



**The University of Georgia**  
ARTIFICIAL INTELLIGENCE CENTER

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**SCHIZOPHRENIA AND THE  
STRUCTURE OF LANGUAGE:  
ANNOTATED BIBLIOGRAPHY 2004-2006**

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## INTRODUCTION

This is an annotated bibliography of papers relevant to the study of schizophrenia and language. These papers were collected by the CASPR team at the University of Georgia after the team's earlier literature review (Covington et al., 2005), the first item in this bibliography, was complete.

## 1 PREVIOUS CASPR REVIEW

### 1.1 2004 Literature Review

Covington, M. A.; He, C.; Brown, C.; Naci, L.; McClain, J. T.; Fjordbak, B. S.; Semple, J.; and Brown, J. (2005). Schizophrenia and the Structure of Language: the Linguist's View. *Schizophrenia Research* 77(1):85–98, 2005.

This is a review of relevant literature related to language and schizophrenia since the 19<sup>th</sup> century. The CASPR team at the University of Georgia put it together. The team focuses on examining the disorder schizophrenia and its effects from the viewpoint of a linguist.

## 2 BRAIN ACTIVITY

### 2.1 EEG Waves

Fogelson, N., and Loukas, C. (2004). A Common N400 EEG Component Reflecting Contextual Integration Irrespective of Symbolic Form. *Clinical Psychology* 115:1349–1358.

Experimenters performed multichannel EEG recordings on 10 healthy subjects. The focus was on EEG waves modulated by context found 400 ms after the presentation after of a new stimulus. The experimenters found that one element of activity contributing to these waves is common to different symbolic forms.

## 3 LANGUAGE

### 3.1 Discourse and Aging

#### 3.1.1 Narrative Speech

Juncos-Rabadan, Onesimo; Pereiro, Arturo X.; and Rodriguez, Maria S. (2005). Narrative Speech in Aging: Quantity, Information Content, and Cohesion. *Brain and Language* 95:423–434.

Experimenters performed a study to examine age-related changes in the narrative speech of adults who told stories after looking at pictures. Experimenters found that age

increases quantity, reduces density of information content and cohesive reference of narratives and increases the units of irrelevant content.

### 3.1.2 Analysis of Writers

Wilson, A. N. (2005). A Beautiful Creature That Jumps. *Brain* 128:237–238.

The author discusses how writers' works change as they age, citing John Milton and Iris Murdoch as examples.

## 3.2 Language Origins

Crow, T. J. (2005). Who forgot Paul Broca? The Origin of Language as Test Case for Specialization Theory. *Journal of Linguistics* 41:133–156.

Timothy Crow examines how language might create problems for Darwin's evolutionary theory. Crow looks at what defines a species and how a species transition might work. Crow sees language as an interesting test case for speciation theory; it might fit in with Darwin's species-defining characteristics, but not smoothly.

Sole, R. (2005). Syntax for Free? *Nature* 434:289.

This is an article in the *Nature* journal about how syntax may have emerged in human language.

## 3.3 Natural Language Processing

Bikel, Daniel. (2004). Intricacies of Collins' Parsing Model. *Computational Linguistics* 30:479–511.

This article discusses the natural language processing parsing model made by Michael Collins. The author analyzes unpublished details on the parser and offers new insight into the parser on issues such as the importance of lexical head choice on discriminative power.

Miltsakaki, E., and Kukich, E. (2004). Evaluation of Text Coherence for Electronic Essay Scoring Systems. *Natural Language Engineering* 10(1):25–55.

Researchers use the Educational Testing Service's e-rater essay scoring system to examine whether local discourse coherence might be a significant contribution to the evaluation of essays. In particular, researchers looked at rough-shifts transitions: when topics are short-lived and unconnected. The researchers concluded that rough-shifts do indicate a source of incoherence.

## 3.4 Parallel Architecture

Phillips, Colin, and Lau, Ellen (2004). Foundational Issues. *Journal of Linguistics* 40:571–591.

This article is a review of Ray Jackendoff's book *Foundations of Language*. It examines parallel architecture and the problems Jackendoff claims that the method solves. The authors remain unconvinced of Jackendoff's claims.

