Workshop *Coordination*

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**Motivations for Three-Dimensional Syntax: Implicit Coordination**

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**Introduction**

Three-dimensional theories of coordination (once)

Goodall (1985), Muadz (1991), Moltmann (1992)

Coordinates are in different planes, dominated by the same note

Coordination = multidominance



(1) John and Mary met.

Implicit coordination

(2) A man came and a woman left who know each other well.

*Man* and *woman* are implicitly coordinated; *came* and *left* are implicitly coordinated.

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**1. Syntactic motivations for three-dimensional theories of coordinate structures**

Two kinds of phenomena that are characteristic of coordination:

1. Phenomena in which coordinated phrases or parallel parts of coordinated phrases behave as units - either in syntactic or in semantic respects or in both.

2. Phenomena in which coordinated phrases exhibit a certain degree of syntactic or semantic independence from each other.

Syntactically, conjuncts of a coordination act as a unit with respect to agreement (1a) or binding (1b) or across-the-board (ATB) extraction (2):

1. a. John and Mary are dancing.

b. John and Mary like themselves.

1. Whom did John meet t and Mary invite t?

Semantically, coordinated DPs may act as units in providing a plural referent for a collective predicate:

(3) John and Bill met.

Parallel singular DPs in distinct conjuncts may form plural antecedents, in split-antecedent constructions:

(4) a. A man came and a woman left who know each other well.

 b. Which pictures of *themselves* did John like and Mary hate?

 c. How many pictures *each* did John like and Mary hate?

Syntactic independence of coordinates

Possibility of DP-movement in one conjunct independently of the other one:

(5) John drove his car to his house and seemed t to be exhausted.

Semantic independence of coordinates

Sentences with phrasal coordinations receive a 'respectively' interpretation (wide distributivity):

(6) John and Bill read books by Mary and Sue (respectively).

Binding displays unity and independence

Binding may take into consideration either only conjoined phrases or only individual conjuncts :

(7) *John* and *Mary* admire pictures of *himself* and stories about *herself* respectively.

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**2. Syntactic status of the coordinator within three-dimensional syntax**

Asymmetries among conjuncts

Quantifier in the first conjunct may bind a pronoun in the second conjunct, but not vice versa.

(8) a. *every man* and *his* wife

 b. *every man* and two of *his* children

 c. *every man* and a picture of *himself*

(9) a. \* *his* wife and *every man*

 b. \* two of *his* children and *every man*

 c. • a picture of *himself* and *every man*

R­expression in the first conjunct can be coreferential with a pronoun in the second conjunct, but not vice versa:

(10) a. *John's* dog and *he/him* went for a walk.

 b. \* *He* and *John's* dog went for a walk.

Binding asymmetry with reciprocals:

(11) a. Theyi liked stories about themi and each otheri.

b. • Theyi liked stories about each otheri and themi.

Account within three-dimensional syntax

Conditions of Binding Theory apply across planes.

Accounting for asymmetry among coordinates:

Coordinators as formal adjuncts of (at least) one of the coordinates.

Coordinator forms a constituent with the last conjunct (Ross 1967):

(12) a. John left; and he didn't even say goodbye.

b. John left. And he didn't even say goodbye.

c. \* John left and. He didn't even say goodbye.

(13) a. John met *every man* and *his* wife.

b. John met every man (and his wife)

New notion 'c-command': c-command can obtain among nodes contained in different planes:

(14) C-command for three-dimensional phrase markers

 For (N, D, P) be a three-dimensional phrase marker.

 x c-commands y in (N, D, P) iff x does not dominate y in all f-planes (N', D', P') of

 (N, D, P) such that x belongs to N', and every branching node z that dominates x

 dominates y.

Asymmetries without overt coordinator:

(15) a. *every man, his* car and *his* dog

b. *every man* and *his* car and *his* dog

(16) a. *John's* dog, *he* and Mary left for a walk.

b. *John's* dog and *he* and Mary left for a walk.

(17) a. *They* told stories about *each other, them* and *each other's* friends.

b. *They* told stories about *each other* and *them* and *each other's* friends.

