



Evidence-based Strategies for Community Colleges: Building on the “What Works Clearinghouse”

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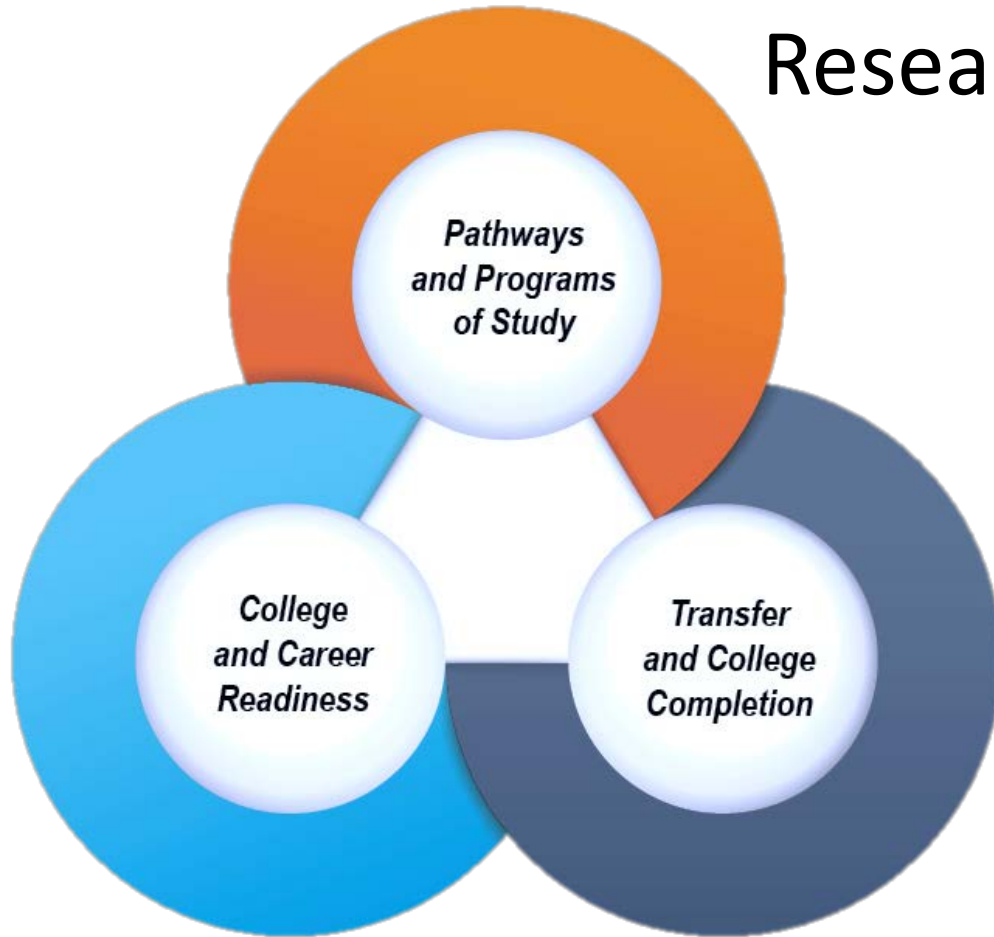
OCCRL Mission

OCCRL researchers study policies, programs, and practices designed to enhance outcomes for diverse youth and adults who seek to transition to and through college to employment.

- OCCRL's studies are disseminated nationally and internationally
- Reports and materials are derived from new knowledge captured and disseminated through OCCRL's website, scholarly publications, and other vehicles

Strengthening Pathways for All Students Through Research and Leadership

Research and Development



- Community College Transformative Change Initiative
- Pathways to Results (PTR)
- TAACCT Evaluation
- STEM CCR
- Credit When it's Due
- Dual Credit

What is the “What Works Clearinghouse”?

Initiative of the U. S. Department of Education’s

- National Center for Education Evaluation and Regional Assistance (NCEE),
 - within the Institute of Education Sciences (IES)
- Established under the Education Sciences Reform Act of 2002

Source: <http://ies.ed.gov/ncee/wwc/>

Evidence for What Works in Education

We review the research on the different *programs, products, practices, and policies* in education.