### **3.5 Reading Comprehension**

Gorin, Joanna S. (2005). Manipulating Processing Difficulty of Reading Comprehension Questions: The Feasibility of Verbal Item Generation. *Journal of Educational Measurement* 42(2):351–373.

The experiment described in this paper manipulated the processing difficulty of reading comprehension questions. Results showed that the manipulation of some features such as increased use of negative wording increases item difficulty in some cases. Other features affected reaction time.

### **3.6 Speech Analysis**

Cannizzaro, Michael; Reilly, Nicole; and Reilly, Peter J. (2004). Speech Content Analysis in Feigned Depression. *Journal of Psycholinguistic Research* 33(4):289–301.

Computerized speech analysis software was used to study the speech of adults who were feigning depression; experimenters were curious if adults who were feigning depression would show linguistic differences when compared to adults using their normal speech. Significant differences were found in the frequency of usage of words in the category "tool" between the two groups.

### **3.7 Syntactic Theories**

Croft, William. (2004). Syntactic Theories and Syntactic Methodology: a Reply to Seuren. *Journal of Linguistics* 40:637–654.

William Croft criticizes an attack on the theory of syntactic representation argued for in Croft's 2001 book *Radical Construction Grammar: Syntactic Theory in Typological Perspective*. Seruren had stated that radical construction grammar is not modular and does not refer to rules.

### **3.8 Syntax vs Semantics**

Garrard, P.; Carrol, E.; Vinson, D; and Vigliocco, G. (2004). Dissociation of Lexical Syntax and Semantics: Evidence from Focal Cortical Degeneration. *Neurocase*, 10(5), 353–362.

This paper examines the question of whether information relevant to meaning and structure relies on a common language processor or on separate subsystems. Experimenters compared a syntactic contrast (between count nouns and mass nouns) and a semantic difference (between naturally occurring and man-made substances) to show a difference between semantic and syntactic aspects of single word processing in a patient with semantic impairments.

### 3.9 Theories

Stowe, Laurie A.; Haverkort, Marco; and Zwarts, Frans (2005). Rethinking the Neurological Basis of Language. *Lingua* 115:997–1042.

Researchers provide an overview of some issues that have arisen when viewing neuroimaging data and attempting to reconcile the data with what is traditionally thought about language areas of the brain. Different areas of the brain are discussed with their potential new functions.

Wettler, Manfred; Rapp, Reinhard; and Sedlmeier, Peter (2005). Free Word Associations Correspond to Contiguities Between Words in Texts. *Journal of Quantitative Linguistics* 12:111–122.

Researchers attempt to show that human associative responses can be predicted from contiguities between words in language use. This supports the hypothesis that the behavior of participants in the free association task can be explained by associative learning.

### 3.10 Verb Fluency

Ostberg, P.; Fernaeus, S. E.; Hellstrom, A.; Bogdanovic, N.; and Wahlund, L.O. (2005). Impaired Verb Fluency: A Sign of Mild Cognitive Impairment. *Brain and Language* 95:273–279.

Researchers compared verb fluency to noun and letter-based fluency in subjects of varying cognitive deficit. Researchers suggested that reduced verb fluency may serve as a model for dementia.

### 3.11 Word Frequency

Ferrer i Cancho, R. (2004). The Variation of Zipf's Law in Human Language. *The European Physical Journal B* 44:249–257.

The author discusses the variations of the word frequency spectrum. The word frequencies in the spectrum are arranged according to Zipf's law. He hypothesizes that this variation reflects our effort to maximize the information transfer and the cost of communication that is imposed by the limits of our brain. The author looks at the balance between cost and communication efficiency.

## 4 MEDICINE

### 4.1 Ketamine

Fu, Cynthia H. Y.; Abel, Kathryn M.; Allin, Matthew P. G.; Gasston, David; Costafreda, Sergi G.; Suckling, John; Williams, Steve C. R.; and McGuire, Phillip K. (2005). Effects of Ketamine on Prefrontal and Striatal Regions in an Overt Verbal Fluency Task: a Functional Magnetic Resonance Imaging Study. *Psychopharmacology* 183:92–102.