(18) a. John and *every professor,* and *his* assistant

 b. John, *every professor,* Mary, and *his* assistant

 c. \* John, *his* assistant, *every professor,* and Mary

 d. \* John, *his* assistant, Mary, and *every professor*

Silent coordinators

(19) ((AND) John) ((AND Mary) (and every professor))

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**3. Split antecedent constructions (implicit coordination) and their semantics**

**3.1. Types of split antecedent constructions and the general idea for their semantics**

Extraposed relative clause

(20) a. A *man* came and a *woman* left *who know each other well.*

 b. a *man* and a *woman who know each other well*

 c. Every *professor* was praised and every *student* was criticized *who had published an*

 *article together.*

 d. every *boy* and every *girl who danced together*

Right node raising

(21) a. *John* praised and *Mary* criticized *different* people.

 b. On the *same* day, *John* died and *Mary* was born.

Reflexives in *picture* NPs

(22) Which pictures of *themselves* did *John* praise and *Mary* criticize?

The idea of the semantics of spit antecedent constructions within three-dimensional syntax

Interpretation of (21a) a ‘fusion’ of two partial interpretations:

(23) a. John praised different people and Mary criticized different people.

 b. [John praised t and Mary criticized t) different people.

Partial interpretation 1

(24) John and Mary praised and criticized different people.

Unproblematic given the semantics of *different* (e.g., Moltmann 1992) and the interpretation of conjunctions in terms of plural reference:

(25) There is an event plurality ee and a plurality xx of people such that: ee is praising

 and criticizing of xx by John and Mary for which the following holds:

 For all distinct parts e' and e" of ee, if there are parts z' and z" of the plurality of John

 and Mary, and parts x' and x" of xx such that z' is the agent of e' with respect to x'

 and z" is the agent of c" with respect to x", then x' and x" are distinct.

Partial interpretation 2

(26) John praised some of them and Mary criticized some of them.

*Them* refers to ‘the people praised and criticized by John and Mary’.

**3.2. Syntactic properties of split antecedent constructions**

1. Restriction to coordination

(27) a. \* Mary met *a man* with *a dog who were quite similar.*

b. \* *A man* met *a woman who came from the same country.*

c. \* John showed *a man a woman who know each other.*

(28) a. • During the same period of time *John* claimed that *Mary* played piano.

b. • At the same time *John* laughed because *Mary* tried to play piano.

2. Parallel constraints on implicit coordination and on ATB movement

(29) a. *\*A woman* came and John met *a man who knew each other well.*

 b. • John gave *Bill* and *Sue* received two presents *each*

Cases where ATB is possible from the object position of a main clause and the subject position of the embedded clause has a parallel with split antecedent constructions:

(30) a. Who did John see t and Mary say t will come tomorrow? (Williams)

b. John sent *the article* and Mary said that *the book* will be sent to two professors *each.*

c. John sent *Max* and Mary said *Sue* will be sent two pictures of *themselves* the *same*

 picture.

Syntactic constraints:

Implicitly coordinated antecedents are excluded if conditions on syntactic parallelism are not satisfied:

(31) a.?\* *A woman* left and John kicked out *a man who knew each other quite well.*

 b. ?\* Mary brought along *a man* and *a woman* appeared *who know each other quite*

 *well.*

 c. ?\* *A man* left and John asked *a woman* to leave *who know each other quite well.*

 d. \* John just wrote *a novel* and *a book* has recently been published *that are quite*

 *similar.*

4. The Coordinate Structure Constraint for implicitly coordinated antecedents

If conjuncts in a coordination contain a part of an implicitly coordinated antecedent, then every conjunct of this coordination must provide a part of the antecedent:

(32) a. \* John met *a woman,* Mary met *a man* and remained alone *who have known*

 *each other for a long time.*

b. \* John, *a man* and *a woman who are married.*

(33) *John* said, *Mary* wrote and *Sue* shouted *different* things.

(34) • Whom did John see and Mary became ill?

