

Abstract for a poster presented at the Society for the Neurobiology of Language annual meeting November 2013

Reduced hemispheric asymmetry in the use of weak sentential context in schizotypy

Edward Wlotko

Schizotypy is associated with the reduced tendency to use context to activate appropriate related information and/or inhibit inappropriate information during language comprehension, mirroring language-related symptoms often seen in schizophrenia. Evidence suggests that one potential factor leading to these language disturbances is disrupted structural and functional lateralization of the cerebral hemispheres.

To assess electrophysiological patterns of hemispheric asymmetry during message-level sentence processing in schizotypy, healthy college student volunteers were asked to read entirely plausible sentences varying in contextual strength, while the electroencephalogram was recorded. Strongly constraining and weakly constraining sentence frames were completed with expected words, unexpected words related to (synonymous with) expected words, or unexpected and unrelated words [e.g., Strongly Constraining: The ship disappeared into the thick FOG/MIST/SMOKE. Weakly constraining: Larry chose not to join the ARMY/MILITARY/PARTY]. Sentence-final critical words were presented in the left or right half of the visual field (LVF/RVF), biasing processing to the contralateral hemisphere. Inferences about hemispheric asymmetry are based on patterns of event-related brain potentials (ERPs) elicited by these words, as a function of visual field.

Analyses focused on the N400 component of the ERP, a functionally specific index of semantic processing. The amplitude of the N400 is reduced whenever demands on semantic processing are eased. Semantic 'facilitation' due to sentence context was assessed by subtracting ERPs for expected and related endings from ERPs to unrelated endings, for strong and weak constraint. N400 effects were measured on the resulting difference waves as mean amplitudes from 300-500 ms over all electrodes. Each participant completed the Schizotypal Personality Questionnaire (SPQ), a non-diagnostic self-report measure of the expression of schizotypal personality traits. The Pearson correlation coefficient was calculated between scores on each sub-scale of the SPQ and the degree of asymmetry of N400 effects (raw difference in facilitation scores for LVF and RVF). The sub-scale of Odd Speech significantly correlated with asymmetry of facilitation for related endings in weak contexts.

Whereas the overall group average showed larger RVF (vs. LVF) facilitation for related endings in weak context, increased Odd Speech scores were associated with reduced asymmetry ($r=.52$). This relationship was driven by a reduction in facilitation for RVF items rather than an increase for LVF items, consistent with literature suggesting that measures of abnormal language production and disorganized thought are associated with decreased activation of

weakly related information in sentences. No significant correlations were observed for facilitation of strongly related words, nor for expected words, implying that the reduced activation for weakly related items is not explained by an overall inability to gain information from sentential context.

These results, obtained within a non-clinical sample of undergraduates from the general university population, demonstrate that individual differences in self-report measures of schizotypal personality traits can identify neurobiological differences related to sentence comprehension that are similar to those observed in schizophrenia. Future work investigating changes in hemispheric asymmetries across non-clinical manifestations of schizotypal traits, schizotypal personality disorder, and schizophrenia may reveal fundamental features underlying schizotypal traits as well as features specific to pathological disordered thought and psychosis in schizophrenia.