Optimising the network of complex prepositional locative constructions in French

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Complex locative prepositions (CLPs) denote a relation of location between a trajector, i.e. a located entity, and a landmark, i.e. a reference entity (Langacker 1987: 225–228 ; Gréa 2017). In (1), tableau 'painting' is the trajector, and cheminée 'fireplace' is the landmark.

(1)   Le tableau au-dessus de la cheminée.

        'The painting above the fireplace'

Following Desagulier (2022), and in accordance with the Cognitive Construction Grammar framework (Goldberg 1995, 2006, 2009), all CLP types are hypothesised to be analysable as constructional subschemas. These subschemas are assumed to be part of a consistent multi-level construction network. This network is headed by its most schematic mother node, namely the CLP construction (CLP_{cxn}). Each subschema is expected to impose a specific construal upon the trajector/landmark relation. Therefore, special attention must be paid to the division of labor between CLP_{cxn} subschemas.

The above hypotheses are operationalised in the emerging framework of Distributional Construction Grammar via the study of the joint distributions of CLP_{cxn} subschemas and their collexemes and their projection in a semantic vector space. All occurrences of CLPs are extracted from two fiction corpora: Frantext and Project Gutenberg. 11,371 tokens and 32 types are found.

To sketch the CLP_{cxn} network, the collocational preferences of each subschema are compared using distinctive collexeme analysis (Gries & Stefanowitsch 2004). The most distinctive landmarks are mapped onto a reference semantic vector space using a predictive distributional semantic model: word2vec's SGNS (Mikolov et al 2013). Contour plots indexed on collostructional strength are added onto this reference space to better assess the conceptual area where each CLP operates.

Like all construction networks, the CLP_{cxn} network is subject to internal dynamics (Diessel 2019; Sommerer & Smirnova 2020). At the horizontal level, such dynamics have been typically described in terms of competition, whether simple or extended (Bolinger 1977, De Smet et al. 2018, Traugott 2020), and degeneracy (Van de Velde 2014). Based on how the vector space of CLP_{cxn} is populated, this paper argues for the addition of another organisational principle in the typology of network dynamics: topological optimisation. In other words, the CLP_{cxn} network optimises the distribution of its subschematic nodes so that all the relevant aspects of location, both spatial and figurative, are covered (Fig. 1).

To illustrate optimisation, this paper focuses on CLPs denoting inclusion (Gréa 2017, Author 2022): *à l'intérieur de(s)* 'inside', *au centre de(s)* 'in/at the center of', *au coeur de(s)* 'in/at the heart of', *au sein de(s) 'at the breast/bosom of'*, and *au (beau) milieu de(s)* 'in the middle of'. The network offers two ways of optimizing the expression of internal location. The first involves the complementary occupation of a given part of the functional space, with little overlap (e.g, *à l'intérieur de/au sein de(s)*). The other implies a peaceful coexistence in the same parts of the space (e.g., *à l'intérieur de/au centre de(s)*). Unlike optimisation, competition may not be the default relation between subschematic nodes.
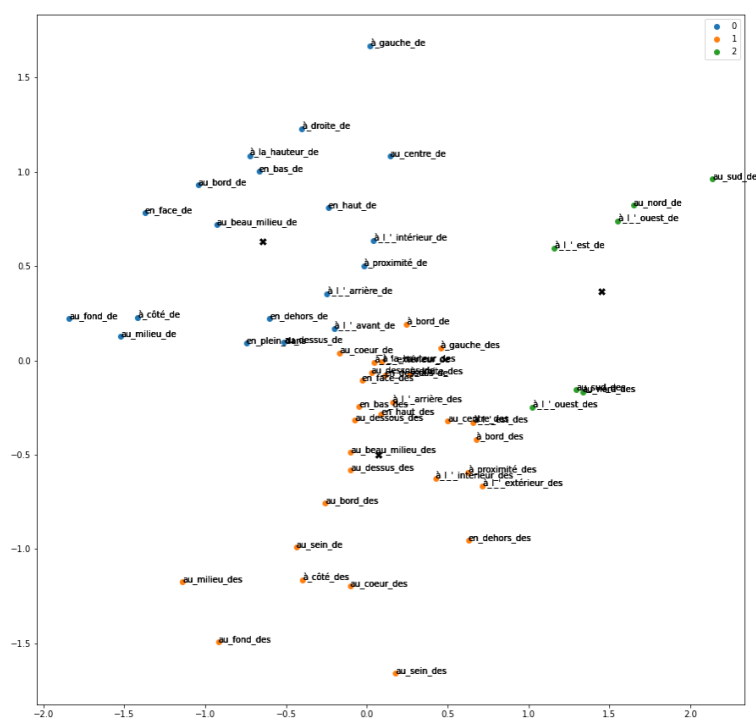
Fig. 1. A simplified t-SNE visualization of French CLPs based on their respective mean SGNS vectors.

References

ATILF. n.d. Base textuelle Frantext (online). ATILF-CNRS & Université de Lorraine. 1998-2023. https://www.frantext.fr/ (accessed June 17, 2022).

Desagulier, Guillaume. 2022. Changes *in the midst of* a construction network: a diachronic construction grammar approach to complex prepositions denoting internal location. *Cognitive Linguistics 33*(2). 339–386.

Diessel, Holger. 2019. *The grammar network: How linguistic structure is shaped by language use*. Cambridge: Cambridge University Press.

Gréa, Philippe. 2017. Inside in French. *Cognitive Linguistics* 28(1). 77–130.

Gries, Stefan. T., & Stefanowitsch, A. (2004). Extending collostructional analysis: A corpus-based perspective on alternations'. *International Journal of Corpus Linguistics*, 9(1), 97-129.

Goldberg, Adele E. 1995. *Constructions: A construction grammar approach to argument structure*. Chicago: University of Chicago Press.

Goldberg, Adele E. 2006. *Constructions at work: The nature of generalization in language*. Oxford & New York: Oxford University Press.

Goldberg, Adele E. 2009. The nature of generalization in language. *Cognitive Linguistics* 20(1). 93–127.

Mikolov, Tomas, Wen-tau Yih & Geoffrey Zweig. 2013b. Linguistic regularities in continuous space word representations. In *Proceedings of NAACL-HLT*, 746–751. Atlanta: Association for Computational Linguistics.

Project Gutenberg. n.d. Accessed June 17, 2022, from www.gutenberg.org.

Sommerer, L., & Smirnova, E. (Eds.). 2020. *Nodes and networks in diachronic construction grammar*. Amsterdam: John Benjamins Publishing Company.