Recursion in the Semantics of Coordination

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Multiple Coordinations in English

Repeated coordinator:
John or Mary or Bill
talk and sing and dance

Single coordinator:
John, Mary or Bill
talk, sing and dance

In short: RC/SC-coordination.

Paradigms of Coordination

Paradigm I – Monosyndetic coordination:

\[ \text{talk and-sing} \quad \text{or} \quad \text{talk-and sing} \]

SC-coordination often exists, as in English, but not always.

- Tibeto-Burman (Peterson and VanBik 2004):
  farmer market go-and chicken buy-and house return
  “the farmer went to the market, bought a chicken and returned home”

*farmer market go chicken buy-and house return
*farmer market go-and chicken buy house return

Paradigm II – Bisyndetic coordination:

\[ \text{talk-and sing-and} = \text{“talk and sing”} \]

SC-coordination probably does not exist in bisyndetic constructions (Haspelmath 2004):

\[
\begin{align*}
\text{talk-and (sing-and) dance-and} \\
*\text{talk (sing) dance-and}
\end{align*}
\]

Paradigm III – Asyndetic coordination (parataxis/juxtaposition):

\[ \text{talk sing} = \text{“talk and sing”} \]

Conclusion: RC/SC contrasts are cross-linguistically common, though not universal.
Recursion in Syntax – RC-coordination

By (virtual) conceptual necessity:
RC-Coordination involves embedding.

Does it also involve flat structures?

Proposed Answer (in full paper):
Quite Possibly.

Recursion in Syntax – SC-coordination

Is it iteration?
Jackendoff 1977,
Sag et al. 1985…

Or embedding?
Munn 1993,
Johannessen 1998…

Proposed answer: Semantic evidence for iteration.

Recursion in Semantics?

Both flat and embedded structures can do without semantic recursion.

But do they?
Proposed Answer: No – Iterative (flat) structures are interpreted recursively.

Syntax-Semantics of SC-coordination

Talk Plan

1. SC-coordination needs flat syntax-semantics interface.
2. But embedding is sometimes useful.
3. Solution:
Syntax – iterative (flat)
Semantics – recursive (embedded)
In a Nutshell

1) A flat structure
2) Interpret daughters
3) Binary interpretation of $n$-ary coordination
4) Shake-n-Bake or…

$\bigcap (\text{dog}, \bigcap (\text{cat}, \text{mouse}))$
$\bigcap (\text{cat}, \bigcap (\text{dog}, \text{mouse}))$

etc etc…

SC-Coordination – flat Syntax-Semantics

Collective DP conjunctions – RC vs. SC:

✓ (1) Dylan, and Simon and Garfunkel wrote many hits in the 60s. (Hoeksema 1988)

✗ (2) Dylan, Simon and Garfunkel wrote many hits in the 60s. (Winter 1998, 2001)

(2) Dylan, Simon and Garfunkel wrote many hits in the 60s.

SC-Coordination – flat Syntax-Semantics

Wide scope conjunction:

(3) Here you’re not allowed to dance and (to) stamp your feet.

Wide Scope Conjunction

Narrow Scope Conjunction

SC-Coordination – flat Syntax-Semantics

Wide scope conjunction – RC vs. SC:

✓ (4) Here you’re not allowed to sing aloud, and dance and stamp your feet.

✗ (5) Here you’re not allowed to sing aloud, dance and stamp your feet.
SC-Coordination – flat Syntax-Semantics

Adverbs of alternation:
(6) John’s swagger alternately bemused, and/?Φ irritated and infuriated his soldiers.

DP-internal Conjunction:
(7) This Batman film features every foe, and/?Φ friend and colleague he ever faced.

Left-subordinating and: (Culicover and Jackendoff 2005)
(8) You drink another can of beer and I’m leaving.
(9) You drink another can of beer, and/?Φ Bill eats more pretzels and I’m leaving.

Embedding is useful – Partee and Rooth

Extensional+Extensional Transitive Verbs:
(1) Mary found and ate a fish.
   (a) There is a fish that Mary found and ate.
   (b) ?Mary found a fish and ate a fish.