Then, by focusing on the results from *high-quality research*, we try to answer the question **“What works in education?”**

Our goal is to provide educators with the information they need to make **evidence-based decisions.**

The Double Meaning of “Evidence-Based Decisions”

Database Resource on “What Works”

- Establishes the *WWC Standards*
- *Filters* and *Rates* research
- *Delivers* it to you

Aim: Help you make “evidence-based decisions” based on What Works around the country

Basis for Shaping Educational Projects

- *Aligns* funding decisions (NSF, IES) with proposals based on WWC Standards

Aim: Incentivize your “decisions” about designing an “evidence-based” project

Goals

1. Provide an overview of “What Works”
2. Offer strategies and checklists for using WWC for your project/proposal
3. Establish a basis for further study of WWC

Part I: Using the WWC database

- Strategies for project design and grant writing

Part II: Using standards for project design

Rating System

- Study design
- Sample attrition
- Baseline equivalence

Measurement and Validity

- Collection
- Reliability
- Over-alignment

Using the WWC Database

The screenshot shows the top navigation bar of the What Works Clearinghouse website. The header includes the IES logo (Institute of Education Sciences) and the text 'WHAT WORKS CLEARINGHOUSE'. A search bar is located on the right with the placeholder text 'Enter search terms here'. Below the header is a dark grey navigation bar with four main categories: '& Products', 'Special Features', 'Resources', and 'Stay Connected'. The 'Resources' category is expanded, showing two sub-sections: 'Tools and References' and 'Databases'. The 'Tools and References' section is highlighted with an orange rounded rectangle and contains a list of links: 'Find What Works!', 'Handbook', 'Reporting Guide', 'Review Protocols', 'Study Review Guide', and 'Webinars'. The 'Databases' section contains a list of links: 'Certified Reviewers', 'Publications & Products', 'RCT Registry', and 'Reviewed Studies', with 'Reviewed Studies' underlined. Below the navigation bar, there are several colorful geometric shapes and the text 'Standards without Handout'.

10,914 Reviewed studies

A **study** is an evaluation that examines whether a program, product, practice, or policy is effective. We review studies using our rigorous research standards to find the high quality research that provides evidence of effectiveness.

Find a study reviewed by the WWC

All Topics

All Ratings



All Publications



All Reasons for Review



Search



Reset Search

Find a study reviewed by the WWC

All Topics ▼

All Topics

Children and Youth with Disabilities
College and Career Preparation
Dropout Prevention
Early Childhood Education
Education Technology
English Language Learners
Literacy
Math
Postsecondary Education
School Choice
School Organization and Governance
Science
Student Behavior
Teacher and Leader Effectiveness
Teacher Incentives

All Ratings ▼

All Reasons for Review ▼

Find a study reviewed by the WWC

Type keyword

All Topics

All Ratings

All Publications

All Reasons for Review

All Publications

Intervention Reports

Practice Guides

Quick Reviews

Single Study Reviews

Find a study reviewed by the WWC

All Topics



All Ratings



All Publications



All Reasons for Review



Search

?

Reset Search

All Reasons for Review

Reviewed for Grant Competition

Reviewed for Report

Find a study reviewed by the WWC

Type keyword

All Topics

All Publications

Search

?

Reset Search

All Ratings

All Ratings

Meets WWC standards without reservations

Meets WWC standards with reservations

Does not meet WWC standards

Ineligible for review

Additional source not reviewed

Review in progress

Not rated

(We will return to "rating system" in Part II)

U of I Library Search: “Math Education”

Multi-Subject Article Databases

Academic Search Complete PLUS (Ebsco)	20710 MATCHES 7296 PHRASE 908 TITLE
Scopus	7230 MATCHES 892 PHRASE 337 TITLE
LexisNexis Academic News	1000 ARTICLE MATCHES
JSTOR [Humanities, Arts, Social Sciences]	207 ARTICLE MATCHES
Web of Science	7324 ARTICLE MATCHES
WorldCat Discovery	79369 ARTICLE/BOOK MATCHES
CrossRef	1729 ARTICLE MATCHES

E-Journals and Databases

Online Journals & Databases (Discover A to Z)	3 TITLE MATCHES
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Additional Recommended Resources

Education Full-Text (Ebsco)	3087 ARTICLE MATCHES
ERIC Education Literature (ProQuest)	5464 ARTICLE MATCHES

Books, Ebooks, Media in UIUC & Illinois Libraries

University of Illinois Library Classic Voyager Catalog	249 MATCHES 10 E-BOOKS
University of Illinois Library VuFind+ Catalog	341 MATCHES 66 PHRASE 114 TITLE 10 E-BOOKS
I-Share Library Catalog [state-wide Illinois, academic]	1110 CATALOG MATCHES
IDEALS - UIUC Reports, Papers	38 MATCHES

Ebooks by Title and Chapter

Springer Ebooks	41436 CHAPTERS 10 TITLES 238 PROTOCOLS
Elsevier Ebooks	22 E-BOOK MATCHES
Wiley Ebooks	6 E-BOOK MATCHES
Google Books	7030 E-BOOK MATCHES
Hathi Trust Ebooks	25 E-BOOK MATCHES



WWC Search Results

Find a study reviewed by the WWC

Type keyword

Math

Meets WWC standards without reservations

All Publications

All Reasons for Review

Search

?

