

Locality, Event-Construal & Extraction: Evidence from Language Processing

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1 Introduction

The plot:

1. Present Two views on the relationship between event construal and extraction
2. Test the views with extraction from coordinate structures
3. Report psycholinguistic evidence supporting an indirect relationship

Central question:

What is the relationship between event construal and extraction patterns?

1. **Direct:** This relationship is encoded into a constraint on extraction:

Wh-questions carry a presupposition that the minimal constituent containing the head and the foot of the chain describes a single event. Wh-movement is permitted only if the denotation of that minimal constituent can be construed accordingly. Truswell (2006)

2. **Indirect:** This relationship is epiphenomenal, arising from the interaction of other constraints.

- (a) *Syntax-Semantics Correspondence*: One event per clause
Multiple ways to spell this idea out:

- i. Constraint imposed by **Viewpoint Aspect**, which marks the transition from events to intervals (Kratzer, 1998, 2002; Smith, 1991), can only quantify over single, self-connected events.
- ii. Reflects a more general cognitive restriction on how we divide up objects and events in the world, e.g. **The Counting Principle**: A counting domain cannot contain non-identical overlapping individuals. (Casati and Varzi, 1999; Kratzer, 2002; Spelke, 2003)

- (b) *Structural Constraint on Extraction*: relevant constraint may be dependent on construction

- i. Locality constraint on extraction
- ii. Configurational constraints

2 Coordination

The coordinate structure constraint (CSC):

In a coordinate structure, no conjunct may be moved, nor may any element contained in a conjunct be moved, out of that conjunct. Ross (1967)

- (1) John plays the piano and sings showtunes.
 - a. * What did John play ... and sing showtunes?
 - b. * What showtune did John play the piano and sing ...?
- Many apparent exceptions to the CSC (Deane, 1991; Goldsmith, 1985; Kehler, 2002; Lakoff, 1986; Na and Huck, 1992; but see Postal, 1998 for a response).
- Two exceptions that Ross noted:
 1. **Across the Board Movement**: In a coordinate structure, the same constituent may be extracted from within the conjuncts simultaneously.
 2. **Pseudo-coordination**: Coordination of a light verb (*go, come, run, etc.*) and a lexical verb.

The plot spoiler:

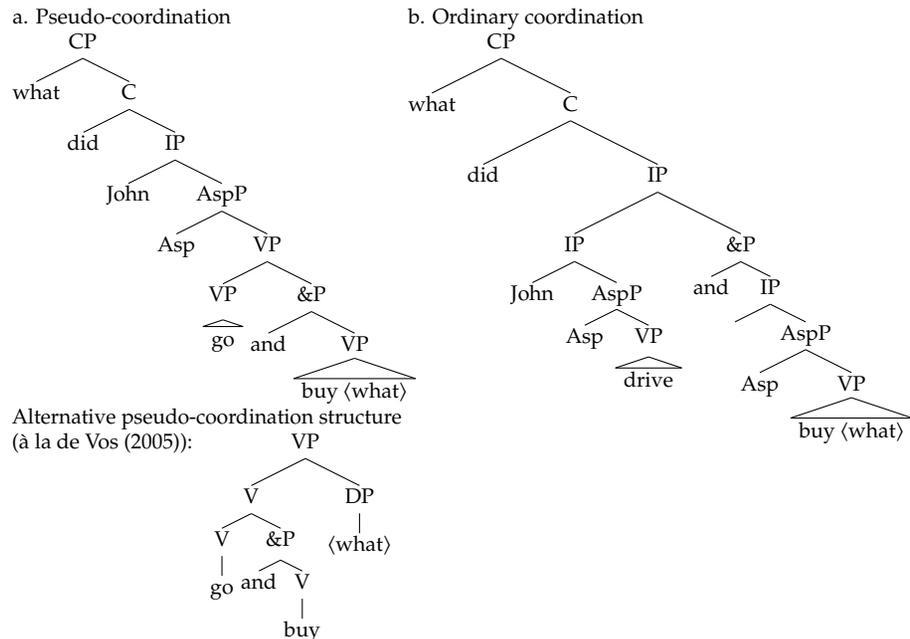
- By syntax-semantics correspondence, height of coordinator matters for event construal:
 1. If coordinate low within a clause (VP-coordination), coordination must describe a single event.
 2. If coordinate high (clausal coordination), then coordination describes multiple events.
- By locality, clause number matters for extractability.
Additional assumptions:
 - The coordination in pseudo-coordination is genuine coordination, not just idiomatic, despite preferring an 'inceptive' sense.
 - Light verbs in pseudo-coordinations appear as V heads (de Vos, 2005).
 - Coordination is adjunction, as in Munn (1993).

