

# An inflexible semantics for cross-categorial operators

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## 1 Introduction

**Question:** to what extent can one lexical item be associated with multiple meanings?<sup>1</sup>

- Are there lexical items that are **systematically ambiguous**?

**Experiment:** suppose every lexical item has exactly **one** meaning.

- The meaning of an expression dictates the meaning of its arguments.
  - E.g. a one-place predicate (*laugh*) requires one entity as argument:
    - (1) a. John laughed.
    - b. \*saw laughed
- So, if every expression is unambiguous, a given expression should always occur with the same kind of argument(s).
  - *Blick* would not be possible:
    - (2) a. [<sub>TP</sub> **blick** [<sub>TP</sub> John saw every student]].
    - b. John saw [<sub>DP</sub> **blick** [<sub>DP</sub> every student]].

**But:** “cross-categorial“ operators show the surface distribution of *blick* — e.g. *and*, *only*.

- (3) a. [<sub>TP</sub> John saw every student] and [<sub>TP</sub> Mary saw every professor].
  - b. John saw [<sub>DP</sub> every student] and [<sub>DP</sub> every professor].
- (4) a. John only [<sub>VP</sub> learned one language].
  - b. John learned only [<sub>DP</sub> one language].
- Natural language semantics seems to allow for flexibility/ambiguity (Montague 1973, Partee & Rooth 1983, Rooth 1985, Keenan & Faltz 1985, Winter 2001)

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⇒ **This talk: despite appearances, the semantics is inflexible.** ⇐

(5) **The Semantic Inflexibility Hypothesis ('SIH')**

Cross-categorical operators have a uniform semantics.

- *And* and *only* always underlyingly operate on sentence meanings.
- The syntax and phonology create a surface illusion of cross-categoriality.

**Roadmap for the talk:**

1. Semantic flexibility over-generates cross-categorical operators.  
→ E.g. *yesterday* should be cross-categorical, but isn't.
2. A case study on apparent conjunction of object quantifiers, e.g. (3-b).  
→ *And* conjoins hidden vPs (sentential meaning).
3. Extension to *only* when it precedes an object DP, e.g. (4-b).  
→ *Only* is interpreted at the vP, too.

## 2 Semantic flexibility over-generates

**What *and* and *only* have in common:** they can operate on sentence meanings.

(3-a) [[<sub>TP</sub> John saw every student] [and [<sub>TP</sub> Mary saw every professor]]]

(4-a) John<sub>1</sub> [<sub>vP</sub> only [<sub>vP</sub> t<sub>1</sub> learned one language]]

**Partee & Rooth (1983), Rooth (1985):** generalize to a systematic theory of ambiguity.

- Take an operator that applies to sentence meanings, and derive from it a family of related meanings taking different kinds of arguments (more later).

⇒ **Any operator that can compose with sentence meanings should be cross-categorical.**

**Observe:** many operators can compose with sentence meanings.

- Conjunctions: *and, or*
- Negation: *not*
- Focus operators: *only, even, too, ...*
- Other additive: (*again*)
- Sentential adverbs: *yesterday, fortunately, necessarily, possibly, ...*
- Modals: *might, must, ...*

**But:** few of these operators are cross-categorial.

- **Class 1:** able to appear with a DP.

– *And, or, only, even*, possibly negation.

- **Class 2:** unable to appear with a DP.

– Temporal adverb: *yesterday*.

- (6) a. Yesterday, John talked to Chomsky.  
b. \*John talked to yesterday Chomsky.<sup>2</sup>

– Modal adverb: *possibly*.

- (7) a. John possibly climbed the tallest mountain in Ireland.  
b. John climbed possibly the tallest mountain in Ireland.

→ (7-b) is grammatical, but  $\neq$  (7-a) (Bogal-Allbritten 2014).

→ By Partee & Rooth's mechanism, these should be equivalent.

– Additive operator: *again*.

- (8) a. John flew off to Paris again.  
b. \*John flew off to again Paris.

– Modal: *might*.

- (9) a. John might go to the party.  
b. \*John went to might the party.

**Possible response:** all Class 2 operators can semantically compose with the DP, but other constraints rule out them DP-adjoining.

- **Take here:** the generalization is different ...

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<sup>2</sup>E.g. Ross (1967), Bresnan (1976), Stowell (1981).

## I propose we take Class 2 seriously as support for the SIH:

- Operators that apply to sentences *uniformly* apply to sentences – so, the large set of Class 2 operators make sense.

**We are led to a hypothesis about the more restricted Class 1 set:** for any “cross-categorical” operator, the syntax must create underlying structures where that operator composes with sentential meanings.

- I.e. Class 1 = Class 2, obscured by the syntax/phonology.

**Focus of the talk:** an extended argument for this view from a case study on *and*.

### 3 Zeroing in on conjunction

**How (3-a) and (3-b) are analyzed in Partee & Rooth (1983):**

- (3) a.  $[_{TP}$  John saw every student] and  $[_{TP}$  Mary saw every professor].  
b. John saw  $[_{DP}$  every student] and  $[_{DP}$  every professor].

- In (3-a), *and* operates on truth-values, parallel to  $\wedge$  of propositional logic.

(10)  $(p \wedge q)$  is true iff  $p$  is true and  $q$  is true.

(11)  $\llbracket \text{and} \rrbracket = \lambda p_t . \lambda q_t . p = q = 1$

– This is the **basic meaning** for *and*.

