RELATIONSHIP AMONG VARIABLES?

- Correlational Research
  - Temporal Sequence Unknown
  - Identifying Risk Factors
    - Temporal Sequence Established - Possibly Causal

FACTORS INFLUENCING THE RELATIONSHIP BETWEEN VARIABLES?

- Identifying Markers
  - Non Causally Related
- Identifying Risk Factors
  - Temporal Sequence Established - Possibly Causal

HOW DOES ANTECEDENT EXERT ITS INFLUENCE?

- Moderators/Protective Factors
  - Non-Causal, But Informative
- Mediators
  - Identifying Process/Mechanisms By Which Variables Produce Outcomes/Models

CAN WE CONTROL OR ALTER THE OUTCOME?

- Prevention/Treatment
  - Decrease Probability Of Occurrence Or Reduce Current Symptoms
- Treatment
  - Establishing Causal Relationships - Models

WHAT EFFECT DOES IV HAVE ON DV?

- Experimental Research
  - Establishing Causal Relationships - Models
Developmental Psychopathology

• A single cause?
• Direct vs. indirect effects:

Moderator

A → B → C

Mediator

A → X → C → B
Developmental Psychopathology

• A single cause?
• Direct vs. indirect effects:

![Diagram showing direct and indirect effects]
Moderators

Hinshaw (2007) - moderators of treatment response in ADHD

Diagram:
- Symptom Severity on the vertical axis.
- Pretreatment and Posttreatment on the horizontal axis.
- Two lines:
  - Red line: Maternal depressive symptoms.
  - Green line: No maternal depression.

Moderator:
- Maternal depression.

Treatment → Symptom reduction
From: Journal of Irreproducible Results

Mediators

Number of pirates \( \rightarrow \) Mediator \( B \) \( \rightarrow \) Global temp.

Global Average Temperature Vs. Number of Pirates

Number of Pirates (Approximate)

Global Average Temperature (C)

13 - 16.5

1820 - 2000
Figure 1 The total effect of $X$ on $Y$ (A), a simple mediation model (B), a single-step multiple mediator model (C), and a multiple-step multiple mediator model (D).
MetaThought 1:
Language Biases in Psychopathology: Descriptions vs Evaluations

<table>
<thead>
<tr>
<th>Descriptions</th>
<th>Evaluations</th>
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<tbody>
<tr>
<td>pushy</td>
<td>assertive</td>
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<tr>
<td>greedy</td>
<td>ambitious</td>
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<tr>
<td>manipulative</td>
<td>persuasive</td>
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<tr>
<td>ruthless</td>
<td>driven</td>
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<tr>
<td>stubborn</td>
<td>tenacious</td>
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<tr>
<td>intrusive</td>
<td>concerned</td>
</tr>
<tr>
<td>exhibitionist</td>
<td>outgoing</td>
</tr>
<tr>
<td>reckless</td>
<td>brave</td>
</tr>
<tr>
<td>troublemaker</td>
<td>feisty</td>
</tr>
<tr>
<td>cheap</td>
<td>frugal</td>
</tr>
<tr>
<td>rigid</td>
<td>steadfast</td>
</tr>
<tr>
<td>unfeeling</td>
<td>nerves of steel</td>
</tr>
<tr>
<td>oversensitive</td>
<td>vulnerable</td>
</tr>
<tr>
<td>cowardly</td>
<td>self-protective</td>
</tr>
<tr>
<td>overly emotional</td>
<td>passionate</td>
</tr>
<tr>
<td>abnormal</td>
<td>unique</td>
</tr>
<tr>
<td>weird</td>
<td>interesting</td>
</tr>
<tr>
<td>dead</td>
<td>ontologically impaired</td>
</tr>
<tr>
<td>sociopath</td>
<td>morally challenged</td>
</tr>
</tbody>
</table>

Underscores the reciprocal influence of attitudes & language
Meta-thought 2: Reification Errors