Reset Search

Showing 1 to 10 of 189 results.

Next 10 ►

Ainsworth, S., O'Malley, C., & Wood, D. (1998). There is more than one way to solve a problem: Evaluating a learning environment that supports the development of children's multiplication skills. *Learning and Instruction*, 8(2), 141-157.

Rating: Meets WWC group design standards without reservations

Reviewed using: [WWC Procedures and Standards Handbook](#)

Reviewed in Practice Guide: [Improving Mathematical Problem Solving in Grades 4 Through 8](#)

Booth, J. L., Koedinger, K. R., Pare-Blagoev, J. (2010). Does practice really make perfect? Improving upon the ubiquitous practice assignment. Unpublished manuscript.

Rating: Meets WWC group design standards without reservations

Reviewed using: [WWC Procedures and Standards Handbook](#)

Reviewed in Practice Guide: [Improving Mathematical Problem Solving in Grades 4 Through 8](#)

Strategies for Project Design and Proposal

Database Aim: Help you make “evidence-based decisions” in designing PROJECT X, based on What Works around the country

1. Search broadly for project/proposal models: find exemplars
2. Study “Standards” in action: what merited high ratings?
3. Use exemplars as supporting evidence: “We build on the design and success of PROJECT X.”
4. Share your research with faculty and researchers
5. Apply project language for your proposal

“This level of detail in attrition and baseline equivalence reporting is **critical toward a future What Works Clearinghouse review of this study.**”

“In order to produce evidence of the effects of this intervention that **meets the What Works Clearinghouse’s (WWC) Evidence Standards without reservations**, students will be randomly assigned to either the treatment or the control group using a cluster randomized trial research design.”

“While randomly assigning classrooms to the treatment or control group **allows for a research design that meets the What Works Clearinghouse Evidence Standards without reservations**, additional steps will be taken to ensure the research design is capable of producing unbiased estimates of the program’s impact.”



Using Standards for Project Design (Method)

Rating System

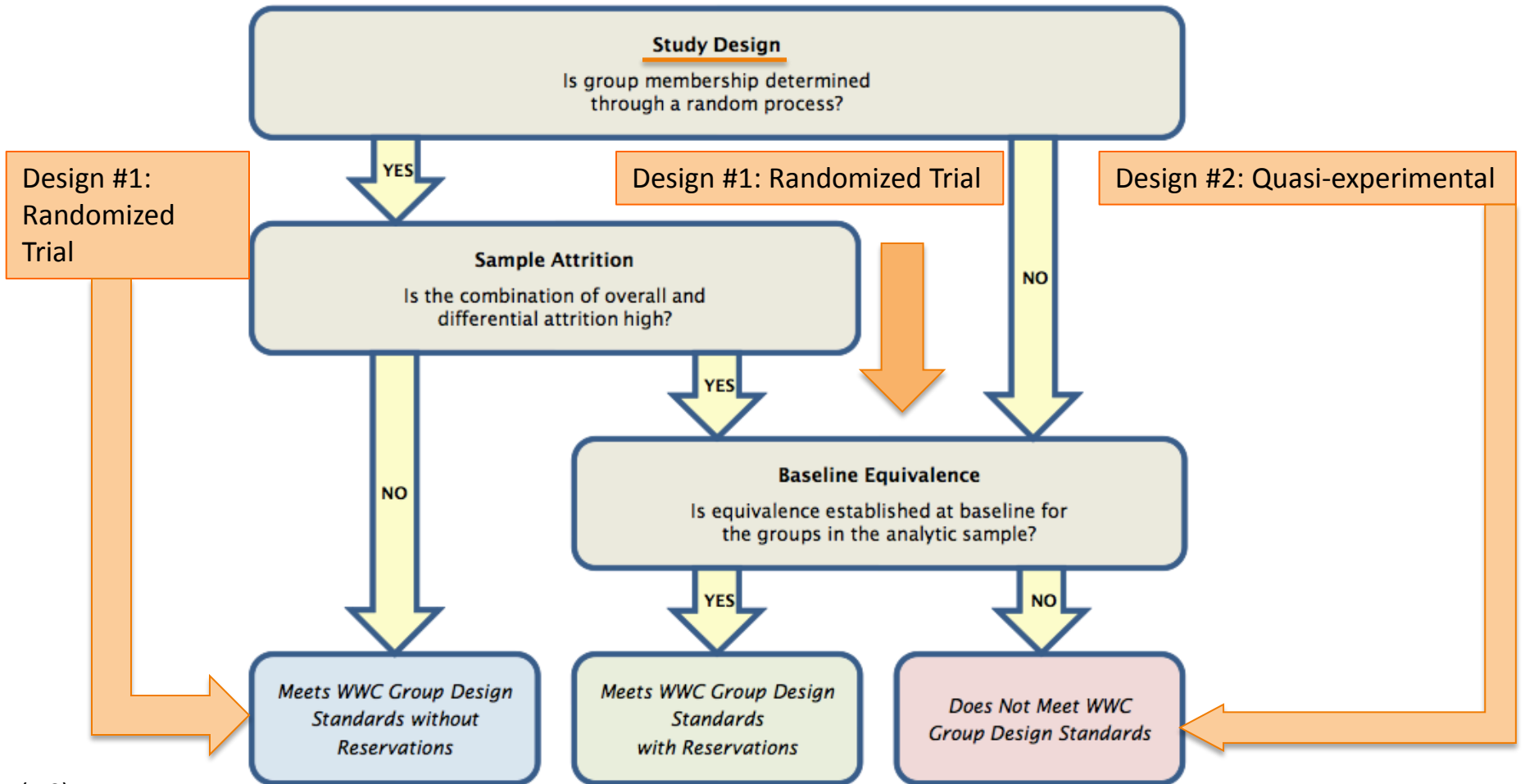
- Study design
- Sample attrition
- Baseline equivalence