- In (3-b), another meaning is invoked, **derived** from the basic meaning:

(12)  $\llbracket \text{and}_2 \rrbracket = \lambda Q_{et,t} . \lambda Q'_{et,t} . \lambda f_{et} . \llbracket \text{and} \rrbracket (Q(f))(Q'(f))$

(13) a.  $\llbracket \text{and}_2 \rrbracket (\llbracket \text{every student} \rrbracket) (\llbracket \text{every professor} \rrbracket)$   
b.  $= \lambda f_{et} . \forall x [\text{student}(x) \rightarrow f(x)] \wedge \forall y [\text{professor}(y) \rightarrow f(y)]$

–  $\llbracket \text{and}_2 \rrbracket$  composes with a quantifier to output a new quantifier.

– Quantifier output in (13): “every student is an f and every professor is an f”.

- Note:  $\llbracket \text{and}_2 \rrbracket$  is one of a family of systematically derived meanings:

(14) **One-place predicates of individuals**

- John is [<sub>A</sub> happy] and [<sub>A</sub> healthy].
- $\llbracket \text{and}_3 \rrbracket = \lambda f_{et} . \lambda g_{et} . \lambda x . \llbracket \text{and} \rrbracket (f(x))(g(x))$

(15) **Two-place predicates of individuals**

- John [<sub>V</sub> hugged] and [<sub>V</sub> pet] the dog.
- $\llbracket \text{and}_4 \rrbracket = \lambda f_{e,et} . \lambda g_{e,et} . \lambda x . \lambda y . \llbracket \text{and} \rrbracket (f(x)(y))(g(x)(y))$

**Case study:** dissect ex. like (3-b), where *and* occurs between object quantifiers.

- **Preview:** despite appearances, *and* underlyingly operates on truth-values.  
 → *And* is interpreted as  $\llbracket \text{and} \rrbracket$ , not  $\llbracket \text{and}_2 \rrbracket$ .

**Two steps to the argument:**

1. There is an available parse with hidden structure in the second conjunct.
  - I.e. a **Conjunction Reduction** ('CR') parse with *and* as  $\llbracket \text{and} \rrbracket$ .
2. Evidence there is no additional parse with *and* conjoining the DPs as  $\llbracket \text{and}_2 \rrbracket$ .

**4 Step 1: CR with  $\llbracket \text{and} \rrbracket$  is available**

**Classic CR:** all conjunction is underlyingly full clausal (e.g. Ross 1967, Hankamer 1970).

(3-b)  $\llbracket \llbracket_{TP} \text{John saw every student} \rrbracket \llbracket \text{and} \llbracket_{TP} \text{John saw every professor} \rrbracket \rrbracket$

- This is not empirically viable, e.g. from Partee (1970):

- (16)
- Few rules are both explicit and easy to read.
  - Few rules are explicit and few rules are easy to read.  $\neq (16-a)$
  - Few rules are explicit and it's easy to read few rules.  $\neq (16-b)$

**Proposal to be developed for (3-b):** underlying *vP* conjunction:

(3-b)  $\llbracket \llbracket_{TP} \text{John T} \llbracket \llbracket_{vP} t_1 \text{ saw every student} \rrbracket \llbracket \text{and} \llbracket_{vP} t_1 \text{ saw every professor} \rrbracket \rrbracket \rrbracket$

- With the VP Internal Subject Hypothesis, *vPs* denote truth-values; *and* =  $\llbracket \text{and} \rrbracket$ .

**Goal:** empirical and conceptual arguments that *vP*-level CR is **productively available**.

- Adding to observations of CR in other constructions, e.g.:
  - Aoun, Benmamoun, & Sportiche (1994, 1999) on Lebanese/Moroccan Arabic.
  - Schwarz (1998, 1999, 2000) on German *und*; English *either ... or*.
  - Vicente (2010), Toosarvandani (2013) on corrective *but*.

#### 4.1 A first probe for hidden structure: adverbs

**Observe:** *yesterday* can precede an apparent DP conjunct (cf. Collins 1988):

(17) John saw Labov and, **yesterday**, Chomsky.

**Main point:** no viable structure for (17) with direct DP conjunction.

**Recall from earlier:** *yesterday* **cannot** generally adjoin to DPs.

- (18) a. \*John saw yesterday you.  
b. \*John talked to yesterday Chomsky.

**Yet:** *yesterday* is clearly adjoined in the second conjunct in (17).

- In (17), *yesterday* scopes inside the second conjunct:

- (19) a. (17)  $\not\Rightarrow$  John saw Labov yesterday.  
b. (17)  $\Rightarrow$  John saw Chomsky yesterday.

- The pattern replicates in minimal pairs to (18).

- (20) a. John saw me and yesterday you.  
b. John talked to Labov and, yesterday, Chomsky.

**Result:** there must be parse with the second conjunct more than just a DP.

- If the second conjunct were just a DP, *yesterday* would illicitly DP-adjoin:

(21) [<sub>TP</sub> John<sub>1</sub> [<sub>vP</sub> t<sub>1</sub> saw [<sub>&P</sub> [<sub>DP</sub> Labov] [and [<sub>DP</sub> yesterday [<sub>DP</sub> Chomsky]]]]]]

- *vP*-level CR would give a viable structure:

(22) [<sub>TP</sub> John<sub>1</sub> [<sub>&P</sub> [<sub>vP1</sub> t<sub>1</sub> saw Labov] [and [<sub>vP</sub> yesterday [<sub>vP2</sub> t<sub>1</sub> saw Chomsky]]]]]]

## 4.2 From gapping to $\nu$ P-level CR

**This empirical result dovetails with a conceptual result:** CR as  $\nu$ P conjunction “follows for free” from independent syntactic mechanisms.