Deriving Narrow Scope and:
[found and ate] [a fish]
AR(found and ate))(a fish) (Argument Raising)

Intensional+Extensional Transitive Verbs:
(2) Mary sought and found a fish.
   Mary sought a fish (de dicto) and found a fish.

Deriving Wide Scope and:
[sought and found] [a fish]
(sought and AR(found))(a fish)
Embedding is useful – SC-coordination

**ITV + 2 x ETV:**

(3) Mary sought, found and ate a fish.

Mary sought a fish (de dicto) and then [found and ate] a fish.

(4) John needed, bought and wore a coat.

(5) Sue ordered, got and used a new PC.

Embedding is useful – *n*-ary semantics fails!

[sought, found and ate]

N-ary analysis:

\[ \text{and}_3 (\text{sought}, \text{AR(}f\text{ound}), \text{AR(a}te)) \]

= sought a fish, found a fish and ate a fish

⇒ Back to P&R’s problem!

But a binary analysis would work fine:

(sought and AR(found and ate))

= sought a fish, [and found a fish and ate it]

How can we get a binary interpretation in a trinary structure?

Recursive Semantics of Iterated Structures

Hypothesis: Any coordinator, also an *n*-ary one, is a direction to use the respective binary operation (recursively) on the conjuncts.

\[
\text{and}_n (x_1, x_2, \ldots, x_n) = \text{and}_2 (x_1, \text{and}_{n-1} (x_2, \ldots, x_n))
\]

[sought, found and ate]:

\[\land (\text{sought}, \land (\text{found, ate})) \] (a fish)

A critical assumption: AR applies at the same semantic level where *and* is interpreted.

Other examples for such operators?

Recursive Semantics of Iterated Structures

Predicate distributivity:

(1) The girls met in the bar and had a glass of beer.

(Dowty 1986, Roberts 1987, Lasersohn 1995)

meet and D(have a glass of beer)

(2) Every Sunday at 4 O’clock, Mary and Sue have a sandwich, drink a glass of milk or build a raft together.

One of two conditions holds every Sunday:

(i) Mary has a sandwich or drinks a glass of milk, and Sue has a sandwich or drinks a glass of milk.

(ii) Mary and Sue build a raft together.
Recursive Semantics of Iterated Structures

(2) Every Sunday at 4 O’clock, Mary and Sue have a sandwich, drink a glass of milk or build a raft together.

N-ary analysis:

\[ \text{or}_3(D(\text{have sandwich}), D(\text{drink milk}), \text{build raft}) \]

- Mary and Sue do the same thing
  \[ \Rightarrow \text{A too weak interpretation} \]

But a binary analysis would work fine:

\[ D(\text{have sandwich or drink milk}) \text{ or build raft} \]

\[ \Rightarrow \text{universal scope over disjunction, as needed} \]

Non-Recursive Semantics of Iterative Struct.

Dylan, Simon and Garfunkel wrote many hits in the 60s.

Boolean Hypothesis: Collectivity with DP conjunction is *syntactically* triggered.

(Winter 1998, 2001)

Either:

(\text{full collectivity})

Or:

(\text{full distributivity})

But not “mixed” collectivity.

Remarks

I - Semantic composition is non-directional:

(1) Mary and Sue have a sandwich, build a raft together or drink a glass of milk.
  (distribution over a non-constituent disjunction)

II - R-type coord. allows S-type interpretation:

(2) Mary and Sue have a sandwich or build a raft together or drink a glass of milk.
  (distribution over a non-constituent R-type disjunction)

(3) \( A \mid (\text{and}) B \mid \text{and} C \)

\( ^*A \mid \text{and} B \mid \text{or} C \)

(4) Between \( A \) and \( B \) and \( C \)

Summary

1. When the semantics gets a series of denotations generated by a flat (iterative) syntactic mechanism, it can still glue them recursively using embedding.

2. But in many cases the hierarchical syntax-semantics interface gives no chance for semantic embedding.

This allows us to distinguish purely-semantic operators from operators at the syntax-semantics interface.
References