(35) plane 1: Whom did John see plane 2: Whom did Mary become ill

(36) Condition on semantically relevant syntactic relations among three-dimensional

 syntactic units

 For syntactic units X and Y belonging to several planes of a tree T and a meaningful

 syntactic relation R (such as 'is anaphor to'), R(X, Y)iff for each f-plane p of T there

 is a correspondent X' of X in p and a correspondent Y' of Yin p such that R(X',Y').

5. Syntactic position of the element taking an implicitly coordinated antecedent

SPEC(CP) with ATB movement, adjunction to IP, the position of phrases that have undergone Right Node Raising, and extraposition:

(37) a. How many pictures *each* did *John* buy and *Mary* sell?

b. On the *same* day, *John* died and *Mary* was born.

 c. John *saw* and Mary *wants to see* the *same* man.

d. *A man* came and *a woman* left *who know each other well*

Other positions are not possible:

(38) a. \* *John* died on the same day and *Mary* was born.

 b. \* *A man* came *who know each other well* and *a woman* left.

(39) Condition on syntactic relations and shared planes

 Two syntactic units X and Y in a three-dimensional syntactic tree can stand in a

 meaningful syntactic relation only if X and Y belong to the same planes.

(40) X and Y belong to the same planes if every plane that X or a member of X is

 part of is a plane that Y or a member of Y is part of.

6. Constraints on the antecedent-anaphor relationship with implicit coordination

(41) a. ?? *John* sold and *Bill* wants Mary to sell pictures of *themselves I* self-portraits.

 b. John bought and Mary discovered that Bill will sell two books *each.*

 c. John praised and Mary criticized different people.

**3.3. Compositional semantics of split antecedent constructions**



Two ways to proceed after A, B and C have been evaluated:

either the syntactic unit consisting of A and B could be evaluated or else the constituents AC and BC could be evaluated.

The first interpretation evaluates 'cross-planar', three-dimensional syntactic units;

the second interpretation evaluates bigger planes first.

Meaningful (m)-plane assignments:

Empty set represents implicit coordination (no overt coordinator)

(42) a. Pl ={<{}, {A, B}>}

b. P2 = { <{}, {AC, BC}>)

(43) For *F* a functional assignment of a sentence *S* with respect to a three-dimensional

 phrase marker *T*. *I* is *a partial interpretation*of S relative to *T* iff there is a complete m-

 plane assignment *M* in *F* such that *I* is the semantic interpretation of S relative to M

 and T.

(44) For a sentence *S* with a phrase marker *T* containing a coordinator *j*, *S* has to be assigned

 an m-plane assignment containing a complete m-plane pair in which j is an element

 of the first argument.

Semantic operations for conjunction of referential NPs and of expressions denoting relations

(45) a. For referential singular DPs Xl and X2, [<{*and*}, {X1, X2}>] = Xl + X2

 b. For two-place place predicates N1 and N2, [<{*and*}, {N1, N2}>] =

 {< xx+yy, x’x’+y’y’ > / (N1(xx, yy) & N2(x’x’, y’y’)}

‘+’ a functor building a plural term from two plural terms.

(46) The Interpretation of Implicit Coordination

 For <{}, X1, ..., Xn}> a complete pair of m-planes of an m-plane assignment

 to a three-dimensional phrase marker T of a sentence S,

 [<{}, {X1, ..., Xn}>] = [*<*{*and*}*,* {X1,..., Xn}>]

Compositional interpretation

(21) a. *John* praised and *Mary* criticized *different* people.

Evaluation of with respect to the small m-plane assignment:

(48) M1 = {<{ }, *{John,* Mary}>,<{}, {*praised, criticized*}>}

(49) a. John and Mary praised and criticized different people.

 b. λeexxyy[([<{*and*}, {*praised, and criticized*}](ee,xx, yy) & people(yy)]

 c. λeexx[∃x’x'x"x"y’y'y"y"(x'Px & x"Px & ¬x' = x" & y < y' & y < y" & ∃e'e"(e' < ee

 & e" < ee & agent(e', x', y') & agent(e", x", y")))

 d. λeey[([<{*and*}, {*praised, and criticized*}](ee*,* [*<*{*and*}*, John ,and Mary>*]*,* yy) &

 people(y)] & ∀e'e"x'x"y'y"(e' < e & e" < e & agent(e'. x', y') & agent(e", x", y") &

 x' < [John *and Mary*]& x" < [<and, *John, and Mary*]& ¬x' = x" & y < y' & y < y"

 🡪 ¬y' = y"))

Evaluation with respect to the big m-plane assignment M2:

(50) M2 = { <{*and*}, *{John praised different people, and Mary criticized different*

 *people*}>}

The planes in (50) cannot be interpreted literally; rather *different people* will be evaluated as a variable.