- **Proposal:** the mechanism for **gapping** derives CR.
- Extending Wilder (1994), Schwarz (1998, 1999, 2000), Toosarvandani (2013).

**Observe:** a descriptive parallel between the adverb data and gapping:

- In gapping, the second conjunct contains two elements: a subject and object.
- In the adverb data, the second conjunct contains two elements: an adverb and object.

- (23) John saw every student and Mary every professor. (*gapping*)  
(17) John saw Labov and, yesterday, Chomsky. (*adverb*)

**Further:** the descriptive parallel is not specific to examples with an adverb:

- In gapping, the verb is pronounced only once.
- In apparent DP conjunction, the subject and verb are pronounced only once.

- (23) John saw every student and Mary ~~saw~~ every professor. (*gapping*)  
(3-b) John saw every student and ~~John~~ ~~saw~~ every professor. (*CR*)

### The mechanism for gapping

- Johnson (1996, 2009; after Siegal 1987): **gapping =  $\nu$ P conjunction.**

- (24) **Step 1:  $\nu$ Ps are conjoined**  
[<sub>TP</sub> T [ <sub>$\nu$ P</sub> John saw every student] [and [ <sub>$\nu$ P</sub> Mary saw every professor]]]]

- (25) **Step 2: *John* moves to spec-TP out of the left conjunct**<sup>3</sup>  
[<sub>TP</sub> John<sub>1</sub> T [ <sub>$\nu$ P</sub> t<sub>1</sub> saw every student] [and [ <sub>$\nu$ P</sub> Mary saw every professor]]]]

- To derive the surface string, I assume, after Coppock (2001), Lin (2002):

- (26) **Step 3: *every professor* moves out of the VP**  
[<sub>TP</sub> John<sub>1</sub> T [ <sub>$\nu$ P</sub> t<sub>1</sub> saw every student] [and [ <sub>$\nu$ P</sub> Mary [<sub>VP</sub> saw t<sub>2</sub>] every professor<sub>2</sub>]]]]

<sup>3</sup>Step 2 appears to violate the Coordinate Structure Constraint (CSC; Ross 1967), but Johnson suggests that A-movement is immune to the CSC. For further discussion of this issue, see e.g. Lin (2001, 2002).

- (27) **Step 4: the VP elides**  
 [<sub>TP</sub> John<sub>1</sub> T [<sub>vP</sub> t<sub>1</sub> saw every student] [and [<sub>vP</sub> Mary [<sub>VP</sub> saw t<sub>2</sub>] every professor<sub>2</sub>]]]]

**Extension to CR**

- **Observe:** combining gapping with across-the-board ('ATB') movement yields CR.

- (28) **Step 1: vPs are conjoined**  
 [<sub>TP</sub> T [<sub>vP</sub> John saw every student] [and [<sub>vP</sub> John saw every professor]]]]

- (29) **Step 2: John ATB moves to spec-TP out of both conjuncts**  
 [<sub>TP</sub> John<sub>1</sub> T [<sub>vP</sub> t<sub>1</sub> saw every student] [and [<sub>vP</sub> t<sub>1</sub> saw every professor]]]]

- (30) **Step 3: every professor moves out of the VP**  
 [<sub>TP</sub> John<sub>1</sub> T [<sub>vP</sub> t<sub>1</sub> saw every student] [and [<sub>vP</sub> t<sub>1</sub> [<sub>VP</sub> saw t<sub>2</sub>] every professor<sub>2</sub>]]]]

- (31) **Step 4: the VP elides**  
 [<sub>TP</sub> John<sub>1</sub> T [<sub>vP</sub> t<sub>1</sub> saw every student] [and [<sub>vP</sub> t<sub>1</sub> [<sub>VP</sub> saw t<sub>2</sub>] every professor<sub>2</sub>]]]]

- **Result:** CR derives as an epiphenomenon of gapping + ATB-movement.

**Next:** further empirical evidence for CR, in order to:

- Corroborate that CR is available in adverb data (Case 1).
- Show that CR is also available without adverbs (Case 2).
- Show that CR is vP-level, not full clausal (Case 3; important later).

### 4.3 Case 1: ellipsis in an adverbial clause

**Consider first:** structures with and without CR for a basic data point:

- (32) Harvard invited Labov and Chomsky.
- (33) **CR: the second conjunct contains a  $vP$**   
 $[_{TP} \text{Harvard}_1 T [_{vP} t_1 \text{ invited Labov}] [\text{and } [_{vP} t_1 \text{ invited Chomsky}]]]$
- (34) **No CR: the second conjunct is just a DP**  
 $[_{TP} \text{Harvard}_1 T [_{vP} t_1 \text{ invited } [_{\&P} [_{DP} \text{Labov}]] [\text{and } [_{DP} \text{Chomsky}]]]]]$

**Prediction to test:** the VP *invited Chomsky* — present in (34), but not (33)— should be available to serve as antecedent to license ellipsis of another VP.

- A VP can elide only when an “appropriate antecedent” for the elided VP is present in the linguistic context (e.g. Sag 1976, Williams 1977).

- (35) **Antecedence requirement (working definition)**  
 $VP_e$  can elide if the linguistic context provides an antecedent  $VP_a$  such that, for any variable assignment  $g$ ,  $\llbracket VP_e \rrbracket^g = \llbracket VP_a \rrbracket^g$ .

