (a_2) are the two coordinated layers, and (b_1) is the layer they are jointly subordinated to. Note that the final (b_i) closes of the layer, i.e. indicates where it ends. This is done in those cases in which as layer has some further specification, as is the case of (b_1) in (10). The variables (a_1) and (a_2) are not repeated as they do not have any further specification:

(10) (b_1: [(a_1), (a_2)] (b_1))

This may be compared to the representation of subordination in (11) and coordination in (12). It will be clear that cosubordination shares the fact that there are multiple conjuncts with coordination, and is similar to subordination in that these multiple conjuncts are dependent on a higher layer.

(11) (b_1: [(a_1)] (b_1))
(12) (a_1), (a_2)

It was shown above that in FDG every layer is associated with operators and modifiers. This fact may be exploited to identify the nature of the layers involved in cosubordination. This is shown in (13).

(13) (π^b b_1: [(π^a a_1: (c_1) (a_1): σ^a (a_1)), (π^a a_2: (c_2) (a_2): σ^a (a_2))] (b_1): σ^b (b_1))
---------- b_1
---------- a_1 ---------- a_2

As shown in (13), π^b and σ^b are operators and modifiers that have scope over (b_1), and hence are shared by both cosubordinated layers (a_1) and (a_2). But (a_1) and (a_2), with their heads (c_1) and (c_2), each have their own operators (π^a) and modifiers (σ^a) as well, which thus apply only to one conjunct. This means that if one can establish which operators and modifiers in a cosubordinate construction are shared by both conjuncts, and which ones apply to individual conjuncts only, a conclusion can be drawn as to the layers that are in a cosubordinate relationship.

Serial predicates qualify as cosubordinate constructions in the approach followed here. An example illustrating this is given in (14):

(14) *Mwotlap* (Austronesian; François 2006: 228)
Kēy to-yoñteg vēglal vēh na-lñe.
3.PL ABIL-hear know ABIL ART-voice.2.SG
'They might recognize your voice.'

In the Mwotlap example in (14) the two predicates *yoñteg* 'hear' and *vēglal* 'know' share the circumpositioned ability operator, and are thus jointly within the scope of that operator.

4. Serial predicate constructions

4.1. Delimitation

In this section I turn to serial predicate constructions and their representation in FDG. Serial predicate constructions are defined here as constructions in which more than one predicate is used in the description of a single State of Affairs. A single State of Affairs can be directly identified in the FDG formalism, as it is a central semantic unit at the Representational Level. Its representation is as in (15).

(15) (e_1: (s_1: [(f_1: ($\$_1$) ($f_1$)) ($x_1$) … ($x_n$)] ($s_1$)) ($e_1$))

In this representation the State of Affairs (e_1) is restricted by the Situational Property (s_1), which itself consists of a predicate (f_1) with its arguments (x_1) … (x_n). The predicate itself is restricted by the lexical primitive ($\$_1$).

The property of a serial predicate construction denoting a single event (in FDG labeled 'State of Affairs') has often been mentioned in the literature, but, as noted by Cleary-Kemp (2015: 122) "attempts to implement single eventhood as an identifying property of SVCs are hampered by the fact that there are no established criteria for what constitutes a single event, either within a particular language, or cross-linguistically". Some authors (Cleary-Kemp 2015: 126), Haspelmath 2016: 306) therefore reject this criterion for the identification of serial predicate constructions. Other authors, such as Bisang (2009) and Durie (1997) explicitly argue in favour of taking eventhood as an important criterion, but note difficulties in determining event status. The FDG framework, however, offers clear criteria to determine whether or not something counts as a State of Affairs or not, particularly the distribution of grammatical markers and modifiers, as will become clear from the tests applied in what follows. In this way it allows for a definition that is much simpler than those encountered in other studies on serialization. For instance, Aikhenvald's (2018) definition is a long list of

properties, and notes that a 'prototypical serial verb construction in a given language will have all the properties', while less prototypical constructions would exhibit less properties. The definition proposed here is meant to identify serial predicate constructions without appealing to prototypicality.

