



Schizophrenia

Psychology 372

Physiological Psychology

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Overview

- Probably consists of more than one disorder
- Is the most devastating disorder
- Occurs in about 1% of the population
- Another 2-3% have Schizotypal Personality Disorder
- No major sex differences in prevalence rates
- Costs of care >30 Billion Dollars annually
- Many homeless are untreated or stop meds.
- Generally,
 - Is a disorder of thought and emotion
 - Is not a "split-personality" disorder.

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Characterized by

- Disorganized Thoughts
- Hallucinations
- Delusions
- Bizarre behaviors

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Two Different Types of Schizophrenic Symptoms

- Positive
- Negative
- Often are preceded by Prodromal signs
 - Social Isolation
 - Odd Behavior and Ideas
 - Poor Hygiene
 - Blunted Affect

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Positive Symptoms

- Usually occur during psychotic episodes
- Usually involve distinct abnormal behaviors
- Includes
 - Delusions
 - Hallucinations
 - Disorders of thought

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Delusions

- Are beliefs that are contrary to reality
- Can involve
 - Control
 - Grandeur
 - Persecution

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Hallucinations

- Are perceptions that occur in the absence of stimuli
- Can be
 - Visual
 - Auditory (Most Common)
 - Olfactory
 - Tactile

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Disorders of Thought

- Can be
 - Disorganized
 - Irrational

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Negative Symptoms

- Usually occurs during non-psychotic periods.
- Generally involves a loss of normal behaviors
 - Reduced speech
 - Low initiative
 - Social withdrawal
 - Diminished affect

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Diagnosis

- Must be continuously ill for at least 6 months.
- Need to have one psychotic phase where you have
 - Delusions
 - Hallucinations
 - Disordered thoughts, incoherence, or other symptoms.
- See DSM IV for more detail

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Many Subtypes of Schizophrenia

- Based on the symptoms that are presented.
 - Paranoid
 - Catatonic
 - Disorganized
 - Others

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Causes of Schizophrenia

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Many Different Hypotheses

- Genetics
- Brain Abnormality Hypothesis
- Dopamine Hypothesis

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Genetic Contributions

- Highly probable schizophrenia is genetic
- Is probably not caused by one gene
 - Would show in all monozygotic twin studies.
 - Is probably caused by the combination of several genes.
- Not totally sure which ones
 - Has been identified with genes on Chromosome 22 and Chromosome 6.

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Brain Abnormality Hypothesis

- Identified by CT and Cerebral Blood Flow Studies
- Some Patients have one or more of the following.
 - Reduction of blood flow to the left Globus Pallidus
 - Problems in the frontal lobes
 - Medial temporal lobe is thinner
 - Anterior Hypothalamus is smaller (especially left side)
 - Lateral and third ventricles are enlarged
 - Sulci are also enlarged (especially in the temporal and frontal lobes)
 - Indicated reduced numbers of neurons.

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Causes of Brain Damage

- Birth trauma (obstetrical issues)
- Viral infections that impair neural development during the second and third trimester.
- Nutritional issues
- Others

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Conclusion

- Not purely a genetic problem
- Not purely a abnormality problem
- Is probably a combination problem triggered by an environmental event
 - E.g., Infants exposed to influenza during second and third trimesters.
- Not really sure what causes the disorder

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Dopamine Hypothesis

- Contends:
 - Positive symptoms occur due to increased levels of Dopamine.
 - Get increased stimulation of Dopaminergic synapses

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History

- Larobit
 - Was looking for a drug to calm patients before neurosurgery.
 - Found Chlorpromazine worked very well.
- Hypothesized it might be used on other patients
- Delay and Deniker found that high dosages of Chlorpromazine calmed patients with schizophrenia or manic-depressive symptoms

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Chlorpromazine and other Phenothiazines

- Part of the drug group – Typical Antipsychotics
- Other Typical Antipsychotics
 - Butyrophenones (Haloperidol)
 - Thioxanthenes (chlorprothixene)
- Have clear effects on schizophrenia
- Block
 - Delusions
 - Hallucinations
 - Disordered thinking

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Atypical Antipsychotics

- Are another group of drugs
- Are better for negative symptoms and cognitive problems
- Also have fewer side effects
- Includes
 - Clozapine
 - Risperidone
 - Olanzapine

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Atypical Antipsychotics

- Bind to D3 and D4 receptors
 - Are in the limbic system and cortex
 - Few in the BG
 - Reason for few extrapyramidal side effects

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Support for Hypothesis

- Drugs that increase dopamine levels (Amphetamine, Cocaine) can produce positive symptoms of schizophrenia
- Drugs that block DA receptors also reverse schizophrenia

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Which Receptors?

- At least five types of Dopamine receptors
- D1 – D5
- D1 and D5 (D1a) Increase CAMP
 - Are in the cortex, hippocampus, caudate nucleus
- D2 Group (D2, D3, D4) decrease CAMP
 - Are in the caudate, putamen, nucleus accumbens, amygdala, hippocampus, parts of the cortex.
 - Are also in the caudate and putamen.

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Four Major Systems for Dopamine

- Tuberoinfundibular
- Nigrostriatal
- Mesolimbic
- Mesocortical

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Nigrostriatal

- Contributes to Parkinson's Disorder
- May be involved with short-term and long-term antipsychotic side effects.
- Short-Term
 - Hand tremor
 - Muscle rigidity
- Long Term
 - Tardive Dyskinesia

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Mesolimbic

- Several structures
- Is involved with emotion and memory.
- Symptoms of thought and perception disturbances are characteristic of schizophrenia and psychomotor epilepsy
- Carlsson
 - Hypothesizes the positive symptoms result from overactivity of this system

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Mesocortical

- Originates in ventral tegmental area
- Projects to the cortex (especially prefrontal cortex)
- Prefrontal cortex is involved in
 - Motivation
 - Planning
 - Attention
 - Social Behavior
- Hypothesized to be involved with negative symptoms of schizophrenia

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Weinberger

- Contents two dopamine systems are impacted by schizophrenia
- Increased activity of mesolimbic pathway through D2 group (especially D4) are associated with Positive symptoms.
- Decreased activity of mesocortical connections in prefrontal cortex is associated with negative symptoms.

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How?

- Mesocortical pathway to prefrontal cortex inhibits the mesolimbic pathway
- Primary effect of schizophrenia is a reduction of inhibition
- Leads to disinhibition in mesolimbic pathway
- Get symptoms

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Drugs

- Many types
- Given on the basis of symptoms and potency needed
- Can be Typical or Atypical depending on the symptoms.

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Some Drug Names

- Highest to lowest potency
- Chlorpromazine
- Clozapine
- Molindone
- Moperone
- Haloperidol
- Pimozide
- Spiperone
- Many others can be inserted in the list.

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Drug Side Effects

- Include
 - Autonomic problems (dry mouth)
 - Skin-eye pigmentation
 - Breast development
 - Tardive dyskinesia: facial tics and gestures
 - Others
- Side effects cause people to stop their medications.

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Conclusion

- Severe disorder
- Most people can be treated effectively
- Many people stop taking their medications
- Revolving door syndrome
- Future, work on decreasing drug side effects
- Examine the genetics associated underlying the disorder.

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