Measurement and Validity

- Plan for collecting and analyzing data

Source: WWC Procedures and Standards Handbook 3.0 (<http://ies.ed.gov/ncee/wwc/DocumentSum.aspx?sid=19>)

Design System: 2 Paths to take & 2 Ratings



(p.9)

Design #1: Randomized Controlled Trial

Elements

- Random selection of participants
- 2 or more study groups
- Control group

PROJECT X

- Pool of 500 Students
- Group 1: 50 students (intervention)
- Group 2: 50 students (control)

Selection Models

- Lottery
- Probability assignment
- Blocking and random sub-sampling

Validity

- 100% chance assignment (totally random)
- “nonzero probability” of participation (no one’s excluded)

Highest rating: “Meets standards without Reservations”

Design #2: Quasi-experimental

“Compares outcomes for students, classrooms, or schools who had access to the intervention with those who did not but were similar in observable characteristics”

PROJECT X

“low income student” intervention

Design

100 low-income (Sec. 8 Housing)

- Group 1: 50 students (intervention)
- Group 2: 50 students (no intervention)

Compare Outcomes

Highest Rating: “Meets Standards with Reservations”

Design #1: Randomized Trial



Sample Attrition

Is the combination of overall and differential attrition high?

Attrition: “rates and patterns of attrition that compromise comparability” between intervention and control groups

Two Kinds of Attrition

“Overall” attrition:

- Group 1: 50 students (intervention)
- Group 2: 50 students (control)
- 40 students (40%) “leave” study
- Now, only 60% left = no real study

“Differential” attrition:

- Only 20 students “leave”; but all are in “control” group
- Now, no valid comparison between groups (50 v. 20)

Why Attrition Matters? → “Bias” → What is “bias”?

Projecting Bias

Bias: Projected (empirical) effect of attrition on outcomes
(See: WWC “Assessing Attrition Bias”)

Levels of Attrition

1. Individual level (unit = student)
2. Cluster level (unit = classroom)

Type

“Exogenous” (outside factors)

- Most students part-time and work full time: high probability of attrition
- Most students full-time: more stable academically
- High/low dropout/withdrawal rate
- High/low attendance rates (projected onto day of assessment)

“Endogenous” (internal factors)