If a serial predicate construction designates a State of Affairs, and serialization is a matter of cosubordination, then based on (15), the following combinations in boldface are predicted to be possible configurations for serial predicate constructions:

(16) Cosubordinated Lexical Primitives (within Property)
(e_1: (s_1: [(f_1: [**($\$_1$), ($\$_2$)**] ($f_1$)) ($x_1$) … ($x_n$)] ($s_1$)) ($e_1$))

(17) Cosubordinated Properties (Within Situational Property)
(e_1: (s_1: [[**(f_1: ($\$_1$) ($f_1$)), ($f_2$: ($\$_2$) ($f_2$))**] ($x_1$) … ($x_n$)] ($s_1$)) ($e_1$))

(18) Cosubordinated Situational Properties (Within State of Affairs)
(e_1: [**(s_1: [(f_1) (x_1) … (x_n)] (s_1)), (s_2: [(f_2) (x_{n+1}) … (x_{n+n})] (s_2))**] (e_1))

Note that we cannot move up one layer higher, as in that case we would combine two States-of-Affairs, and the resulting configuration does no longer comply with the definition of serial predicate constructions. An example of such a construction would be the A'ingae switch-reference construction given in (7).

I will argue here that each of the configurations in (16)-(18) represents a specific type of serial predicate construction. I will call the first type lexical serialization, the second type nuclear serialization, and the third type core serialization. The last two terms are chosen as they have been widely used in the literature for the two relevant types since they were convincingly argued for in Olson (1981) and Foley & Olson (1985), and adopted in Role and Reference Grammar in Foley & Van Valin (1984). Below I will show that the implementation of these two types in FDG leads to a number of modifications of their original definitions. The following sections discuss the three types one by one, in the order given in (16)-(18).

4.2. Lexical serialization

In the first type of serialization, two lexical primitives are conjoined and together form a single Lexical Property. This means that they are jointly within the scope of operators and modifiers at the layer of the Lexical Property[3], as shown in (19).

(19) Cosubordinated Lexical Primitives (within Property)
(e_1: (s_1: [**(π^f f_1: [($\pi^\$$ $\$_1$), ($\pi^\$$ $\$_2$)] ($f_1$): σ^f (f_1))** (x_1) … (x_n)] (s_1)) (e_1))

One of the predictions that follows from (19) is that the two verbs may share an operator of the Lexical Property, as highlighted in (20):

(20) Cosubordinated Lexical Primitives (within Property)
(e_1: (s_1: [**(π^f** f_1: [($\pi^\$$ $\$_1$), ($\pi^\$$ $\$_2$)] ($f_1$): σ^f (f_1)) (x_1) … (x_n)] (s_1)) (e_1))

[3] They are also within the scope of any higher operators of modifiers, but I focus here on the layer at which lexical serialization takes place.

One of the possible operators of the Lexical Property is the Diminutive operator, which may in Mandarin be expressed by reduplication, as in (21), represented in (22):

(21) *Mandarin* (Sino-Tibetan; Melloni & Basciano 2018: 330)
教 教
jiāo jiāo
teach teach
'teach a little'

(22) (e_i: (s_i: [**(Dim** f_i: ($\$_i$: jiāo ($\$_i$)) ($f_i$)) ($x_i$)] ($s_i$)) ($e_i$))

In this case the Lexical Property is headed by a single Lexical Primitive, which is reduplicated when the Diminutive operator is present.

The Diminutive operator can also be applied to (lexicalized) combinations of Lexical Primitives. An example is given in (23):

(23) *Mandarin* (Sino-Tibetan; Melloni & Basciano 2018: 328; Hongmei Fang, pers.comm.)
a. 休 息
xiū-xi
rest-breathe
'take a rest'
b. 休息休息
xiū-xi~xiū-xi
rest-breathe~rest-breathe
'take a little rest'

Note that in this case, unlike in other types of reduplication in Mandarin, it is not the individual verbs that are reduplicated, but the combination of verbs as a whole, resulting in an ABAB pattern, which is further indication that it is this combination as a whole that is subjected to the diminutive operator. This is shown in (24):

(24) (e_i: (s_i: [**(Dim** f_i: [($\$_i$: xiū ($\$_i$)), ($\$_j$: xi ($\$_j$))] ($f_i$)) ($x_i$)] ($s_i$)) ($e_i$))

Similar examples may be found in Kalam (Lane 2007). In this language reduplication is used to express Duration, another operator pertaining to the Lexical Property. Lane (2007: 20) notes that certain types of combinations of verbs can only be reduplicated as a whole to express duration, so one finds the distribution in (25):

(25) *Kalam* (Nuclear Trans New Guinea; Lane 2007: 20)
a. ap yap ap yap
come descend come descend
'come downwards'
b. *ap ap yap
c. *ap yap yap

Again, this seems to indicate that *ap yap* is a lexicalized combination of two Lexical Primitives, together forming a Lexical Property that is reduplicated in the presence of the Duration operator.

As regards the ordering of the serialized Lexical Primitives, the representation in (19) indicates that these have to be adjacent, as they form a single Lexical Property. This is highlighted in (26).