- The error of regarding abstract concepts as if they were concrete objects.
- To reify is to invent a concept (or construct), name it, and then convince ourselves that such a thing exists in the world.
- Example: ‘self-esteem’ – people don’t actually have ‘self-esteem’ – it is merely a concept we have created to help us organize and make sense out of other people’s behavior.
- Therapist: ‘Your self-esteem is too low...you need to get more of it’...as if self-esteem were a commodity that can be purchased at the store.
- Examples of commonly reified constructs:
  - the mind
  - intelligence
  - emotions
  - motivation
  - complexes
cognition
personality
the unconscious
personality traits
mental illnesses
Meta-Thought 3: The Reification of Theories

✓ Theory: a proposed explanation of observed phenomena

✓ Two types: Event Theory and Construct Theory

a. Event theory – theories that provide explanations that lend themselves to direct measurement...and under the right circumstances, can be proven or disproven...in the former case, it is no longer a theory (e.g., how the patient acquires an infection? Did humans evolve from apes?).

b. Construct theory – theories that provide explanations that, by their very nature, are not directly measurable. As a consequence, even under ideal conditions, a Construct Theory can never be proven because the explanations themselves are intangible abstractions (e.g., the phenomena under investigation may be observable, but the underlying explanation is not – gravity, motivation, personality, psychopathology).
Meta-thought 4: Multiple levels of description: the simultaneity of physical and psychological events (mental vs physical)

✓ Mind & body relationships – which comes first and does one cause the other?

✓ Physical and mental are non-comparable terms & represent an error of reification – treats a theoretical construct (mental) as if it were a concrete object (physical).

✓ Mental events all have physical correlates – if one causes the other at least two conditions must occur:
  1. Event A must precede Event B
  2. When Event A changes or is manipulated, Event B changes accordingly; similarly, when Event A stops changing, Event B changes accordingly.

Can a physical event occur in the absence of a psychological event? Biochemical activity exists in a deceased person.

Can a psychological event occur in the absence of a physical event? Probably not – every mental event corresponds with a physical event (basis of fMRI and other scans).
Anxiety as an example

At the biological level, anxiety involves specific neurochemical activity (viz., arousal of the sympathetic division of the autonomic nervous system along with other particular neurological configurations).

Concurrently, at the psychological level, anxiety involves the subjective perception and experience of apprehension or fear.

Thus, neurochemistry doesn’t cause fear, and fear doesn’t cause neurochemistry – they are equivalent and simultaneous phenomena, merely described in two different ways and at two different levels of analysis (i.e., they are a singular event).

Implication: psychotherapy is no less biochemical than medication!
Structural Equation Modeling

Unobserved (latent) factor.

Observed (manifest) variables that serve as indicators of factors.

Measurement error associated with observed variables.

Residual error (disturbance) in the prediction of the unobserved factor by another factor.
Fitted structural equation model of early behavior, early IQ, and later delinquency and scholastic ability. [Ferguson & Horwood, 1995, J of Abnorm Child Psychology, 23, 183-199]

TOSCA = Test of scholastic abilities

Mother, self, police, TOSCA-a, TOSCA-b

Later delinquency 15 years

Later school achievement 13 years

Early conduct problems 8 years

Early attention deficit 8 years

Early IQ 8 years

Mother, teacher
*J Child Psychology & Psychiatry*
COMPARATIVE FIT INDEX = .94
ROBUST FIT INDEX = .93

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?

• e.g., gender differences in IQ, achievement?
Statistical vs. clinical significance

• Hynd (2005) review of gender differences

• Statistical significance
  – Dependent on sample size
    • Large enough sample almost always means significant differences

• Effect size: estimate of the magnitude of group differences

*Figure 1. Two normal distributions that are 0.15 standard deviations apart (i.e., $d = 0.15$. This is the approximate magnitude of the gender difference in mathematics performance, averaging over all samples.*)
Statistical vs. clinical significance

• Clinical significance (Jacobson & Truax, 1991; Speer, 1992)
  – So what?

