

**Andrea Santi. McGill University.**  
Saturday, March 29<sup>th</sup>: 4:00-5:00

fMRI Studies of Broca's Area in Sentence Comprehension

Broca's Area has been associated with language since the 1860s, but only relatively more recently has it been associated with syntactic comprehension. In particular, aphasia and neuroimaging studies of healthies have shown that Broca's area (ie, Brodmann Areas (BA) 44 and 45) distinguishes between sentences with subject extraction (ie, **The horse** that ■ is kicking the bear is brown) compared to object extraction (ie, **The horse** that the bear is kicking ■ is brown). While comprehension of object extraction is critically dependent on Broca's area being intact, comprehension of subject extraction is not. Based on these results, functional accounts of Broca's area in sentence comprehension have been formulated that range from verbal Working Memory (WM) to General-Syntactic to Specific-Syntactic. Predictions of these three types of accounts were tested across 2 fMRI studies with healthy subjects. Study I contrasted long-distance argument extraction to another syntactic dependency – Reflexive Binding – while parametrically varying the distance of the dependent elements in both dependencies to test the WM accounts against the syntax-specific one. The results from Study I indicate that Broca's area is sensitive to WM demands in sentences with extraction but not those with Reflexive Binding favoring a syntax-specific account. Study II tested the syntax-specific account against the syntax-general account by investigating fMRI adaptation to the two syntactic complexity factors – extraction type (object vs subject) and relative clause position (center-embedded vs right-branching). While anterior Broca's area (BA 45) adapted to extraction type only, posterior Broca's area (BA 44) adapted to both complexity factors. The results from these studies converge on a functional parcellation of Broca's area, with anterior sections being syntactically specialized and posterior sections being syntactically general.