The authors investigated the effects of ketamine on the performance and neural correlates of verbal fluency, which engages executive function. 10 healthy individuals

took ketamine and performed a verbal fluency task as they were scanned for a MRI. The symptoms displayed by the individuals with ketamine were similar to those of individuals in an acute psychotic state.

Parwani, Arti; Weiler, Martin A.; Blaxton, Theresa A.; Warfel, Dale; Hardin, Michael; Frey, Kristen; and Lahti, Adrienne C. (2005). The Effects of a Subanesthetic Dose of Ketamine on Verbal Memory in Normal Volunteers. *Psychopharmacology* 183:265–274.

Experimenters studied the effect of the drug ketamine on individuals' mental status; the recall performance of individuals on identifying items was tested before and after administering doses of the drug. It was concluded that evidence suggests that ketamine negatively affects the verbal memory performance of individuals.

## 4.2 Psychosis

Kapur, Shitji; Mizrahi, Romina; and Li, Ming (2005). From Dopamine to Salience to Psychosis—Linking Biology, Pharmacology, and Phenomenology of Psychosis. *Schizophrenia Research* 79:59–68.

Authors present a heuristic framework that attempts to link the biology, phenomenology, and pharmacology of psychosis. The framework discussed looks at how antipsychotic medication can block dopamine receptors; this leads to the attenuation of aberrant novelty and salience.

## 5 AUTISM

### 5.1 Brain Connections

Firth, Chris (2004). Is Autism a Disconnection Disorder? *The Lancet* 3:577.

The author of this article suggests that abnormal connectivity might be related to autism. He is unsure of precisely where the connections would be in the brain. He considers feed-forward and feedback connections.

## 6 ALZHEIMER'S DISEASE

### 6.1 Constrained Sentence Production

Altman, Lori J. P. (2004). Constrained Sentence Production in Probable Alzheimer Disease. *Applied Psycholinguistics* 25:145–173.

Adults with mild probable Alzheimer's disease were found to produce fewer correct responses when asked to make a sentence using a verb and two nouns provided by an experimenter when compared with adults without probable Alzheimer's disease. Experimenters suggest that these results add support to the theory that the ability to fully activate semantic representations is impaired in probable Alzheimer's disease.



## 6.2 Lexical Analysis

Garrard, Peter; Maloney, Lisa M.; Hodges, John R.; and Patterson, Karalyn (2005). The Effects of Very Early Alzheimer's Disease on the Characteristics of Writing by a Renowned Author. *Brain* 128:250–260.

Researchers study the work of British post-war author Iris Murdoch to examine the effects of the early stages of Alzheimer's disease. Automated textual analysis was used to show differences in lexical diversity and lexical characteristics in her works at different stages of the disease.

Venneri, Annalena; Forbes-McKay, Katrina E.; and Shanks, Michael F. (2005). Letter to the Editor. *Brain* 128:E27.

This letter is in reference to an article about Murdoch's final novel and a linguistic analysis of the writing in an attempt to seek a method of identifying signs of Alzheimer's disease in writing. The authors state that their findings appear to indicate that detailed analysis of the semantic aspects of language using laboratory tests can detect subtle changes at a very early stage with accuracy and high discriminatory power.

## 6.3 Spontaneous Speech

Forbes-McKay, K.E., and Venneri, A. (2005). Detecting Subtle Spontaneous Language Decline in Early Alzheimer's Disease with a Picture Description Task. *Neurological Science* 26: 243–254.

Spontaneous speech and writing skills were studied in individuals with Alzheimer's disease. Over 70 % of Alzheimer's patients performed below average on the tasks designed to measure semantic processing.

# 7 BIPOLAR AFFECTIVE DISORDER

## 7.1 Emotional Salience

Tai, S.; Haddock, G.; and Bentall, R. (2004). The Effects of Emotional Salience on Thought Disorder in Patients with Bipolar Affective Disorder. *Psychological Medicine* 34:803–809.

Researchers sought to explore the effects of emotionally salient material on thought disorder in patients with bipolar affective disorder. They found that manic patients presented with significantly more thought disorder than any other group in both conditions and exhibited the greatest reaction to emotionally salient material.

# 8 BODY DYSMORPHIC DISORDER

## 8.1 Form

Phillips, Katharine. (2004). Psychosis in Body Dysmorphic Disorder. *Journal of Psychiatric Research* Vol. 38:63–72.