(26) Cosubordinated Lexical Primitives (within Property)
(e_1: (s_1: [**(π^f f_1: [($\pi^\$$ $\$_1$), ($\pi^\$$ $\$_2$)**] ($f_1$): σ^f (f_1)) (x_1) … (x_n)] (s_1)) (e_1))

The examples in this section show that this is indeed the case.

In terms of argument structure, given their lexical status, both lexical elements have the same arguments, which makes lexical serialization different from nuclear and core serialization. This is predicted by the representation in (19), repeated here with the relevant part in boldface:

(27) Cosubordinated Lexical Primitives (within Property)
(e_1: (s_1: [**(π^f f_1: [($\pi^\$$ $\$_1$), ($\pi^\$$ $\$_2$)] ($f_1$): σ^f (f_1)) (x_1) … (x_n)**] (s_1)) (e_1))

Some authors would exclude constructions like the ones discussed here from the domain of serialization (e.g. Dixon 2006: 343, Haspelmath 2016: 296-298), as they involve lexicalization to a smaller or larger extent and therefore are non-compositional. I take a different stance here, as the compounding of two verbs is just as much a case of cosubordination as the other types of serialization discussed below. Lexicalization is only to be expected in this case of cosubordination, as serialization in this case takes place in the lexicon.[4]

4.3. Nuclear serialization

In the second type of serialization, two lexical properties (f) are conjoined and together form the predicate of a Situational Property (s). This means that they are jointly within the scope of operators and modifiers at the layer of that Situational Property[5], as shown in (28).

(28) Cosubordinated Properties (Within Situational Property)
(e_1: **(π^s s_1: [[(π^f f_1: σ^f), (π^f f_2: σ^f)] (x_1) … (x_n)] (s): σ^s (s_1))** (e_1))

This representation predicts that two verbs in nuclear serialization may share an operator at the layer of the Situational Property, as shown in boldface in (29):

(29) Cosubordinated Properties (Within Situational Property)
(e_1: **(π^s** s_1: [[(π^f f_1: σ^f), (π^f f_2: σ^f)] (x_1) … (x_n)] (s): σ^s (s_1)) (e_1))

A'ingae provides an illustration of this feature of nuclear serialization. As shown in (30), and as predicted by (29), the two serialized predicates share the imperfective operator, which is

[4] Note that in this approach English compounds such as *sleepwalk* also count as cases of lexical serialization. I thank an anonymous reviewer for pointing this out to me.

[5] They are also within the scope of any higher operators of modifiers, but I focus here on the layer at which nuclear serialization takes place.

an operator at the layer of the Situational Property, as shown in the representation of (30) in (31).

(30) *A'ingae* (Isolate; Hengeveld & Fischer in prep.)
Na'enga amphi jaje'fa.
na'e=nga **amphi ja**-'je='fa
river=DAT fall go-IMPF=PLS
'They used to fall into the river.' [BC20.004]

(31) (e_i: (**Impf** s_i: [(f_i: [[($\$_i$: amphi ($\$_i$)) ($f_i$)), ($f_j$: ($\$_j$: ja ($\$_j$)) ($f_j$))] ($x_i$)$_U$ (x_j: na'e (x_j))$_{Dir}$] (s_i)) (e_i))

A similar example can be found in Cantonese (Matthews 2006, discussed in Haspelmath 2016).

(32) *Cantonese* (Sino-Tibetan; Matthews 2006: 75)
keoi^5 **haam^3-sap^1**-zo go zam^2_tau4
she cry-wet-PFV CLF pillow
'She made her pillow wet by crying.'

Note that in (32) the perfective marker, another operator at the layer of the Situational Property, is shared by the two verbs.

The representation in (28) also predicts that in nuclear serialization the two verbs may share a modifier of the Situational Property, as shown in boldface in (33):

(33) Cosubordinated Properties (Within Situational Property)
(e_1: **(**π^s s_1: [[(π^f f_1: σ^f), (π^f f_2: σ^f)] (x_1) … (x_n)] (s): **σ^s** (s_1)) (e_1))

An illustration of this is given in example (34) from Barai, discussed in Olson (1981: 173-174). Barai has both nuclear and core serialization, the former is illustrated in (34), the latter will be discussed in the next section.

(34) *Barai* (Koiarian; Olson: 1981)
Fu fase **fi isoe**.
3.SG letter sit write
'He sat writing a letter.'

The two serial predicates may be modified by manner adverbs such as *isema* 'wrongly', which is a modifier of the Situational Property.

