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## Change-of-state verbs in scientific writing across time

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Katrin Menzel  
*Universität des Saarlandes*  
k.menzel@mx.uni-saarland.de

This talk discusses an analysis of change-of-state verbs (*saturate*, *dilute*, etc.) in a diachronic corpus of scientific periodicals (RSC, Fischer et al. 2020). The close relationship between morphosyntactic patterns and semantics helps to identify change-of-state verbs and their contexts. Verbs that involve a change in the composition of an entity often occur in similar morphosyntactic contexts as manner-of-motion verbs in the RSC (e.g. as -ing-participles or gerunds or followed by directional prepositional phrases). Change-of-state verbs typically have an external causer in the RSC as the data contain many experimental reports. Interactive visualizations of word embeddings with groups of semantically similar words provide visual co-occurrence information and are used for identifying groups of related verbs in the data (e.g. change-of-state verbs from experimental contexts in the field of chemistry). To observe whether change-of-state verbs are used in a rather conventionalized or productive way, the number of bits transmitted by these forms, i.e. their surprisal, is measured (cf. Degaetano-Ortlieb & Teich 2017).

The results demonstrate the increasing importance of change-of-state verbs used in conventionalized patterns. Specialization and diversification of the sciences is reflected by the growing complexity of morphosyntactic patterns these verbs occur with and by the increased usage of morphologically more complex change-of-state verbs and their derivations. Such multimorphemic forms encode more information on the word-internal level verbs and often come with high average surprisal values (e.g. *supersaturate*, *undiluted*, *decolorised*, *recrystallizable*).

**References:** • Degaetano-Ortlieb, S., Teich, E. (2017). Modelling Intra-textual Variation with Entropy and Surprisal: Topical vs. Stylistic patterns. In Proceedings of LATECH'17, ACL, Vancouver, 68–77. • Fischer, S., Knappen, J., Menzel, K., Teich, E. (2020). The Royal Society Corpus 6.0: Providing 300+ Years of Scientific Writing for Humanistic Study. In Proceedings of LREC'20, Marseille, ELRA, 794–802.