- Voluntary participation or student recruiting

Projecting Attrition

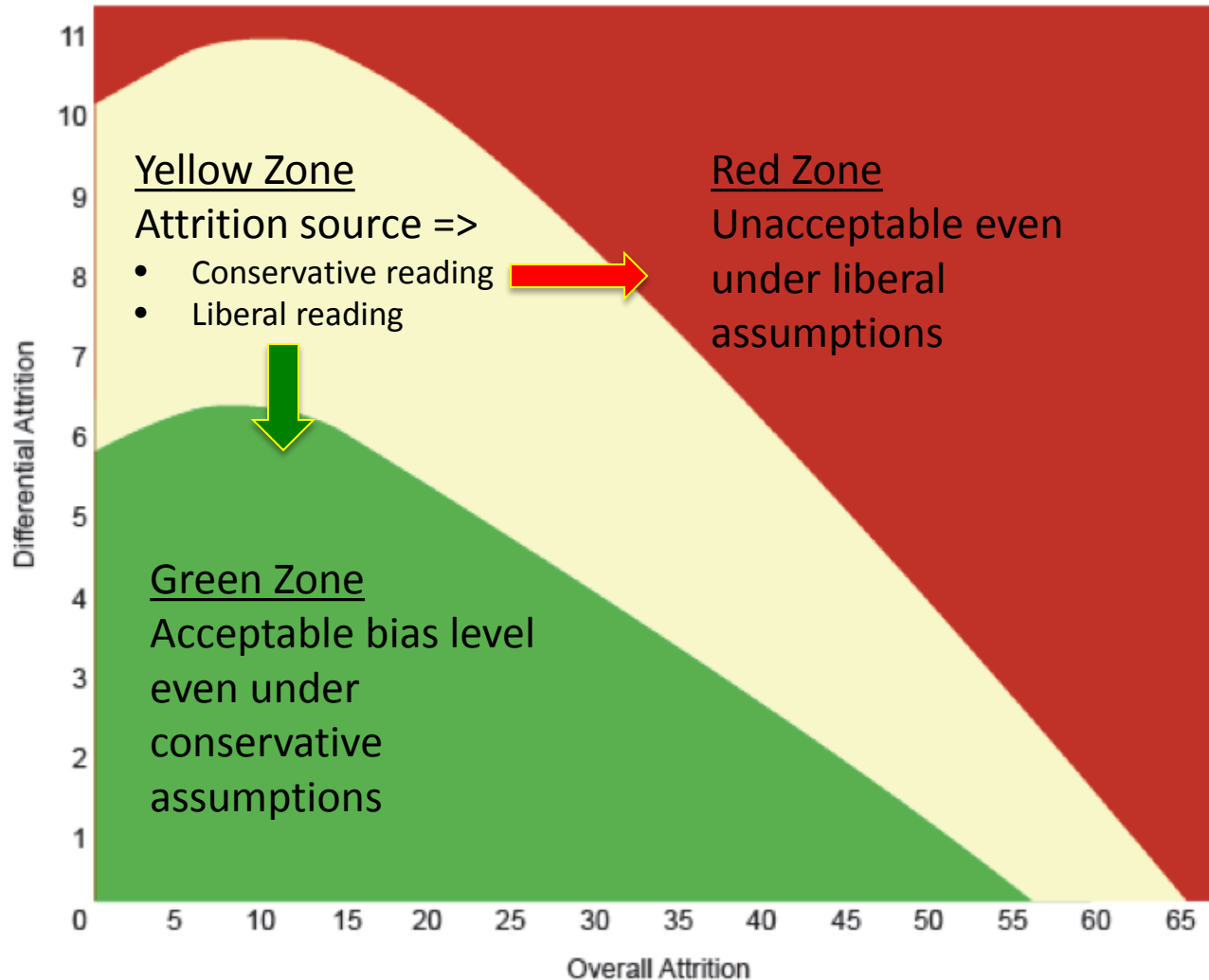
Liberal Projection

- Given attrition, less bias projected

Conservative Projection

- Given attrition, more bias projected

“Zones” of Bias: Attrition => Outcomes



Attrition + Bias

Checklist:

1. Determine if PROJECT X entails a randomized trial. If so:
 - A. Project attrition
 - B. Calculate bias (liberal or conservative)
 - C. Locate project in Green/Yellow/Red Zone
2. If Green or Yellow (liberal), frame project accordingly, with an eye to the “without Reservation” rating.
3. If Yellow (conservative) or Red, turn to “Baseline Equivalence” (next), with an eye to “with Reservation” rating.