(35) *Barai* (Koiarian; Olson 1981: 174)
Na fase **isema** fi isoe.
1.SG letter wrongly sit write
'I wrongly sat writing a letter.'
("I sat in the wrong way to write a letter.")

This may be represented as in (36), which shows that the two verbs in a nuclear serialization are within the scope of the manner adverb, which modifies the Situational Property as a whole:

(36) (e_i: (s_i: [(f_i: [[($\$_i$: fi ($\$_i$)) ($f_i$)), ($f_j$: ($\$_j$: isoe ($\$_j$)) ($f_j$))] ($x_i$: na ($x_i$))$_A$ (x_j: fase (x_j))$_U$] (s_i) **isema** (s_i)) (e_i))

The representation in (28) furthermore predicts that each of the two predicates may carry its own operators or modifiers of the Lexical Property, as shown in boldface in (37).

(37) Cosubordinated Properties (Within Situational Property)
(e_1: **(**π^s s_1: [[(**π^f** f_1: **σ^f**), (**π^f** f_2: **σ^f**)] (x_1) … (x_n)] (s): σ^s (s_1)) (e_1))

This may be illustrated with the following examples from A'ingae. In this language, multiplicativityis expressed through reduplication. Multiplicativity is an operator of the Lexical Property, and indeed each of the two verbs in a serial predicate construction may be reduplicated individually, as shown in (38)-(39):

(38) *A'ingae* (Isolate; Hengeveld & Fischer in prep.)
A'i ankan jaja'fa.
a'i **ankan ja~ja**='fa.
Cofán.person hold go~MLTP=PLS
'Clinging (to the tree) the people went (down the river).'

(39) Tse'i dyupa tueki shandanda ja'fa.
tse'i dyu=pa tueki **shanda~nda ja**='fa
then be_afraid=SS back return~MLTP go=PLS
'Then being afraid they began to leave.' [BC14.023]

Example (38) is represented in (40), and shows how the multiplicative operator applies to one of the lexical predicates only:

(40) (e_i: (s_i: [(f_i: [[($\$_i$: ankan ($\$_i$)) ($f_i$)), (**Mltp** f_j: ($\$_j$: ja ($\$_j$)) ($f_j$))] ($x_i$: a'i ($x_i$))$_A$] ($s_1$)) ($e_1$))

A similar situation obtains in Mwotlap (François 2006). As shown in example (14), repeated here as (41), both serial predicates are in the scope of participant-oriented facultative modality, which operates at the layer of the Situational Property:

(41) *Mwotlap* (Austronesian; François 2006: 228)
Kēy **to-yoñteg** **vēglal** **vēh** na-lñe.
3.PL ABIL-hear know ABIL ART-voice.2.SG
'They might recognize your voice.'

At the same time, as also noted by Aikhenvald (2018: 112) for Mwotlap and other languages, each of the predicates in the series may be subject to reduplication, which, like in A'ingae, expresses multiplicativity:[6]

[6] Note that this construction also shows that the term 'serial predicate construction' is to be preferred over 'serial verb construction', as *mat* is an adjective. This is evident from the fact that it can be used in its bare

(42) *Mwotlap* (Austronesian; François 2006: 228)
No **mi-yim mat~mat** ne-men
1.SG PERF-stone dead~MLTP ART-bird
'I stoned the birds (once) and killed them.'

(43) Mwotlap (Austronesian; François 2006: 228)
Kem **mi-yim~yim mat** ne-men
1.SG PERF-stone~MLTP dead ART-bird
'We stoned the bird(s) and killed it/them outright.'

Another property of nuclear serialization also follows straightforwardly from the general representation in (28). The relevant part is given in boldface in (44).

(44) Cosubordinated Properties (Within Situational Property)
(e_1: **(π^s s_1: [[(π^f f_1: σ^f), (π^f f_2: σ^f)**] (x_1) … (x_n)] (s): σ^s (s_1)) (e_1))

Since the two lexical predicates jointly predicate and form a unit with a shared set of arguments, they have to be expressed contiguously in linearization. And indeed, all the examples given in this section have the two serial predicates in adjacent positions.

Turning now to the expression of arguments, as the representation in (28) shows, in nuclear serialization the two predicates necessarily share a single set of arguments, a property that distinguishes them from core serialization, to be discussed in Section 4.4. This is highlighted in the representation in (45).