**Testing strategy:** introduce into (32) an **adverbial clause** containing an elided VP.

- (36) Harvard invited Labov and, ten years after Brandeis did  $\Delta$ , Chomsky.  
 $\rightarrow \Delta = \text{invited Chomsky}$
- (37) “Harvard invited Labov and — ten years after Brandeis invited Chomsky — invited Chomsky, too.”

- Because (36) is felicitous out of the blue, the antecedent for  $\Delta$  must be **intra-sentential**.

**With CR:** the extra  $vP$  structure predicts an intra-sentential antecedent.

- (38) a.  $[_{TP} \text{Harvard } \lambda 1 [_{\&P} [_{vP} t_1 \text{ invited Labov}] [\text{and } [_{vP} [_{CP} \dots(38-b)\dots] [_{vP} t_1 [_{VP1} \text{ invited Chomsky}]]]]]$   
 b.  $[_{CP} \text{ten years after } [_{TP} \text{Brandeis}_F \lambda 2 [_{vP} t_2 [_{VP2} \text{ invited Chomsky } \Delta]]]]]$   
 $\rightarrow VP_1 = \text{invited Chomsky} = \Delta; VP_1 = \text{intra-sentential antecedent!}$

**Without CR:** there is no intra-sentential antecedent.

- The only VP present is *invited Labov and Chomsky*  $\neq \Delta$ .

#### 4.4 Case 2: split scope

**Prediction to test:** CR should be available **without** an adverb in the second conjunct.

- We've so far looked at examples with a simple adverb *yesterday* and a complex adverbial clause *ten years after Brandeis did*.

**Diagnostic for CR without adverbs: scope.**

- *And* can scope at a different height than the DPs it seems to conjoin. This is consistent with CR, but not expected if *and* =  $\llbracket \text{and}_2 \rrbracket$  and conjoins the DPs.

**The split scope signature:**

(39) John refused to visit any city in Europe and any city in Asia.

– Scope operators are: *refused*, *and*, *any city in Europe*, *any city in Asia*.

- **Observe:** the DPs scope **below** *refuse*, *and* scopes **above** *refuse*.

(40) **Paraphrase of (40)**

J refused to visit any city in Europe and he refused to visit any city in Asia.

(41) *And* > *refuse* > *any city in Europe, any city in Asia*

$$\neg \exists w' \in W(J)(w_0) [\exists x [x \text{ is a city in Europe in } w' \wedge J \text{ visits } x \text{ in } w']]$$

$$\wedge \neg \exists w'' \in W(J)(w_0) [\exists y [y \text{ is a city in Asia in } w'' \wedge J \text{ visits } y \text{ in } w'']]$$

→ NPI *any* traps the DPs *any city in Europe/Asia* in the scope of *refuse*.

→ *And* is an intervener for NPI licensing,<sup>4</sup> so must out-scope *refuse*.

**Split scope signature:** *And* scopes above some operator and the DPs *and* apparently conjoins scope below that same operator (replicates with *or*; Rooth & Partee 1982).

**The split scope signature is not restricted to NPIs:** Split scope replicates with a range of embedded nominals. A second example:<sup>5</sup>

(42) This plant is easy to take care of! It needs little water and little sunlight.

<sup>4</sup>Linebarger (1987), Guerzoni (2006)

<sup>5</sup>Thanks to Irene Heim for pointing out this datum.

- Assumption: *little* decomposes into *not* + *much*. (cf. Büring 2007, Heim 2008)

(43) This plant needs little water.

(44) **Scope in (43): *not* > *need* > *much***

- It's not the case that this plant needs much water.
- $\neg\forall w' [w' \in N(p)(w_0) \rightarrow \text{the plant receives much water in } w']$

- Scope in (42) is split: *and* scopes above *need*; the *much* component of *little* below.

(45) ***and* > *not* > *need* > *much***

- It's not the case that this plant needs much water and it's not the case that this plant needs much sunlight.
- $\neg\forall w' [w' \in N(p)(w_0) \rightarrow \text{the plant receives much water in } w']$   
 $\wedge \neg\forall w'' [w'' \in N(p)(w_0) \rightarrow \text{the plant receives much sunlight in } w'']$

**With CR:** split scope is predicted.

- **Needed:** a mechanism for *and* to scope higher than the DPs — which CR provides.
- **Ingredient 1:** *and* scopes above *refuse*.

(46)  $[_{TP} \text{ John } \lambda 1 T [_{\&P} [_{vP1} t_1 \text{ refused PRO to visit any city in Europe}]$   
 $[\text{and } [_{vP2} t_1 \text{ refused PRO to visit any city in Asia}]]]]$

- An available CR structure has the vPs *refused to visit any city in Europe* and *refused to visit any city in Asia* conjoined.

- **Ingredient 2:** the quantifiers scope below *refuse*.

(47)  $[_{TP} J \lambda 1 T [_{\&P} [_{vP1} t_1 \text{ refused } [_{TP} [_{DP} \text{ any city in Europe}] \lambda 2 [_{TP} \text{ PRO to visit } t_2]]]$   
 $[\text{and } [_{vP2} t_1 \text{ refused } [_{TP} [_{DP} \text{ any city in Asia}] \lambda 3 [_{TP} \text{ PRO to visit } t_3]]]]]]]$

- The quantifiers take scope within the conjuncts, below *refuse*.