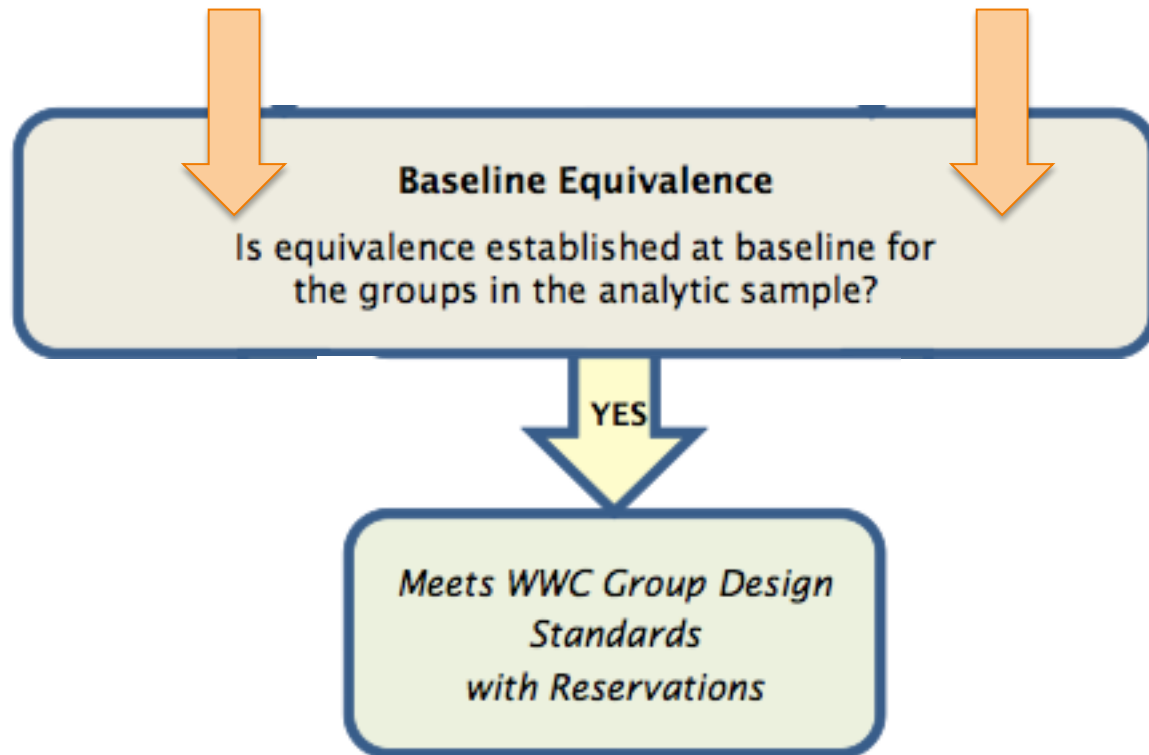
Determining Baseline Equivalence

Design #1: Random Trial

- High attrition and bias
- Turn to “baseline equivalence”

Design #2: Quasi-experimental

- No random selection
- Turn to “baseline equivalence”



Determining Baseline Equivalence

Group Characteristics

Intervention Group

- Demographic
- Past performance
- Study environment
- Pre-test



Comparison Group

- Demographic
- Past performance
- Study environment
- Pre-test

Difference in standard deviation

$0.00 \leq \text{ES Difference} \leq 0.05$

Satisfies baseline equivalence

Good!

$0.05 < \text{ES Difference} \leq 0.25$

Statistical adjustment required to satisfy baseline equivalence

Adjust (e.g.)

- Regression adjustment
- Covariance analysis

$\text{ES Difference} > 0.25$

Does not satisfy baseline equivalence

Not good...

Baseline Equivalence Checklist

If PROJECT X is: quasi-experimental or random (with high project attrition)

1. Establish and identify all baseline characteristics
2. Calculate equivalence
3. Use statistical adjustment, if appropriate
4. Describe and explain baseline equivalence in grant proposal
5. Modify project if don't meet equivalence standards

Describing Outcome Measurements

Three Tests

1. Uniform data collection: all clusters/individuals
 - Modes
 - Timing
 - Personnel
2. “Demonstrate face validity and reliability”
 - Internal consistency
 - Temporal stability
 - Inter-rater reliability
3. Not “over-align” with project intervention

Checklist

1. Establish and identify outcome measurements
2. Design a measurement plan that accounts for:
 - Data collection
 - Assessment
 - Over-alignment

What Works Wrap Up

PROS

- Provides nationwide resource for science-based education
- Builds educational foundation through funding-science incentives

CONS

- Values only performance-based education that is “scientifically” measurable
- Limits healthy mix of best practices and innovation/experimentation
- Sometimes, education takes place in the silence of the heart

Questions?

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