Researchers investigate body-dysmorphic disorder's delusional form. They suggest that a dimensional model of psychosis in these disorders may be more accurate than the DSM's current categorical view.

## 9 DEPRESSION

### 9.1 Treatment

Zarate Jr., C.A.; Singh, J. B.; Carlson, P. J.; Brutsche, N. E.; Ameli, R.; Luckerbaugh, D. A.; Charney, D. S.; and Manji, H. K. (2006). A Randomized Trial of an *N*-methyl-D-aspartate Antagonist in Treatment-Resistant Major Depression. *Archives of General Psychiatry* 63:856–864.

Experimenters attempted to determine if a rapid antidepressant effect could be achieved with an antagonist at the *N*-methyl-D-aspartate receptor in subjects with major depression. After giving doses of ketamine to subjects with major depression, the experimenters concluded that robust and rapid antidepressant effects resulted from a single intravenous dose of an *N*-methyl-D-aspartate antagonist; onset occurred within 2 hours post infusion and continued to remain significant for 1 week.

## 10 GENERAL MENTAL ILLNESS

### 10.1 Causes

Holguin Lew, Jorge C. (2004). Historia y neurociencias: Psiquiatria e Investigacion Neurobiologica: Entre la Fascinacion y la Insatisfaccion. *Revista Colombiana de Psiquiatria* Suplemento No. 1, Vol. XXXIII.

This paper is a summary of the history of researchers attempting to answer the question of what causes mental illness. It is in Spanish.

### 10.2 Delusions

Rhodes, J. E., and Jakes, S. (2004). The Contribution of Metaphor and Metonymy to Delusions. *Psychology and Psychotherapy: Theory, Research, and Practice* 77:1–17.

Researchers investigated the possible role of metaphorical thinking in psychotic delusions. Participants with delusions were used in the study of their delusional beliefs. In the end, their conclusion suggests that for some participants there may have been a crucial period when the person has unusual experiences, psychosocial difficulties, and made attempts involving metaphor/metonymy to understand these experiences. Furthermore, some participants described very recent, unusual experiences using metaphorical terms; and they speculate on the possibility that the content of the metaphors contributes to a continuation of psychotic experience.

## 11 PARKINSON'S DISEASE

### 11.1 Speech Pattern Analysis

Hensley, Scott. (January 7, 2005). New Test May Detect Parkinson's Early, Aid Search for Drug. *Wall Street Journal* pp. B1.

This is an article for Science Journal. It discusses an idea of the drug company Pfizer to detect Parkinson's disease by analyzing speech patterns.

## 11.2 Acoustic Measuring

Harel, Brian T.; Cannizzaro, Michael S.; Cohen, Henri; Reilly, Nicole; and Snyder, Peter J. (2004). Acoustic Characteristics of Parkinsonian Speech: a Potential Biomarker of Early Disease Progression and Treatment. *Journal of Neurolinguistics* 17:439–453.

In the experiment described in this paper, two individuals with Parkinson's disease had their speech analyzed over a ten-year period to determine if certain acoustic measures were sensitive markers of early pathophysiologic changes or treatment response.

## 12 SCHIZOPHRENIA

Mueser, Kim T., and McGurk, Susan R. Schizophrenia. (2004). *The Lancet* 363:2063–72.

This is a basic paper on schizophrenia: its symptoms, causes, and treatments.

Murray, Robin. (2005). SRF Interviews.

<http://www.schizophreniaforum.org/for/int/default.asp>

This is an interview the Schizophrenia Research Forum conducted with Robin Murray, a leader in European schizophrenia research. He discusses many aspects of schizophrenia, from the nature of the disease to environmental factors.

### 12.1 Associations

Maher, Brendan A.; Manschreck, Theo C.; Linnet, Jakob; and Candela, Steven (2005). Quantitative Assessment of the Frequency of Normal Associations in the Utterances of Schizophrenia Patients and Healthy Controls. *Schizophrenia Research* 78:219–224.