**With  $[[\text{and}_2]]$  operating on DPs:** split scope is not predicted.

(48) John refused to visit  $[_{\&P} [_{DP} \text{ any city in Europe}] [\text{and } [_{DP} \text{ any city in Asia}]]]$

(49)  $[[\&P]]^w = [[\text{and}_2]](\llbracket \text{any city in Europe} \rrbracket^w)(\llbracket \text{any city in Asia} \rrbracket^w)$   
 $= \lambda f_{et} . \exists x [x \text{ is a city in Europe in } w \wedge f(x)]$   
 $\wedge \exists y [y \text{ is a city in Asia in } w \wedge f(y)]$

- The &P is a single quantifier that takes scope as such; because the &P contains both *and* and the quantifiers, they all scope at the same height relative to *refuse*.<sup>6</sup>
- If the &P scopes **above** *refuse*:

(50) **And and the quantifiers all scope above refuse**

$[_{TP} [_{\&P} \text{any city in Europe and any city in Asia}] \lambda 1 [_{TP} \text{J refused } [_{TP} \text{PRO to visit } t_1]]]$

(51) **Predicted: *and* > *any city in Europe, any city in Asia* > *refuse***

$\underline{\exists x} [x \text{ is a city in Europe in } w_0 \wedge \neg \exists w' \in W(J)(w_0) [\text{John visits } x \text{ in } w']]$   
 $\wedge \underline{\exists y} [y \text{ is a city in Asia in } w \wedge \neg \exists w'' \in W(J)(w) [\text{John visits } x \text{ in } w'']]$

“*There is some city in Europe that John refused to visit, and there is some city in Asia that John refused to visit.*”

→ This reading is unavailable: the NPIs must be in the scope of *refuse*.

- If the &P scopes **below** *refuse*:

(52) **And and the quantifiers all scope below refuse**

$[_{TP} \text{J refused } [_{TP} [_{\&P} \text{any city in Europe and any city in Asia}] \lambda 1 [_{TP} \text{PRO to visit } t_1]]]$

(53) **Predicted: *refuse* > *and* > *any city in Europe, any city in Asia***

$\underline{\neg \exists w' \in W(J)(w_0)} [\underline{\exists x} [x \text{ is a city in Europe in } w' \wedge \text{John visits } x \text{ in } w']]$   
 $\wedge \underline{\exists y} [y \text{ is a city in Asia in } w' \wedge \text{John visits } y \text{ in } w']]$

“*What John refused was for there both to be some city in Europe that he visits and some city in Asia that he visits.*”

→ This reading is also unavailable: the NPIs are in the scope of *refuse*, but *and* intervenes between *refuse* and the NPIs; *and* blocks NPI licensing.

**Result:** split scope argues for the productive availability of CR without an adverb.

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<sup>6</sup>If *any city in Europe* and *any city in Asia* are taken to have intensional types and shifted from  $\langle s, \text{ett} \rangle$  to  $\langle \langle s, \text{ett} \rangle, t \rangle, t \rangle$  by means of the “lift” operation (e.g. Montague 1970, Partee & Rooth 1983, Partee 1987), there is a derivation without CR which can derive split scope. Allowing this derivation, however, leads to problematic predictions in other data. I leave further discussion of this to the question period.

#### 4.5 Case 3: constraints on NPI licensing require $\nu$ P-level CR

**Main point:** the gapping-like analysis of CR predicts constraints on NPI licensing that would not be predicted if conjunction were underlyingly full clausal.

**Recall from Case 2:** NPIs can occur in apparent DP conjunction under *refuse*:

(40) John refused to visit any city in Europe and any city in Asia.

- As seen, this is consistent with underlying  $\nu$ P conjunction:

(54)  $[_{TP} \text{John } \lambda 1 \text{ T } [_{\&P} [_{\nu P1} t_1 \text{ refused PRO to visit any city in Europe}]$   
 $[\text{and } [_{\nu P2} t_1 \text{ refused PRO to visit any city in Asia}]]]]$

– *And* does not intervene between negation and NPI.

- But, this would also be consistent with full clausal conjunction (like all data so far):

(55)  $[_{\&P} [_{TP} \text{John refused PRO to visit any city in Europe}]$   
 $[\text{and } [_{TP} \text{John refused PRO to visit any city in Asia}]]]$

**To decide:** a full clausal parse over-generates, while  $\nu$ P-level CR does not.

- An example showing *and* as an intervener:

(56) \*I didn't drink a cocktail and any soda. (Guerzoni 2006:360)

- **With  $\nu$ P conjunction:** *and* intervenes between *not* and the NPI.

(57)  $[_{TP} I_1 [\text{not } [_{\nu P} t_1 \text{ drink a cocktail}] [\text{and } [_{\nu P} t_1 \text{ drink any soda}]]]]]$

- **With full clausal conjunction:** *and* does not intervene.

(58)  $[[[_{TP} \text{I didn't drink a cocktail}] [\text{and } [_{TP} \text{I didn't drink any soda}]]]]]$

**Result:** (40) requires *some* CR parse; (58) supports  $\nu$ P-level CR in particular.

## 4.6 Concluding Step 1

**Conclusion:** CR is productively available with and without adverbs, and a gapping-like analysis as underlying  $\nu$ P co-ordination is supported.

- CR with an adverb is required: to host *yesterday*, and license ellipsis.
- CR without an adverb is required: to derive split scope readings.
- CR as  $\nu$ P conjunction is required: to explain the distribution of NPIs.

