Some underlying factors of semantic change:  
A large-scale bottom-up distributional approach

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Lexical semantic change is an undeniable and ubiquitous facet of our experience of language, with words acquiring new senses, losing old senses, or developing polysemies, over both short and long time-frames (Newman 2015).

Over the years, linguists have identified some recurring types of semantic change. Some of the major types include change in scope, e.g., widening (Latin caballus ‘nag, workhorse’ > Spanish caballo ‘horse’) or narrowing (hound ‘canine’ > ‘hunting dog’), or in connotation (amelioration or pejoration). However, the systematic search for an explanatory theory of semantic change was largely neglected until Geeraerts (1985, 1992) and Traugott & Dasher (2002), who both claimed that semantic change is overwhelmingly regular, and that semantic change – like language change in general – is rooted in and constrained by properties of human cognition and of language usage.

To date there is no empirically-grounded theory that can explain – or predict – which words are likely to undergo semantic change, and why this is so, across an entire lexicon. In fact, the question posed in this talk – what are the specific properties of words that make them more or less prone to semantic change? – has been almost entirely overlooked in historical linguistic research. Furthermore, most studies of attested pathways of change tend to focus on their descriptive semantics, and have tended to ignore their distributional properties.

We propose a bottom up computational approach to analyze semantic change. This approach learns words’ meanings by their usage context in massive corpora, i.e. Google Books, and using word2vec, a popular distributional semantic model. These types of models capture the words’ distributional properties as vectors which represent their semantic meaning. All subsequent analyses, diachronic or synchronic, are done on these vectors and are based on the model’s property that large differences between the vectors attest to large differences in their meanings, and vice versa. This approach has been fruitfully applied in our previous work (Dubossarsky et al. 2015).

Several independent factors are identified to contribute to diachronic semantic change. First, the degree of prototypicality of a word within its semantic category correlated inversely with its likelihood of change (the “Diachronic Prototypicality Effect”). Second, the word class assignment of a word correlates with its rate of change: verbs change more than nouns, and nouns change more than adjectives (the “Diachronic Word Class Effect”), which we propose may be the diachronic result of an independently established synchronic psycholinguistic effect (the “Verb Mutability Effect”, Gentner & France 1988). Third, we found that mere token frequency does not play a significant role in the likelihood of a word’s meaning to change. A regression analysis shows that these effects complement each other, and together, cover a significant amount of the variance in the data.