Coordination type	Event number	Clause number	& Height	Extraction?
i. Pseudo	1	1	Low (VP)	✓
ii. Ordinary	2	2	High (IP)	*
iii. Ambiguous	1/2	1/2	depends	depends

Table 1: Properties of different kinds of coordination

- (2) **Pseudo-coordination:** coordination of a light verb and a lexical verb.
- John went and bought some whiskey
 - * John both went and bought some whiskey (Single event)
 - What did John go and buy ...? (Extraction OK)
- (3) **Ordinary coordination:** coordination of two lexical verbs
- John drove and bought some whiskey
 - John both drove and bought some whiskey (Multiple events)
 - What did John drive and buy ...? (Extraction *)
- (4) **Ambiguous coordination:** coordination of a light verb with a PP and a lexical verb
- John went to the store and bought some whiskey
 - John both went to the store and bought some whiskey (Multiple events possible)
 - * What did both John go to the store and buy ...? (Extraction * if 2 events)

(5) Tree representations for two kinds of coordination:



3 Experiments

Experiment 1. QUESTION: Will extraction from pseudo-coordinated structures be rated higher than extraction from similar biclausal structures? ANSWER: Yes!

- 20 participants, 24 quartets, rated in an offline acceptability judgment task. Participants rated materials on a scale of 1 to 7 (highest).

	Cond	Verb	Subordinator	Rating(SDs)
(6) What did the electrician	Light	go	and	5.23(1.05)
	LightPP	go in the attic	and	4.77(1.30)
	LexPP	crawl in the attic	and	3.68(1.29)
	LexPurp	crawl in the attic	to	4.03(1.50)

... repair after his afternoon coffee?

- Results:** Significant differences between conditions by subjects, $F_1(3, 19) = 18.27, p < 0.001$, and by items, $F_2(3, 19) = 13.49, p < 0.001$.
- As expected:** Light, LightPP > LexPP, LexPurp ($p < 0.001$)
- But:** Results are broadly consistent with both direct and indirect accounts.

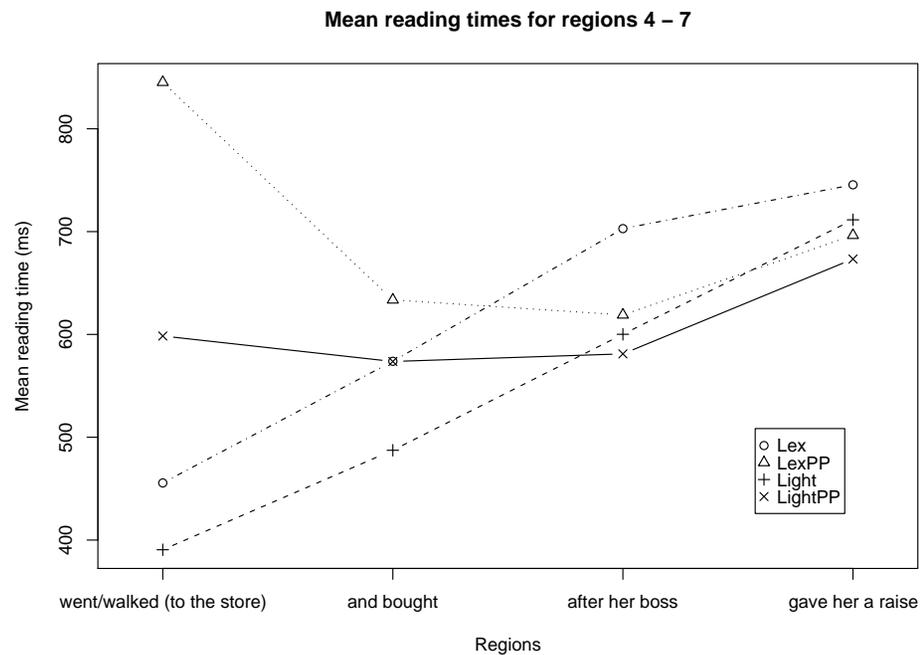
Experiment 2. QUESTION: Is there evidence that coordination must be reanalyzed from a monoclausal structure to a biclausal one when it describes multiple events? ANSWER: a (cautious) yes...