*Figure 1. Two normal distributions that are 0.15 standard deviations apart (i.e., $d = 0.15$. This is the approximate magnitude of the gender difference in mathematics performance, averaging over all samples.)*
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
- No Change
- Deteriorated
Normalization Paradigm

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

Typically Developing

Typically Developing
Rating Scales as Measures of Children’s Behavior
Ratings Scales as Measures of Behavior

Positives:
✓ ease of administration and scoring
✓ appropriate for examining underlying factor structure
✓ cost efficiency

Negatives:
✓ not real quantitative measures in the physical sense
✓ rely on retrospective recall
✓ subject to rater expectation biases & halo effects
✓ rarely constructed according to measurement theory
✓ weak or non-significant correlations with objective measures of the same construct (e.g., 66%-91% not linearly related between rating scales and actigraph measures of activity level)
✓ most fail to account for symptom severity in scoring
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Code</th>
<th>Code</th>
<th>Code</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td></td>
<td>57. Physically attacks people</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td></td>
<td>58. Picks nose, skin, or other parts of body</td>
<td>0</td>
<td>1</td>
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<tr>
<td></td>
<td>(describe):</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>0</td>
<td></td>
<td>59. Plays with own sex parts in public</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td></td>
<td>60. Plays with own sex parts too much</td>
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<td>1</td>
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<tr>
<td>0</td>
<td></td>
<td>61. Poor school work</td>
<td>0</td>
<td>1</td>
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<tr>
<td>0</td>
<td></td>
<td>62. Poorly coordinated or clumsy</td>
<td>0</td>
<td>1</td>
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<tr>
<td>0</td>
<td></td>
<td>63. Prefers being with older kids</td>
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<tr>
<td>0</td>
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<td>64. Prefers being with younger kids</td>
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<td>0</td>
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<td>65. Refuses to talk</td>
<td>0</td>
<td>1</td>
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<td>0</td>
<td></td>
<td>66. Repeats certain acts over and over;</td>
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<td>1</td>
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<tr>
<td></td>
<td></td>
<td>compulsions (describe):</td>
<td></td>
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<td>84. Strange behavior (describe):</td>
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<td>1</td>
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<td></td>
<td></td>
<td>85. Strange ideas (describe):</td>
<td>0</td>
<td>1</td>
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<td>86. Stubborn, sullen, or irritable</td>
<td>0</td>
<td>1</td>
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<td>87. Sudden changes in mood or feelings</td>
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<td>1</td>
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<td></td>
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<td>88. Sulks a lot</td>
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<td></td>
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<td>89. Suspicious</td>
<td>0</td>
<td>1</td>
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<tr>
<td></td>
<td></td>
<td>90. Swearing or obscene language</td>
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<tr>
<td></td>
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<td>91. Talks about killing self</td>
<td>0</td>
<td>1</td>
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<tr>
<td></td>
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<td>92. Talks or walks in sleep (describe):</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>93. Talks too much</td>
<td>0</td>
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</table>
Item Response Theory

Item response theory is presently in widespread use in the development of intelligence and achievement tests.

Its use is specifically to help identify the hierarchy of items ranging from the easiest (or most often endorsed) to the most difficult (or least endorsed).
Item Response Theory and Rasche Modeling

**Item Response Theory** – based on the assumption that test responses reflect an underlying trait (or set of traits) & that the relation between response and trait can be described for each test item by a monotonically increasing function called an ‘item characteristic curve’ or ICC.

Individuals with higher levels of the trait have higher expected probabilities for answering an item correctly or in the expected direction and the ICC provides the precise values of these probabilities for each level of the trait.

IRT also provides statistics indicating the precision with which an individual respondent’s trait level is estimated, and also provides estimates to indicate the usefulness of a particular item for differentiating among different levels of the trait.
**Potential Ideal Response Pattern**

- **Most Difficult or Highest Ability**
  - destroys own things (+3.0)
  - threatens people (+2.0)
  - mean, bullying (+1.0)

- **Least Difficult or Lowest Ability**
  - screams a lot (-1.0)
  - unusually loud
  - stubborn
  - teases a lot (-3.0)