Experimenters hypothesized that coherent utterances elicited from a sample of schizophrenic patients will present a higher mean frequency of normative associations than in normal controls; and there is a positive association between total associations in utterances and hyperassociative activity (positive facilitation) as assessed by a semantic priming task. After tests were performed on schizophrenic patients and controls, it was found that schizophrenia patients produced higher mean totals of associations compared to controls. Patients with positive facilitation scores in the controlled processing interval of the semantic priming procedure, there was a correlation between facilitation scores and total frequency of associations.

### 12.2 Causes

#### 12.2.1 Cannabis

Henquet, Cecile; Murrah, Robin; Linszen, Don; and van Os, Jim (2005). The Environment and Schizophrenia: The Role of Cannabis Use. *Schizophrenia Bulletin* Vol. 31 No 3 pp. 608–612.

Cannabis was tested on individuals diagnosed with a psychotic disorder as well as individuals with high levels of liability to psychosis. Experimenters determined that cannabis usage was a cause in the development and prognosis of psychological disorders.

## 12.3 Cognition

### 12.3.1 Cognitive Deficits

Fioravanti, Mario; Carlone, Olimpia; Vitale, Barbara; Cinti, Maria Elena; and Clare, Linda (2005). A Meta-Analysis of Cognitive Deficits in Adults with a Diagnosis of Schizophrenia. *Neuropsychology Review* 15(2):73–95.

Researchers analyzed over a thousand studies done between 1990 and 2003 examining the cognitive deficits of adults with schizophrenia. IQ, memory, language, executive function, and attention were examined. The schizophrenic patients showed poor performance in all five cognitive areas when compared to healthy controls.

### 12.3.2 Cognitive Differences

Heinrichs, Walter (2005). The Primacy of Cognition in Schizophrenia. *American Psychologist* 60:229–242.

This is an article that discusses the use of cognitive tasks in diagnosing and treating schizophrenia. The history of different neuroimaging techniques (such as MRI and PET scanning) is discussed. The author concludes that cognitive differences between schizophrenic patients and healthy individuals are the most significant means of distinguishing between schizophrenic brains and those of healthy individuals.

### 12.3.3 Cognitive Functions

Jonides, John, and Nee, Derek Evan (2005). Assessing Dysfunction Using Refined Cognitive Methods. *Schizophrenia Bulletin* Vol. 31 No. 4 pp. 823–829.

The authors discuss two cognitive functions that are linked with psychological disorders. Sophisticated neuroimaging methods and lesion data are used to aid the understanding of the component process of these cognitive functions.

### 12.3.4 Hemisphere Functions

Mitchell, Rachel L. C., and Crow, Tim J. (2005). Right Hemisphere Language Functions and Schizophrenia: The Forgotten Hemisphere? *Brain* 128:963–978.

Researchers discuss the importance of right hemisphere language functions when used in social communication. Researchers found evidence that they believe supports the hypothesis that the core deficit in psychosis is a failure of segregation from left and right hemisphere functions.

### 12.3.5 Memory

Wittorf, Andreas; Klingberg, Stefan; and Wiedemann, Georg (2004). Secondary Verbal Memory: A Potential Endophenotype of Schizophrenia. *Journal of Psychiatric Research* 38:601–612.

Experimenters attempted to identify neuropsychological endophenotypes of schizophrenia that met the criteria of stability and sensitivity. They gave comprehensive neuropsychological tests to 26 non-schizophrenic first-degree relatives together with their affected family members. They concluded that the secondary verbal memory seems to be a potential endophenotypic marker of schizophrenia.

### 12.4 Decision Making

Shurman, Brett; Horan, William; Nuechterlein, Keith H. (2004). Schizophrenia Patients Demonstrate a Distinctive Pattern of Decision-Making Impairment on the Iowa Gambling Task. *Schizophrenia Research* 72:215–224.

Researchers examined schizophrenic patients and non-schizophrenic controls while they performed the Iowa Gambling Task. The results of the study suggest that individuals with schizophrenia display a pattern of compromised decision-making that is somewhat distinct from that found in OFC lesion patients and that may be linked to certain clinical symptoms.

### 12.5 Drug Development

Carter, Cameron (2005). Applying New Approaches From Cognitive Neuroscience to Enhance Drug Development for the Treatment of Impaired Cognition in Schizophrenia. *Schizophrenia Bulletin* 31(4):810–815.

