Understanding Schizophrenia: An Integrative Perspective

Kristin Mickel
Immaculata University

Introduction

- Much attention has been devoted to understanding the positive and negative symptoms of schizophrenia

- Cognitive symptoms and the biological components of schizophrenia need to be better understood in order to provide the best possible treatment
Overview

- Etiology
- Biological Components
- Cognitive Components
- Treatment Options

Nature vs. Nurture

- Strong genetic component
  - Heritability estimates as high as 80-85%

- Environment also plays an important role
  - Adoption studies provide evidence that genetics alone do not determine the development of schizophrenia
Onset of Schizophrenia

- Typically develops in early adulthood between the ages of 16-25
- Onset is very unpredictable
  - It can takes years for schizophrenia to develop or only a matter of weeks

Symptom Presentation

- Positive: symptoms of excess such as hallucinations and delusions
- Negative: symptoms of diminution such as flat affect and poverty of speech
- Cognitive: impairments in areas such as memory and executive function
Prognosis

- Individuals with positive symptoms have the best prognosis
  - Symptoms fluctuate in severity
  - Good response to antipsychotic medication
- Negative and cognitive symptoms are the most difficult to treat
  - Symptoms are stable over time
  - Poor response to antipsychotic medication

The Role of Dopamine

- Dopamine hypothesis: positive symptoms of schizophrenia are the result of overactive dopaminergic neurons in the mesolimbic pathway
Dopamine and the Mesolimbic Pathway

The nucleus accumbens (NA) plays a role in reinforcement.

Overactive dopamine stimulates the NA and creates a feeling of euphoria that gets paired with the positive symptoms.

This reinforcement of the positive symptoms increases their frequency.
The Use of Antipsychotic Medication

- Antipsychotic medication decreases positive symptoms by blocking dopamine receptors and decreasing the activity level of dopamine.

Dopamine and Negative Symptoms

- Hypofrontality theory: a lack of dopamine in the dorsolateral prefrontal cortex (DLPFC) decreases the metabolic activity of that part of the brain.

- This theory contradicts evidence of dopaminergic neurons being hyperactive in the NA and producing positive symptoms.
Dopamine and the DLPFC

- There is an inverse relationship between the DLPFC and the NA

- A decrease in dopamine in the DLPFC triggers an increase in dopamine in the NA
The Use of Atypical Antipsychotics

- Atypical antipsychotics may target the prefrontal cortex and increase dopamine levels.

- Atypical antipsychotics have been successful in treating both negative and positive symptoms.

Brain Abnormalities

- Brain abnormalities in the prefrontal cortex have been associated with negative symptomology.

- Abnormalities found in the prefrontal cortex include deficits in volume and thickness of specific areas.
Prefrontal Cortex Deficits

- Deficits in volume of the bilateral pars triangularis
  - This is a crucial component of the DLPFC
- Deficits in volume and thickness in the orbitofrontal cortices
  - These are essential components of social functioning
  - Integrate self-monitoring and emotional valence

Areas of Cognitive Impairment

- Declarative memory
- Working memory
- Executive Functioning
Declarative Memory
- Includes episodic and semantic memory
- Episodic memory deficits may be due to an inability to encode new information
- There is some debate over the source of semantic memory impairment
  - Inability to organize information into a network of associated concepts
  - Inability to inhibit the activation of irrelevant associations

Working Memory
- Working memory is comprised of three components which all show deficits
  - The central executive system has impaired maintenance and retrieval
  - The visual and verbal systems display impairments with encoding
Executive Functioning (EF)

- Includes abilities such as planning, problem solving, and set shifting which all show impairment

- Abnormalities found in the prefrontal cortex are believed to be the root of EF impairment

Treatment Options

- The traditional approach to treating cognitive symptoms is through the use of medication
  - Atypical antipsychotics are used due to the similar nature of cognitive and negative symptoms
  - Alternative options such as the acetylcholinesterase inhibitor galantamine are being explored
Therapeutic Options

- Neurocognitive Enhancement Therapy (NET) and Work Therapy have been studied to determine their impact on improving cognitive functioning.

NET and Work Therapy

- **NET**
  - Up to 5 hours of cognitive exercises per week for 26 weeks
  - Rating of work related cognition in the support group
  - Weekly social information processing groups

- **Work Therapy**
  - Paid work activities in job placements at a medical center
How Effective Are They?

- Individuals who participated in both NET and work therapy displayed the greatest cognitive improvement six months after therapy ended.

- Individuals who just had work therapy also showed some improvement.
  - The opportunity to practice cognitive skills in a real world setting is important.

Conclusion

- Cognitive symptoms are just as devastating as positive and negative symptoms.

- There is still much to learn about the biological components of schizophrenia and how they relate to the cognitive deficits that are being observed.
References