- The direct account predicts:** Coordinations describing multiple events must be reanalyzed as biclausal coordinations. The reanalysis cost will be apparent in measurements of online processing.
- The indirect account predicts:** No reason to expect that any *structural* reanalysis should take place, since pragmatic construal of events is what's at issue. At most, expect a cost for items that are less plausibly one event.
- Method:** 60 UMass undergraduates participated in an online self-paced moving window task testing 24 quartets, crossing the first conjunct verb (Light vs. Lexical) and presence of preposition (\pm PP).

- (7) /₁ Abby loved her new computer./₂ It was the one /₃ that she/₄ ...
- | | |
|------------------------|---------|
| A. went | Light |
| B. went to the store | LightPP |
| C. walked | Lex |
| D. walked to the store | LexPP |
- ... /₅ and bought ... /₆ after her boss /₇ gave her a raise./

Predictions.

- Differences between conditions will emerge on Region 4 and following.
- Can't really interpret region 4, because of frequency and length confounds.
- Light, LightPP conditions should be comparatively easy to process since they are consistent with the preferred monoclausal structure.
- Lex, LexPP conditions should be comparatively difficult to process, since (a) they must be reanalyzed as biclausal structures, and (b) gaps for the wh-filler cannot be felicitously posited in either conjunct.



Results.

CONDITION	RESULT	INTERPRETATION
Light	shortest reading times	easiest to process
LightPP	longer times on reg 4 and spillover	effects of PP in reg 4
Lex	longer times on reg 5 onwards	effects of reanalysis
LexPP	longer times on reg.s 4 and 5	early cost of assigning an implausible gap* and attempt to reanalyze

* The long reading times on the initial conjunct of the LightPP is consistent with findings that PPs or other items that tend to mark end of phrases may force the parser to assign a gap in that region (Bourdages, 1992; Pickering et al., 1994), as in ... *walked the computer to the store.*

Analysis.

	Predictor	Value	Std.Error	t-value	
Region 5	(Intercept)	547.61	16.20	33.80	***
	verblight	-64.65	15.93	-4.06	***
	preppp	72.01	15.92	4.52	***
	verblight:preppp	3.61	22.54	0.16	
Region 6	(Intercept)	652.19	21.20	30.77	***
	verblight	-69.53	18.77	-3.70	***
	preppp	-50.77	18.74	-2.71	**
	verblight:preppp	45.92	26.44	1.74	.
Region 7	(Intercept)	714.15	23.19	30.79	***
	verblight	-20.89	21.05	-0.99	
	preppp	-43.69	21.02	-2.08	*
	verblight:preppp	-8.37	29.81	-0.28	

Table 2: **Details of analysis.** Discarded scores above three standard deviations, resulting in < 2% loss/condition. Verbs in the Light/LightPP condition had much higher frequencies than those in the Lex/LexPP condition and could not be included in the model (colinearity violation). The length of Region 4 varied enough and so was computed in the model, with no significant effects in regions of interest, and thus was eliminated from the model. Linear Mixed-Effects models with Subjects & Items as random effects. '***' $p < 0.001$; '**' $p < 0.01$; '*' $p < 0.05$; '.' p is marginal.

- Processing effects provide initial evidence for structural differences between different kinds of coordination
 - Pseudo-coordination structures, including ambiguous coordinations, elicit shorter reading times in extraction environments
 - Could the increased reading times be due to plausibility effects? Unlikely, but not impossible. No apparent reason why *walk to the store* is less plausible than *go to the store*.
- Since there is evidence that a syntactic factor mediates the relationship between event-construal and extraction, the results can be taken as evidence for an indirect account.

Take home points

1. The relationship between events and extraction is indirect, in that – although single clauses encode single events – extraction is sensitive to structural differences, rather than the event descriptions themselves.
2. Evidence for structural differences was supported by the results of an online self-paced reading experiment.

4 Reflections

QUESTIONS: What role did locality really play in this account? Could we get by without it?

