Week 2: A brief review

Definition of a clinical disorder
Factor Analysis
Conditional Probabilities:
  Sensitivity
  Specificity
  PPP
  NPP
Statistical vs Clinical Significance
Working Definition of a Clinical Disorder:

A combination of symptoms that significantly impairs an individual’s ability to function, and is characterized by a particular symptom picture with a specifiable onset, course, duration, outcome, and response to treatment, and associated familial, psychosocial, and biological correlates.
The Role of Factor Analysis in Understanding Clinical Disorders
WORRY
POOR CONCENTRATION
NERVOUS
TEARFULNESS
IRRITABLE
WORRY
POOR ACADEMICS
INATTENTIVE
HIGH ACTIVITY LEVEL
IMPULSIVE
PEER RELATION DIFFICULTIES
UNIQUE SYMPTOMS
SHARED SYMPTOMS
UNIQUE SYMPTOMS
### Rotated Factor Matrix

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<th>3</th>
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**Extraction Method:** Maximum Likelihood.

**Rotation Method:** Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.
<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
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The Role of Epidemiology for Understanding Child Psychopathology
What is epidemiology?

Epidemiology is concerned with the ways in which clinical disorders and diseases occur in human populations, and with factors that influence these patterns of occurrence.

Three interrelated components of epidemiological research involve:

1. Assessing the occurrence of new cases (incidence rate) or existing cases (prevalence rate) of the disorder at a given period of time or within a specific time period; [note: community vs clinic samples]

2. Assessing how the disorder is distributed in the population, which may include information concerning geographic location, gender, socioeconomic level, and race; and

3. Identifying factors associated with the variation and distribution of the disorder to enable etiological hypotheses to be generated.
Conditional Probabilities as a means of understanding Clinical Symptoms:

The Role of Sensitivity, Specificity, PPP, and NPP
### Differential Diagnosis & Conditional Probabilities

<table>
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<th></th>
<th>Meets Dx</th>
<th>Doesn’t Meet Dx</th>
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<tbody>
<tr>
<td>Symptom Present</td>
<td>A</td>
<td>E</td>
</tr>
<tr>
<td>Symptom Absent</td>
<td>B</td>
<td>D</td>
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<tr>
<td>Symptom Present</td>
<td>C</td>
<td>F</td>
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<tr>
<td>Symptom Absent</td>
<td>D</td>
<td></td>
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</table>

- **Sensitivity** = $\frac{A}{B}$ (true positive)
- **Specificity** = $\frac{C}{D}$ (true negative)

- **PPP** = $\frac{A}{E}$
- **NPP** = $\frac{C}{F}$
Working Definition of a Clinical Disorder:
a constellation of symptoms that significantly impairs an individual’s ability to function, and is characterized by a particular symptom picture with a specifiable onset, course, duration, outcome, and response to treatment, and associated familial, psychosocial, and biological correlates.

Sensitivity – the proportion of children with a particular disorder who exhibit a specific symptom

Specificity – the proportion of children without a particular disorder who do not exhibit a specific symptom

PPP – the proportion of children with a specific symptom who meet diagnostic criteria for a specific disorder

NPP – the proportion of children without a specific symptom who do not meet diagnostic criteria for a specific disorder

Pathognomonic: a symptom that is highly characteristic for diagnosing a specific disorder

2-way pathognomonic – a symptom that if present, signals a high likelihood of having the disorder, and whose absence, signals the unlikelihood of the disorder being present.

Importance of Base Rate
PPP = \( \frac{A}{B} \); given a positive response in academic efficiency (B), the probability of obtaining a positive response in attention (A).

NPP = \( \frac{C}{D} \); given no positive response in AES (D), the probability of no response in attention (C).
Academic Performance

Attention To Task

ACTRS

Self-Control

a Positive Predictive Power

b Negative Predictive Power

.88 (.36)

.60 (.72)

.55 (.80)

.90 (.28)

.57 (.78)

.93 (.22)

.98 (.11)

.89 (.50)

.97 (.27)

.97 (.17)

.79 (.60)

.80 (.45)

.55 (.80)
The Role of Different Variables in Understanding Child Psychopathology
Three features of scientific inquiry:

1. Scientists generate hypotheses about natural phenomena.

2. The hypotheses that scientists formulate must be falsifiable.

3. Scientists systematically evaluate hypotheses using empirical data.

One goal is to establish causal relationships between variables:

3 mandatory conditions:

   Variable A & B show covariation.