(45) Cosubordinated Properties (Within Situational Property)
(e_1: (π^s s_1: [[(π^f f_1: σ^f), (π^f f_2: σ^f)] **(x_1) … (x_n)**] (s): σ^s (s_1)) (e_1))

This does not mean that each of the predicates needs to have the same set of arguments, but it does mean that every semantic function/thematic role may be assigned only once in the joined set of arguments of the two predicates (Foley & Olson 1985: 44). In (41) the arguments completely overlap, as shown in (37):

(46) (e_i: (Fac s_i: [(f_i: [[($\$_i$: yoñteg ($\$_i$)) ($f_i$)), ($f_j$: ($\$_j$: vēglal ($\$_j$)) ($f_j$))] ($x_i$: kēy ($x_1$))$_A$ (x_j: lñe (x_j))$_U$] (s_i)) (e_i))

The two predicates *yoñteg* 'hear' and *vēglal* 'know' each have an Actor argument *kēy* 'they' and an Undergoer argument *lñe* 'your voice', so the set of arguments is shared in its totality. In (43), however, the predicate *yim* 'stone' has an Actor and an Undergoer, but the predicate *mat* 'dead' has an Undergoer only, as shown in (47):

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form as an attribute within a noun phrase:
(i) *Mwotlap* (Austronesian; François 2003: 52)
na-tm̄an mat
ART-man dead
'a dead man'

(47) $(e_i: (s_i: [(f_i: [[(\text{Mltp } \$_i: \text{yim } (\$_i))\ (f_i)), (f_j: (\$_j: \text{mat } (\$_j))\ (f_j))]\ (x_i: \text{kem } (x_1))_A\ (x_j: \text{men } (x_j))_U]\ (s_i))\ (e_i))$

However, since *nemen* 'the bird(s)' is the Undergoer of both predicates, the Undergoer role is assigned only once. I will show in the next section that the situation is different in core serialization.

3.4. Core serialization

In the third type of serialization, two Situational Properties (s) are conjoined and together form the head of a State of Affairs (e). This means that they are jointly within the scope of operators and modifiers at the layer of that State of Affairs[7], while each of them may carry operators and modifiers of the Situational Property, as shown in (48).

(48) Cosubordinated Situational Properties (Within State of Affairs)
$(\pi^e\ e_1: [(\pi^s\ s_1: [(f_1)\ (x_1)\ \ldots\ (x_n)]\ (s_1): \sigma^s\ (s_1)), (\pi^s\ s_2: [(f_2)\ (x_{n+1})\ \ldots\ (x_{n+n})]\ (s_2): \sigma^s\ (s_2))]\ (e_1))$

In this type of serial predicate construction, it should be possible to have operators of the Situational Property on each of the serialized verbs, as indicated in boldface in (49):

(49) Cosubordinated Situational Properties (Within State of Affairs)
$(\pi^e\ e_1: [(\mathbf{\pi^s}\ s_1: [(f_1)\ (x_1)\ \ldots\ (x_n)]\ (s_1): \sigma^s\ (s_1)), (\mathbf{\pi^s}\ s_2: [(f_2)\ (x_{n+1})\ \ldots\ (x_{n+n})]\ (s_2): \sigma^s\ (s_2))]\ (e_1))$

The following examples from Saramaccan, also discussed in Haspelmath (2016), show that each of the verbs in the serial predicate construction can be independently specified for imperfective aspect, which is an operator at the layer of the Situational Property. In (50) the imperfective aspect marker precedes the first verb, in (51) the second one.

(50) *Saramaccan* (English-Lexified Creole; Muysken & Veenstra 2006)
A tá fáa páu túe.
3.SG IMPF chop tree throw
'He is felling a tree.'

(51) A fáa páu tá túe.
3.SG chop tree IMPF throw
'He is felling a tree.' (i.e. at this very moment the tree is falling)

Example (51) is represented in (52) and shows that the imperfective operator applies to the second Situational Property only:

(52) $(e_i: [(s_i: [(f_i: \text{fáa } (f_i))\ (x_i: \text{a } (x_i))_A\ (x_j: \text{páu } (x_j))_U]\ (s_i)), (\mathbf{Impf}\ s_j: [(f_j: \text{túe } (f_j))\ (x_i)_A\ (x_j)_U]\ (s_j))]\ (e_i))$

On the other hand, (48) predicts that operators of the State of Affairs layer can only be specified once, as shown in boldface in (53):

[7] They are also within the scope of any higher operators of modifiers, but I focus here on the layer that at which core serialization takes place.