**Consequence:** *and can* be interpreted as  $\llbracket \text{and} \rrbracket$  in apparent DP conjunction.

**Question now:** is a parse with  $\llbracket \text{and}_2 \rrbracket$  available in addition to CR?

## 5 Step 2: Direct DP conjunction with $\llbracket \text{and}_2 \rrbracket$ is unavailable

**Main point:**  $\llbracket \text{and}_2 \rrbracket$  over-generates scope readings (without new stipulations); the data are predicted with CR.

### 5.1 A missing scope reading

**Test case, adapted from Partee & Rooth (1982):**

- (59) Some company hired (both) a maid and a cook.
- (60)  $\checkmark$  *some* > *and*
- a. Some single company hired both a maid and a cook.
  - b.  $\exists x [\text{company}(x) \wedge \exists y [\text{maid}(y) \wedge x \text{ hired } y] \wedge \exists z [\text{cook}(z) \wedge x \text{ hired } z]]$
- (61) *\*and* > *some*
- a. Some company hired a maid and some company hired a cook.
  - b.  $\exists x [\text{company}(x) \wedge \exists y [\text{maid}(y) \wedge x \text{ hired } y] \wedge \exists x' [\text{company}(x') \wedge \exists z [\text{cook}(z) \wedge x \text{ hired } z]]$

### 5.2 The problem for $\llbracket \text{and}_2 \rrbracket$

**If  $\llbracket \text{and}_2 \rrbracket$  is available:** the unavailability of *and* > *some* is surprising.

- The &P is a quantifier:

- (62)  $[_{TP} \text{ some company hired } [_{\&P} [_{DP} \text{ a maid}] \text{ and } [_{DP} \text{ a cook}]]]$

(63)  $\llbracket \text{and}_2 \rrbracket (\llbracket \text{a maid} \rrbracket) (\llbracket \text{a cook} \rrbracket)$   
 $= \lambda f_{e,t} . \exists x [\text{maid}(x) \wedge f(x)] \wedge \exists y [\text{cook}(y) \wedge f(y)]$

- Both readings derive, depending on where the &P takes scope.
  - If the &P QRs **below** *some company*, the available reading derives.

(64)  $[_{TP} \text{ some co. } \lambda 1 \text{ T } [_{vP2} [\&P \text{ a maid and a cook}] \lambda 2 [_{vP1} t_1 \text{ hired } t_2]]]$

- If the &P QRs **above** *some company*, the unavailable reading derives.

(65)  $[_{TP2} [\&P \text{ a maid and a cook}] \lambda 1 [_{TP1} \text{ some co. } \lambda 2 [_{vP} t_2 \text{ hired } t_1]]]$

- Object universal quantifiers can scope above a subject existential:

(66) Some company hired every applicant.  
 $\checkmark [\forall y [\text{applicant}(y) \rightarrow \exists x [\text{company}(x) \wedge x \text{ hired } y]]]$  (*every* > *some*)

- So, a new stipulation would be required to block wide scope specifically of an &P.

**But, if  $\llbracket \text{and}_2 \rrbracket$  is unavailable:** the data appear as they are expected to ...

### 5.3 CR predicts the data

**The prediction from CR:**

(67) Scope in apparent DP conjunction should correlate with vP conjunction.

- Scope in (59) is expected, given a vP baseline:

(68) Some company (both) hired a maid and fired a cook.  
 $\rightarrow \checkmark \text{ some} > \text{ and}; * \text{ and} > \text{ some}$

(59) Some company hired (both) a maid and a cook.  
 $\rightarrow \checkmark \text{ some} > \text{ and}; * \text{ and} > \text{ some}$

**How the pattern is accounted for analytically:**

- The available reading follows from ATB-movement:

(69)  $[_{TP} \text{ some company}_1 \text{ T } [_{\&P} [_{vP1} t_1 \text{ hired a maid}] \text{ and } [_{vP2} t_1 \text{ hired a cook}]]]$

- *Some company* in spec-TP scopes over the conjunction of vPs.

- The unavailable reading would require ATB-reconstruction:

(70)  $[_{TP} T [_{\&P} [_{vP1} \text{some co. hired a maid}] \text{ and } [_{vP2} \text{some co. hired a cook}]]]$

- The baseline in (68) shows that ATB-reconstruction is blocked; constraints on ATB-reconstruction are independently analyzed (Moltmann 1992, Fox 2000).

#### A further correct prediction of CR:

- There are cases where ATB-reconstruction is allowed in overt  $vP$  conjunction:

(71) **Overt  $vP$  conjunction, from Fox (2000)**

A soldier is standing in front of every church and sitting beside every mosque.

(72) **Available: *and* > every church, every mosque > a soldier**

$\forall x [\text{church}(x) \rightarrow \exists y [\text{soldier}(y) \wedge y \text{ is standing in front of } x]]$   
 $\wedge \forall x' [\text{mosque}(x') \rightarrow \exists z [\text{soldier}(z) \wedge z \text{ is sitting beside } x']]$

- The judgment is tracked in apparent DP conjunction:

(73) **Apparent DP conjunction; same judgment**

A soldier is standing in front of every church and every mosque.

**Result:** scope data are most easily understood if  $[[\text{and}_2]]$  is *unavailable*; CR predicts the data, given an *independently needed* theory of ATB-reconstruction.

