

Andreasen N C. Negative symptoms in schizophrenia: definition and reliability. *Arch. Gen. Psychiat.* 39:784-8, 1982; and Andreasen N C & Olsen S. Negative v positive schizophrenia: definition and validation. *Arch. Gen. Psychiat.* 39:789-94, 1982.  
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"Positive" and "negative" symptoms of psychosis were first described in detail by the British neurologist J. Hughlings-Jackson.<sup>1</sup> The concept was largely ignored in clinical research, however, until the detailed description of scales for measuring these symptoms given in this pair of papers. The Scale for the Assessment of Negative Symptoms and the Scale for the Assessment of Positive Symptoms have become the standard methods for evaluating these symptoms. This pair of articles has facilitated the exploration of the brain mechanisms that produce such symptoms in psychotic disorders. [The *SSCI*<sup>®</sup> and the *SCI*<sup>®</sup> indicate that these papers have been cited in more than 395 and 480 publications, respectively.]

## Positive and Negative Symptoms of Psychosis

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I have been fortunate enough to have had two professional incarnations within one biological life. In my first professional incarnation, I was a young English professor, which schooled me in closely observing patterns of expression and emotional response. As a teacher, I found myself trying to train students to understand poetry and novels both objectively and subjectively. In my second incarnation, I have been a physician, psychiatrist, and neuroscientist. (Explaining how and why I got there would exceed the allowed space for *Citation Classics*<sup>®</sup>. Leaving a few things unexplained is the nature of science anyway!)

I chose schizophrenia as the illness in which I would specialize because it is one of the most important public health problems in medicine. Schizophrenia is common (affecting 1 percent of the population), has great morbidity (70-80 percent of its victims are unable to work), and leads to high mortality (10 percent of people with schizophrenia die by suicide). Its victims also tend to be stigmatized and neglected, which appealed to my "rescue instincts" (often ridiculed by psychiatrists and others, but not really such a bad trait). Finally, schizophrenia is one of

the great enigmas of medicine. After more than 100 years of study by many first-rate scientists and clinicians, we are still far from understanding its mechanisms and causes.

My own angle in psychiatry has been to try to relate the various signs and symptoms of mental illness to their underlying brain mechanisms. "Localizing" has been common in neurology, but much less common in psychiatry. I became especially interested in identifying and defining two broad classes of symptoms. Positive symptoms (e.g., delusions and hallucinations) represent an exaggeration or distortion of normal functions, while negative symptoms (e.g., loss of emotional expression or fluency of thought and speech) represent a diminution or loss of normal functions. This dichotomy served the purpose of giving clinicians and scientists a way of reducing the very complicated clinical presentation that characterizes schizophrenia to a simpler one that has facilitated hypothesis testing concerning the neural substrates of this disorder. In this pair of articles, I described reliable methods for rating these symptoms and their relationship to neural correlates.

This pair of articles was probably widely cited because they provided the first detailed and reliable method for measuring negative symptoms. The methods have been remarkably robust over the past decade and are still widely used. Further, a growing body of evidence suggests that their neural correlates can be identified and that they may involve either the prefrontal cortex or the subcortical regions that project to the frontal areas of the brain.<sup>2,3</sup> Frontal regions are the phylogenetically most advanced part of the human brain, comprising nearly one-third of the human cortex. This brain region mediates many important human functions, such as volition and drive, the capacity to plan for the future, and the ability to think abstractly.<sup>4</sup> Ongoing efforts to define the symptoms of mental illness precisely and to relate them to specific brain abnormalities will, we hope, lead ultimately to a better understanding of their causes and to improved treatments and ultimately to their prevention.

1. Hughlings-Jackson J. *Selected writings*. (Taylor J, ed.) London: Hodder & Stoughton, 1931.

2. Andreasen N C, Rezaei K, Alliger R, Swayze V W, Flaum M, Kirchner P, Cohen G & O'Leary D J. S. Hypofrontality in neuroleptic-naive and chronic schizophrenic patients: assessment with xenon-133 single photon emission computed tomography and the Tower of London. *Arch. Gen. Psychiat.* 49:943-58, 1992.

3. Buchsbaum M S. The frontal lobes, basal ganglia, and temporal lobes as sites for schizophrenia. *Schizophrenia Bull.* 16:379-84, 1990.

4. Fuster J M. *The prefrontal cortex*. New York: Raven Press, 1990.

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