Evaluation of 'crossplanar' antecedents

(51) For any constituent x in a three-dimensional tree T, if x enters an anaphoric relation

 to an antecedent that is a complete set of m-planes in a plane assignment M of T,

 then for any plane assignment M' distinct from M, [x]T, M' = y for an appropriate

 variable y.

Evaluation of the clausal coordination

(52) [*<and, John praised different people, and Mary criticized different people*>]T, M2 =

 λeeyy[praise(e', John, yy) & criticize(ee, Mary, yy))]

The combination of the two partial interpretations: union of two relations

After union, existential quantification

(53) ∃eeyy[([*praised and criticized*](ee,[*John and Mary*]*,*yy) & people(yy)] &

 ∀e'e"x'x"y'y"(x' < [John *and Mary*] & x"< [*John and Mary*] & x' ≠ x" & y' < y &

 y" < yy & e' < ee & e" < ee & e' ≠ e" & agent(e', x', y') & agent(e", x", y") 🡪 y’ ≠ y")

 & ∃y'e'(e' < e & y' < y & praise(e', John, y')) & ∃y'e'(e' < ee & y' < yy &

 criticized(e', Mary, y'))]

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**4. Wide distributivity: what are the generalizations?**

**4.1. Data issue**

Moltmann (1992): wide (nonlocal) distributivity available only with special plural expressions, e.g., relational adjectives or other expressions

Schmitt (2019): wide distributivity is always available

**4.2. Locality of distributivity**

Generally, the distributive reading of simple plurals is restricted to the minimal clause containing the plural:

(54) John and Mary believe that Bill read these two books.

Standard view predicts clause-boundedness of the distributive reading

Distributive readings of simple plurals due to a general property of verb meanings:

(55) For any two-place predicate V, if V(xx, yy) and V(xx', yy'), then V(xx+xx’, yy+yy’).

**4.3. Relational adjectives make broad distributivity possible**

NPs with relational adjectives such as *same, different, equal, related* and *neighboring* may receive a non-clause­bound distributive interpretation, based on a special syntactic relation that relational adjectives may enter (subject to certain locality conditions):

(56) a. John and Bill want to live in different / neighboring villages.

 b. John and Mary want Sue to learn the same language / related languages

 c. John and Bill expect that they will work in adjacent buildings.

By contrast, no wide distributivity available without relational adjective:

(57) John and Mary expect that they will live in two small villages

Same restriction on wide distributive readings holds for NPs with relational head nouns:

1. a. John and Mary want Sue to visit neighboring countries. (wide distributivity available)

b. John and Bill want Sue to visit neighbors. (no wide distributivity)

**4.4. Wide distributivity and split antecedent constructions**

The same contrasts with implicit coordination sentences:

1. a. John married and Bill proposed to these (two) women. (no split interpretation)

b. John married and Bill proposed to different women. (split interpretation)

1. a. John painted and Bill composed these two masterworks. (no split interpretation)

b. These two masterworks, John painted and Bill composed. (no split interpretation)

c. John painted and Bill composed different / similar masterworks (split interpretation)

*Wh*-plural phrases pattern with other simple plurals:

(61) a. Which two women did John marry and is Bill engaged to?

 b. Which two masterworks did John paint and Bill compose?

Again, plurals with relational head nouns pattern with simple plurals, rather than with NPs modified by relational adjectives:

(62) a. John married and Bill proposed to these two sisters/ two sisters.

b. These two sisters John married and Bill proposed to.

c. Which two sisters did John marry and is Bill engaged to?