(53) Cosubordinated Situational Properties (Within State of Affairs)
($\boldsymbol{\pi}^{e}$ e_1: [(π^{s} s_1: [(f_1) (x_1) … (x_n)] (s_1): σ^{s} (s_1)), (π^{s} s_2: [(f_2) (x_{n+1}) … (x_{n+n})] (s_2): σ^{s} (s_2))] (e_1))

And indeed, in a serial predicate construction in Saramaccan "negation can be marked only once in the string" (Muysken & Veenstra 2006: XX), as is illustrated in (54):

(54) *Saramaccan* (English-Lexified Creole; Muysken & Veenstra 2006)
De á bì héngi en peeká a dí lakwa-páu.
3.PL NEG TNS hang 3.SG nail LOC DET cross
'They didn't crucify him.'

Since negation is an operator at the layer of the State of Affairs, this is exactly as one would expect on the basis of the representation in (53). This is also shown in the represention of (54) in (55).

(55) (**Neg** e_i: [(s_i: [(f_i: héngi (f_i)) (x_i: de (x_i))$_A$ (x_j: en (x_j))$_U$] (s_i)), (s_j: [(f_j: peeká (f_j)) (x_i)$_A$ (x_j)$_U$ (x_k: lakwa (x_k))$_L$] (s_j))] (e_i))

Similar facts can be given for Dyirbal serial predicate constructions, as described in Dixon (2011). Example (56) shows that an individual verb in a serial predicate construction can be specified for ingressive aspect, an operator of the Situational Property:

(56) *Dyirbal* (Pama-Nyungan; Dixon 2011: 201)
(bayi) … banaga-**yarra**-ñu balu-dayi muŋan-gu-bi-n.[8]
3.SG.M.ABS … go.back-INGR-PST THERE.TO-UPWARDS mountain-ALL-INCH.VR-PST
'(He) started to go back a short distance uphill there to the mountains.'

The ingressive is an aspectual operator that applies at the layer of the Situational Property, and in (56) can have scope over one of the two verbs in the serial predicate construction only. Example (57) shows that the serialized predicates fall under the scope of a single negator:

(57) *Dyirbal* (Pama-Nyungan; Dixon 2011: 202)
(Ñaywi …) gulu rañjarañja-bi-n milgay-marri-ñu.
Nyaywi NEG talk.in.harsh.voice-INCH.NR-PST grumble.at-REFL-PST
'Nyaywi didn't talk in a harsh voice, nor did he grumble at people.'

Note furthermore that the predicates in a serial predicate construction have to carry the same temporal specification, which in the case of (57) is the past inflection.

A final prediction that follows from (48) is that each verb may be specified by a modifier of the Situational Property, as shown in boldface in (58):

(58) Cosubordinated Situational Properties (Within State of Affairs)
(π^{e} e_1: [(π^{s} s_1: [(f_1) (x_1) … (x_n)] (s_1): $\boldsymbol{\sigma^{s}}$ (s_1)), (π^{s} s_2: [(f_2) (x_{n+1}) … (x_{n+n})] (s_2): $\boldsymbol{\sigma^{s}}$ (s_2))] (e_1))

[8] The inchoative suffix derives an intransitive stem.

That this prediction is correct can be shown for manner adverbs in Barai. In example (34) in the previous section it was shown that in nuclear serialization the manner adverb *isema* scopes over the serialized predicates. In core serialization the situation is different, as shown in (59) and (60). In these examples each of the individual verbs is modified separately.

(59) *Barai* (Koiarian; Olson 1981: 173, 174)
Na isema fi fase isoe.
1.SG wrongly sit letter write
'He sat wrongly and wrote a letter.'

(60) Na fi fase isema isoe.
1.SG sit letter wrongly write
'He sat down and wrote the letter wrongly.'

This difference in scope of the manner adverb can be captured as in (61) and (62):

(61) (e_i: [(s_i: [(f_i: fi (f_i)) (x_i: na (x_i))$_A$] (s_i): **isema** (s_i)), (s_j: [(f_j: isue (f_j)) (x_i)$_A$ (x_j: fase (x_j))$_U$] (s_j))] (e_i))

(62) (e_i: [(s_i: [(f_i: fi (f_i)) (x_i: na (x_i))$_A$] (s_i)), (s_j: [(f_j: isue (f_j)) (x_i)$_A$ (x_j: fase (x_j))$_U$] (s_j): **isema** (s_j))] (e_i))

The representation of core serialization in (48) also shows that, different from the previous two types of serialization, the predicates in core serialization do not have to be in contiguous positions[9], as already illustrated in (50), (51), (56), (59) and (60). This does not mean that the predicates can never be in contiguous positions. Example (57) above and (63) below show that in Dyirbal under the appropriate circumstances serial predicates can occur contiguously.

