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.

Characterized by
- Disorganized Thoughts
- Hallucinations
- Delusions
- Bizarre behaviors

Two Different Types of Schizophrenic Symptoms
- Positive
- Negative
- Often are preceded by Prodromal signs
  - Social Isolation
  - Odd Behavior and Ideas
  - Poor Hygiene
  - Blunted Affect

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

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

- Inherited predispositions
- Environmental stressors
- Brain chemistry imbalances
Many Different Hypotheses

- Genetics
- Brain Abnormality Hypothesis
- Dopamine Hypothesis

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.

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.

Causes of Brain Damage

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

Conclusion

- Not purely a genetic problem
- Not purely an 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

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.
Four Major Systems for Dopamine

- Tuberoinfundibular
- Nigrostriatal
- Mesolimbic
- Mesocortical

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

Mesolimbic

- Several structures
- 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

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

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.

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
Drugs

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

Some Drug Names

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

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.

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.