**Background**

**Pars Opercularis, Verbal Fluency, Social Cognition**

Speech production has been classically attributed to Broca’s area, specifically with the left pars opercularis being important to verbal fluency. Previous fMRI studies have implicated this region in speech initiation. (Xue et al., 2008). Its homologue on the right, the right pars opercularis, has been implicated as part of the human mirror-neuron system. It has been suggested that this system plays an important role in social cognition by providing a neural mechanism for the understanding and imitation of action. Previous findings suggest that volume differences in the right pars opercularis may be strongly linked to differences in empathy competence and performance on a variety of cognitive tasks involving social sensitivity, emotional recognition, and verbal fluency. (Cheng et al., 2009). Other findings have also suggested that the pars opercularis, both left and right, is a system shared by both spoken language and arm gestures (Gentilucci & Volta, 2008; Xue et al., 2008).

**Schizotypal Personality Disorder**

People with schizophrenia have impaired verbal fluency and prosody processing. SPD is epidemiologically linked to schizophrenia, and SPD subjects exhibit similar language and social deficits.

**Methods**

**Subjects**

Eighteen neuroleptic-naive SPD (15 males, 3 females) and twenty-one healthy control subjects (10 males, 11 females) were recruited from the community.

**Paras Opercularis Tracing**

The gray matter of the left and right pars opercularis was hand-drawn on sagittal MRI images. Volumes were corrected for brain size.

**Speech Production Assessment**

Verbal fluency was assessed by the number of words beginning with “C” (phonemic fluency) and by the number of animals (semantic fluency) produced in one minute each. Novel tests of prosody were employed targeting voice inflection, emotional expression, and number of pauses in speech (pause proportion). Speech samples were examined using Praat software and raters’ scores along a seven-point Likert scale. Pearson correlations were calculated between measures.

**Results**

In SPD subjects only, left pars opercularis volume was correlated with greater semantic fluency, (more animals named in one minute) and lower pause proportion. In control subjects, there was a correlation between right opercularis volume and more vocal inflection. While unclear whether SPD subjects’ verbal deficits are due to left or right pars opercularis volume differences, larger left pars opercularis gray matter volume in SPD subjects is correlated with greater semantic fluency and lower pause proportion. Furthermore, the correlation coefficients for the relationship between right pars opercularis volume and measures of prosody were significantly different between groups. Given prior evidence for the role of the left pars opercularis volume in verbal fluency and speech initiation, and prior evidence for the role of right pars opercularis volume in empathy competence, these data suggest a possible neuroanatomical basis for the verbal and prosodic deficits seen in SPD subjects.

**Conclusion**

Prosodic deficits may have significant social consequences: in all subjects, more emotion expressed and more vocal inflection were both correlated with raters wanting to spend more time with the subject. While unclear whether SPD subjects’ verbal deficits are due to left or right pars opercularis volume differences, larger left pars opercularis gray matter volume in SPD subjects is correlated with greater semantic fluency and lower pause proportion. Furthermore, the correlation coefficients for the relationship between right pars opercularis volume and measures of prosody were significantly different between groups. Given prior evidence for the role of the left pars opercularis volume in verbal fluency and speech initiation, and prior evidence for the role of right pars opercularis volume in empathy competence, these data suggest a possible neuroanatomical basis for the verbal and prosodic deficits seen in SPD subjects.

**References**