(63) *Dyirbal* (Pama-Nyungan; Dixon 2011: 201)
(bala.maŋgan) ... baŋum gana bani-ñu ŋurba-**yarra**-ñu yalu-bayju-bi-n.
3.PL.ABS … THEN TRY come-PST go.back-INGR-PST HERE.TO.PLACE-DOWN-INCH.NR-PST
‘(They) then tried to come back to a place a long distance downhill.’

This means that, if predicates in a serial predicate construction occur discontinously, one may conclude that the construction is an instance of core serialization; but if they occur contiguously, one cannot conclude that the construction is an instance of lexical or nuclear serialization. On the basis of this observation, examples like the following are straightforward instances of core serialization:

(64) *Haruai* (Piawi, Papua New Guinea; Comrie 1995:31–32)
An dw röbö p-ỏy-n-ŋ.
we go water get-NEG-FUT-1.PL
‘We will not go for water.’ (Lit. “We will not go and get water.”)

[9] Aikhenvald (2018) also discusses the issue of (non-)contiguity, but does not relate it to different types of serialization.

(65) *Paamese* (Austronesian; Crowley 2002: 55)
Inau nuas vuas he:mat.
inau ni-uasi vuasi hee-mate
1.SG 1.SG.DIST.FUT pig 3.SG.DIST.FUT-die
'I will hit the pig to death.'

(66) *Sranan* (English-Lexified Creole; Jansen, Koopman & Muysken 1978: 145)
Meri teki watra gi den plantjes.
Mary take water give the plants
'Mary gives water to the plants.'

(67) *Numbami* (Austronesian; Bradshaw 1993: 146)
E i-ma teteu i-ndomoni aiya.
3.SG 3.SG-come village 3.SG-seek 2.SG
'He came to the village and looked for you.'

A last issue to be discussed in relation to core serialization is the argument structure of this construction. As noted above, in nuclear serialization the predicates involved necessarily share a single set of arguments, in the sense that every semantic function/thematic role may be assigned only once in the combined set of arguments of the serializing predicates. As the representation in (48), repeated here as (68) with the relevant parts in boldface, shows, in core serialization there may be coreference between the arguments of the serializing predicates, but this is not a necessary condition.

(68) Cosubordinated Situational Properties (Within State of Affairs)
$(\pi^e e_1: [(\pi^s s_1: [(f_1)$ **$(x_1) \ldots (x_n)$**$] (s_1): \sigma^s (s_1)), (\pi^s s_2: [(f_2)$ **$(x_{n+1}) \ldots (x_{n+n})$**$] (s_2): \sigma^s (s_2))] (e_1))$

Consider the following examples from Paamese:

(69) *Paamese* (Austronesian; Crowley 2002: 61, 41, 61, 61)
Nisa:nik ki:ha: en sukul.
ni-saani-ko kii-haa eni sukulu
1.SG.DIST.FUT-send-2.SG 2.SG.DIST.FUT-go LOC school
'I will send you to school.'
"I will send you, you go to school"

(70) Makurik lovaha.
Ma-kuri-ko lo-va-haa.
1.SG.IMM.FUT-take-2.SG 1.DL.INCL-IMM.FUT-go
'I will take you away with me'
"I will take you, we go."

(71) Inau nimun si:b hetal tonik.
inau ni-muni siine he-tali tonike
1.SG 1.SG.DIST.FUT-drink gin 3.SG.DIST.FUT-accompany tonike
'I will drink gin with tonic.'
"I will drink gin, it accompanies tonic."

(72) Inau namuasik gaih.
inau na-muasi-ko Ø-gaiho
1.SG 1.SG.REAL-hit-2.SG 3.SG.REAL-hard
'I hit you hard.' (lit. "I hit you, it (i.e. the hitting) was hard.")

In (69) the Undergoer of the first predicate verb is the Actor of the second predicate; in (70) the Actor and Undergoer of the first predicate jointly serve as the Actor of the second predicate; in (71) each verb has its own (Actor and) Undergoer, and in (72) the event described by the first predicate and its arguments is the subject of the second predicate. Crowley (2002: 60-61) uses the terms 'switch subject'[10], 'inclusory', 'multiple object', and 'ambient' serialization for these four types, respectively.

