Experimental Psychopathology

Lecture 39
The Symptoms Are Not the Disease

• Vocabulary of the Medical Model
  – Symptoms
    • Superficial Manifestations of Underlying Pathology
  – Syndromes
    • Clusters of Symptoms that Tend to Co-Occur
  – Disease
    • Syndrome Whose Underlying Pathology is Known

• Underlying Pathology
  – Revealed by Laboratory Research

  Scientific Medicine
  Treats Pathology, Not Symptoms
Beyond Symptoms to Underlying Pathology

**Medicine**
- Anatomical Lesions
- Physiological Malfunction
- Infection
  - Virus, Bacteria, Fungi

**Psychopathology**
- Psychological Deficits
  - Mental Structures
  - Mental Processes
  - Neural Substrates?
- Maladaptive Mental Contents
  - Thoughts, Beliefs, Expectations
  - Feelings, Desires
  - Product of Social Learning
Laboratory Studies of Psychological Deficit

- Emil Kraepelin in Wundt’s Laboratory
  - Donders’s Reaction-Time Technique
- Attentional Deficit in Schizophrenia
  - Breakdown in Selective Attention
    - Distractibility
    - Inability to Filter Out Irrelevant Ideas
  - Consequences
    - Language Disorder
    - Social Withdrawal
The Multi-Store Model of Memory

After Waugh & Norman (1965); Atkinson & Shiffrin (1968)
Iconic Memory in Schizophrenia

• Iconic Memory
  – Very-Short-Term Sensory Store
  – Prelude to Storage in Short-Term or Working Memory
    • Available for Further Processing

• Sperling Paradigm
  – Decays < 1 Second
  – Displacement <= 1 Second

• Mask Displaces Iconic Trace
  – Stimulus Onset Asynchrony
    • Between Onset of Target and Onset of Mask
Backward Masking

*Is there a “T”?*
Retrieval from Iconic Memory
Saccuzzzo & Schubert (1981)

![Graph showing correct responses vs. stimulus-onset asynchrony (milliseconds) for Schizophrenic and Control groups.](#)
Working Memory in Schizophrenia
Goldman-Rakic (1994); Barch (2003)

• Maintains Information in an Active State
  – Permits Further Information Processing
  – Critical for Selective Attention
    • Focusing on Task-Relevant Information
    • Inhibition of Task-Irrelevant Information

• Critical for “Higher” Cognitive Functions
  – Memory Encoding and Retrieval
  – Reasoning and Problem-solving
  – Language
Working Memory in Schizophrenia
Metzak et al. (2012)

• Sternberg Paradigm
  – Memorize Study Set
    • Varies from 2-8 Letters
  – Find Target
    • Accuracy, Response Latency

• Schizophrenics vs. Normals
  – Matched for Demographic Variables
  – Patients Taking Medication

\[ T = 397.2 + 37.9 \text{ s} \]
Working Memory in Schizophrenia
Metzack et al. (2012)

[Graph showing % Correct for Control and Schizophrenic groups across different study set sizes (2, 4, 6, 8).]

[Graph showing Response Latency (msec) for Control and Schizophrenic groups across different study set sizes (2, 4, 6, 8).]
Working Memory in Schizophrenia
Goldman-Rakic (1994); Barch (2003)

• Components
  – Modality-Specific Buffers
    • Support Rehearsal
      – Hold Information in Active State
    • Inferior/Posterior Prefrontal Cortex
  – Central Executive
    • Guides Information-Processing
      – Manipulation/Transformation of Information
    • Dorsolateral Prefrontal Cortex
      – Supported by Dopamine System?

• Represent, Maintain Contextual Information
  – Relevant to Current Tasks
Eye-Tracking and Attention
Holzman et al. (1981)

• Follow swinging pendulum with eyes
  – Smooth Pursuit Eye Movements

• Eye-Tracking Dysfunctions
  – Interruptions of SPEMs
  – Saccadic Tracking
  – Saccadic Intrusions

• Eye-Tracking and Attention
  – Peripheral, Psychophysiological Index
Smooth Pursuit Eye Movements
Holzman et al. (1981)

Normal Subject

Direct

Derivative

A = Standard EOG; B = Infrared Reflection

Schizophrenics
Eye-Tracking in Psychosis
Holzman et al. (1981)

% Anomalous

Schizophrenic  Affective Disorder

Subjects

Patients

Parents
Components of Emotion in Schizophrenia
Kring & Neale (1998)

• Anhedonia
  – Flat/Blunted Affect
  – Inappropriate Affect

• Emotional Films
  – Positive, Negative, Neutral

• Components of Emotion
  – Subjective: Self-Rating
  – Overt Behavior: Facial Expressions
  – Covert Physiological: Skin Conductance
## Facial Expressions of Emotion

Kring & Neale (1998)

<table>
<thead>
<tr>
<th></th>
<th>Schizophrenics</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Facial Expression</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>1.30</td>
<td>4.90</td>
</tr>
<tr>
<td>Intensity</td>
<td>0.50</td>
<td>0.92</td>
</tr>
<tr>
<td>Duration</td>
<td>5.65</td>
<td>27.74</td>
</tr>
<tr>
<td><strong>Skin Conductance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reactivity</td>
<td>2.27</td>
<td>0.32</td>
</tr>
</tbody>
</table>
Self Reports of Emotional Experience