This paper looks at how researchers are currently attempting to treat the cognitive impairments that are caused by schizophrenia. The author discusses the “cognitive revolution” in experimental psychology that has influenced a new type of neuroscience and how these new ideas may assist with treating cognitive impairments in schizophrenia.

### 12.6 Formal Thought Disorder

Vaever, Mette S.; Licht, Deborah M.; Moller, Lise; Perlt, Dorthe; Jorgensen, Age; Handest, Peter; Pamas, Josef (2004). Thinking Within the Spectrum: Schizophrenic Thought Disorder in Six Danish Pedigrees. *Schizophrenia Research* 72:137–149.

Researchers attempted to examine the specificity of formal thought disorder (FTD) in the schizophrenia spectrum disorders and the hypothesized linear aggregation of formal thought disorder within pedigrees. They found that individuals with a schizophrenia diagnosis had higher global levels of FTD, exhibited more severe types of FTD, and had a qualitatively different type of FTD than did participants with other diagnoses or no mental illness.

### 12.6.1 Semantic/Executive Affects

Barrara, A.; McKenna, P. J.; and Berrios, G. E. (2005). Formal Thought Disorder in Schizophrenia: an Executive or Semantic Deficit? *Psychological Medicine* 35:121–132.

Experimenters were curious about the schizophrenic symptoms of formal thought disorder and how they are connected with semantic and executive dysfunction. They gave tests of executive and semantic control as well as tests measuring verbal fluency and comprehension to schizophrenic patients with and without formal thought disorder as well as healthy, non-schizophrenic controls. The patients with formal thought disorder were impaired on all executive tests but only on one semantic test, which dealt with semantic associations between concepts. The experimenters suggested that formal thought disorder in schizophrenia impairs executive function and has an unknown effect on semantic function.

Stirling, John; Hellewell, Johnathan; Blakey, Andrew; Deakin, William (2006). Thought Disorder in Schizophrenia is Associated With Both Executive Dysfunction and Circumscribed Impairments in Semantic Function. *Psychological Medicine* 36:475–484.

Researchers investigated the origin of formal thought disorder. They concluded that the origins of thought disorder seem more closely linked to deficits in executive functioning and semantic processing than to impairments in other language functions or general cognition.

### 12.6.2 Verbal Productivity

Bowie, Christopher R.; Tsapelas, Irene; Friedman, Joseph; Parrella, Michael; White, Leonard; and Harvey, Phillip D. (2005). The Longitudinal Course of Thought Disorder. *American Journal of Psychiatry* 162:793–795.

Patients with geriatric schizophrenia were studied for verbal underproductivity and disconnection in thought disorder. Thought, language, and communication were measured once and again after an average period of 2.3 years for 220 patients with chronic schizophrenia. It was found that verbal underproductivity increased over time; disconnection did not seem to change.

## 12.7 Hallucinations

### 12.7.1 Auditory

Hubl, Daniela; Keonig, Thomas; Strik, Werner; Federspiel, Andrea; Kreis, Roland; Boesch, Chris; Maier, Stephan E; Schroth, Gerard; Lovblad, Karl; and Dierks, Thomas (2004). Pathways That Make Voices: White Matter Changes in Auditory Hallucinations. *Archive of General Psychiatry* Vol. 61 July 2004.

Experimenters found evidence to suggest that, during inner speech, the alterations of white matter fiber tracts in patients with frequent hallucinations lead to abnormal coactivation in regions related to the acoustical processing of external stimuli.

Lidner, Axel; Their, Peter; Kircher, Tilo T. J.; Haarmeier, Thomas; and Leube, Dirk T. (2005). Disorders of Agency in Schizophrenia Correlate with an Inability to Compensate for the Sensory Consequences of Actions. *Current Biology* 15:1119–1124.

It had been theorized that schizophrenic individuals had been mistaking their own inner voice as someone else's voice. Researchers decided to pursue this through vision studies of schizophrenic patients. The authors found a correlation between the strength of delusions of a schizophrenic individual and the ability of the individual to cancel out self-induced retinal information in motion perception.

