

Modeling lexical semantic shifts during ad-hoc coordination

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1 Meaning shifts in ad-hoc coordination

Coordination is an essential aspect of linguistic communication. First, meaning itself is said to emerge from active coordination between speakers’ communicative intentions and hearers’ expectations (Grice, 1969). Second, speakers use coordination on particular communication instances to settle for specific word meanings and thus overcome possible discrepancies across the generic conceptual representations they associate with words (Clark, 1992, 1996). This active process takes place during every linguistic interaction, allowing speakers’ respective conceptual representations—necessarily grounded in different *background experiences* (Connell and Lynott, 2014)—to ultimately converge to similar ones.

2 A distributional model of coordination

Distributional semantic models of lexical meaning (DSM; Turney and Pantel, 2010; Clark, 2012; Erk, 2012; Lenci, 2018) create lexical representations via latent aggregation of co-occurrence information between words and contexts, but do not distinguish background linguistic stimuli from active coordination in their acquisition process. As such they relegate the latter to an unspecified latent effect within the aggregated data, which is tantamount to considering conceptual representations to remain invariant during communication.

We propose to explicitly distinguish *background experience* from *ad-hoc coordination* within the aggregation pipeline of a DSM. We consider a standard count-based model with PPMI weighting and a dimensionality reduction step involving the top singular vectors of a Singular Value Decomposition (SVD). We control for *background experience* by varying the data fed to the DSM; we implement *ad-hoc coordination* by replacing the variance-preservation bias in the SVD

by an explicit coordination bias, sampling the set of d singular vectors which maximize the correlation with a particular similarity dataset. The core assumption underlying this sampling step is that it is possible for a DSM to capture different kinds of semantic relations from the same corpus, so that rather than generating a *single* meaning space from the SVD matrix, a *collection* of possible meaning spaces could coexist within the same data. Moreover, we posit that the process of aligning similarity judgments across sets of word pairs provides a nice approximation of ad-hoc coordination between two speakers originally disagreeing and ultimately converging to a form of agreement with respect to some lexical decision.

3 Results

Using the above methodology, we make two contributions: first, we show how a DSM construction process can model notions of background experience and coordination. In particular, we demonstrate that replacing the variance preservation bias with an explicit sampling bias actually reduces the variability across models generated from different corpora. This shows how speakers exposed to different linguistic data might nevertheless converge towards some community-agreed meanings.

Second, we show that conceptual spaces produced from different background experiences—modeled as DSMs generated from different corpora—can be aligned in different ways (in particular, by selecting different sets of singular vectors in the SVD). A deeper investigation of this effect suggests that alignment does not necessarily equate conceptual *agreement* but in some cases, mere *compatibility*. We conclude by proposing that coordinating one’s conceptual spaces might simply be the cooperative act of avoiding conflict, rather than being in full agreement.

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