



THE UNIVERSITY *of* EDINBURGH

Edinburgh Research Explorer

## Mechanisms for interaction: Syntax as procedures for online interactive meaning building

### Citation for published version:

Kempson, R, Chatzikyriakidis, S & Cann, R 2016, 'Mechanisms for interaction: Syntax as procedures for online interactive meaning building: Commentary on Christiansen and Chater "The Now-or-Never Bottleneck: A Fundamental Constraint on Language"', Behavioral and Brain Sciences, vol. 39, e79. <https://doi.org/10.1017/S0140525X15000849>

### Digital Object Identifier (DOI):

[10.1017/S0140525X15000849](https://doi.org/10.1017/S0140525X15000849)

### Link:

[Link to publication record in Edinburgh Research Explorer](#)

### Document Version:

Peer reviewed version

### Published In:

Behavioral and Brain Sciences

### General rights

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

### Take down policy

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact [openaccess@ed.ac.uk](mailto:openaccess@ed.ac.uk) providing details, and we will remove access to the work immediately and investigate your claim.



<Commentary Kempson et al. on Christiansen & Chater [BBS 38, 2015]>

## **Mechanisms for interaction: Syntax as procedures for online interactive meaning building**

Ruth Kempson,<sup>a</sup> Stergios Chatzikyriakidis,<sup>b</sup> and Ronnie Cann<sup>c</sup>

*<sup>a</sup>Philosophy Department, King's College London, Strand, London, WC2R 2LS, United Kingdom; <sup>b</sup> Department of Philosophy, Linguistics and Theory of Science, Research Fellow, 41124 Gothenburg; <sup>c</sup>Linguistics and English Language, School of Philosophy, Psychology and Language Sciences, University of Edinburgh, Edinburgh EH8 9AD, Scotland.*

**ruth.kempson@kcl.ac.uk**  
**stergios.chatzikyriakidis@gu.se**  
**r.cann@ed.ac.uk**

**<http://www.kcl.ac.uk/artshums/depts/philosophy/people/staff/associates/emertus/kempson/index.aspx>**  
**<http://www.stergioschatzikyriakidis.com/contact.html>**  
**<http://www.lel.ed.ac.uk/~ronnie/>**

**Abstract:** We argue that to reflect participant interactivity in conversational dialogue, the Christiansen & Chater (C&C) perspective needs a formal grammar framework capturing word-by-word incrementality, as in Dynamic Syntax, in which syntax is the incremental building of semantic representations reflecting real-time parsing dynamics. We demonstrate that, with such formulation, syntactic, semantic, and morpho-syntactic dependencies are all analysable as grounded in their potential for interaction.

<C-Text begins>

Following their observation of a Now-or Never bottleneck on cognitive processing and a Chunk-and-Pass constraint to overcome this hurdle, Christiansen & Chater (C&C) set the challenge that existing grammars be evaluated in terms of commensurability with their claim that language itself should be seen in processing terms. Directly in line with their perspective is Dynamic Syntax (DS), in which syntax is a set of mechanisms for online building of semantic representations used in both production and perception (Cann et al. 2005; 2007; Kempson et al. 2001; 2011). These mechanisms involve anticipatory specifications of structure relative to some other structure as context, with the need for subsequent update, thus achieving the desired tightly time-constrained interpretation process. As codevelopers of DS, we suggest three points of comparison between DS and

the construction-grammar (CoG) perspective which C&C envisage: (1) incrementality; (2) the parsing-production interface; (3) lack of structural universals specific to language.

Though C&C stress the importance of incrementality of both parsing and production, given that CoG defines syntax as stored construction-types, somehow learned as wholes, it is not clear what basis this provides for the word-by-word incrementality displayed in conversation. In informal dialogue, participants can interrupt one another at any point, effortlessly switching roles. These switches can split any syntactic and semantic dependencies distributing them across more than one participant: In the following examples, number 1 involves a syntactic split between preposition and noun, and between infinitive and controlling subject; and number 2 involves a morpho-syntactic dependency split (*have* plus past participle) and a syntactic/semantic dependency split (reflexive and local antecedent).

1. A: We're going to –  
B: Burbage to see Granny.
2. A (seeing B emerging from a smoke-filled kitchen): Are you OK? Have you –  
B (interrupting): burnt myself? No fortunately not.

Such data, despite being widespread in conversation, pose severe challenges to conventional syntactic assumptions, including CoG, because the fragments are characteristically not induced as independently licensed by the grammar and even the sequence may not be well-formed, as in example number 2. Furthermore, it is hard to see how C&C's account of such interactions, given a Levelt-like characterisation of production as the inverse of parsing, can match the required level of granularity.

In contrast, such data follow as an immediate consequence of the DS view of syntax. Speakers and hearers both use the defined tree-growth mechanisms to construct a representation of what is being said, taking the immediate context as input: The only difference between them is the additional requirement on speakers that the construction process has to be commensurate with some more richly annotated (possibly incomplete) structure corresponding to what they have in mind. This dynamic predicts that switching from parsing to production, and the converse, will be seamless, yielding the effect of in-tandem construction without needing to invoke higher levels of inference (Poesio & Rieser 2011) or superimposed duplication of the one type of activity upon the other (Pickering & Garrod 2013b). Each individual will simply be constructing the emergent structure relative to the context he or she has just constructed in his or her other capacity (Gregoromichelaki et al. 2011; 2013). Despite DS commitment to word-by-word incrementality, interpretation can be built up with apparent delays, because language input invariably encodes no more than partial content specifications, allowing subsequent enrichment.

