# UNIT III: Research Design

SWK 3300
Kimberly Baker-Abrams

## What is a needs assessment? Why is it helpful?

- an assessment to determine the existence of services, client population, client access to services, barriers to service, existence of problems
- used at all levels of intervention

## In designing a needs assessment the first thing to consider is level for the assessment

whose need is being studied?
(once this is established, seek input from them)

## Needs assessments are also used in other types of research

## Cross-sectional study

one time study designed to survey a cross-section of the population (most common for needs assessment)

## Longitudinal study

- multiple surveys of the target population over a period of time
- Trend - same sample monitor changes
- Cohort - subgroup based on characteristic
- Panel - exact sample used over period

The population's views and personal concerns should always be foremost in a needs assessment.

(Not the needs and concerns of the researcher or funding agency.)

## What is a program evaluation?
## (Why is it helpful?)

research on a programs functioning (goals, needs, strengths, areas to improve, funding, personnel....)

## There are two types of program evaluations:

- Formative - focused on the planning, development and implementation of a program
- Summative - focused on evaluating outcomes for goals, objectives and the extent to which outcomes are generalizable

## Conditions that must be met for causality to exist between variables.

1. cause must precede effect in time
2. variables empirically correlated
3. correlation can not be explained by some other factor

(also correlation does not mean causation)

## Validity is "the extent to which we are measuring what we think we are measuring."

## There are two types of validity: internal & external

Each type of validity has threats to the confidence in the outcome of the measurement.

# Internal validity

the extent to which changes in the dependent variable are the result of interaction with the independent variable (rather than other factors)

# There are nine threats to internal validity.

1. History
2. Maturation
3. Testing
4. Instrumentation error
5. Statistical regression
6. Selection bias
7. Mortality
8. Diffusion
9. Reactive effects

# External validity

the extent to which the causal relationship can be generalized beyond the study conditions

# There are six threats to external validity.

1. Pretest - treatment interaction
2. Selection - treatment interaction
3. Multiple - treatment interference
4. Researcher bias
5. Reactivity (the Hawthorne effect)
6. Placebo effect

# Understanding validity is important to considering different types of research designs. Let us begin with a discussion of research shorthand.

- "X" treatment
- "O" observation
- "$X_1$" 1st treatment (if more than one)
- "$O_1$" 1st observation (if more than one)
- "R" random assignment (control group)
- "A" baseline (single subject design)
- "B" intervention (single subject design)
- "C - through Z" consecutive interventions

The most basic research designs are known as "pre-experimental"

(for exploratory and descriptive level research studies)

# Cross-sectional survey design

O

one time measurement of the dependent variable

# One group post-test only ("one shot" case study)

XO

can not rule out any other factors for outcome

# One group pretest / post-test

$O_1XO_2$

controls for selection as a threat

# Static group comparison

XO

O

comparison group used for outcome

"Quasi-experimental" designs are more complex and address more threats to internal and external validity than pre-experimental designs.

# Interrupted time series

$O_1O_2O_3$ X $O_4O_5O_6$
controls for other variables and events (regression)

# Pretest / post-test comparison

$O_1XO_2$
$O_1 \quad O_2$

identifies differences in groups, therefore observed change may be more significant

"Experimental" designs allow for better manipulation and isolation of the independent variable. This allows the researcher to make the strongest claims of causality.

Experimental designs use random assignment to groups. Randomly assigned groups are called "control" groups.

# Pretest / Post-test control group ("classical design")

$_rO_1XO_2$
$_rO_1 \quad O_2$

random assignment rules out many threats to internal validity comparison can not

# Post-test only control group

$_rXO$
$_r \quad O$
assumes random assignment controls for differences

# Solomon Four group

$_rO_1XO_2$
$_rO_1 \quad O_2$
$_r \quad XO$
$_r \quad O$

controls for everything possible (rare)

# Ethical questions with some designs:

- is it ok to with-hold or delay treatment for measurement
- did the participants give consent to potentially not receive treatment

# Good research design:

- based on a review of existing knowledge
- appropriate for level of knowledge
- has internal consistency
- is feasible

# What is practice evaluation? Why is it helpful?

- evaluation of an individual's practice
- helpful: show effectiveness of interventions, show client progress, connect intervention with change, provide continued funding

# Descriptive designs

- describe intervention and client progress (see text p. 115 and following)
- most common: process recordings, practice logs, case studies
- interventions can be modified based on observations

# Explanatory designs

- examine impact of intervention on target behavior (causality)
- move beyond description to direct cause and effect analysis
- most common: single-subject design

# Single-subject design

- logic of time-series design
- involve three elements:
    1. baseline
    2. clear identification of intervention
    3. target behaviors that can be operationalized and repeatedly measured

# Baseline period

client serves as own control for target behavior
a stable baseline is needed before intervention

# Experimental (intervention) phase

looking for trend shift in target behavior corresponding with introduction of intervention

# For causality, three issues must first be addressed in single-subject designs:

1. clear conceptualization of behavior and measurement
2. timing of intervention must be clear
3. a stable baseline must be established (can be retrospect of using artifacts)

# Basic designs for single-subject (explanatory):

- AB: baseline and intervention
- ABC: successive intervention design
- ABAB: reversal or withdrawal design

# Single subject designs (specifically AB) can be expanded to study multiple target behaviors, multiple clients, or to include multiple settings. This is called a "Multiple baseline design"

## In single subject designs the question is raised as to who is best to do measurements:

- strongest results with multiple individuals conducting measurements
- combine to form a more objective understanding of the issues

## Key questions in interpreting single subject designs

- Is it statistically probable that the change occurred because of the intervention?
- Is the amount of change significant from a clinical perspective?
- Do the patterns coincide with changes in baseline and experimental phase?

*see textbook discussion p. 127-130

## Knowing the results can be beneficial to the practitioner as well as the client. Results can verify positive changes, feelings and therefore encourage continued progress toward goals.