## **12.8 Language Development**

Condray, Ruth. (2004). Language Development in Schizophrenia as a Developmental Learning Disorder. *Schizophrenia Research* 73:1–16.

This paper explores the idea that many schizophrenic patients may have lived with a preexisting developmental language disorder. The authors discuss the idea that a primary deficit in the temporal dynamics of brain function causes receptive language disorder in schizophrenia.

## **12.9 Logical Reasoning**

Goel, Vinod; Bartolo, Angela; St. Clair, David; and Venneri, Annalena (2004). Logical Reasoning Defects in Schizophrenia. *Schizophrenia Research* 66: 87–88.

This is a letter to the editors of Schizophrenia Research journal. The authors discuss a test they conducted on 23 schizophrenic patients to determine whether a conclusion followed logically from a premise. The results of the experiment suggested that schizophrenic patients are unable to fully mobilize the belief-laden reasoning mechanism associated with the frontal-temporal lobe system.

## **12.10 Memory Impairments**

Brebion, Gildas; Gorman, Jack M.; Malaspina, Dolores; and Amador, Xavier (2004). A Model of Verbal Memory Impairments in Schizophrenia: Two Systems and Their Associations with Underlying Cognitive Processes and Clinical Symptoms. *Psychological Medicine* 35:133–142.

Fifty schizophrenic patients were tested for verbal memory, source memory, processing speed and selective attention. Memory efficiency was found to be distinct from memory errors. Memory efficiency was found to be associated with processing speed and selective attention at the cognitive level and depression at the symptom level. Memory errors were increased by positive symptoms of schizophrenia and decreased by certain negative symptoms (especially those reflecting lack of emotion or social interactions).

## **12.11 Myths**

McGrath, J.J. (2005). Myths and Plain Truths About Schizophrenia Epidemiology – the NAPE Lecture. *Acta Psychiatrica Scandinavica* 111:4–11.

Researchers looked at data on schizophrenic patients related to incidence rates for the disorder. By examining the data, researchers found evidence that commonly held beliefs about the disorder appeared to be false. For instance, males appeared to have higher incidence rates than females; this finding seems to contradict the idea that males and females are equally affected. Also, data suggested that the incidence of schizophrenia varied between different sites; the opposite was thought to be true.

## 12.12 Speech Problems

### 12.12.1 Source Monitoring

Nienow, Tasha M., and Docherty, Nancy M. (2005). Internal Source Monitoring and Communication Disturbance in Patients with Schizophrenia. *Psychological Medicine* 35:1717–1726.

Researchers examined the relationship between internal source monitoring and disordered speech in patients with schizophrenia. Researchers found that internal source monitoring was related to the frequency of missing information.

### 12.12.2 Verbal Fluency

Phillips, Tania Jane; James, Anthony C. D.; Crow, Timothy J.; and Collison, Simon M. (2004). Semantic Fluency is Impaired but Phonemic and Design Fluency are Preserved in Early-Onset Schizophrenia. *Schizophrenia Research* 70:215–222.

Investigators studied impairments in verbal fluency of individuals who suffer from early-onset schizophrenia. Schizophrenic patients were shown to have significantly impaired semantic fluency when compared to controls but no impairment on phonemic or design fluency.

### 12.12.3 Voice Onset Time

Epstein-Lubrow, Gary; Hochstadt, Jesse; Lieberman, Philip; and Kaplan, Gary B. (June, 2005). Speech Production in Schizophrenia: Preliminary Data Regarding Voice Onset Time. [Letter to the editor]. *Schizophrenia Research* 74:1–3.

This is a letter to the editors of Schizophrenia Research journal about a study conducted among schizophrenic patients that measured voice onset time. Participants read aloud 30 monosyllabic words that each began and ended with a stop consonant. It was found that some with schizophrenia might have a disruption in the motor sequencing of speech. The authors theorized that this might be due to antipsychotic medication.

### 12.12.4 Word Production Deficits

Marvel, Cherie L.; Schwartz, Barbara L.; and Isaacs, Keren L. (2004). Word Production Deficits in Schizophrenia. *Brain and Language* 89:182–191.



Researchers explored the deficit in word selection and search in schizophrenic patients. In the end, the researchers found that patients were impaired in conditions with high search demands; but not in cases of high selection demands.