The result is, as C&C say, that there will no encapsulated, specifically linguistic, universals; these will be grounded in general constraints on online cognitive processing. However, this should not be taken as denying the existence of universals, for a robust set of structural universals are predicted as dictated by limits imposed by logical and processing constraints in combination. Consider the syntactic puzzle precluding multiple

long-distance dependencies. Within DS, semantic representations as trees are defined as sets of nodes, each of which is uniquely identified in terms of its position relative to other nodes in the tree (Blackburn & Meyer-Viol 1994). This restricts emergent tree growth to transitions which meet this characterisation. The effect is to freely license multiply building any one node, while ensuring that no such multiple actions give rise to distinguishable output. In the case of left-periphery effects, where on the DS account, nodes can be constructed as not yet fixed (“unfixed”) within the current domain, nothing precludes such an action being repeated. However, such multiple applications of this strategy will invariably give rise to one and the same node, yielding a well-formed result as long as attendant attributes are compatible: hence, the restriction precluding multiple long-distance dependency. Verb-final languages, with their as-yet unfixed arguments, might seem apparent counterexamples; but here, the Chunk-and-Pass constraint provides an answer: Case specifications on an unfixed node are taken to induce an immediate update of that node to a locally fixed relation, allowing another construction of an unfixed node again with potential from its case specifications for update in anticipation of the following verb. The supposed counterexample of NP NP NP V sequences in verb-final languages thus merely demonstrates the interaction of logic-based and processing-based constraints, in turn accounting for typological observations such that verb-final languages are typically case-marking (Kempson & Kiaer 2010).

This constraint extends to language change, further bolstering the overall perspective (Bouzouita & Chatzikyriakidis 2009). As C&C observe, language change commonly involves prosodic reduction of adjacent items leading to composite grammaticalised forms. On the DS view, such novel creations would reflect what had earlier been discretely triggered sequences of update actions, now with the novel composite form triggering this sequence of update actions as a single macro induced by that form. Accordingly, we expect such grammaticalised forms to reflect whatever general limits are imposed by intersections of logic and processing constraints (see Chatzikyriakidis & Kempson [2011] for arguments that weak [clitic] pronoun clusters in Greek constitute such a case). In short, DS buttresses C&C’s claims about language as a mechanism for progressive construction of information-bearing units. Despite much variation across languages, synchronic and diachronic, the C&C program promises to enable formally characterisable perspectives on language directly matching the dynamics of language behaviour in interaction.

<C-Text ends>

## References

- Blackburn, S. & Meyer-Viol, W. (1994) Linguistics, logic and finite trees. *Bulletin of Interest Group in Pure and Applied Logics* 2:3–29. [RK]
- Bouzouita, M. & Chatzikyriakidis, S. (2009) Clitics as calcified processing strategies. In: *Proceedings of LFG09, City, ST, Month 2009*, pp. 189–207, ed. M. Butt & T. Holloway-King. CSLI Press.  
[http://www.stergioschatzikyriakidis.com/uploads/1/0/3/6/10363759/lfg09bouzouitac\\_hatzikyriakidis\\_2.pdf](http://www.stergioschatzikyriakidis.com/uploads/1/0/3/6/10363759/lfg09bouzouitac_hatzikyriakidis_2.pdf)
- Cann, R., Kempson, R. & Marten, L. (2005) *The dynamics of language: An introduction*. Elsevier (now published by Emerald Insight Publishers) [RK]

- Cann, R., Purver, M. & Kempson, R. (2007) Context and wellformedness: The dynamics of ellipsis. *Research on Language and Computation* 5:333–58. [RK]
- Chatzikiyiakidis, S. & Kempson, R. (2011) Standard modern and Pontic Greek person restrictions: Feature-free dynamic account. *Journal of Greek Linguistics* 10:127–66. <http://www.stergioschatzikiyiakidis.com/> [RK]
- Gregoromichelaki, E., Kempson, R., Howes, C. & Eshghi, A. (2013) On making syntax dynamic: the challenge of compound utterances and the architecture of the grammar. In: *Alignment in communication: Towards a new theory of communication*, ed. I. Wachsmuth, J. de Ruiter, P. Jaecks & S. Kopp, pp. 57–86. John Benjamins. [RK]
- Gregoromichelaki, E., Kempson, R., Purver, M., Mills, G., Cann, R., Meyer-Viol, W. & Healey, P. (2011) Incrementality and intention-recognition in utterance processing. *Dialogue and Discourse* 2:199–33. Available at: <http://elanguage.net/journals/dad/article/view/363>.
- Kempson, R., Gregoromichelaki, E. & Howes, C. (2011) *The dynamics of lexical interfaces*. CSLI Press.
- Kempson, R. & Kiaer, J. (2010) Multiple long-distance scrambling: Syntax as reflections of processing. *Journal of Linguistics* 6:127–92.
- Kempson, R., Meyer-Viol W. & Gabbay, D. (2001) *Dynamic syntax: The flow of language understanding*. Blackwell.
- Pickering, M. & Garrod, S. (2013b) How tightly are production and comprehension interwoven? *Frontiers in Psychology* 4:377–92. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3636456/>
- Poesio, M & Rieser, H. (2011) An incremental model of anaphora and reference resolution based on resource situations. *Dialogue and Discourse* 2:235–77.