It has been argued in the literature (e.g. Aikhenvald 2006: 13, Dixon 2006: 340, Foley & Olson 1985: 47, Haspelmath 2016: 309) that in serialization at least one argument has to be shared between the predicates involved (but see Aikhenvald 2018 for a different position). It has also been argued that within the serial complex roles cannot be duplicated (Durie 1997: 340). Examples (69)-(72) contradict these statements, and their existence is actually not problematic in terms of the general representation of core serialization in (48). These examples can be straightforwardly represented as in (73)-(76):

(73) (e_i: [(s_i: [(f_i: saani (f_i)) (x_i: 1.SG (x_i))$_A$ **(x_j: 2.SG (x_j))$_U$**] (s_i)), (s_j: [(f_j: haa (f_j)) **(x_j: 2.SG (x_j))$_A$** (x_j: sukulu (x_j))$_L$] (s_j))] (e_i))

(74) (e_i: [(s_i: [(f_i: kuri (f_i)) (x_i: 1.SG (x_i))$_A$ (x_j: 2.SG (x_j))$_U$] (s_i)), (s_j: [(f_j: haa (f_j)) (x_k: 1.DL (x_k))$_A$] (s_j))] (e_i))

(75) (e_i: [(s_i: [(f_i: muni (f_i)) (x_i: 1.SG (x_i))$_A$ **(x_j: gin (x_j))$_U$**] (s_i)), (s_j: [(f_j: tali (f_j)) **(x_j)$_A$** (x_k: tonike (x_k))] (s_j))] (e_i))

(76) (e_i: **[(s_i: [(f_i: muasi (f_i)) (x_i: 1.SG (x_i))$_A$ (x_j: 2.SG (x_j))$_U$] (s_i))**, (s_j: [(f_j: gaiho (f_j)) **(s_i)$_U$**] (s_j))] (e_i))

In (73) the 2.SG (x_j) is Undergoer of the first predicate, and Actor of the second; in (74) the first predicate has two arguments, the Actor (x_i) and the Undergoer (x_j), and the second predicate has a new argument (x_k) which does not coincide in reference with either of the arguments of the first predicate; in (75) the Undergoer of the first predicate is the Actor of the second predicate, which furthermore has its own Undergoer; and in (76) the entire Situational Property (s_i) becomes the Undergoer argument of the second predicate. Example (73) furthermore shows that Hapelmath's (2016: 310) claim that serial predicate constructions cannot have two different agents is too strong.

4. Conclusions

In this paper I operationalize the notion of cosubordination in the framework of Functional Discourse Grammar. By applying cosubordination to the layered structure of FDG, three types of serial predicate constructions can be identified. The resulting types of serialization are lexical serialization, nuclear serialization, and core serialization. These differ from one another as regards the scope of operators and modifiers, constituent order, and argument structure. Lexical serial predicate constructions are within the scope of operators and modifiers of the Lexical Property, are expressed contiguously, and have a single set of arguments. Nuclear serial predicate constructions are within the scope of operators and modifiers of the Situational Property, are expressed contiguously, and have a combined set of arguments, in

[10] Aikhenvald (2006: 14) prefers the term 'switch-funtion', as the referent stays the same but its semantic function changes.

which every semantic function may occur only once. Core serial predicate constructions are within the scope of operators and modifiers of the State of Affairs, do not have to be expressed contiguously, and each predicate has its own set of arguments. These properties of the three types are listed in Table 3.

	Lexical serialization	Nuclear serialization	Core serialization
Within scope of operators and modifiers of the Lexical Property	+	–	–
Single set of arguments	+	–	–
Within scope of operators and modifiers of the Situational Property	+	+	–
Contigious expression	+	+	–
Overlapping sets of arguments	–	+	–
Within scope of operators and modifiers of the State of Affairs	+	+	+
Separate sets of arguments	–	–	+

Table 3: Summary of properties of the three types of serial predicate constructions

The classification presented here deviates in two ways from existing approaches. First of all, it includes lexical serialization as a specific type of serialization, thus including verbal compounding in the domain of serialization. And secondly, it provides an explanation for those cases of core serialization in which none of the arguments is shared, contrary to the claim in the literature that the predicates in a serial predicate construction share at least one argument. The examples given in this paper clearly show that such a claim is too restrictive.

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Abbreviations used

1 first person
2 second person
3 third person
ABIL ability
ABS absolutive
ACC accusative
ADVR adverbializer
ALL allative
ANA anaphoric
ART article
ASS assertive
CLF classifier
CONJ conjunction
CONTR contrast
DAT dative
DET determiner
DIST distal
DL dual
DS different subject
FUT future
IMM immediate
IMPFV imperfective
INCH inchoative
INCL inclusive
INGR ingressive
INT interrogative
LOC locative
M masculine
MLTP multiplicative
NEG negation
NR nominalizer
PERF perfect
PFV perfective
PL plural
PLS plural subject
PST past
REAL realis
REFL reflexive
RPRT reportative
SG singular
SIM simultaneity
SS same subject
TNS tense

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