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Section D

Causation and Conceptualization
Process and Causation

- Understanding process usually means understanding causes
  - What *causes* development to unfold the way it does for a particular individual?

- Causation can be broad or narrow
  - Broad: low control job causes cardiovascular disease (CVD)
  - Narrow: endothelial function leads to degree of arterial plaque
Establishing Causality

- X precedes Y in time—the outcome cannot occur before the purported cause

- X is empirically correlated with Y—the variables vary together—when one changes the other must change

- The relationship between X and Y is not caused by some third factor Z—that is, the relationship is non-spurious
Establishing Causality: Spuriousness

X \rightarrow Y \quad OR \quad X \rightarrow Y

Z \rightarrow X \rightarrow Y \quad OR \quad X \rightarrow Z \rightarrow Y
Possible Fourth Criterion for Causality

- Should be able to explain the mechanisms that link X and Y, that is, the underlying process that creates the causal relationship.

- Identification of mechanisms often generates causal chains and the identification of intervening variables.
Establishing Causality: Spuriousness

\begin{align*}
X & \rightarrow Y \\
Z & \rightarrow X \quad \text{OR} \quad Z & \rightarrow X \\
& \rightarrow Y
\end{align*}

\begin{align*}
X & \rightarrow Y \\
& \rightarrow Y
\end{align*}

\begin{align*}
Z & \rightarrow X \quad \text{OR} \quad X & \rightarrow Z \rightarrow Y
\end{align*}
Childhood SES and CVD

Childhood

Family socioeconomic status

Adulthood

Cardiovascular disease

- Temporally prior?
  - Yes

- Associated?
  - Yes

- Spurious?
  - Unclear

- Mechanism?
  - Unclear
Conceptual Frameworks

- Provide a way of thinking about and describing a research or practical problem
  - How to “frame” it
  - How to “conceptualize” components and processes

- Though abstract, makes problem concrete

- Not theories but can aid development and testing of both theories and interventions
Conceptual Frameworks

- Tool for thinking clearly about inherently complex problems
- Start developing a conceptual framework for own work
- Central to educational goals
Conceptual Framework Shows

- Interrelationships among predictors and how they lead to outcome
  - Diagrams a process

- Population view
  - General, applies to many settings
  - Probabilistic, not deterministic
  - Does not show relative weights of determinant
Usually Represented by a Diagram

- Boxes to represent outcomes, predictors, groups of both
  - “Variables,” “levels,” “determinants”

- Connected by arrows
  - Sometimes, but not always indicates causation (or reciprocal causation)

- Together shows interrelationships among predictors and how they lead to outcome—diagrams a process
Population Health

Adapted from: Kaplan, Everson, & Lynch. (2000).
Children’s Health

Adapted by CTLT from Institute of Medicine. (2000).
Social Influences on Health

Source: Berkman & Glass. (2000).
Adult Lung Disease