Semantic Composition in Autism Spectrum Disorder

Kristin Börjesson

In a series of experiments using MEG, Liina Pylkkänen and colleagues have collected evidence that the neural correlate of the linguistic process of semantic composition is the ventromedial prefrontal cortex (vmPFC) (Pylkkänen and McElree 2007, Pylkkänen 2008, Brennan and Pylkkänen 2008, Pylkkänen et al. 2009a, 2009b, Bemis and Pylkkänen 2011). However, in an fMRI experiment, Husband and colleagues did not find activation of vmPFC for complement coercion, calling into question the hypothesis of the vmPFC as the locus of semantic composition (Husband et al. 2011). Similarly, Kuperberg and colleagues tested complement coercion sentences and pragmatically implausible sentences using EEG (Kuperberg et al. 2010). In both cases they found an N400 as compared to control sentences. However, these N400 components did not differ from one another topographically, thus, also lending support to the hypothesis that the neural generators actually do not differ from one another for the two types of mismatch.

Interestingly – and as Pylkkänen and McElree 2007 note – so far the vmPFC has rather been shown to play a role for social cognition and theory of mind (Rowe et al. 2001). They suggest that “... silent meaning interpretation may share mechanisms with these neighboring domains of cognition.” If that is the case, then one would expect to find difficulties in the processing of silent meanings in people with deficiencies in these domains of cognition, such as people on the autism spectrum. Thus, there are several studies involving tasks such as self vs. other-referencing (Lombardo et al. 2010) or delayed nonmatching to sample (Dawson et al. 1998, 2001, 2002) which suggest dysfunction of the vmPFC in autistic people. However, their processing of sentences involving complement coercion has not been investigated as yet, probably because the emphasis in researching language (use) in autism is mainly on problems with the pragmatics of communication.

With this project, I want to pursue two objectives. On the one hand, I want to contribute to the investigation of the role of the vmPFC in semantic composition, specifically in complement coercion. On the other hand, I want to contribute to the investigation of the linguistic deficits found in autistic individuals, concentrating on the process of semantic composition. I will do this by investigating a population which is characterised by a dysfunction of the vmPFC and which therefore should show difficulties in processing complement coercion: autistic language users.