#### 5.4 Concluding the case study

##### Account for the full data set:

- The underlying syntax **can** and **must** have *and* operating at the  $vP$ -level.
- $And = [[\text{and}]]$ ;  $[[\text{and}_2]]$  is unavailable — **as the SIH predicts.**

**Observe:** Partee's (1970) datum is not a counter-example to  $vP$ -level CR:

(74) Few rules are both explicit and easy to read. (*few > and, \*and > few*)

(75)  $[_{TP} \text{few rules}_1 T [\text{both } [_{vP} t_1 \text{ are explicit}] \text{ and } [_{vP} t_1 \text{ are easy to read}]]]$

- *Few* in spec-TP scopes above the conjunction of  $vPs$ .
- As seen, ATB-reconstruction is heavily restricted.

**Scaling up:** recall: with semantic flexibility, *and* has a family of other meanings (e.g.  $\llbracket \text{and}_3 \rrbracket$  for *happy and healthy*,  $\llbracket \text{and}_4 \rrbracket$  for *hugged and pet*).

- Since all derive from *the same mechanism*, no  $\llbracket \text{and}_2 \rrbracket \Rightarrow$  questioning  $\llbracket \text{and}_3 \rrbracket$ , ...
- Schein (forthcoming): takes *and* to compose with sentence meanings in *all* cases.

## 6 Prospects of extending to *only*

**Recall:** *only*, like *and*, shows a cross-categorial distribution:

- (76) a. John only  $[_{VP}$  learned ONE language].  
 b. John learned only  $[_{DP}$  ONE language].

- **Basic meaning:** applies to a proposition.

$$(77) \quad \llbracket \text{only} \rrbracket(\text{ALT}) = \lambda p_{st} . \lambda w : p(w) . \forall p' \in \text{ALT} [p'(w) \rightarrow p \subseteq p']$$

– Presupposes truth of  $p$  ('prejacent'); negates non-weaker alternatives.

- **Possible derived meaning:** composes with a quantifier to yield a new quantifier.

$$(78) \quad \llbracket \text{only}_2 \rrbracket(\text{ALT}) = \lambda Q_{est,st} . \lambda f_{e,st} . \lambda w . \llbracket \text{only} \rrbracket(\text{ALT})(Q(f))(w)$$

- Pre-DP *only* appears to invoke  $\llbracket \text{only}_2 \rrbracket$  — but, there's again more going on ...

**Main point:** like with *and*, when *only* occurs with a DP, it need not semantically compose with that DP as  $\llbracket \text{only}_2 \rrbracket$  — the data receive an analysis if *only* =  $\llbracket \text{only} \rrbracket$ .

### 6.1 Split scope

A split scope signature like that with *and* replicates with *only*: *only* may scope at a different height than a DP it appears to compose with (cf. von Stechow & Iatridou 2007).

**Background:** the scope of pre-DP *only* is ambiguous (Taglicht 1984).

- (79) John is required to learn only Spanish.
- a. “The requirement is that John learn only Spanish.” (*require* > *only*)  
 b. “The only requirement is that John learn Spanish.” (*only* > *require*)

**Split scope** arises when the DP is a quantifier:

(80) John is required to learn only one language.

(81) **Available:** *only* > *require* > *one language*

a. “The only requirement is that John learn any one language.”

b. ONLY  $[\forall w' \in R(\text{John})(w_0) [\geq 1x [\text{lang}(x)(w') \wedge \text{John learns } x \text{ in } w']]]$

• Split scope does not derive if  $[[\text{only}_2]]$  composes with the DP to create a new quantifier:

– If *only one language* scoped **below** *require*:

(82)  $[_{TP} \text{John}_1 \text{ is required } [_{TP} \text{PRO}_1 \text{ to } [[_{DP} \text{only one lang}]_2 [_{VP} t_1 \text{ learn } t_2]]]]$

(83) **Predicted:** *require* > *only* > *one language*  $\neq$  (81)

“The requirement is that John learn only one language.”

– If *only one language* scoped **above** *require*:

(84)  $[_{TP} \text{John}_1 \text{ is } [[_{DP} \text{only one lang}]_2 [_{VP} t_1 \text{ required } [_{TP} \text{PRO} \text{ to learn } t_2]]]]$

(85) **Predicted:** *only* > *one language* > *require*  $\neq$  (81)

“For only one particular language x is John required to learn x.”

## 6.2 Ellipsis

**Ellipsis (or *do so* anaphora) corroborates scope split:**

• A VP with *only* preceding the object DP can serve as antecedent to license ellipsis of another VP without *only* — *V only DP* can be antecedent for  $\forall \text{DP}$ .

(86) To be considered for tenure, you have to publish only three articles. This year, everyone did (so)  $\Delta$ . Unfortunately, only the professor who published ten articles actually got tenure.

–  $\Delta = \text{published at least three articles}$ .

– Antecedent = *published only three articles ...?*

• Despite appearances, the semantic contribution of *only* must be made outside the antecedent VP, while *three articles* is interpreted inside.

**Result:** like with *and*, appearances are deceiving; *only* need not compose with a DP as  $[[\text{only}_2]]$  when it apparently adjoins to that DP.

## 7 Sketching an analysis

**Hypothesis:** When *only* is pre-DP, the interpreted operator is still  $\llbracket \text{only} \rrbracket$ , at the  $vP$ .

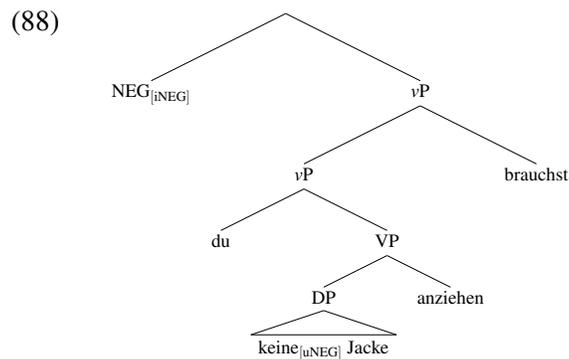
- CR does not extend past *and* — so, what is the syntax of *only*?