**4.5. Wide distributivity and NP-conjunction**

No split reading of simple plurals as arguments of conjoined NPs:

1. a. the editor and the author of these two books

b. the husband and the fiancée of these two women

c. the portrait and the sketch of these two women

 (63a) cannot refer to the editor of one of the two books and the author of the other book; implies that the two books each have an author and an editor.

(63b) is not compatible with monogamous relationships.

(63c) impossible if the portrait represents one woman and the sketch the other woman.

But split interpretation of plurals in conjoined NPs available with relational adjectives:

(64) a. three students and two teachers of different languages / the same language

 b. three members and two vice-chairmen of interlocking committees

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**5. Split antecedent constructions with other plural expressions**

**5.1. Collective adverbials**

(65) a. John *whistled* and Mary *hummed together.*

 b. John *sang* and Mary *played simultaneously / separately / consecutively*

 */independently.*

*One after the other* allows for an implicitly coordinated antecedent, but not *each other* - even in semantically similar constructions:

(66) *John* sang and *Mary* played *one after the other* /\* after *each other's* graduation.

The ability of taking an implicitly coordinated antecedent is syntactically, rather than semantically conditioned!

Generalization

All collective adverbials allow for implicitly coordinated antecedents in English.

**5.2. English reflexive and reciprocal pronouns and split antecedents**

Plural reflexives in picture NPs:

(67) a. *Bill* bought and *John* sold pictures of *themselves.*

 b. *John* saw and *Bill* wants to see *themselves* sleep.

Simple reflexives and reciprocals do not allow for an implicitly coordinated antecedent:

(68) \* *Bill* admired and *Mary* despised *themselves.*

(69) a. *Bill* bought and *John* sold pictures of *each other.*

 b. *John* saw and *Bill* wants to see *each other* sleep.

Plural reflexives in *picture*-NPs may also take split antecedent without coordination :

(70) *John* showed *Mary* pictures of *themselves.*

Plural possessive pronouns allow for implicitly coordinate antecedents:

(71) *John* lost and *Bill* found *their* key.

**5.3. *A total of* with split antecedents**

(72) a. John painted and Mary drew ten pictures.

 b. John painted and Mary drew *a total of* ten pictures.

 c. John painted and Mary drew ten pictures in all.

(73) a. a composer and a painter of ten masterworks

 b. a composer and a painter of *a total of* ten masterworks

Like relational adjectives, *a total of* differs from simple plurals in that it enters a special syntactic relation for its interpretation.

(74) ten(the xx l ∃ee(drew(e, John + Mary, xx) & pictures(xx)}))

Locality constraints:

(75) John and Mary want Sue to see a total of ten pictures.

The semantics of *a total of*

 Partial interpretation on the basis of assignment of small m-planes:

(76) ten(supP({xlEe drew and painted(e, John and Mary, x**)** & pictures(x)}))

Partial interpretation on the basis of assignment of big m­planes

(77) John drew *some of them1* and Mary painted *some of them2.*

Locality constraint on *a total of* must be obeyed by all conjuncts:

(78) \* John painted and Mary wants Sue to paint a total of ten pictures.

**5.4. Binominal *each***

(79) *John and Mary* painted two pictures *each.*

(80) a. John and Mary painted four pictures.

 b. *John* drew and *Mary* painted two pictures *each.*

(81) a. Four pictures were painted by John and by Mary.

 b. Two pictures *each* were painted by *John* and drawn by *Mary.*

(82) a. How many pictures did John draw and Mary paint ?

 b. How many pictures *each* did *John* draw and *Mary* paint?

**5.5. Exception phrases**

Extraposed exception phrases may relate to split quantifier restrictions, both in phrasal clausal conjunctions:

(83) a. every man and every woman except John and Mary/ the parents of Bill

 b. *Every man* entered and *every woman* left *except John and Mary / except the*

 *parents of Bill.*

 c. *No student* may write his dissertation in Latin and *no professor* may lecture in

 *Latin except the ones in Germany.*

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**6. Conclusion**

* Split antecedent constructions require a notion of implicit coordination made (only) available by three-dimensional syntax.
* Three-dimensional syntactic structures can be interpreted compositionally – on the basis of multiple m(meaningful)-plane assignments and their partial interpretations.

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