Kring & Neale (1998)

![Bar chart showing the comparison of emotional reports between Schizophrenics and Controls for Positive and Negative emotions. The chart indicates that Schizophrenics report higher levels of positive emotion and lower levels of negative emotion compared to Controls.](chart.png)
Experimental Neurosis in Animals

Shenger-Kristovnikova (c. 1927); Pavlov (1941); Gantt (1944)
Mineka & Kihlstrom (1978)

• Discrimination Learning
  – Salivary Conditioning
    • CS+ (Circle/Ellipse)
    • CS- (Ellipse/Circle)
  – Test Stimulus: 9:8 Ratio

• Response to Difficult Discrimination
  – Agitation
  – Loss of Discriminative CR
  – Impaired Savings in Relearning
Conditioning Models of Phobias, Obsessions, and Compulsions

Wolpe (1952, 1958)

• Phobias as Conditioned Fear Responses
  – Observational Learning vs. Direct Experience
  – Preparedness

• Obsessions as Generalized Fear Responses
  – Similar Behavior During Conditioning Experience

• Compulsions as Avoidance Behaviors
  – Reduce Conditioned Fear
  – Resistance to Extinction
Laboratory Models as Theories of Psychopathology
Maser & Seligman (1977)

• Symptoms
  – Phobia as Conditioned Fear

• Causes
  – But Often No Conditioning Experience!
  – Observational/Vicarious Learning

• Cures
  – Systematic Desensitization as Extinction

• Prevention
  – Prevent Fearful Encounter/Social Learning

• Biological Substrates
  – Heart-Rate Acceleration as a Measure of Fear Response
Parallels Between Learned Helplessness and Depression
Seligman (1975)

- Symptoms
  - Passivity, Negative Expectations
  - Lack of Aggression
  - Loss of Appetite, Sexual Interest

- Life history

- Treatment
  - Change Expectations
  - Antidepressant Drugs

- Prevention
  - Mastery Experiences

- Biological Substrates
  - Norepinephrine Depletion
Revising the Helplessness Theory of Depression

Abramson, Seligman, & Teasdale (1978); Abramson, Metalsky & Alloy (1989)

• Exposure to Uncontrollable Aversive Events
  – But Often Angry, Not Depressed

• Dimensions of Causal Attribution
  – Internal vs. External
  – Stable vs. Variable
  – Global vs. Specific
Hopelessness Theory of Depression
Abramson, Seligman, & Teasdale (1978); Abramson, Metalsky & Alloy (1989)

- Depression as Hopelessness
  - Uncontrollable Aversive Events
  - “Depressogenic” Causal Attributions
    - Internal, Stable, Global

- “Illusion of Control”
  - Depressive Realism

- “Hopelessness” Subtype of Depression
  - Attributional Style as Risk Factor
  - Other Subtypes Have Other Causes
Dopamine Hypothesis of Schizophrenia

• Excess Activity of Dopamine
  – Neurotransmitter
    • Active in Dorso-Lateral Prefrontal Cortex
  – Causes Attentional Deficit, Symptoms

• Phenothiazine Treatment of Schizophrenia
  – Blocks Neural Receptors for Dopamine
    • Impairs Uptake by Post-Synaptic Neurons

• Post-Mortem Data, Brain-Imaging
  – Increased Brain Dopamine?
  – Increased Dopamine Receptors?
Amphetamine Psychosis
A Laboratory Model of Schizophrenia?
Snyder (1972, 1976)

• Amphetamines
  – Benzedrine (Amphetamine)
  – Dexedrine (Dextroamphetamine)
  – Methedrine (Methamphetamine)

• Amphetamine Psychosis
  – Habitual, Heavy Use
  – Hallucinations
  – Thought Disorder
  – Paranoid Symptoms
Psychopathy:
Linking Laboratory Models to Psychological Deficits

• **Response to Aversive Stimulation**
  – Failure of Avoidance Learning
  – No Response to Punishment

• **Septal Lesions in Rats**
  – Freezing When Punished
  – Passive Avoidance
  – Delay of Gratification

Failure to Suppress Habitual Responses in Order to Avoid Aversive Consequences
Hypnosis and “Hysteria”
Kihlstrom (1979)

• Suggested Alterations in Consciousness
  – Perception
    • Hypnotic Blindness, Deafness, Analgesia
      – Parallel Symptoms of Conversion Disorders
  – Memory
    • Posthypnotic Amnesia
      – Parallels Symptoms of Dissociative Disorders

• Dissociations in Hypnosis and “Hysteria”
  – Explicit and Implicit Perception, Memory
    • Parallel Findings in Dissociative, Conversion Disorders
Connecting the Clinic to the Lab
Maher (1966); Kihlstrom & McGlynn (1991)

• Beyond Symptoms to Pathology
  – Underlying Causes
  – Correlated Biological Processes
• New Ways of Formulating Theory
  – Working Laboratory Simulations
• New Diagnostic Tools
  – Laboratory Tests, Not Symptom Checklists