

Intervention Fidelity

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Objectives

- Define intervention fidelity & its importance to intervention studies
- Explore measurement of intervention fidelity
- Describe evolution of measurement in one program of research



Intervention Fidelity

- The adherent & competent delivery of an intervention by an interventionist as set forth in the research plan
- Components
 - Adherence – degree to which prescribed elements of an intervention have been delivered & proscribed elements avoided
 - Competence – extent to which interventionist displayed engaging behaviors



Santacroce, S., et al. (2004). Intervention fidelity. *Nursing Research*, 51, 63-66.

Adherence Components

- Behaviors prescribed by the intervention
- Behaviors universal in therapeutic interactions
- Behaviors proscribed in the intervention



Stein, K. F., et al. (2007). Establishing fidelity of the independent variable in nursing clinical trials. *Nursing Research*, 56, 54-62.

Fidelity & Validity

- The soundness of conclusions about the intervention's effect on an outcome
- Statistical Conclusion Validity
 - Unsystematic variation in intervention delivery
 - Increases within-group error term
 - Heightens the possibility of faulty conclusions



Shadish, W., Cook, T., & Campbell, D. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton-Mifflin



Study Specific

- Identify essential elements of experimental & control conditions
- Construct scale items
- Identify units for coding
- Develop item scaling
- Test items & revise
- Specify rater qualifications & develop training
- Pilot test



Stein, K. F., et al. (2007). Establishing fidelity of the independent variable in nursing clinical trials. *Nursing Research*, 56, 54-62.

Advantages & Disadvantages

- Created for just one study, so treatment components can be highly specific
- Need a new one for each study
- Time-consuming to develop
- Potentially high cost



The Technology Model (A Generic Approach)

- Details intervention specification & regular assessment of fidelity
- Features
 - Manual development
 - Training & supervision of interventionists
 - Regular monitoring of intervention delivery using a measure
 - Inclusion of the measurement in analysis



Manuals

- Required & includes
 - Intervention theory
 - Goals
 - Strategies for achieving goals
- Allows
 - Comparison of interventions
 - Replication
 - Facilitation of transfer to practice
 - Reduction of variance due to interventionist



Manuals

- Advantages
 - Greater consistency & precision in delivery
 - Explication of active ingredients
- Disadvantages
 - Too rigid adherence so that participant needs ignored
 - Too much specification limits generalizability



Training & Supervision of Interventionists

- To refine the skills of interventions to deliver the intervention
- Approaches
 - Manual review
 - Seminars
 - Experience & role play



Monitoring Intervention Fidelity

- Measurement based on manual
- Includes adherence & competence
- Includes behaviors essential & unique, essential & not unique, compatible but not required, proscribed



Consideration of Intervention Fidelity in Analysis

- Usual approach = ANOVA, mixed methods
- Fails to account for intervention fidelity
 - Incorrect conclusions
- Regression approach
 - Reduced error variance
 - Higher statistical power
 - More than 'dose'



Evolution of Fidelity Assessment across a Program of Research

- RCT of Coping Skills Training with teens with type 1 diabetes
- Control group = standard care and education
- Manual, training
- Sessions audiotaped & evaluated for major coping skills



Studies 2 & 3

- CST for school-aged children & parents compared to a standard diabetes education program
- Manual & training
- Audiotapes of both conditions
- Reviewed for key content of both conditions
- Dose was analyzed, not fidelity assessment



Retrospective Analyses

- Development of generic measure based on Yale Adherence and Competency Scale (Corvino, et al., 2000)
- Trained raters & assessed inter-rater reliability
- Applied to audiotapes of initial 2 studies
- Reliable & content valid
- Will reanalyze controlling for IF



Corvino, J. et al. (2000). *Yale Adherence and Competency Scale (YACS) Guidelines*. New Haven, CT: Yale University.
Santacroce, S. J., et al. (in review). A generic system for intervention fidelity measurement in behavioral research with people affected by a chronic physical condition.

Type 2 Prevention

- Teacher delivered nutrition and activity intervention with coping skills to prevent type 2 diabetes
- Crucial to access intervention fidelity across schools and interventionists
- Study specific rating scales for each session – adherence & competence
- Analyses not yet complete



TeenCope



- Multi-site trial comparing TeenCope (Internet-based CST) to Managing Diabetes (internet-based diabetes education)
- Adherence collected via web
- Powered to include in analysis



<https://transact.med.yale.edu/teencope/login.asp>



Summary

- Assessment of intervention fidelity crucial for internal validity
- Involves adherence & competence
- Components
 - Manual
 - Training
 - Monitoring
 - Analysis