   Variable A precedes variable B.

   Alternative causes for covariation are ruled out.
Basic research designs:

Experimental research

Involves the systematic manipulation of IV to observe change in DV; includes random assignment into groups

Correlational (quasi-experimental) research

1. Cross-sectional studies
2. Longitudinal studies
   - Prospective
   - Retrospective
   - Follow-back
Correlation does not imply causality:

Although there is a correlation between brain size and autistic symptoms, we do not know if (a) brain abnormalities cause autistic behaviors, (b) autistic behaviors lead to abnormal brain development, or (c) other risk factors, like exposure to toxins, cause both brain abnormalities and autism. Based on Baron-Cohen (2005) and Lawrence and colleagues (2005).
Single Subject Research Designs

• ABAB Reversal Design
• Multiple Baseline across children
  time
  events
Spina bifida is a congenital anomaly marked by defective closure of the bony encasement of the spinal cord and is one of the most severe neural defects compatible with prolonged life. When the spinal cord or lumbosacral nerve roots are involved, there are varying degrees of paralysis below the involved level, e.g., gait and orthopedic difficulties (Berkow, 1977, p. 1034). Associated problems such as overproduction or incomplete absorption of cerebral spinal fluid (hydrocephalus) occur in 70% to 90% of all children with spina bifida which frequently necessitates neurosurgical repair (i.e., shunt procedure) to relieve the obstruction (Leonard & Freeman, 1981).

The advent of early detection methods and modern surgical treatment have led to a higher survival rate and consequently, a great number of handicapped children requiring treatment (Evans, Hickman, & Carter, 1974). As a result, several authors have suggested using behavioral techniques and assessment strategies to augment traditional physical therapies and evaluation instruments, respectively (Carr & Williams, 1982; Michels, 1982; Taylor, Varni, & Dietrich, 1979).

Although these suggestions have not gone entirely unheeded, there remains a paucity of research evaluating the effectiveness of applying behavioral technology to the physically disabled. Innovative treatment programs for gait training (Horner, 1971; Manella & Varni, 1981), weight loss (Killman, Apodaca, Manella, & Varni, 1983), improving muscle incoordination via self-modeling (Dowrick & Dove, 1980), toilet training (Butler, 1976), management of fecal incontinence (Jeffries, Killam, & Varni, 1982; Whitehead, Parker, Masek, Cataldo, & Freeman, 1981), and behavioral parent training to increase children's self-help skills (Feldman, Manella, Apodaca, & Varni, 1982; Feldman, Manella, & Varni, 1983) have shown generally encouraging results.
Mr. Attention

The Attention Training System

Inventor: M.D. Rapport, Ph.D. Manufactured by Gordon Systems Inc. P.O. Box 746, DeWitt, NY 13214
Equifinality – multiple causes, one outcome

- ADHD
- Other psychiatric diagnosis
- Acute stressors
- Abrupt environmental changes
- Unrealistic expectations
- Working memory deficits
- Vision/hearing problems
- Learning disability
- Mental retardation
- Unsafe environment
- Physical/sexual abuse

Classroom Inattention
Multifinality – one cause, multiple outcomes

- Depression
- Anxiety
- Aggression
- PTSD/Acute Stress
- Resilience

Maltreatment during childhood
Assessing Therapeutic Change:

The Truax and Jacobson Model

Statistically significant change vs Clinically meaningful change
Statistical vs. clinical significance

• Statistical significance: $p < .05^*$
  – Power issues?
  – “The World is Round, $p < .05$” (Cohen)

• Clinical significance: so what?
Statistical vs. clinical significance

• Example: Your treatment significantly decreased depressive symptoms
  – So what?
  – Did you measure something meaningful?
  – Did the treatment make an impact on the children’s functioning?
  – Are the children normalized with the treatment?
Normalization Paradigm

No Change
Normalization Paradigm

- Improved, Normalized
- Improved, Not Normalized
- No Change
- Deteriorated
Pathological

Typically Developing

Cutoff Score

$X_1$

$X_0$