**Reference point:** another case of split scope outside conjunction.

- Negative indefinites in e.g. German: (Bech 1955, Jacobs e.g. 1982)

(87) ... weil du **keine** Jacke anziehen brauchst  
 ... because you no jacket wear need  
 ‘You don’t need to wear a jacket.’ ( $\neg > \text{need} > \exists$ )

- Penka (2011):



- Negation is an abstract operator at the  $vP$ ; *keine* is not itself negative.
- *Keine* is spelled out due to Agreement with NEG
- Zeijlstra (2008) proposes a similar analysis for negative concord.

**A similar approach to *only*, following Lee (2004) on Korean; Bayer (2016):**

- Pre-DP *only* is not semantically “only”, it is Agreement with covert interpreted ONLY.

**A bipartite structure for focus:** cf. Horvath (2007), Cable (2008, 2010).

(89) [... [ONLY<sub>[iONLY]</sub> [<sub>vP</sub> ... [... only<sub>[uONLY]</sub> ... [... *wh* ...] ...] ...]]]

- Two heads: one at the  $vP$ , the other more local to the focus, linked by Agree.
- Higher head: ONLY is interpreted as  $\llbracket \text{only} \rrbracket$ .
- Lower head: *only* is Agreement morphology (take to be semantically inert).

**The full range of data observed earlier are now captured:<sup>7</sup>**

- (90) a. John learned only ONE language.  
 b. [John<sub>1</sub> [ONLY [<sub>vP</sub> t<sub>1</sub> learned [only one<sub>F</sub> language]]]]
- Taglicht's ambiguity: ONLY can adjoin to the embedded or matrix vP.
- (79) John is required to learn only Spanish.
- (91) **Deriving require > only**  
 [<sub>TP</sub> J<sub>1</sub> is [<sub>vP</sub> t<sub>1</sub> required [<sub>TP</sub> PRO<sub>1</sub> to [ONLY [<sub>vP</sub> t<sub>1</sub> learn [only Spanish<sub>F</sub>]]]]]]]
- (92) **Deriving only > require**  
 [<sub>TP</sub> J<sub>1</sub> is [ONLY [<sub>vP</sub> t<sub>1</sub> required [<sub>TP</sub> PRO<sub>1</sub> to [<sub>vP</sub> t<sub>1</sub> learn [only Spanish<sub>F</sub>]]]]]]]
- Split scope: ONLY adjoins to the matrix vP; (*only*) *one language* stays below *require*.
- (81) John is required to learn only one language.
- (93) **Deriving only > require > one language**  
 [J<sub>1</sub> is [ONLY [<sub>vP</sub> t<sub>1</sub> required [PRO<sub>1</sub> to [[only one<sub>F</sub> lang]<sub>2</sub> [<sub>vP</sub> t<sub>1</sub> learn t<sub>2</sub>]]]]]]]

**Bipartite structure appears to occur overtly in other languages: Vietnamese:**

- (94) Nam **chi** mua **moi** [cuon sách]. (Höle 2013, Erlewine 2013)  
 Nam only<sub>1</sub> buy only<sub>2</sub> CL book  
 'Nam only bought one book.'

– Two heads, each with different phonology.

**Results for *only* converge with *and*:** in both cases, the syntax obscures a uniform semantics when they appear with object quantifiers.

- **With *and*:** vP-level CR makes [[and]]+vP look like [[and<sub>2</sub>]]+DPs.
- **With *only*:** Agreement makes [[only]]+vP look like [[only<sub>2</sub>]]+DP.

<sup>7</sup>Note that certain analyses of *only* adopt a different basic meaning than [[only]]. For instance: (a) Wagner (2006) i.a. takes *only* always to be a two-place operator. This *only* still composes with the DP in *only DP* so faces a challenge with split scope. (b) von Stechow & Iatridou (2007) propose a decomposition of *only* into negation and an exceptive (similar to e.g. French *ne ... que ...*). That is a kind of bipartite structure and I believe their proposal could be integrated with the present one (with some modification to capture the ellipsis fact in (86)). I leave discussion of this to the question period.

## 8 Conclusion

**At the heart of this talk:** the division of labor between semantics and other modules.

- Does cross-categoriality = **semantic flexibility**?
- Or, is **the semantics uniform** with cross-categoriality a surface phenomenon created by mechanisms which obscure **the underlying syntax**?

**This talk:** evidence for a uniform semantics, with surface cross-categoriality.

- Semantic flexibility over-generates cross-categorial operators.  
→ E.g. *yesterday* should be cross-categorial, but isn't.
- A case study on apparent conjunction of object quantifiers, e.g. (3-b).  
→  $\llbracket \text{and} \rrbracket$  can and must conjoin hidden  $\nu$ Ps;  $\llbracket \text{and}_2 \rrbracket$  is unavailable.
- Extension to *only* when it precedes an object DP, e.g. (93-b).  
→ Is interpreted as  $\llbracket \text{only} \rrbracket$  at the  $\nu$ P.

⇒ This talk initiates a broad research program to pursue the SIH.

**If the SIH holds, implications for the syntax/semantics interface include:**

1. A more uniform semantics = a more powerful tool for predicting syntax.
2. Arbitrating between theories of displacement.

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