Distinguishing two routes to silent meaning through hemodynamic and electrophysiological techniques

Research on the online composition of sentence meanings has made significant headway in recent years by investigating the processes that comprehenders use to recovery silent meanings. Sentences like “The reporter (1) began/(2) needed the article” both assert an implicit activity (e.g. writing or reading), and previous research has found the recovery of these implicit meanings is costly (McElree, et al., 2001; Traxler, et al. 2002; Delogu, et al., 2010). While these assertions appear to be similar and give rise to similar processing costs, different computations are thought to derive them: (1) requires semantic enrichment via a silent type-shifting operator, while (2) requires syntactic enrichment via a silent verb (Pylkkänen 2008). In this talk, I propose that these computational differences require recruitment of different neural circuits which have been linked to characteristic electrophysiological and hemodynamic responses. I first discuss the different neural responses that have been previously linked to semantic and syntactic processing and then report on some preliminary results from an electrophysiological study and an event-related fMRI study contrasting sentences requiring semantic or syntactic enrichment with unenriched control sentences. The results of these studies suggest that different neural circuits are required to process computationally different silent meanings, providing further evidence that, while similar on the surface, not all implicit meanings are created alike.