- In a sense, all I've argued that we should conclude from the experimental work is (a) that pseudo-coordination and ordinary coordination are structurally different, and (b) these structural differences reflect differences in event interpretation.
- The locality constraint was meant to account for the idea that extraction from ordinary coordinations are typically judged as degraded or ungrammatical.
- Could it be that the relevant constraint has to do with coordination itself? One view:
 - Light verbs (by stipulation) may be coordinated with other verbs to form a single event. In this case, conjunction is non-Boolean (see Krifka (1990) for discussion). Such verbs are truly intransitive.
 - Lexical verbs, even similar verbs of motion, cannot be so combined. Tense and Aspect heads must appear above each event in order to situate the event in time. As such, coordination is forced to be high and coordination is Boolean.
 - Could now stipulate that in Boolean conjunctions the conjuncts must be **Parallel**, in that they must be of the same type and contain a gap. Ordinary coordinations are bad for reasons independent of locality: (a) if they take the intransitive sense, they violate Parallelism and (b) if they obey parallelism, the gap in the first conjunct is filled with an implausible argument.

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References

- Johanne S. Bourdages. Parsing complex NPs in French. In Helen Goodluck and Micael Rochemont, editors, *Island Constraints*, pages 61–87. Kluwer Academic Publishers, The Netherlands, 1992.
- Roberto Casati and Achille C. Varzi. *Parts and Places. The Structures of Spatial Representation*. MIT Press, Cambridge, MA, 1999.
- Mark de Vos. *The syntax of pseudo-coordination in English and Afrikaans*. PhD thesis, Landelijke Onderzoekschool Taalwetenschap, The Netherlands, 2005.
- Paul D. Deane. Limits to attention: A cognitive theory of island phenomena. *Cognitive Linguistics*, 2: 1–63, 1991.
- John Goldsmith. A principled exception to the coordinate structure constraint. In P. Kroeber W. Eilfort and K. Peterson, editors, *Papers from the Twenty-First Regional Meeting*, volume 21, pages 133–143. Chicago Linguistic Society, 1985.
- Andrew Kehler. *Coherence, Reference, and the Theory of Grammar*. CSLI, Stanford, CA, 2002.
- Angelika Kratzer. The event argument and the semantics of verbs. Manuscript, University of Massachusetts-Amherst, 2002.
- Angelika Kratzer. More structural analogies between pronouns and tenses. In *Proceedings of SALT VII*, Ithaca, 1998. Cornell University.
- Manfred Krifka. Boolean and non-boolean 'and'. In László Kalman and László Pólos, editors, *Papers from the Second Symposium on Logic and Language*, pages 161–188, Akadémiai Kiadó, Budapest, 1990.
- George Lakoff. Frame semantic control of the coordination structure constraint. In *CLS 22: Papers from the Parasession on Pragmatics and Grammatical Theory*, number 2, pages 152 – 167, Chicago, 1986. Chicago Linguistic Society.
- Alan Boag Munn. *Topics in the Syntax and Semantics of Coordinate Structures*. PhD thesis, University of Maryland, College Park, College Park, Maryland, 1993.
- Younghee Na and Geoffrey J. Huck. On extracting from asymmetrical structures. In G. Larson D. Brentari and L. Macleod, editors, *The Joy of Grammar: A Festschrift in Honor of James D. McCawley*, pages 251–274. John Benjamins., Amsterdam/Philadelphia, 1992.
- Martin J. Pickering, Stephen B. Barton, and Richard Shillcock. Unbounded dependencies, island constraints and processing complexity. In Charles Clifton Jr., Lyn Frazier, and Keith Rayner, editors, *Perspectives on sentence processing*, pages 199–224. Erlbaum, London, 1994.
- Paul M. Postal. *Three Investigations of Extraction*. MIT Press, Cambridge, MA, 1998.
- John Robert Ross. *Constraints on Variables in Syntax*. PhD thesis, MIT, Cambridge, MA, 1967. Published as *Infinitive Syntax*. Norword, NJ: Ablex (1986).
- Carlota Smith. *The Parameter of Aspect*. Kluwer Academic Press, Dordrecht, 1991. 2nd edition, 1997.
- Elizabeth S. Spelke. What makes us smart? core knowledge and natural language. In Dedre Gentner and Susan Goldin-Meadow, editors, *Language and Mind: Advances in the Study of Language and Thought*, pages 277–311. MIT Press, Cambridge, MA, 2003.
- Robert Truswell. *Locality of Wh-Movement and the Individuation of Events*. PhD thesis, University College London, London, UK, 2006.